



Does acquiring venture capital pay off for the funded firms? A meta-analysis on the relationship between venture capital investment and funded firm financial performance



Nina Rosenbusch ^{a,*}, Jan Brinckmann ^{b,1}, Verena Müller ^{c,2}

^a University of Strathclyde, Hunter Centre for Entrepreneurship, 199 Cathedral Street, Glasgow, G4 0QU, United Kingdom

^b ESADE Business School, Ramon Llull University, Av. Pedralbes, 60–62, E-08034 Barcelona, Spain

^c Jacobs University, School of Humanities and Social Sciences, Campus Ring 1, 28759 Bremen, Germany

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ABSTRACT

Researchers and practitioners frequently propose that venture capital (VC) is an important resource to increase the performance of funded firms, especially in environments of uncertainty. In this paper we scrutinize these theoretical propositions, following an evidence-based research approach. We synthesize 76 empirical samples on 36,567 firms. We find a small positive performance effect of VC investment on funded firm performance; however, the effect vanishes if researchers control for industry selection effects. Furthermore, we find that the performance effect mainly relates to firm growth while profitability is unaffected. We also uncover that performance effects are reduced when the funded firms are very young or very mature. In addition, studies focusing on IPO events, which constitute the majority of studies, determine a substantially smaller performance effect. We discuss theoretical implications and offer suggestions for future research on VC.

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1. Executive Summary

The acquisition of financial resources is one of the key challenges entrepreneurs face as they start and grow their ventures. Venture capital (VC) has attracted exceptional prominence as a distinctive type of financing which is expected to generate above-average performance in environments of high uncertainty. VCs are frequently portrayed as special investors that create value 1) by selecting the more promising ventures in the most promising industries and 2) by providing financial resources and additional support following their investment decisions. Despite the predominant view in the literature that VC increases the success of funded firms in uncertain environments, empirical evidence on this relationship is non-conclusive.

Hence, we scrutinize whether and especially under which circumstances VCs provide value for the firms they fund. Following an evidence-based research tradition, we statistically integrate 76 empirical samples on 36,567 firms in a meta-analysis. Our baseline hypothesis focuses on the relationship between VC investment and funded firm performance. Subsequently we analyze whether and to what extent industry selection effects drive this relationship and which performance dimensions (profitability, growth, stock market performance) are affected by VC funding. In a third step, we argue that the direction and magnitude of the VC–success relationship may depend on the context. More specifically, we scrutinize whether the age of the funded firm, the pre vs. post-IPO status, and the cultural uncertainty avoidance moderate the relationship between VC investment and firm performance.

* Corresponding author. Tel.: +44 141 548 3091.

E-mail addresses: ninarosenbusch@aol.com (N. Rosenbusch), jan.brinckmann@esade.edu (J. Brinckmann), v.mueller@jacobs-university.de (V. Müller).

¹ Tel.: +34 93 280 61 62; fax: +34 93 204 81 05.

² Tel.: +49 421 200 3486; fax: +49 421 200 49 3486.

We find a small positive performance effect of VC investment; strikingly, however, the effect vanishes if researchers control for industry selection effects. Furthermore, we find that the performance effect mainly relates to firm growth while profitability is unaffected. We also uncover that performance effects are reduced when the funded firms are very young or very mature. In addition, VC funding seems to lose value after the funded firm goes public.

The empirical evidence from this study suggests that inter-industry selection plays a dominant role compared to intra-industry selection and value-adding activities by VCs. This indicates that readily available information about the structure, status, and dynamics of industries enables VCs to select the more promising industries. As researchers isolate the effect that VCs have on funded firms within an industry the comparative performance advantages of VC funded firms vanishes. This finding suggests that proposed advantages associated with VC investments are partially offset by disadvantages. In environments of missing or asymmetrical information, high risk and uncertainty, VCs might not be able to systematically identify the most promising firms within an industry. Further, the post-investment performance benefits including the actual provision of financial resources, managerial support, and monitoring may be offset by disadvantages. For instance, the financial resources provided by VCs may create a false sense of security and reduce the need to focus on close customer interaction and fast positive cash-flow generation. In addition, the funded firms might need to absorb the substantial transaction costs given the high degrees of risk and uncertainty which lowers their resulting performance. Overall, our results highlight that performance implications of VC investments for the funded firms largely depend on the context.

2. Introduction

Alfred Marshall pointedly stated that: “Capital is that part of wealth which is devoted to obtaining further wealth” (e.g., Marshall and Marshall, 1879). Financial resources are of special importance for the survival and growth of firms as they enable a firm to acquire other value-creating resources such as human resources or physical resources (e.g. Barney, 1986). However, obtaining financial resources is especially burdensome in the entrepreneurial context due to the high degrees of novelty, uncertainty, and instability (Knight, 1921; McMullen and Shepherd, 2006; Stinchcombe, 1965), as well as pronounced information asymmetries (Amit et al., 1998; Megginson and Weiss, 1991). In consequence, many traditional financing forms are not available for entrepreneurs. However, venture capital (VC) has attracted prominence as a distinctive financing form that is expected to generate wealth in environments of uncertainty.

Theory suggests that in environments of uncertainty, venture capitalists (VCs) can create and appropriate value for themselves by deploying special mechanisms such as screening, selecting, staging, and monitoring individual investments (Amit et al., 1998; Baum and Silverman, 2004; Kaplan and Strömberg, 2001). Moreover, they can hedge themselves against risks resulting from uncertainty by diversifying and syndicating their investments at the portfolio level (Lockett and Wright, 2001; Manigart et al., 2006). While these mechanisms might help to improve the VC investors' performance, scholars debate whether VC investments also benefit the funded firms.

In light of the inherent uncertainty of the entrepreneurial process (McMullen and Shepherd, 2006), scholars advocating positive performance effects of VC investments for the funded firms highlight two important functions. They suggest that VCs are uniquely apt in *selecting* the more promising industries and firms; in addition they can also *provide value after they selected* the firms (Brander et al., 2002; Dimov and Shepherd, 2005; Dimov et al., 2007; Lerner, 1994). Being selected by a VC firm provides assurance to the founders and other resource providers including employees, customers, suppliers, and other investors (e.g., Davila et al., 2003; Megginson and Weiss, 1991). Post-investment funded firms can benefit from the provision of financial resources as well as value-added functions such as managerial resources and access to the VC's social capital (e.g., Hellmann and Puri, 2002; Kaplan and Strömberg, 2004; MacMillan et al., 1989; Sapienza, 1992). Moreover, the monitoring of the funded firms might help the respective firms in using their resources more efficiently (e.g., Amit et al., 1998; Barry et al., 1990; Gompers, 1995; Sahlman, 1990).

However, another group of scholars challenges whether VCs are able to select the most promising ventures since the inherent uncertainty of the entrepreneurial context makes it difficult to systematically identify more promising ventures (Aldrich and Kenworthy, 1999; Baum and Silverman, 2004). Uncertainty can also lead to substantial transaction costs (Williamson, 1973) which VCs might transfer to their funded firms' post investment in order to improve their own returns. Moreover, conflicts of interests might sway VCs to pressure entrepreneurs to pursue strategies that benefit their exit-oriented interest, but are not necessarily beneficial for the funded firms. In this regard, a prominent critique comes from Gompers (1996) and is known as the ‘grandstanding argument’. He postulates that VCs take their funded firms to IPOs prematurely in order to hastily realize the significant exit values.

Addressing the theoretical debate in the empirical domain, an immense body of empirical research has scrutinized the relationship especially in recent years. However, empirical findings on performance implications of VC investments for the funded firms are “non-conclusive” (Barney et al., 1996; Jelic et al., 2005). While some researchers find positive effects of VC financing (e.g., Brav and Gompers, 1997), other research suggests non-significant (e.g., Busenitz et al., 2004) or negative performance implications for the financed firms (e.g., Belden et al., 2001; Jain et al., 2008). Overall, various prominent authors characterize the VC research domain as fragmented and patchy (e.g., Wright and Robbie, 1998). Strikingly, no systematic aggregation and synthesis of the extant empirical evidence has been undertaken to date. As a consequence, the controversy in the theoretical domain, as well as the disjointed findings in the empirical domain, leave the community of scholars with important questions relating to whether, how, and especially under which circumstances VC investment benefits the performance of funded firms.

In this study, we carry out an empirical synthesis of research on the effects of VC investments for their funded firms using meta-analysis and following an evidence-based research tradition (Rousseau, 2006). Our synthesis aims at increasing our understanding regarding if and especially how and under which circumstances VCs can create value for the funded firms. While a single, testable theory linking VC investment and funded firm performance has yet to emerge, we follow salient propositions that VCs have comparative advantages as financial intermediaries in environments of uncertainty. Hence, our analysis attributes particular attention to uncertainty and the role VCs can play in mitigating this uncertainty. We offer the following three main contributions to research.

First, building on prior theory, we identify specific mechanisms via which VC investments can augment funded firm performance. We aim at distinguishing between selection and post-investment effects. In this respect, our analysis uncovers that a crucial aspect is frequently ignored in extant research: VCs try to select the most promising industries (e.g., Gompers, 1995). This undertaking in consequence likely improves the funded firm performance relative to non-funded firms. However, the positive industry selection effects may lead the scholarly community to believe in the VCs' capabilities to select the best firms and subsequently add value. Yet, they could also camouflage poor performance once industries are selected. This is especially problematic when researchers theorize about intra-industry effects, yet in their empirical testing, ignore potential industry selection effects. Our quantitative synthesis of extant empirical research allows an estimation of the performance differentials which are based on industry selection effects vis-à-vis intra-industry effects. Hence, our analysis provides evidence of whether VC investors can gather the necessary information and adequately interpret this information to select the more promising industries *and* whether there are consequently able to add value by selecting the winners in an industry and supporting them. As firms that seek funding generally have already chosen specific industries, such analysis yields important indications regarding the additional value VCs can provide for these firms.

Second, in order to further understand how VC investments affect funded firm performance, we distinguish different performance dimensions. We juxtapose growth, stock market, and profitability-oriented performance dimensions to detect how VCs generate value under uncertainty. The strategic decision of whether profitability or growth should be the primary focus for entrepreneurial firms has been actively debated in the entrepreneurship literature. Different authors stress the importance of profitability as a means to obtain own financial resources and certainty about functioning business models which subsequently facilitate growth (Davidsson et al., 2009). Drawing on insights from the VC funded firms, we can test whether externally supplied financial capital and associated supplementary resources are an effective alternative strategic approach to achieve growth in environments of uncertainty. Additionally, such distinction facilitates insights as to whether the VC funded firms are able to achieve hybrid outcomes where both profitability and growth are increased. An increase in profitability, in addition to firm growth, would open a supplementary financial resource pool that would indicate additional future performance of the funded firm (Brinckmann et al., 2011; Levesque et al., 2012).

Third, we address the specific uncertainty context in which VC investments are beneficial for the funded firm. In fact, the term 'venture' capital suggests abilities to take on risks and effectively mitigate uncertainty. To date, however, we lack systematic evidence regarding contexts when VC investment improves funded firm performance. For instance, literature documents that VCs typically avoid investments in firms that are in the earliest stages (Wright and Robbie, 1998). Yet, recently authors report that VCs increasingly invest in earlier stages. However, we do not know whether VCs are able to equally perform in these distinct environments characterized by different degrees of uncertainty. Similarly, the IPO event implies special documentation requirements that are established to reduce the uncertainty investors and other stakeholders face. Hence, questions arise whether VCs – as stewards of uncertainty – can contribute value in these contexts. Finally, prominent scholars propose that the perception of uncertainty varies in cultural contexts. This leads to previously unaddressed questions whether VCs' uncertainty mitigation function is affected by the cultural context they operate in. In this article, we address these questions. We commence with a reflection of the nature of VC investment vs. alternative financing forms, followed by a discussion of the direct VC investment–firm performance effects, before turning to the contextual moderators. Our research framework is depicted in Fig. 1.

3. Theoretical background and hypotheses

3.1. Venture capital vs. other forms of equity financing

While no commonly accepted or regulatory definition exists with regards to VC (Amit et al., 1998), prior literature generally characterizes VCs as institutional (Bessler and Kurth, 2007), formal (Bruton et al., 2009), and professional investors (da Silva Rosa et al., 2003; Gompers and Lerner, 2001; Hellmann and Puri, 2000; Smart et al., 2003) who are actively involved in investee firms (Sahlman, 1990). VCs typically invest in longer term, un-quoted, hence less liquid, risk equity that promises high returns (Dimov et al., 2007; Wright and Robbie, 1998). They invest at early as well as later stages in the firm's life cycle (Dimov et al., 2007).

Thus, we distinguish VCs from less formally organized individual angel investors or groups of angel investors who generally invest only their own funds and tend to do so only in the early funding stages (Mason and Harrison, 2002). In contrast, VCs typically raise the funds they invest from other investors. Moreover, literature suggests that angel investors frequently pursue non-economic goals with their investments such as supporting entrepreneurs while VCs are focused on generating financial returns (Wright and Robbie, 1998). Many angel investors have acquired their net worth being an entrepreneur or manager and understand their investment as a form of 'giving back' to other entrepreneurs. In consequence, they might feel less pressure to appropriate value from their funded firms, while VCs have to generate substantial returns to satisfy their own investors and assure that they can raise new financial resources for their future funds.

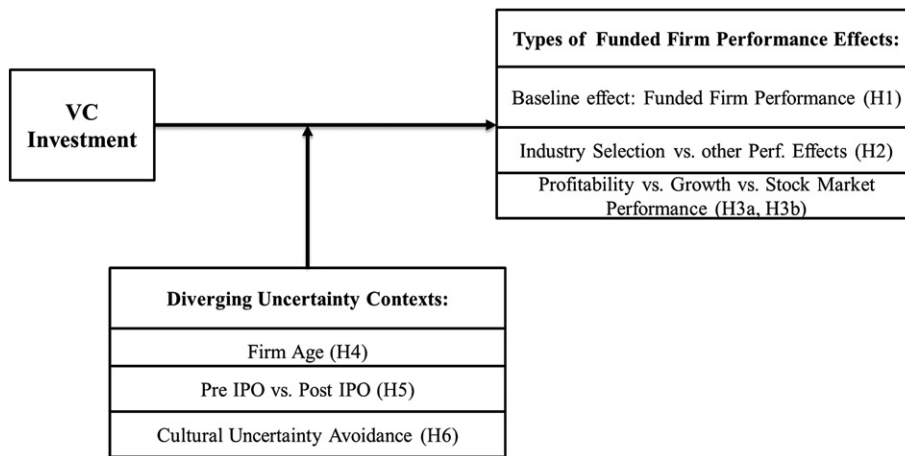


Fig. 1. Studied relationships.

Another type of investor supplying firms with financial resources is leveraged buyout (LBO) firms. However, in contrast to VCs, LBO firms primarily supply debt financing to complement equity investment for more established firms. LBOs commonly collateralize the supplied debt finance drawing on assets of the firm. Because VCs supply equity finance, they generally do not demand collateral for their investments, leaving them with a greater exposure to the risks of the funded firm. LBO firms' debt usually does not have investment grade status. Hence, LBO firms need to demand respective interest rates for their investments. As a consequence, LBO firms invest in firms that have sufficient, positive cash-flow. Meanwhile, VCs generally supply financial resources to firms that do not have positive cash-flow dynamics given their growth trajectory. Another key distinction with regard to VCs is that LBO firms generally assume control of the board, but do not actively engage in the firm's management (Sahlman, 1990). Following prior literature (e.g. Bruton et al., 2010; Gompers and Lerner, 1999a), we exclude business angels and (reverse) LBOs from our subsequent theorizing and empirical analysis.

3.2. Venture capital and firm performance

Literature on VC distinguishes between two theoretical linkages between VC investments and the performance of funded firms: a positive *selection* effect and a *post-investment value-added* effect (Brander et al., 2002; Dimov and Shepherd, 2005; Dimov et al., 2007; Lerner, 1994). The selection effect itself can be divided into two effects: an industry and intra-industry selection effects.

VCs do not invest in all industry sectors equally, but select specific industries. Lee and Wahal (2004) show that VC is concentrated in certain industries such as software and biotechnology whereas firms in other industries such as hotel and lodging usually do not receive any VC investments. Other research documents that VC providers specifically select high-growth markets with a strong focus on technologies (Gompers, 1995; Roberts and Barley, 2004; Zacharakis et al., 2007). These specific industries offer more promising success rates in comparison to the general economy (Shane, 2008; Zacharakis et al., 2007). Especially emerging industries could present a fertile ground for investments as competition is limited, intra-industry experience is limited while VCs possess insights from analogous industry developments, VCs have networks to foster industry creation and to position their funded firms as emerging industry leaders, and industry growth prospects are substantial.

In addition to selecting the more attractive industries, VCs can aim at picking the most promising ventures within those industries in meticulous processes. In order to avoid adverse selection in the pre-investment stage, VCs conduct comprehensive multiple-phase evaluations of the industry, the firm, and the executive team. In particular, they assess perceived risks and expected returns (Hall and Hofer, 1993; Tyebjee and Bruno, 1984). Following the due diligence assessment, uncertainty and potential agency costs decrease (Arthurs and Busenitz, 2003). In consequence, a VC investment can serve as a positive signal to other potential resource providers such as customers, suppliers, employees, or lenders. Thus, VCs can act as vicarious selectors (Baum and Silverman, 2004). Substantial scholarly inquiry scrutinizes these intra-industry selection factors highlighting elements such as the founding team (e.g., Baum and Silverman, 2004; Tyebjee and Bruno, 1984) or product or service characteristics (e.g., Tyebjee and Bruno, 1984).

A major part of the literature on VC investments deals with the value VCs add after the initial investment. One of the proposed principal benefits are the financial resources provided by the VCs to the funded firms which engage in risky and dynamic markets where traditional forms of investments frequently cannot be obtained (Ueda, 2004; Wright and Robbie, 1998). In consequence, these financial resources can be deployed to acquire other value-creating resources such as human resources or physical resources. During the duration of the investment, VCs are generally expected to offer value-added services which go beyond the provision of financial resources (MacMillan et al., 1989; Tyebjee and Bruno, 1984). VCs assist their portfolio companies in networking, recruiting, and strategic decision-making (e.g., Lindsey, 2008; Mäkelä and Maula, 2005; Thomas Hellmann, 2002). The access to a VC's network can increase firm performance by providing important contacts with stakeholders such as potential

customers, suppliers, and employees. VCs also help firms to attract other types of funding in the later stages of the venture's life cycle, for example by attracting high-quality underwriters for an IPO (Bottazzi and Da Rin, 2002; Lerner, 1994; Megginson and Weiss, 1991). Moreover, VCs can add to the professionalization of the funded firms by improving governance structures, human resource policies, and instituting stock option plans (Thomas Hellmann, 2002). VCs' knowledge and skills usually complement the capabilities of the funded firm and, thus, increase the funded firm's performance (MacMillan et al., 1989; Sapienza, 1992). Furthermore, an investment by a VC can act as an endorsement and increase the legitimacy of a firm which is an important prerequisite for future resource acquisitions and venture growth (Gulati and Higgins, 2003; Megginson and Weiss, 1991; Stuart, 1998; Zimmerman and Zeitz, 2002).

In comparison to other owners, VCs have a monitoring incentive which provides an opportunity to decrease the probability of moral hazard in the absence of incentive compensation (Jensen and Meckling, 1976). Additionally, VCs have the expertise to control managerial actions (Gompers, 1995). In contrast to other institutional shareholders such as mutual or pension funds, VCs often have close relationships with firms which provide them with opportunities to monitor via different governance mechanisms such as representation on the boards of funded firms (Lerner, 1995). Due to the longer-term horizon of their investments and high information asymmetry, shareholder activism of VCs is high (Sapienza et al., 1996; van den Berghe and Levrau, 2002). In consequence, VCs' monitoring should positively influence the funded firms' development. These various mechanisms indicate that VCs can add value to funded firms' post investment.

Strikingly, while extant research frequently theorizes about the value of financial and value-added resources for the funded firms, many authors do not consider that the industry selection effects influence performance, leading them to overestimate the intra-industry performance effect. To shed more light on industry selection and intra-industry performance effects, we subsequently distinguish between performance effects based on all prior empirical evidence and evidence derived from studies that control for industry selection effects. We posit:

Hypothesis 1. VC investments increase the performance of the funded firms.

Hypothesis 2. Performance effects of VC investments are smaller in studies controlling for industry effects than in studies not controlling for industry effects.

In sum, selection and post-investment value adding activities by VCs should lead to an increased performance of VC-backed firms. However, it can also be argued that financial resources provided by VC investors can have detrimental effects for the funded firms as they can create a false sense of security and reduce the need to focus on close customer interaction and fast revenue generation. Moreover, it is questionable whether VCs are able to identify and foster the most promising ventures in contexts of uncertainty (Amit et al., 1998; Manigart et al., 1997; Zacharakis et al., 2007), and more specifically when principal-agent problems such as adverse selection and moral hazard are present (Aldrich and Kenworthy, 1999; Cumming, 2006; Gompers, 1995; Hellman et al., 2000; Masulis and Nahata, 2011; Maula and Murray, 2002). In consequence, these challenges might lead to considerable transaction costs that need to be absorbed by the funded firm (Williamson, 1973). Moreover, conflict of interests might sway VCs to advise or pressure entrepreneurs to pursue strategies that benefit their exit-oriented interest, but are not necessarily beneficial for the funded firm itself (Gompers, 1996).

Such disadvantages of VC investments may partially offset their benefits in specific circumstances leading to lower performance effects of the investments. Furthermore, they may lead to a higher effect on specific types of performance measures. Hence, in a next step, we further detail our base-line hypotheses and distinguish between the effects VC investments have on different performance dimensions and identify conditions under which VC investments should prove more beneficial.

3.2.1. Types of performance outcomes

Several authors have argued that organizational performance is a multi-dimensional construct (Combs et al., 2005; Davidsson et al., 2009; Murphy et al., 1996). Following Combs et al. (2005) three dimensions of financial performance can be distinguished: profitability, growth, and stock market success. Due to the specific characteristics of VC investments, they are likely to influence different firm success dimensions in different ways.

As most VCs view an IPO as the preferred exit option which will raise their returns a central goal of VCs is to increase shareholder value by increasing the market valuation of their funded firms (Barry, 1994). In this respect, a strategic trade-off exists between aiming for growth or profitability of the funded firm (Davidsson et al., 2009). Extant literature suggests that firms which receive VC investments are likely to put greater emphasis on growth than on profitability (Belden et al., 2001). Literature documents that VC-funded firms aim to become market leaders in fast growth markets in order to command a premium when exiting their investments (e.g., Roberts and Barley, 2004). This has consequences for the value they add based on both selection and post-investment effects.

Selection and self-selection effects will characterize funded firms as firms in growth markets, with a likely early growth trajectory as a selection indicator used by the VCs and a strong strategic orientation towards further growth. Due to the VCs' emphasis on growth one can expect a selection process in favor of high-growth firms rather than profitable businesses.

Given the strategic orientation towards growth and increasing the market valuation, post-investment VCs have an incentive to provide resources that enable such strong growth including access to their networks, managerial resources, effective monitoring systems, or additional financial capital. These resources can provide an added value for funded firms in their attempt to augment their growth. Furthermore, the support of VCs for the funded firms' growth strategies may be valued by other shareholders leading to an increased market valuation. Meanwhile, profitability might be of a secondary strategic concern and becomes more

relevant only after a beneficial competitive position is established. Although high growth can eventually pay off in terms of higher profitability (for a review of the literature on the relationship between growth and profits see Davidsson et al., 2009), for example, through economies of scale, economies of scope, and learning economies, we expect that VC investments have more immediate effects on growth because of the strategic preferences of VCs, selected and self-selected entrepreneurs.

Furthermore, VCs add value post-investment by sending a positive signal to potential stakeholders (Gompers, 1995; Gompers and Lerner, 1999b; Lerner, 1994; Lerner, 1995). A VC investment will attract stakeholders with similar interests who perceive the selection by VCs as a positive signal. As a consequence, their willingness to interact with the funded firm increases. Previous research has shown that firm growth accelerates in the months immediately following the VC investment event indicating a positive selection effect on growth (Davila et al., 2003). At the same time, selection effects should not result in higher profitability – at least not in the short run – as it affects the behavior of stakeholders rather than the operational efficiency of the funded firm.

Based on the above considerations, we conjecture that the selection and post-investment value-added activities primarily relate to the growth and stock market dimensions of firm performance, while operational improvements with regard to profitability are relatively smaller and follow with a substantial time lag. We posit:

Hypothesis 3a. VC investments increase the funded firms' growth more than profitability of the funded firms.

Hypothesis 3b. Venture capital investments increase the stock market performance more than the profitability of the funded firms.

3.2.2. Funded firm age

It is likely that the performance implications of VC funding are also contingent on the characteristics of the firms and their operating context because VC investments and involvement may not be equally effective in all types of firms and in all types of environments. A key characteristic in this regard is the age of the funded firms as newer firms imply substantially elevated degrees of risk and uncertainty (e.g., Aldrich, 1979; Knight, 1921; Shepherd et al., 2000). A more established firm has an operating history which can help in judging its management, initial progress, the market context, and future prospects. In contrast, new firms face a liability of newness due to the absence of an operating history and lack of existing relationships with key partners such as customers, employers, investors, or suppliers (Aldrich and Wiedenmayer, 1993; Stinchcombe, 1965). Thus, potential stakeholders may be reluctant to interact with new ventures due to the uncertainty involved in such interactions. An operating history enables resource providers to better assess risks and in consequence enables financial transactions. Given that the uncertainty and risks decrease as the firms mature and information about actual operations and performance becomes available, there might be an optimal time for VCs to invest.

Regarding the selection of the most promising firms, the elevated degrees of uncertainty in the earliest days of a firm's existence may have a negative effect on the VC selection process. Nascent and new firms have a higher failure rate than their more established counterparts (Stinchcombe, 1965; Thornhill and Amit, 2003). Because uncertainty is very high, the value of the firm's future cash flows is difficult to predict even for specialized VC investors, which might limit the positive selection effects in the earliest stages. Moreover, VC investors cannot rely on an operating history of these firms, which might make it impossible to ascertain whether the TMTs function well, if the products under development are competitive, or if customers will purchase and repurchase from the new firm. Thus, the positive selection effects could be lower in the very early stages of the firm's life cycle as compared to later stages.

Furthermore, high uncertainty may lead to increased agency-problems between VC investors and managers, making the effective transfer and deployment of financial and value-added resources difficult and costly (Sapienza and Gupta, 1994). Even if the objective of managers and VC investors are similar, they may disagree about the strategies to achieve these objectives leading to a perilous situation for the funded firms (Sapienza and Gupta, 1994). Thus, the post-investment value-adding activities by VCs may not be as effective in newly established ventures as they should be later on.

Yet, if the funded firms are very mature and information about the focal firms' management team, operating history, effective strategies, and market dynamics are existent, the degree of uncertainty decreases. As uncertainty decreases, VCs should be able to select the more promising firms. However, previous research has reported that accuracy in VCs' decision-making regarding investment decisions decreases when they possess a larger amount of information about the firm that seek funding (Zacharakis and Shepherd, 2001). At the same time, VCs' unique benefits vis-à-vis other financial intermediaries also decreases as uncertainty diminishes (Amit et al., 1998). In other words, if a long operating history is observable, various investor types might be able to select the more promising firms. In addition, VC is relatively costly if uncertainty is low. This could lead to adverse selection effects of firms aiming for VC finance in later stages when more traditional forms of financing are also available.

The positive post-investment effects relating to financial resource acquisition should also diminish as firms mature and additional financial intermediary types provide financial resources. For instance, assets that have been accumulated previously, can serve as a collateral opening up opportunities for debt financing. Furthermore, the positive post-investment value added effects of VCs likely also decrease since firms that already have experienced high growth over an extended time should have information and systems in place to manage the growth. Moreover, during their existence the focal firms had time to build up their social capital and develop effective ties with their environment (Stinchcombe, 1965). The resulting larger resource base should decrease the need and value of resources VCs can supply. Although more information enables absolute positive selection effects, reduced relative selection effects, adverse selection effects, and reduced post VC investment effects might decrease the performance of older, more established firms that receive VC funding especially relative to firms that are able to obtain other types of financing.

Overall, if we assume that a trade-off exists between the lower value VCs can add to funded firms and their increasing absolute ability to select the most promising ventures when uncertainty decreases in the course of the firm's life cycle, there should be an optimal firm age when VC investments increase the funded firms' performance the most. Following uncertainty-based arguments, we expect that very early stage investments will perform sub-optimal due to excessive levels of uncertainty resulting from a lack of information. At the same time, we conjecture that the benefits of VC investments decrease when firms mature due to the abundance of information. Hence, we hypothesize that VC investment and funded-firm performance follows an inverted U-shape with respect to funded firm age.

Hypothesis 4. Firm age has an inverted U-shape relationship with the VC-funded firm performance link such that firms in growth stages benefit more from VC investments than new ventures and very mature firms.

3.2.3. Pre and post-IPO effects

Having argued that firm age has an influence on the VC–performance relationship, we now look at the effects of a unique event in a firm's life cycle: an IPO. An IPO is a preferred exit option of VC providers (Barry, 1994). At the same time, VC providers generally keep a part of their stake in the venture even after the firm goes public (Barry et al., 1990; Megginson and Weiss, 1991). Yet, it is unclear whether the link VC investment–funded firm performance link is stronger pre-IPO than post-IPO.

One of the key differences in the post-IPO context in comparison to the private firm context is the availability of information. Public markets are regulated and demand substantial information about the listed firms in regular intervals (Benston, 1973). Hence, information asymmetry and uncertainty for stakeholders decreases once the firm goes public. Following prior arguments, the increased availability of information and the reduced levels of asymmetric information should lower the VCs' relative advantage as financial intermediary specialists with an expertise in environments of incomplete and asymmetric information (Amit et al., 1998).

Although potential shareholders may value the selection by VCs when making their own investment choices (Megginson and Weiss, 1991), this signaling effect, however, should decrease when firms achieve an IPO since the public listing itself is an indicator of prior success (Ritter and Welch, 2002). In other words, potential stakeholders may perceive the IPO itself as a sufficient positive signal to start engaging and interacting with the firm. Hence, a positive selection effect of VC-funding may decrease after a firm goes public.

Furthermore, an important benefit of publicly-traded firms is their greater access to financial resources (Ritter and Welch, 2002). While in private markets, VC investments are often the only source of finance for entrepreneurial firms which operate in dynamic environments and lack the collateral to secure debt-financing (Ueda, 2004; Wright and Robbie, 1998), this unique advantage of acquiring VC diminishes when the firm is listed on public markets. Furthermore, the provision of value-added managerial support or monitoring provided by VC investors are generally replaced by systems required for publically listed firms. An IPO leads to a change in ownership structure which has effects on monitoring (Ritter and Welch, 2002). Monitoring by institutional investors and efficient markets for corporate control will decrease the necessity of VC monitoring. Similarly, the need for VCs to provide access to networks and to assist with recruiting and strategic decision-making decreases (e.g., Lindsey, 2008; Mäkelä and Maula, 2005; Thomas Hellmann, 2002) as IPO firms can now rely on other stakeholders for support.

A final argument for a weaker relationship between VC and funded-firm performance post-IPO is provided by Gompers (1996). He cautions that VC investors may urge firms to go public prematurely in order to maximize their own benefits. If the stock market participants are not ready to invest in the company because team, operations, products, and market standing are not mature enough, an IPO may have detrimental effects for firms. Thus, if Gompers' (1996) grandstanding argument applies, VC-backed firms that had an IPO should show lower performance levels after their public listing. Hence, in addition to age effects, we expect that the fact of being traded in public markets should negatively impact the VC investment–funded firm performance. We put forth:

Hypothesis 5. The relationship between VC investments and funded firm performance is stronger pre-IPO than post-IPO.

3.2.4. Uncertainty avoidance

Previous research indicates that the benefits of a VC investment for the funded firm additionally depend on the country in which a firm is located (Chahine et al., 2007; Sapienza et al., 1996). Such cross-country differences of the VC investment–performance relationship might be attributable to specific characteristics of the national culture. According to Hofstede (1980), national cultures differ with respect to various dimensions. Because VCs often engage in highly uncertain businesses operating in industries that are characterized by technological disruption, varying customer needs, and changing competition (Gompers, 1995), uncertainty avoidance is a cultural dimension with a high potential to influence the outcomes of VC investments. Although uncertainty avoidance has been reported to influence VC investments (Li and Zahra, 2012) and entrepreneurial activity in general (Lee and Peterson, 2000; Wennekers et al., 2007), we are not aware of empirical findings which depict how uncertainty avoidance affects the VC investment–funded firm performance relationship.

The degree of uncertainty avoidance of a culture affects the behavior of firms, investors, and other stakeholders in a society. This likely impacts the selection and post selection effects of VC investments on funded firm performance. Li and Zahra (2012) argue that VCs in highly uncertainty avoidant countries may on average choose less risky investments. Even though lower risk VC funded firms may have a greater likelihood to survive, the aggregate effect of selecting lower risk investments should still cumulate in lower performance because lower risk is related to lower returns (Fama and MacBeth, 1973; Markowitz, 1959).

Additionally, VCs in countries characterized by high uncertainty avoidance likely provide less financial resources to the funded firms (Li and Zahra, 2012) as they spread their funds more broadly to achieve greater risk reduction. In consequence, the provision of less financial capital allows only more modest growth trajectories. With respect to the monitoring, uncertainty avoidance should increase the monitoring costs. In consequence, increased monitoring costs such as legal and reporting costs may lower the performance in comparison to funded firms in other countries where firms do not have to undertake these additional efforts. Furthermore, some value-added activities that VCs commonly undertake may be affected adversely by high uncertainty avoidance in a society. For example, due to high uncertainty avoidance networking and recruiting support by VCs may not be as effective because potential networking partners and key employees may be reluctant to work with VC-backed firm based on their assumption that VC funded firms take risks. In more general terms, a VC investment hence may prevent various stakeholders such as potential employees, other investors, customers, and suppliers to transact with the VC-backed firm. For example, highly skilled workers may opt for a position in an established firm which is perceived as less risky or they may demand a premium that compensates them for the greater risk perceived. Since premiums imply additional costs to the funded firms, the performance of VC-backed firms in consequence likely decreases. Drawing attention to the cultural impact on the perception of VC investments, we put forth our final hypothesis:

Hypothesis 6. A higher degree of uncertainty avoidance in a culture will have an adverse effect on the relationship between the VC investment and the performance of the funded firm.

4. Method

4.1. Study identification and sample

In order to identify empirical studies investigating the relationship between VC investments and firm performance, we followed a four-step-procedure: First, we performed computerized keyword searches in the databases *Business Source Premier*, *EconLit*, *ABI Inform*, and *SSRN*. We used combinations of the following VC-related and performance-related keywords: venture capital, financing and performance, success, profitability, growth, market valuation, and underpricing. The choice of databases which we searched enabled us to locate published as well as unpublished studies. Second, we searched relevant journals in entrepreneurship (*Journal of Business Venturing*, *Entrepreneurship Theory and Practice*, *Venture Capital*), strategy (*Strategic Management Journal*, *Academy of Management Journal*), and finance literature (*Journal of Finance*, *Review of Financial Studies*, *Journal of Banking and Finance*, *Journal of Financial Economics*) manually. We considered all volumes published after 1980. Third, we checked the reference sections of the identified studies for further work on the subject. Fourth, we contacted researchers through listservs for unpublished material in order to decrease a potential publication bias.

To be included in this meta-analysis, the study needed to address VC investments and funded-firm performance at the organizational level. The measure of VC investment needed to be in line with our definition. We particularly excluded related types of private investments such as informal investments (e.g., angel financing) or debt finance (e.g., LBOs) studies. In order to assure that these types of financing were not included in studies investigating VC effects, we screened every paper with a special focus on the respective sample description sections. Where full text search options were available, we additionally searched the full text of each candidate study for specific keywords including angel, informal, LBO, and private equity to minimize the risk that the underlying studies included such divergent investment types. Furthermore, it was required that the empirical studies underlying this meta-analysis, report statistics that can be converted into correlation-based effects sizes. Such statistics include the results of t-tests (t-values or corresponding p-values), 2-by-2 Chi-square test values, means and standard deviations for sub-groups and frequency tables. For the conversion of relevant statistics into r, we used the effect size calculator provided by David Wilson on the Campbell Collaboration's website. Furthermore, we did not include studies (e.g., Fischer and Pollock, 2004) if the bivariate statistics are based on panels with different data points per firm in order to avoid a bias resulting from the potential violation of the independence assumption. If studies matched our inclusion criteria, but did not include the necessary statistics, we contacted the authors and asked them to provide us with these statistics.

Another problem researcher face when conducting a meta-analysis is that some articles are based on the same sample. Detecting such repeated samples ensures that the analysis does not contain a bias due to the overrepresentation of specific samples. We applied a heuristic similar to the one suggested by Wood (2008) to identify duplicate samples. As a starting point, we identified overlappings in authorships. Subsequently, we checked for similarities in study characteristics, sample sizes and effect sizes. In a second step, we carefully compared sample description to identify similar samples used by different authors due to their availability in databases. Whenever one sample was used in more than one study (e.g., Arthurs and Busenitz, 2006; Arthurs et al., 2008, 2009), we selected the study that used the largest number of firms, so as to include a sample only once and avoid potential biases (Hunter and Schmidt, 2004). Using the above-described procedure, we identified 76 independent samples that stem from 48 studies. The two numbers differ because some studies reported statistics for several independent samples.

Lastly, we checked whether there are outliers in our sample. We found that three samples have produced correlations which are more than 2 standard deviations below the mean. All of the respective samples stem from the study by Wong and Wong (2008). We ran all analyses without these three samples. However, as the results did not change significantly, we report the results for the full sample.

Table 1 contains a brief description of each sample with respect to variables examined in this paper. Most of the studies compare VC-backed to non-VC-backed firms. Moreover, studies frequently include IPO events because this is one common,

well-documented exit option for VCs. Five studies apply continuous measures of VC investments such as the share of equity held by VCs or the number of board members that are representatives of VC firms. A majority of researchers focuses on stock market-based measures of firm performance such as underpricing, as a short-term indicator and buy-and-hold abnormal returns for longer timeframes. Fewer studies are concerned with the effects of VC on the profitability or growth of firms. The sample is based primarily on firms from North America, Europe, and Asia.

4.2. Measures

We coded dependent, independent, and moderator variables for all included studies. The dependent variable in this study is firm performance. In order to obtain a broad picture of the relationship between VC investments and firm performance, we included three dimensions of financial performance: profitability, growth, and stock market performance (Combs et al., 2005).

In addition, we coded a dummy variable that has the value 1 if researchers controlled for industry effects in the respective primary study, and 0 if industry effects were not controlled for. It is noteworthy that the industry control dummy refers to whether the underlying study used industry control methods that affect the bivariate statistics because our meta-analytical approach is based on the bivariate statistics of the primary studies (Hunter and Schmidt, 2004). Methods addressing industry effects at the bivariate level include a focus on a single industry or a matching procedure that includes industry as a matching parameter.

Moreover, we coded the average age of the firms in the samples to assess whether the underlying studies focus on established or newer firms. While we were able to use the continuous variable in the multivariate analyses, we needed to classify the studies with regard to firm age for the bivariate analyses. In order to obtain a differentiated understanding in the bivariate analysis and facilitate a robustness test of our multivariate inverted u-shaped effects tests, we divided the studies in three groups: 1) studies investigating mature firms when the average firm age in the studies was more than 12 years (Brinckmann et al., 2010; Zahra, 1996), 2) semi-established firms if the sample firm age average was between 6 and 12 years, and 3) new firms if firms in the studies on average were less than 6 years old (Zahra et al., 2000). Furthermore, we coded whether the sample firms are in pre-IPO (0) or post-IPO stages (1).

Third, we measured uncertainty avoidance based on the index developed by Hofstede (1980). We used the uncertainty avoidance index for the regression analysis. For the bivariate analysis, we categorized the studies in two groups based on the degree of uncertainty avoidance of the country. The threshold for the categorization was an uncertainty avoidance score of 52 which equals the mean value of all uncertainty avoidance scores in our sample. This marker implies that Australia is the country with the highest uncertainty avoidance index ($UAI = 51$) in the category of cultures with low uncertainty avoidance, whereas Germany with an uncertainty avoidance score of 65 is the country with the lowest uncertainty avoidance score in the group of cultures with high uncertainty avoidance. Because there are no cultures in the sample that have uncertainty avoidance scores slightly above the threshold, the categorization leads to distinct groups. In particular, the Anglo-Saxon countries, Hong Kong and Singapore, belong to the group of countries with low uncertainty avoidance whereas Germany, France, Belgium, Taiwan and Japan are considered as cultures with high uncertainty avoidance.

In addition, we coded three control variables. We coded whether the sample stems from a published article (0) or an unpublished work (1). Regarding the performance measure we coded whether it was assessed subjectively (1) or objectively (0). With respect to VC investment, which is the independent variable in our research, we coded whether researchers used a dummy variable or if they applied a continuous measure for VC investments. Continuous measures include the percentage of shares held by VCs (e.g., Bruton et al., 2009; Florin, 2005) or the number of board members that were sent by VCs (e.g., Thompson, 1993; Williams et al., 2006).

4.3. Analyses

In this paper, we follow an evidence-based research approach to complement individual studies and narrative reviews which frequently suffer from cognitive and normative biases of researchers, sampling problems, measurement problems, stochastic effects, and questions regarding the external validity of the findings (Glass, 1976; Hedges and Olkin, 1985). Meta-analysis is a method to synthesize empirical research on important questions that have been subject to extensive research in the literature (Hunter et al., 1982). Meta-analysis offers several advantages for academic research. First, compared to narrative reviews, meta-analysis systematically quantifies the relationships between the variables. While empirical analysis in management science generally focuses only on the significance of the scrutinized relationship, meta-analysis draws attention to the effect size and hence the strength of the relationships between variables. The standardization of effect sizes in meta-analysis allows a direct comparison of different effects. Second, in comparison to small sample field studies, meta-analysis offers more statistical power. Third, meta-analytic reviews can control for a selection bias resulting from the publication review processes. Fourth, meta-analysis can scrutinize moderating variables beyond the ones identified in individual studies and hence depict novel contingencies of proposed relationships. In sum, meta-analyses provide insights that go beyond the summation of the incorporated parts. It enables researchers to obtain advanced estimates on true relations and provides a useful way to advance theory-building (Hunter and Schmidt, 2004; Rauch and Frese, 2007).

For our analyses we used Pearson's correlation r as the effect size. Whenever the r was not available, we transformed other statistics such as Student t tests or means and standard deviations into the effect size r . We then corrected the effect size for sampling errors before calculating the mean effect in the bivariate analyses. A 90% confidence interval indicates whether an effect

Table 1
Overview of studies.

Authors, year	Sample description	Sample size	Effect size	Performance measure	Venture capital measure	Industry focus or matching	Age	IPO	Country	Published
Alemany and Marti, 2005	VC-funded firms in the top three the regions in Spain: Madrid, Catalonia, and Basque country	208 302 86	0.07 0.17 −0.13	Growth Growth Growth	Dummy Dummy Dummy	Yes Yes Yes	New Growth Est.	No No No	E E E	No No No
Arthurs et al., 2009	Firms from different technology-based industries that went through an IPO in the U.S. market during the 1990–1994 and 2001–2005 timeframe	640	0.10	Stock market	Dummy	No	Growth	Yes	US	Yes
Barry and Mihov, 2006	U.S. IPOs during the period 1980–2002	3060	0.17	Stock market	Dummy	No	Growth	Yes	US	No
Beatty and Zajac, 1994	Young U.S. IPOs from various industries that went public in 1984	435	0.17	Profitability	Dummy	No	Growth	Yes	US	Yes
Belden et al., 2001	Matched sample of VC backed and non-VC-backed IPOs that went public in 1989	32	−0.15 0.32	Profitability Growth	Dummy	Yes		Yes	US	Yes
Bradley and Jordan, 2002	U.S. IPOs from various industries that went public between 1990–1999	3325	0.15	Stock market	Dummy	No		Yes	US	Yes
Brau et al., 2004	Matched sample of VC backed and non-VC backed manufacturing, small and medium-sized firms going public between 1990 and 1996	234	−0.06 −0.01	Growth Stock market	Dummy	No		Yes	US	Yes
Brav and Gompers, 2003	Sample of 934 VC backed IPOs from 1972–1992 and 3407 non-VC backed IPOs from 1975–1992	2794	0.02	Stock market	Dummy	No		Yes	US	Yes
Bruton et al., 2009	Entrepreneurial IPOs that have been floated on the London Stock Exchange and the Alternative Investment Market in 2000–2003	275	−0.01	Stock market	Contin.	No	New	Yes	UK	Yes
Busenitz et al., 2004	Ventures that received venture capital financing identified in the 1987–1989 editions of the Venture Capital Journal	183	0.04	Growth	Contin.	No		No	US	Yes
Campbell Li and Frye, 2006	1993 and 1996 US IPOs	881	0.00	Stock market	Dummy	No		Yes	US	Yes
Chahine et al., 2007	Entrepreneurial IPOs in the UK and France during the period 1996–2002	303	0.05	Stock market	Dummy	No	Growth	Yes	UK	Yes
Chan et al., 2008	US IPOs of 48 different industries that went public over the period 1980–2000	141 3626	−0.02 0.11	Stock market Stock market	Dummy Dummy	No No	Est. Yes	Yes Yes	F US	Yes
Chang et al., 2008	Small Australian firms that went public over the period 1996–2003	371	−0.05	Stock market	Dummy	No	New	Yes	AUS	Yes
Chen, 2009	Small Taiwanese new ventures listed in the annual books of the high-tech industries, published by the Industrial Technology Research Institute of Taiwan	122	0.12	Perceived	Dummy	No	New	No	TWN	Yes
Da Silva Rosa et al., 2003	Industrial IPOs on ASX from 1991 to 1999	333	−0.05	Stock market	Dummy	No	Growth	Yes	AUS	Yes
Daily et al., 2005	Small US firms from 37 industries undergoing an IPO in the mid-1990s	192	0.05	Stock market	Contin.	No	Growth	Yes	US	Yes
Demers and Lewellen, 2003	US internet and non-internet firms that went public in 1990 and 2000	373 220	0.16 0.14	Stock market Stock market	Dummy Dummy	Yes No		Yes Yes	US US	Yes
Doukas and Gonenc, 2005	U.S. IPOs over the periods 1989–1994 and 1995–1997	456 1565	0.13 0.09	Stock market Stock market	Dummy Dummy	No No		Yes Yes	US US	Yes
Engel and Keilbach, 2007	Microlevel database on German firms that is developed and maintained by ZEW in Mannheim, Germany	44 50 48	0.30 0.19 0.36	Growth Growth Growth	Dummy Dummy Dummy	Yes Yes Yes	New New New	No No No	GER GER GER	Yes
Espenlaub et al., 1999	UK IPOs issued between 1992 and 1995 on London Stock Market	249	0.20	Stock market	Dummy	No		Yes	UK	Yes
Florin, 2005	Small U.S. IPOs that went public in 1996	277	−0.01 0.03 0.03	Profitability Growth Stock market	Contin.	No	Growth	Yes	US	Yes
Francis and Hasan, 2001	U.S. IPOs that went public during the 1990–1993 period	843	0.10	Stock market	Dummy	No		Yes	US	Yes
Gompers, 1993	IPOs that went public between 1978 and 1987	60 112 111 63 33 128 88	−0.14 −0.03 −0.13 0.05 0.03 0.05 0.03	Stock market Stock market Stock market Stock market Stock market Stock market Stock market	Dummy Dummy Dummy Dummy Dummy Dummy Dummy	Yes Yes Yes Yes Yes Yes Yes	New New Growth New New New Growth	Yes Yes Yes Yes Yes Yes Yes	US US US US US US US	No

Table 1 (continued)

Authors, year	Sample description	Sample size	Effect size	Performance measure	Venture capital measure	Industry focus or matching	Age	IPO	Country	Published
Gutierrez, 2003	Small U.S. IPOs issued from 1996 through 1999	30	−0.13	Stock market	Dummy	Yes	Growth	Yes	US	No
		27	−0.39	Stock market	Dummy	Yes	New	Yes	US	
		14	0.15	Stock market	Dummy	Yes	New	Yes	US	
		20	0.01	Stock market	Dummy	Yes	Growth	Yes	US	
		51	−0.34	Stock market	Dummy	Yes	New	Yes	US	
		9	0.01	Stock market	Dummy	Yes	New	Yes	US	
Hamao et al., 2000	Large firms that had their IPOs on Japan's over-the-counter market between 1989 and 1994	1440	0.23	Stock market	Dummy	No	Growth	Yes	US	Yes
Heeley et al., 2007	Large manufacturing firms conducting IPOs in the period 1981–98	456	0.02	Stock market	Dummy	No	Est.	Yes	JP	Yes
Higashide and Birley, 2002	UK firms funded by one of 174 VC firms between 1994 and 1995	1413	0.01	Stock market	Dummy	No	Est.	Yes	US	Yes
Jain et al., 2008	Small US internet IPOs issued during the period 1996–2000	57	−0.24	Perceived	Contin.	No		No	UK	Yes
Jelic et al., 2005	IPOs at the London Stock Exchange, during the period 1964–1997	160	−0.17	Profitability	Dummy	Yes	New	Yes	US	Yes
Kutsuna et al., 2000	Small companies registered on the JASDAQ in 1996	167	0.00	Stock market	Dummy	No	New	Yes	UK	Yes
Lee and Wahal, 2004	US IPOs during the period 1980–2000	109	0.09	Growth	Dummy	No	Est.	Yes	JP	Yes
Lerner, 1999	Firms participating in the Small Business Innovation Research program between 1983 and 1997	2608	−0.01	Stock market	Dummy	Yes	New	Yes	US	Yes
		476	0.27	Stock market	Dummy	Yes	New	Yes	US	
		388	0.23	Stock market	Dummy	Yes	New	Yes	US	
Ljungqvist and Wilhelm, 2003	Large U.S. high-tech firms that completed an IPO between 1996 and 2000	1345	0.06	Growth	Dummy	Yes	Est.	No	US	Yes
Manigart and van Hyfte, 1999	Matched sample of VC backed and non-VC backed small Belgian firms	2178	0.08	Stock market	Dummy	Yes	Est.	Yes	US	Yes
Megginson and Weiss, 1991	US IPOs between 1983 and 1987	76	−0.18	Profitability	Dummy	Yes	New	No	BEL	Yes
		69	0.03	Profitability	Dummy	Yes	New	No	BEL	
		173	0.07	Profitability	Dummy	Yes		No	BEL	
Morgan, 2003	U.S. IPOs from the biotech industry	640	−0.14	Stock market	Dummy	Yes	Growth	Yes	US	Yes
Penneder, 2010	Austrian VC- and matched non-VC-backed firms	323	−0.12	Stock market	Dummy	Yes	Growth	Yes	US	No
Rindermann, 2004	IPOs at the British techMark between 1996 and 1999	209	0.18	Growth	Dummy	Yes	Est.	No	A	Yes
Sapienza, 1992	VC-backed ventures in the U.S.	62	0.03	Profitability	Dummy	Yes	Growth	Yes	UK	No
Stubner et al., 2007	Small German start-up companies	51	0.44	Perceived	Contin.	No	New	No	US	Yes
Thompson, 1993	US IPOs between 1978 and 1987 in chemicals, machinery Electronics, business services and health services	106	−0.07	Profitability	Contin.	No	New	No	GER	Yes
			0.12	Growth						
			0.20	Perceived						
Tykova and Walz, 2007	Hand-collected database of IPOs on Germany's Neuer Markt during the period 1997–2002	159	−0.06	Profitability	Contin.	Yes	New	Yes	US	No
Wang et al., 2003	Companies listed at the Singapore stock exchange from 1987 to 2001		−0.16	Stock market						No
Westerman et al., 2008	Small US IPOs	326	0.05	Stock market	Dummy	No		Yes	GER	Yes
Wijbenga et al., 2007	Dutch VC backed small and medium-sized enterprises	164	−0.13	Profitability	Dummy	Yes	Est.	Yes	SIN	Yes
Williams et al., 2006	Small health care and biotechnology firms that registered to go public from 1996 to 1999	164	0.02	Stock market	Dummy	Yes	Est.	Yes	SIN	Yes
Wong and Wong, 2008	Small IPOs at the Hon Kong Stock Exchange from 1999 to 2003	402	0.09	Stock market	Dummy	Yes	New	Yes	US	Yes
		93	−0.14	Perceived	Contin.	No	Est.	No	NL	Yes
		182	0.07	Profitability	Dummy	Yes		Yes	US	Yes
		33	−0.32	Profitability	Dummy	Yes	Growth	Yes	HK	Yes
		38	−0.31	Profitability	Dummy	Yes	Growth	Yes	HK	
		64	−0.24	Profitability	Dummy	Yes	Growth	Yes	HK	
		80	−0.21	Profitability	Dummy	No	Growth	Yes	HK	
		17	−0.45	Profitability	Dummy	Yes	Growth	Yes	HK	
		59	−0.26	Profitability	Dummy	Yes	Growth	Yes	HK	

Note: A = Austria, AUS = Australia, BEL = Belgium, E = Spain, F = France, GER = Germany, HK = Hong Kong, JP = Japan, NL = Netherlands, SIN = Singapore, TWN = Taiwan, UK = United Kingdom, and US = United States.

is significant. If the interval does not include zero it can be assumed that the effect differs significantly from zero (Hunter and Schmidt, 2004).

Subsequently, we tested for heterogeneity in the population. We relied on several methods to detect heterogeneity and, thus, an indication for the existence of potential moderator effects. First, we calculated an 80% credibility interval which suggests a homogenous population of studies if it does not include zero (Hunter and Schmidt, 2004). Furthermore, we calculated the share of variance which is attributable to sampling errors. According to Hunter and Schmidt (2004) a share of variance attributable to sampling error above 75% indicates a homogenous population. Additionally, we calculated Q- and I²-statistics. Both also serve as indicators of heterogeneity (Higgins and Thompson, 2002; Higgins et al., 2003). A Q-value beyond a certain threshold (depending on the degrees of freedom) indicates a heterogeneous population. Similarly, a rather high I²-value suggests heterogeneity between studies.

For the moderator analyses, we divided the sample into sub-groups. Subsequently, we calculated mean effect sizes, confidence, and credibility intervals for each sub-group. If a moderating relationship exists, the confidence intervals of the subgroups do not overlap. In addition, we calculated all above-described indicators of heterogeneity for each subgroup. If a moderator effect exists, the within-sub-group variation between studies should decrease whereas there should be a significant between sub-group variation. Furthermore, the average share of variance attributable to sampling error should increase compared to the overall analysis. To further check whether the effect sizes differ significantly between sub-groups, we calculated respective z values.

In order to assure robustness of our findings, we relied on two different meta-analytic approaches: a traditional bivariate technique proposed by Hunter and Schmidt (2004) and a meta-analytic regression suggested by Lipsey and Wilson (2001). Meta-analytic regressions use moderating variables as independent variables to predict the inverse coefficient adjusted effect sizes of the individual studies. As such, meta-analytic regressions test the significance and the effect strength of multiple moderating effects simultaneously (Brinckmann et al., 2011; Rosenbusch et al., 2011). In our analyses, we predict the effect size for the relationship between VC investments and firm performance. We look at the type of performance measure, an industry control dummy variable, average firm age in a study (both as a linear and a squared term), a dummy variable indicating whether the study refers to IPOs, and the uncertainty avoidance level of the country of study location as independent variables. Furthermore, we control for publication bias by using a dummy variable that assesses whether a study was published. We also control for subjective performance measures and for the type of VC measure.

5. Results

Tables 2 and 3 present the results of the bivariate and the regression analyses. First, we tested the general effect of VC investment on firm performance. We found support for Hypothesis 1. VC investments have a positive and significant impact on firm performance at an aggregate level ($r=0.08$). Yet, the effect is comparatively small. Furthermore, a credibility interval including zero and a portion of variance attributable to a sampling error of only 22.0% indicate that the population of samples is heterogeneous. We can observe a similar indication when looking at the Q- and I²-values. The Q-value of 342.86 suggests that the

Table 2
Bivariate results.

	k	N	r	95% confidence interval	80% credibility interval	VSE	Q	I ²	Z
H1: Overall relationship	76	36,567	0.0769	0.0553: 0.0985	−0.0319: 0.1857	22.22%	342.86	78.13%	
H2: Industry control							30.60***		
No industry control	33	24,823	0.0969	0.0708: 0.1229	0.0107: 0.1830	22.42%	147.62***	78.32%	2.7803***
Industry control	43	11,744	0.0347	−0.0005: 0.0699	−0.0950: 0.1644	26.37%	164.64***	74.49%	
H3a–b: Performance measure							16.26***		
Returns	17	2124	−0.0297	−0.0998: 0.0403	−0.1795: 0.1201	37.09%	45.99***	65.21%	
Growth	14	3263	0.0756	0.0316: 0.1195	0.0079: 0.1432	60.45%	23.16**	43.86%	2.4951**
Market-based	49	32,185	0.0807	0.0558: 0.1055	−0.0215: 0.1829	19.13%	257.46***	81.36%	2.9113***
H4: Age							72.00***		
New ventures	27	6277	0.0361	−0.0108: 0.0830	−0.0993: 0.1715	27.85%	99.64***	73.91%	−1.6856*
Growth stage firms	22	8577	0.0990	0.0429: 0.1550	−0.0605: 0.2584	14.01%	155.24***	86.47%	
Mature firms	10	6194	0.0445	0.0129: 0.0760	0.0043: 0.0847	62.08%	15.98*	43.67%	−1.6598*
H5: IPO vs. earlier stages							8.94***		
IPO firms	59	34,272	0.0746	0.0511: 0.0982	−0.0311: 0.1804	20.03%	295.12***	80.35%	0.0308
Earlier stage firms	17	3252	0.0737	0.0222: 0.1252	−0.0299: 0.1773	44.30%	38.80***	58.77%	
H6: Uncertainty avoidance							9.32***		
High	16	2555	0.0722	0.0321: 0.1123	−0.0010: 0.1454	65.65%	24.33*	38.36%	−0.3582
Low	59	31,218	0.0821	0.0609: 0.1033	−0.0319: 0.1961	19.09%	309.21***	81.24%	

Note: First Q reported for each moderator represents the Q between groups. Other values represent Q within groups. k = number of independent samples, N = number of firms, r = sample-size weighted mean correlation, VSE = share of variance attributable to sampling error, Q = Q-statistic, I² = I²-Statistic, and Z = Z-statistic for difference in r between groups.

*** p<0.01.

** p<0.05.

* p<0.10.

Table 3
Results of the meta-regression.

	B	B	B
Unpublished	0.06***	0.09***	0.09***
VC measure	−0.06**	−0.05	−0.03
Subjective performance	0.06	0.00	−0.02
Industry control		−0.10***	−0.10***
Profitability		−0.08**	−0.06**
IPO-data		−0.11***	−0.12***
Uncertainty avoidance		−0.00*	0.00
Average age		−0.00	0.00
Average age squared			−0.01**
R ²	0.07	0.37***	0.39***

*** p<0.01.

** p<0.05.

* p<0.10.

null-hypothesis of homogeneity in the population of studies is to be rejected. Similarly, a value of 78.13% for the I^2 -statistics indicates heterogeneity in the population of studies. All of these results point to third variables moderating the VC–performance link.

As proposed in [Hypothesis 2](#), studies that do not control for industry effects deliver substantially stronger effect sizes for the VC–performance relationship ($r=0.10$) than studies that control for industry selection effects ($r=0.03$). The meta-analytic regression supports the result that industry control measures decrease the effect size significantly. To be more precise, the positive overall effect vanishes when studies incorporate industry control measures as the effect size among studies that control for industry effects is not significant. Taken together, the finding indicates that VCs choose the more promising industries, but are not able to consistently increase the funded firms' performance across all performance dimensions within an industry.

Turning to differences in the performance measures, the bivariate analyses and the meta-regression do support [Hypotheses 3a and 3b](#). Whereas VC investments have a small, positive impact on growth ($r=0.07$) and stock market performance ($r=0.08$), they do not influence the profitability of the funded firms ($r=-0.03$). In many cases, VC investments are even associated with lower profitability (e.g., [Jain et al., 2008](#); [Wong and Wong, 2008](#)). Although the confidence intervals of the sub-groups' "profitability-based studies" and "growth-oriented studies" slightly overlap, the other results (z value and increase in variance attributable to sampling error) indicate that the type of performance has a moderating influence on the strengths of the VC investment–performance relationship. The results of the meta-analytic regression further support this finding.

Moreover, in additional post-hoc analyses we re-calculated the bivariate analyses of the different performance dimensions only with the studies that control for industry selection effects to determine whether additional intra-industry effects exist with respect to the different performance dimensions. We find that the effect of VC investment on growth remains significant ($r=0.09$), while the effect on stock-market performance turns non-significant ($r=0.03$), and the effect on profitability is negative ($r=-0.09$).

In addition, we tested the effects of firm age, IPO vs. non-IPO firms and uncertainty avoidance on the effect size. According to bivariate and multivariate analyses, firm age has the hypothesized curvilinear relationship with the VC–performance link. The influence on the VC investment–performance relationship, i.e. the relationship between VC and funded-firm performance is strongest in growth stage firms ($r=0.10$), as compared to new ventures ($r=0.04$) and to established firms ($r=0.04$). The meta-regression also supports [Hypothesis 4](#) which proposes an inverted U-shaped effect as indicated by the negative coefficient for the squared term of firm age, which is significant.

Although we do not find a significant difference between the effect sizes for post-IPO studies in comparison to pre-IPO studies, the multivariate regression analysis which simultaneously tests age effects and IPO effects indicates a significant difference between pre-IPO performance and post-IPO performance effects. Empirical studies investigating post-IPO effects report lower effect sizes than the pre-IPO studies lending support for hypothesis 5.

Furthermore, the bivariate analysis indicates that firms in cultures with high uncertainty avoidance benefit significantly less from venture capital ($r=0.00$) than firms in cultures with low uncertainty avoidance ($r=0.08$). Yet, the coefficient for uncertainty avoidance is not significant when we control for additional moderators in the meta-regressions. Hence, we have to reject [Hypothesis 6](#).

Our control variables further indicate that the event of VC investment has a stronger impact on firm performance ($r=0.08$) than continuous measures of VC investment ($r=0.01$). This finding is, however not supported by the meta-analytic regression. Furthermore, we do not find evidence of a publication bias overestimating the strength of the relationship. In fact, unpublished work shows higher effect sizes ($r=0.13$) than published articles ($r=0.07$). Although, the confidence intervals of the two respective sub-groups overlap slightly, the z value and the results of the meta-regressions demonstrate that publication has a significantly negative impact on the effect size.

6. Discussion

This study was motivated by three questions: whether, how, and especially under which circumstances VC investment benefits the funded firms. Prior research presented conflicting theoretical arguments as to how firm performance is affected by VC

funding. Moreover, empirical findings were fragmented and inconclusive. Furthermore, the high variance in previous empirical findings pointed to the existence of contextual moderators. We built on prior theorizing about *selection* and *post-investment value added* effects and systematically structured our analysis according to the selection and value-added hypotheses (Brander et al., 2002; Dimov and Shepherd, 2005; Dimov et al., 2007; Lerner, 1994). Following an evidence-based research approach, we empirically synthesized research results based on 76 independent samples.

Our results show that overall VC has a positive, yet, weak effect on the funded firm's performance. However, the overall performance effect disappears if researchers control for industry selection effects. Moreover, another part of the variance in empirical results can be attributed to contextual factors including the type of performance studied, the age of the firm, and whether it is a publicly-traded or private firm. Uncertainty avoidance, however, does not moderate the relationship between VC and funded firm performance. Our findings have important theoretical and practical implications and suggest various promising avenues for further research.

6.1. Theoretical implications

Theoretical debates regarding performance effects of VC investments center on how VC investments influence funded firm performance. A prominent stream of literature proposes that VCs have comparative advantages in comparison to other financial intermediaries when operating in environments of missing or asymmetrical information (Amit et al., 1998). Further research points to two important effects that could explain a positive performance impact of VC investments on funded firms: selection and post-investment value added effects (Brander et al., 2002; Dimov and Shepherd, 2005; Dimov et al., 2007; Lerner, 1994). The empirical evidence from this study suggests that selection or more specifically, inter-industry selection, seems to play an important role for positive performance effects of VC investments. The relationship between VC and funded firm performance is significantly stronger if researchers did not control for industry. This indicates that VCs are indeed able to identify and invest in the more promising industries. Readily available information about the structure, status, and dynamics of industries appears to enable VCs to select the more promising industries. Hence, when comparing VC funded vs. non-funded firm performance across industries a positive performance effect of VC funded firms' results.

Strikingly, however, if researchers isolate the effect that VCs have on funded firms within an industry the comparative performance advantages of VC funded firms vanishes. This finding indicates that proposed advantages associated with VC investments might be partially offset by disadvantages. For example, in environments of missing or asymmetrical information, high risk and uncertainty, VCs might not be able to systematically identify the most promising firms within an industry (Amit et al., 1998). The inherent uncertainty of the entrepreneurial context might make predictions regarding who the winners within an industry difficult. Moreover, an adverse selection might cause that generally more subpar firms are willing to present themselves and take on VC investments. Taken together, our results raise doubts whether there is – on average – a positive intra-industry selection effect.

Moreover, the post-investment performance benefits including the actual provision of financial resources, managerial support, and monitoring may be offset by disadvantages. For instance, the financial resources provided by the VCs may create a false sense of security and reduce the need to focus on close customer interaction and fast positive cash-flow generation. Also, dependencies and strategic rigidities that are attached to financial resources provided by the VCs might particularly confine the emergent organization's ability to flexibly change strategic directions. In addition, the funded firms might also need to absorb the substantial transaction-costs given the high degrees of risk and uncertainty which would lower their resulting performance. Further, the search for VC investments requires substantial managerial time and attention that, depending on the stage of the venture, might be spent more efficiently on alternative activities.

The non-significant overall intra-industry effect is accompanied by strong indications of heterogeneity of the aggregated performance effects. Hence, we can assume that selection and post-investment effects unfold their benefits only on specific performance dimensions and under specific circumstances. Whereas the overall analysis combines all performance dimensions which leads overall to a non-significant relationship between VC investments and firm performance, the subsequent moderator analyses reveal a more differentiated picture. VC investments mainly lead to growth and higher valuations while profitability is unaffected. This finding supports our propositions that VCs strategically position their funded ventures to pursue growth paths while profitability increases are of a lesser concern or might not be achievable at the same time.

An important contingent effect relates to the age of the funded firms. Our findings suggest there might be a trade-off between decreasing uncertainty and, thus, higher likelihood of positive selection and a decreasing return for financial resources and value-added activities provided by VCs as ventures mature. Hence, we find indications for an optimal age or age range which we would term the "sweet-spot" of VC investments when these investments especially benefit the funded firms. More specifically, the inverted u-shaped relationship suggests that there is an optimal level of informational detail. If VCs invest very early, the lack of information might be excessive and lead to the VC's inability to successfully select. However, if they invest in very established firms, information is generally abundant and hence their specialized capabilities and relative advantage to operate in environments of risk and uncertainty lose value. Supporting this line of argument, we observe that the IPO event significantly alters the performance implications for the funded firms in addition to the age effects. Due to the disclosure requirements related to the IPO and as a public company, more information becomes available and information asymmetries decrease. The resulting decreasing uncertainty, in consequence, does limit VCs to provide unique value for their funded firms. Hence, our findings provide further support to scholars' theorizing that VCs have special capabilities to provide value in contexts of lacking and asymmetric information. It also suggests that the performance effects for the funded firms might depend on the availability of alternative

financial resources. If access to substantial financial capital is available through other means such as the public markets, the value that VCs can provide likely diminishes.

Overall, our findings suggest the need for a more contextual understanding of the VC investment-funded firm performance phenomenon in general and the selection and post investment benefits in particular especially taking into account the uncertainty of a venture. The variance of the effect sizes further cautions researchers to be sensitive to consider a comprehensive set of positive and negative outcomes of VC investments. Furthermore, researchers should take industry-selection effects into account when designing empirical studies and when drawing implications from their results. If scholars are interested and theorize about intra-industry effects of VC investment, but do not control for industry selection effects findings are likely biased. Moreover, research needs to focus on those dependent variables that are primary objectives of VC investments such as the evaluation of the funded firms and related growth metrics and take into consideration how the context impacts the availability of information and the resulting uncertainty.

While our results caution to critically reflect on the far-spread assumption about the overall positive effects of VC investments, we also acknowledge that the value provided by the different VCs likely varies to a great extent (e.g., [Fitza et al., 2009](#); [Guler, 2007](#); [Scherer et al., 2000](#)). In consequence, first tier VCs might be more proficient in selecting the more promising ventures, providing more and more valuable resources, and bestowing the funded firms with more positive signaling effects than lower tier VCs.

6.2. Managerial implications

Taken together, findings presented in our study challenge the assumption that VCs systematically select the most promising ventures and add value to funded firms across different contexts. Much of the positive performance effects are due to industry selection effects. If an entrepreneur, however, has already selected an industry to operate in, these positive selection does not appear to substantiate. This suggests that entrepreneurs need to carefully consider the value a specific VC can provide for them. However, our findings also show that VC investments can be value-creating especially with regard to firm growth while their contribution to simultaneous profit improvements can be very limited or even negative. Hence, entrepreneurs should reflect on their personal priorities with regard to growth and profitability before they consider a VC investment.

We further found that VC investments provide most value when firms are between 6 and 12 years old and when they are not yet publicly-traded. Thus, timing of the first investment and optimal duration of the investment seem to be important considerations in order to maximize the VC impact for the funded firm. At the same time, entrepreneurs should consider that in other stages VCs overall might impact the performance substantially less.

6.3. Limitations

Different limitations need to be acknowledged. First, we would like to highlight that to date no commonly accepted definition of VC exists. Prominent literature, however, argues that VCs are unique and differ from adjacent financial intermediary types such as business angels and LBO firms. In order to get a specific understanding of how VCs affect funded-firm performance, we aimed at excluding studies that included angel investments or LBO firms based on different study screening methods described in the [Method](#) section. However, a risk remains that authors of the primary studies included in this meta-analysis did not mention that these alternative financing forms are part of their samples.

Second, a common shortcoming of meta-analyses is the publication bias ([Rosenthal, 1979](#)). While we identified a significant number of unpublished studies, overall access to unpublished studies is limited. However, we assume that a normative bias of editors to publish only significant findings or findings that highlight specific effects is limited, because the performance effects of VC financing have always been controversially discussed. This suggests that a normative publication bias is unlikely. The comparison of published vs. unpublished studies further reveals that the unpublished studies present stronger effect sizes than the published studies. This contradicts a publication bias which is generally considered an upward bias.

Third, our results could suffer from a survival bias. VC-financed firms are generally pursuing strategies that promise greater returns, yet imply also greater chances of failure. Since the primary studies frequently do not account for differences in failure rates between VC-backed and non-VC-backed firms, the underlying studies may be biased, resulting in a potential survival bias of our aggregated findings. However, survival bias could have two opposing effects. On the one hand, firms that do not obtain VC funding might go bankrupt more often. On the other hand, the VC financed firms might aim for higher growth which could increase the risk of failure. Hence, it remains uncertain how a survival bias might affect the findings. This problem should be more frequently accounted for in the primary research. As researchers incorporate survival in their models of VC–performance effects, it allows future meta-analyses of survival effects.

Fourth, our research highlights that industry selection effects impact the VC investment–performance relationship. In a similar manner, other selection effects might exist that determine which firm acquires VC funding. These non-observed VC selection effects or the endogeneity of the choice of entrepreneurs to opt for VC funding could also bias our findings ([Hamilton and Nickerson, 2003](#)). However, primary studies generally do not account for these more advanced modeling techniques. Such self-selection effects could be addressed if the primary studies would use random control experiments. Yet, given the VC context, such research design has not been used. Hence, in order to contextualize our findings, future primary research should aim at analyze both positive and negative self-selection effects of firms aiming for VC.

6.4. Outlook

This is the first meta-analysis analyzing the impact of VC-investment on the funded firms. The synthesis of previous literature illustrates frequent research frameworks and less scrutinized relationships. Hence, research gaps can be identified. In addition, our findings suggest opportunities for future research. We would like to highlight a few salient research opportunities. First, although this meta-analysis presented some indications regarding the value that VCs provide for their funded firm and under which circumstances these benefits unfold, further research is needed to improve our understanding of selection and post investment performance effects. The limited overall effect as well as the variance in the underlying effect sizes of the VC and funded firm performance relationship indicates that both positive and negative selection and post-investment factors are present. Further, these negative and positive effects may only unfold under specific circumstances.

Hence, future research should aim at uncovering positive and negative effects for each of the two hypotheses (selection effects and post-investment performance effects), take the additional forms of a firms financing into account, and especially consider and report specific context factors such as stage of the VC investment and especially the quality of the VCs. In this regard, research frameworks that more thoroughly investigate the reputation of the different VCs, while simultaneously capturing the value of specific resources provided by VCs could advance current research. Although research on VCs reputation and their impact on funded firm performance exists (e.g., [Brau et al., 2004](#); [Campbell Li and Frye, 2006](#); [Nahata, 2008](#)) the mechanisms behind these performance effects as well as their specific value remain unclear. For example, out of 10 studies in this analysis which look at different measures that could be somewhat related to the quality of the VCs, 7 find insignificant or mixed results. Moreover, we identified only four studies that specifically addressed the quality of the VC by having respondents rate the quality of the VC's activities. These studies obtain a non-significant average effect size of $r = 0.016$ that is comparable to the overall effect when controlled for industry. Yet, we understand these initial findings as only suggestive and believe that more research needs to be directed as this aspect aiming for a more rigorous empirical measurement regarding the VC's quality and the resources they provide as well as an incorporation of longitudinal research designs to address causality concerns. A recent study by [Krishnan et al. \(2011\)](#) provides a step in this direction by separating selection and value-added effects and linking them to VCs reputation. Yet, this study looks at post-IPO performance effects and, thus, misses out on important stages of VC funding prior to an IPO.

Moreover, the success of VC investments may depend on the expertise and the size of the VCs. Previous research has pointed out that the type of VC may influence strategy-making and the success of funded firms. For example, [Mäkelä and Maula \(2005\)](#) argue that cross-border VC funding influences internationalization processes of funded firms. Furthermore, VCs affiliated to banks or governments may have a different impact on the performance of funded firms than independent venture capitalists (e.g., [Hamao et al., 2000](#); [Tykvova and Walz, 2007](#)). However, empirical research on these issues has been scarce. Another important perspective is that the individual partners of a VC might vary substantially in quality and resources they can provide. Hence, studies could focus more on the individual level to understand which individual factors of the VC partners affect the funded firm performance. In sum, more research on the characteristics of VCs and their moderating influence on the VC–performance link is needed, which in consequence would enable evidence-based researchers to address respective questions.

Another important contingency that could not be addressed in the present study is the expertise of the funded firm's top management team. For instance, the ability of the entrepreneurs to collaborate with the VCs and to deploy capital effectively and efficiently appears to be another important yet under-researched contextual factor that impacts the VC investment performance relationship.

Extant VC research predominantly focuses on IPO events. Out of the 76 independent samples integrated in this meta-analysis 59 focused on firms that had an IPO. This leads to a shortage of studies which scrutinize the impact of VCs on smaller and newer firms. Hence, more research about firms that are in the early stage of their life cycle and are of smaller size is warranted to complement the existing empirical work. This gap in research presents a special opportunity for entrepreneurship researchers. Research on IPO performance is dominated by finance scholars whose main interest is the explanation of stock-market performance differentials at and post-IPO. Because entrepreneurship as a field of research emphasizes the discovery and exploitation of opportunities ([Shane and Venkataraman, 2001](#)) and entrepreneurship scholars have an expertise in investigating dynamics of new ventures, entrepreneurship research is well-positioned to address the gap of research regarding early-stage VC investments. In this regard, we especially believe in the potential for entrepreneurship scholars to include non-financial aspects such as cognition of the VCs or entrepreneurs, strategy constructs, or team configuration variables in the analyses.

In our call for further non-IPO or post IPO studies we also would like to address the value of replication studies. We are concerned that in entrepreneurship and management science scholars predominantly strive for novel research frameworks at the expense of repetition studies while in other disciplines such as medicine or education science replication and empirical synthesis are a common practice. We believe that future research would benefit if researchers would more regularly report findings regarding study elements that previous research addressed even if and especially if respective findings are non-significant.

Further, we call for a more extensive description of the sampled VCs. Our provided overview of the studies underlines this shortcoming in extant research. Only one study distinguishes between funding stages when reporting bivariate statistics ([Alemany and Marti, 2005](#)). Two more studies explicitly include only start-ups ([Engel and Keilbach, 2007](#); [Stubner et al., 2007](#)) while another study documents the focus on pre-IPO investments in growth stages ([Wang et al., 2003](#)). We believe that a more detailed description of the sampled funded firms and the characteristics of the VCs helps scholars contextualize the findings and can help in identifying more specific effects.

Understanding the mechanisms via which VC investors add value to early-stage ventures still remains an under-researched, but important topic in the VC literature. Gaining further knowledge about these mechanisms and the contingencies under which

they unfold their benefits would advance this stream of research. Because it is difficult to capture the performance effects of VC investments on early-stage ventures for instance due to the multi-dimensional nature of firm performance (Combs et al., 2005), researchers should use multiple measures including perceptual and objective indicators of firm performance and also consider that the importance of the performance dimensions for entrepreneurs and their investors might change as the firm develops and establishes itself in the marketplace.

Overall, this study aimed at highlighting the need for a more contextual understanding of VC investment–performance. Specific variables relating to the funded firm, the funding VC and the funding context need to be taken into consideration when determining whether a VC investment is beneficial for the funded firm. While we see substantial progress VC research made in the last decades, we hope that our study serves as a point for reflection. We further hope that the suggested avenues for future research inspire scholars to identify specific mechanisms how more generally financial management can contribute to create value for entrepreneurial firms given the different investment contexts.

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