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Lohwasser, Todor S.

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Meta-analyzing the relative performance of venture capital-backed firms

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Meta-Analyzing the Relative Performance of Venture Capital-Backed Firms

Todor S. Lohwasser

Abstract

In this study, we perform a meta-analysis on existing research covering the relationship between a venture capitalist's involvement (VCI) and the performance (P) of funded firms. As research on this topic has been inconclusive, we aim to determine whether providers of venture capital (VC) only possess superior scouting capabilities or whether they can also provide additional value beyond the simple endowment of financial resources. Furthermore, we determine whether the nature of the institutions in the funded firms' home countries, in terms of institutional quality and financial market efficiency, is a critical factor in the VCI – P relationship. We argue that a venture capitalist's decision to actively engage in its portfolio firms and provide value beyond capital depends on the quality of formal institutions and the likelihood of achieving a successful exit. We test our arguments using a meta-analytical approach on a dataset of 984 effect sizes in 15 individual countries. Our results show that venture capitalists have advantages stemming from superior selection and guidance capabilities. In addition, our results confirm that higher quality of formal institutions and the efficiency of the financial market in the startups' home countries strengthen the VCI – P relationship. In essence, we help corroborate arguments from the resource-based view, which suggest that the success of a VCI depends on institutional factors.

JEL Codes: G2, G24, L25, M13, O43

Metaanalyse der relativen Performance von Venture-Capital-finanzierten Unternehmen

Zusammenfassung

In dieser Studie wird eine Metaanalyse der gegenwärtig vorliegenden Forschung durchgeführt, die sich mit der Beziehung zwischen der Venture Capital-Beteiligung (VCI) und der Performance (P) der finanzierten Unternehmen befasst. Da die Forschungsergebnisse zu diesem Thema nicht eindeutig sind, wird untersucht, ob Anbieter von Venture Capital ihre Portfoliobeteiligungen nur besser auswählen oder ob sie auch über die bloße Ausstattung mit finanziellen Mitteln hinaus einen Mehrwert, z. B. durch aktives Engagement, generieren können. Darüber hinaus soll ermittelt werden, ob die Art der Institutionen in den Heimatländern der finanzierten Unternehmen hinsichtlich ihrer Qualität und Finanzmarkteffizienz einen Einfluss auf die Beziehung zwischen VCI und P hat. Es wird argumentiert, dass die Entscheidung eines Risikokapitalgebers, über das Kapital hinaus Unterstützung zu leisten, von der Qualität der formalen Institutionen und der Wahrscheinlichkeit eines erfolgreichen Exits abhängt. Diese Argumente werden mit Hilfe eines metaanalytischen Ansatzes anhand von 984 Effektgrößen aus 15 einzelnen Ländern getestet. Die Ergebnisse zeigen, dass Risikokapitalgeber Vorteile haben, die sich aus ihren überlegenen Fähigkeiten zur Auswahl und Unterstützung der Portfoliobeteiligungen ergeben. Darüber hinaus bestätigen die Ergebnisse, dass die höhere Qualität der formalen Institutionen und die Effizienz des Finanzmarktes in den Heimatländern der Portfoliounternehmen die Beziehung zwischen VCI und P stärkt. Dies stützt Argumente der ressourcenbasierten Sicht, dass der Erfolg einer VCI von institutionellen Faktoren abhängt.

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Westfälische Wilhelms-Universität Münster
Institut für Organisationsökonomik
Scharnhorststraße 100
D-48151 Münster

Tel: +49-251/83-24303 (Sekretariat)
E-Mail: io@uni-muenster.de
Internet: www.wiwi.uni-muenster.de/io

Meta-Analyzing the Relative Performance of Venture Capital-Backed Firms*

1. Introduction

For decades, venture capital (VC) has helped provide financial resources to young and innovative firms that have risky business models but also very high potential to grow (Hellmann & Puri, 2000; Sahlman, 1990). When comparing different options to finance startups, VC is generally associated with enormous returns for its investors and the stimulation of innovation and economic growth (Grilli, Latifi, & Mrkajic, 2019; Kortum & Lerner, 2000). Providers of VC are perceived as highly successful scouts of risky startups with promising business models in fast-growing industries that would usually suffer from resource restrictions (Gompers & Lerner, 2001). Besides selecting a promising portfolio of companies, venture capitalists have been associated with active engagement and the provision of value beyond simply offering financial resources. For instance, venture capitalists provide guidance, value-adding services, such as integration into the venture capitalist's network, and establish professional and active monitoring (Chemmanur, Krishnan, & Nandy, 2011; Lerner, 1995; Sapienza, 1992). As a result, VC-backed firms benefit by having more resources at hand and experiencing fewer conflicts and transaction costs between entrepreneurs and investors (Kaplan & Strömberg, 2001).

Still, in contrast with situations in the past, the occurrence of highly scalable business models and recent low interest rates have resulted in dozens of young VC-backed firms worth over $1bn, but they are far from being profitable (Economist, 2019). Thus, much attention has been devoted to capturing the effect of the relationship between a venture capitalist's involvement (VCI) and the backed firm's performance (P). In most cases, scholars observe a positive association (e.g., Bertoni, Colombo, & Grilli, 2011; Engel & Keilbach, 2007). However, comparing VC-backed firms with non-VC-backed firms generally suffers from severe methodological weaknesses regarding the biased selection of the sample (Bertoni et al., 2011; Brander, Amit, & Antweiler, 2002; Rosenbusch, Brinckmann, & Müller, 2013). For instance, numerous studies argue that venture capitalists have superior capabilities in selecting young firms based on numerous criteria, such as their business models (Baum & Silverman, 2004), human capital endowment (Bertoni, D'Adda, & Grilli, 2019; Colombo & Grilli, 2010), and other firm-specific characteristics (Lee & Wahal, 2004; Puri & Zarutskie, 2012). Therefore, research on performance outcomes reveals a puzzling picture, as studies also reveal non-significant (e.g.,

* The author thanks Alexander Dilger for his valuable suggestions.

Campbell & Frye, 2009) and even negative results (e.g., Jain, Jayaraman, & Kini, 2008). Several reviews (e.g., Drover et al., 2017) and meta-analyses (Rosenbusch et al., 2013; Tanda & Manzi, 2019) have attempted to sort out this puzzling picture and provide a clear definition of different types of startup funding.

Furthermore, literature suggests that the availability of VC varies across countries (e.g., Grilli et al., 2019; Groh & Wallmeroth, 2016; Wright, Pruthi, & Lockett, 2005). For instance, while the volume of global VC investments has increased tenfold in the last ten years, the United States and China share approximately 80% of the total VC in the market (Preqin, 2019). Naturally, research primarily focusses on these geographic areas, neglecting institutional and capital market-based cross-country differences. At present, little empirical research exists on how the a country's institutions affect the VC-funded firms' performance (e.g., Li, Vertinsky, & Li, 2014; Lin, Li, Peng, & Zhang, 2017). The idea that national characteristics affect business firm performance has been at the heart of international business research for years (e.g., Chahine, Filatotchev, & Wright, 2007; Sapienza, Manigart, & Vermeir, 1996).

The purpose of this study is twofold: First, we seek to address the theoretical debate of whether venture capitalists possess a selection advantage, and we aim to determine their true ability to add value to the firms in their portfolio (Chemmanur et al., 2011). While Drover et al. (2017) shed light on the different types of startup equity financing, Tanda and Manzi (2019) reveal in a meta-analysis that venture-backed IPOs have higher underpricing, but the extent varies between countries. Regarding the VCI – P relationship, Rosenbusch et al. (2013) assessed the effects of industry controls in primary studies and find support for the idea that venture capitalists possess selection advantages. More specifically, they show that the positive effect of a VCI vanishes if the primary study controlled for industry selection effects. Besides methodological concerns, it remains unclear how other characteristics, such as business models, human capital, and other firm-specific characteristics influence this relationship.

Second, we seek evidence to assess how the VCI – P relationship is moderated by the firm's home-country formal institutions and the efficiency of the financial market. An emerging topic of discussion in the VC literature has been the increasing internationalization activities of venture capitalists (Drover et al., 2017). More specifically, studies have widely confirmed the impact of both formal and informal institutions on VC activities (Gu & Lu, 2014). While Grilli et al. (2019) review the effects of institutions on VC activity, the literature lacks empirical evidence of how institutions impact the performance of VC-backed firms.

With the present work, we aim to resolve these research gaps by performing a meta-analysis on existing research that discusses the VCI – P relationship across 15 developed and developing countries and investigating how institutions moderate this relationship. Our models rely on the resource-based view and on transaction cost economics to argue that venture capitalists possess superior capabilities in selecting the most promising ventures in attractive markets, and provide capital and other valuable resources, such as access to their professional network and active engagement, to their portfolio firms. We further argue that the willingness to provide capital and other resources becomes stronger as the quality of institutions and the efficiency of financial markets increase. We test our arguments based on a dataset of 984 effect sizes, from 71 individual studies from 1964 through 2014 and contribute to research in two ways.

First, in order to address the general question of whether venture capitalists are simply superior scouts or also better guides (Baum & Silverman, 2004; Colombo & Grilli, 2010), we apply a meta-analytic regression analysis and control for this assumption through including partial correlation coefficients instead of simple bivariate correlations. Therefore, this study not only controls for industry-selection effects but its superior design additionally makes use of all information included in the respective models of the primary study. This sophisticated analysis uncovers that the performance measures generally decrease but remain positive and significant. Using the theoretical lens of the resource-based view, we provide evidence that venture capitalists are able to transfer more than just financial capital to their portfolio firms. Furthermore, we disentangle different performance dimensions and show that venture capitalists provide relevant resources to foster growth and achieve a timely exit. We further postulate that investors value venture capitalists' efforts to professionalize the ventures' governance and monitoring systems, as VC-backed firms achieve higher performance in terms of market measures than their non-VC-funded counterparts.

Second, this study further portrays that the VCI – P relationship is moderated by the quality of institutions and the efficiency of the markets to be willing to provide sufficient resources and a deeper integration into their professional network. Based on meta-analytic regression analysis, we show that the quality of institutions positively moderates the VCI – P relationship by reducing the uncertainty for both venture capitalists and their portfolio firms. This holistic view extends research on the VCI – P relationship by explaining the reasoning behind why venture capitalists decide to provide a certain amount of resources and engagement to their portfolio firms.

2. Theoretical Background and Hypotheses

Startups and their entrepreneurs require financial resources to transform their innovative ideas into new products, finance their operations, and become relevant market players through growth (Chittenden, Hall, & Hutchinson, 1996; Jeng & Wells, 2000). However, entrepreneurs often suffer from financial restrictions since they cannot finance their growth by savings or debt (Denis, 2004). Additionally, they shy away from the approach of issuing too much equity too early to increase the firm's resources. As a result, startups need to choose between financing their growth and operations by retaining profits, taking on debt, or making use of outside equity. An extensive amount of research has focused on the growth implications of different types of startup funding.

First, by retaining profits, entrepreneurs can refrain from diluting their ownership stake and remain independent from external shareholders. Their desire to keep control, however, limits the firm's financial resources and complicates growth (De Bettignies, 2008; De Bettignies & Brander, 2007). Through the unification of ownership and management, startups evade agency costs, and moral hazard might only be an issue between multiple entrepreneurs (Eisenhardt, 1989; Jensen & Meckling, 1976).

Second, by acquiring financial resources through debt, startup growth can be accelerated. Entrepreneurs and bank employees often internalize their relationship with time, leading startups to increased access to further capital, information, and other services (Thomsen & Pedersen, 2000). Still, financing through debt comes with certain disadvantages and is usually not an exclusive option. Apart from the limited amount of debt a startup can get, banks are keen to keep their risk low, such that they are generally reluctant to provide high loans to startups that follow a model that is too risky or innovative. Banks usually favor risk-averse decisions, since they will not directly benefit from the startup's growth and at best will only get back the loan amount, including bank fees and interest (Winton & Yerramilli, 2008). Besides, many startups are typically not profitable from the beginning and lack tangible assets as a security (Denis, 2004). Indeed, it can also be argued that information asymmetries and agency costs are very high in this setup.

Third, by issuing equity at an early stage, a startup might be able to overcome this burden. When entrepreneurs pursue fast growth, e.g., to quickly enter or even create a market with their idea, outside equity funding is a common arrangement for high-growth-potential startups (Drover et al., 2017). Winton and Yerramilli (2008) suggest that VC financing is most suitable

when young and innovative firms follow an aggressive growth strategy that is usually not profitable in the beginning. Furthermore, VC financing seems applicable if the entrepreneurs expect small or even negative returns for a certain time, but where there is a small chance of exceptionally high returns (Sahlman, 1990; Winton & Yerramilli, 2008).

Nevertheless, VC funding is usually only temporary, regardless of whether startups are funded or already more successful firms. Aghion, Bolton, and Tirole (2004) argue that this is because venture capitalists only have limited capital available and investors expect to realize returns by managing young ventures until a beneficial exit option arises (Kaplan & Strömberg, 2004). As a result, an extensive amount of research has focused on the performance implications of VC-funded firms. Even though different types of entrepreneurial equity investments, such as accelerators, angel investors, corporate VC providers, and crowdfunding, have occurred and been studied, research on equity financing in growth stages tends to focus mostly on VC (Tykvová, 2018).

Typically, venture capitalists raise funds from investors and partners and aim at providing a suitable return to these investors by selecting a portfolio of promising firms at an early stage and providing strategic and operational guidance through active engagement (Gompers & Lerner, 2000; Hellmann & Puri, 2000). Characteristically, venture capitalists are small and provide follow-on funding (Sapienza, 1992; Sørensen, 2007) to mid-stage and later stage startups (Drover et al., 2017). More specifically, they usually invest after angel investors have provided the first sources of capital to the startup (Hellmann & Thiele, 2015). Venture capitalists usually provide outside capital from formal (i.e., professional or institutional) investors and are typically actively involved in funded firms (Gompers & Lerner, 2001; Sahlman, 1990). Contrary to angel investors, who mainly invest their own funds at a startup's early stages and occasionally pursue other than economic goals with their investments (Drover et al., 2017; Mason & Harrison, 2002; Wright & Robbie, 1998), venture capitalists connect young and innovative startups that have a higher risk of failure (Amit, Brander, & Zott, 1998; Ruhnka & Young, 1991) with investors who expect high return potential (Amit et al., 1998; Hall & Hofer, 1993). To mitigate this risk, venture capitalists often invest in a broad portfolio of young ventures and regularly seek investment syndication (Fama & MacBeth, 1973; Manigart et al., 2006; Markowitz, 1952).

To realize gains and transfer the profit to the investors, venture capitalists aim for a funded startup to make a timely exit through an acquisition or initial public offering (IPO) (Black & Gilson, 1998; Cumming, Fleming, & Schwienbacher, 2006). An exit via IPO is an attractive

goal for both venture capitalists and entrepreneurs, as wealth can be returned to the investors while entrepreneurs, depending on the dispersion of ownership, may re-confer control of their firm (Grilli et al., 2019). Through successful deals, they build up experience and reputation and raise new financial resources for further funds and projects (Black & Gilson, 1998; Nahata, 2008). These extended funds can be used to facilitate further growth of their portfolio firms, while successful exits signal quality for future IPOs and regularly lead to higher share prices (Gompers, 1996; Nahata, 2008; Sørensen, 2007).

In research, the success of venture capitalists is usually associated with two main advantages: First, a VCI provides financial resources and other value through active engagement. Depending on the type of bottleneck, venture capitalists may be able to switch between different roles and engage in mentoring and coaching, business consulting, recruiting of necessary human capital, sounding board actions, or simply act as a monitoring financier (Kanniainen & Keuschnigg, 2004; Timmons & Sapienza, 1992). Second, venture capitalists are perceived to be better scouts that select the most promising startups. Inherently, this reduces information asymmetries and discourages potential opportunism between the venture capitalist and the venture (Amit et al., 1998; Gompers, 1995).

2.1. Venture Capitalists and Their Ability to Add Value to Their Portfolio Firms

VCI is expected to create additional value for their portfolio firms in different ways. From an organizational perspective, the main benefit of acquiring VC is to gain financial resources. These additional resources may be used to upgrade operations, invest in human capital, and develop a certain degree of professionalization, such as governance structures and human resources management (Farag, Mallin, & Ow-Yong, 2014; Hellmann & Puri, 2002). Apart from the simple provision of financial resources, venture capitalists additionally support their portfolio firms by integrating them in their professional environment. This ecosystem offers the portfolio firm access to the venture capitalist's network of relationships (Shane & Cable, 2002), the capability to recruit valuable human capital (Bottazzi, Darin, & Hellmann, 2008; Hellmann & Puri, 2002), and advice in, e.g., finance, marketing and strategy as well as legal and accounting matters (Kanniainen & Keuschnigg, 2004).

The opportunity to capitalize on these relationships may support a venture capitalist to connect the entrepreneurs of their portfolio firms with valuable contacts, such as potential customers, suppliers, collaboration partners, career networks, or even further investors. This way, a VC-backed firm might get access to human capital and further financial resources but perhaps also

to other production facilities and distribution networks that are capable of increasing revenue streams (Hellmann & Puri, 2000, 2002). Furthermore, venture capitalists actively monitor and coach the entrepreneur and management teams of their portfolio firms (Ehrlich, De Noble, Moore, & Weaver, 1994; Yoshikawa, Phan, & Linton, 2004), which enables the ventures to capitalize on the venture capitalist's management capabilities and experience. Bernstein, Giroud, and Townsend (2016) illustrate that active on-site involvement of venture capitalists is especially important for increasing a startup's innovations and chance of an IPO. Hence, venture capitalists support their portfolio firms with financial resources and skills that complement the resource stock of the funded startup firm (Macmillan, Kulow, & Khoylian, 1989; Sapienza, 1992).

Correspondingly, related research shows that the profitability of a firm depends not only on the firm's ability to create value but also on the capabilities of the management to capitalize on this (Blanco-Mazagatos, De Quevedo-Puente, & Castrillo, 2007). Venture capitalists can use their monitoring systems to detect where their portfolio firms require support to handle additional resources to improve the VCI – P relationship (Wijbenga, Postma, & Stratling, 2007). Furthermore, Drover et al. (2017) argue that venture capitalists utilize contractual mechanisms to support their portfolio firms' management and align their interest toward a successful exit (Bayar & Chemmanur, 2011). Thus, hazardous behavior and agency costs can be expected to be lower with a VCI compared to other types of funding (Arthurs & Busenitz, 2003). Moreover, a VCI can be expected to reduce agency costs between multiple entrepreneurs or already larger management teams in a venture, as they can be considered as objective intermediaries following a common goal.

As a consequence, the additional financial resources and active engagement should increase the general VCI – P relationship. Hence, we expect that a VCI provides financial resources as well as other essential assistance, and we posit the following:

H1a: *VC-backed firms achieve higher financial performance measures than non-VC-backed firms.*

Especially for young and innovative startups with high growth ratios, financial performance should not be considered as a single facet for measuring the VCI–P relationship. Instead, organizational performance is assumed to consist of multiple dimensions, such as efficiency (Bottazzi, Secchi, & Tamagni, 2008; Combs, Crook, & Shook, 2005). Chemmanur et al. (2011) and Croce, Martí, and Murtinu (2013) find that a VCI significantly increases the productivity

of startups. As monitoring can be expected to increase the performance of VC-backed firms (Hellmann & Puri, 2002; Lerner, 1995), it can also be expected to increase their productivity. More specifically, productivity is found to be increased by monitoring aimed at detecting any need for managerial support and consulting as well as monitoring aimed at identifying potentially hazardous management behavior (Chemmanur et al., 2011). Through value-adding monitoring, venture capitalists may detect operational and strategic weaknesses early and provide advice and resources to eliminate them. By further providing administrative, legal, and accounting advice, back-office activities can be streamlined and organized more efficiently. By contrast, monitoring that simply aims to reduce costs may not increase the performance of funded firms (Wijbenga et al., 2007). Nevertheless, monitoring to disclose activities arising from managerial misconduct or the pursuit of non-financial goals to maximize the entrepreneurs' utility is also expected to foster efficiency and productivity in VC-backed firms.

In line with the arguments regarding superior financial performance of VC-funded firms, we also expect a similar impact of a VCI on the funded firm's productivity:

H1b: *VC-backed firms achieve higher productivity measures than non-VC-backed firms.*

Indeed, profitability and productivity of VC-backed firms, especially in comparison to firms with similar lifecycles, can be assessed to compare the performance of a firm. Nevertheless, as an IPO is usually considered to be the preferred exit option, a strategic trade-off exists between aiming at firm growth or firm profitability (Bayar & Chemmanur, 2011; Davidsson, Steffens, & Fitzsimmons, 2009). Research argues that venture capitalists already prefer selecting startups with a potential for high growth, as firms with higher sales are more likely to go public than being acquired (Bayar & Chemmanur, 2011; Poulsen & Stegemoller, 2008). Because of their financial restrictions, firms that seek an exit via IPO are considered as more keen to grow fast (Poulsen & Stegemoller, 2008). In this context, Chemmanur et al. (2011) find that a VCI increases growth by 18.5% compared to similar firms that had not received VC financing, and Puri and Zarutskie (2012) observe that VC-funded firms are able to achieve higher and faster growth in revenue compared to their non-VC-funded counterparts. However, Belden, Keeley, and Knapp (2001) pose that these higher growth rates of VC-funded firms vanish after an IPO. Therefore, it can be expected that venture capitalists have incentives to provide resources and advice that direct their portfolio firms toward growth rather than profitability.

To achieve an exit, the entrepreneurs and venture capitalists have a strong incentive to emphasize becoming market leaders in a rapidly growing market and send valuable signals, as this

grants them a premium when terminating their investment (Bayar & Chemmanur, 2011; Reuer, Tong, & Wu, 2012). To promote growth and increase scale, venture capitalists are expected to exploit their network extensively (Hochberg, Ljungqvist, & Lu, 2007). Furthermore, a VCI might attract further funding with time, such as from banks and other investors, and to form syndicates (Bottazzi & Da Rin, 2002; Bottazzi et al., 2008; Lerner, 1994). Venture capitalists can also help to initiate the exit process through their experience and relationships (Kanniainen & Keuschnigg, 2004). After successful growth, profitability can be fostered through market power, economies of scale, and economies of scope (Davidsson et al., 2009).

Already at their early phases, entrepreneurs of promising startups likely self-select VC financing to win over markets quickly rather than focus on profitability. Similarly, venture capitalists can be expected to reduce information asymmetries by assessing the entrepreneur's motivation and selecting promising firms with mainly scalable business models and a high potential for rapid growth. Through this alignment of interests, both the venture capitalists and entrepreneurs have an incentive to allocate the necessary financial and non-financial resources to promote firm growth (Rosenbusch et al., 2013). This can be secured through intensive monitoring and active involvement in the firm (Bottazzi et al., 2008; Sapienza, Amason, & Manigart, 1994).

Consequently, this reasoning leads us to expect that the growth focus of venture capitalists results in higher growth rates of VC-backed firms. Hence, we can add the following hypothesis:

H1c: *VC-backed firms achieve higher growth measures than non-VC-backed firms.*

2.2. The Effect of Selection Bias in VC Research

Besides the positive expectations of the research stream regarding the abilities of venture capitalists to add value after funding, a great deal of attention has been devoted to their superior capabilities to select the most promising firms (Baum & Silverman, 2004; Kaplan, Sensoy, & Strömberg, 2009). Literature argues that venture capitalists are ascribed superior abilities in scouting the most promising firms and evaluating them according to observable and unobservable criteria (Baum & Silverman, 2004). For instance, Rosenbusch et al. (2013) explain the positive VCI – P relationship with selection effects, as venture capitalists select portfolio firms that operate in the most promising industries. Further selection criteria are attributed to the business models of potential firms (Baum & Silverman, 2004), the human capital of the entrepreneurs and employees (Bertoni et al., 2019; Colombo & Grilli, 2010), and other firm-specific characteristics, such as the stage of funding (Lee & Wahal, 2004; Puri & Zarutskie, 2012). As described before, venture capitalists prevalently engage in risky and dynamic environments and

select relatively young firms with high potential but uncertain success rates (Ueda, 2004; Wright & Robbie, 1998).

First, to receive VC, startups are keen to signal the potential of their business model, as venture capitalists value certain types of firms with very innovative business models (Amit et al., 1998; Gompers, Gornall, Kaplan, & Strebulaev, 2020). Engel and Keilbach (2007) demonstrate that venture capitalists choose startups with particularly innovative output. Further characteristics may be related to certain industries, lifecycle stages, or even geographic characteristics, such as the geographic proximity to venture capitalists (Lee & Wahal, 2004; Puri & Zarutskie, 2012). Kaplan and Strömberg (2004) describe that venture capitalists focus on a variety of variables when making their investment memoranda, such as the general market and competitors, the product, and the technology behind the business model in general. While some researchers find that venture capitalists choose business models over human capital, more recent research considers that venture capitalists put more importance on a firm's entrepreneurial team than on their business model or technology (Fisher, Kotha, & Lahiri, 2016; Gompers et al., 2020).

Therefore, social, intellectual, and human capital as well as the quality of the entrepreneurs are decisive selection criteria for venture capitalists (Baum & Silverman, 2004). However, many of these characteristics are not or only partially observable. Warnick, Murnieks, McMullen, and Brooks (2018) argue that the passion and value that entrepreneurs contribute to their product or service are very attractive to venture capitalists. Also, management experience is attractive, as this seems to be a key to successful growth, even for technology-based startups (Nuscheler, Engelen, & Zahra, 2019).

Besides the firm-related variables, Rosenbusch et al. (2013) argue that venture capitalists preferably invest in specific industries and areas. More specifically, venture capitalists tend to focus on high-growth industries related to high-tech (e.g., Bertoni et al., 2011; Colombo & Murtinu, 2017; Grilli & Murtinu, 2015; Lee & Wahal, 2004) and biotechnology (e.g., Baum & Silverman, 2004; Strömsten & Waluszewski, 2012). Kortum and Lerner (2000) and Engel and Keilbach (2007) claim that venture capitalists are more active in industries with significantly higher levels of patenting. Lee and Wahal (2004) examined a mixed-industry sample and they conclude that VC backing is not "randomly distributed, but represents an endogenous choice" (p. 377), which creates a selectivity bias.

Also, some industries offer higher exit rates than others, as young and innovative ideas provide an attractive environment for investments. Rosenbusch et al. (2013) claim that in emerging

industries competition and industry knowledge are limited for all market participants. Venture capitalists, however, may relate specific conditions to experiences with previous investments in risky and fast-growing markets and derive strategies from those. Their capabilities and networks allow them to select exceptionally promising firms in the fastest growing industries. Furthermore, venture capitalists know how to use their reputation and networks to boost growth and to set the funded firm as a market leader in a rapidly growing environment. The combination of these selection advantages in terms of more promising business models, entrepreneurial human capital, and industry selection leads to advantages in scouting compared to other non-VC types of financing.

As a result, superior knowledge and selection capabilities may facilitate venture capitalists to adequately assess the risk–reward potential (Hall & Hofer, 1993). These excessive stages of selection are a positive signal to other stakeholders, such as customers, employees, suppliers, or further investors and banks (Rosenbusch et al., 2013).

From a performance point of view, the question remains whether the positive VCI – P relationship results from superior selection capabilities of ventures or whether a VCI can provide additional value through active engagement. This reasoning leads us to expect that the performance of firms, independent of whether they receive VC funding or not, depends on factors related to their business model, human capital endowment, and industry. Following this logic, we formulate the following hypothesis:

H2: *The association with superior performance of VC-backed firms decreases if the primary studies use control variables.*

2.3. Home-Country Institutions and the VCI – P Relationship

Besides the moderating effect of selection, research further describes that the home-country of the portfolio firms and the differences between formal and informal institutions influence the degree of advantages associated with a VCI (Chahine et al., 2007; Sapienza et al., 1996). For instance, Hofstede's dimensions of national culture (Hofstede, 2001) as well as other institutional measures have been widely applied in research on VC (Grilli et al., 2019; Rosenbusch et al., 2013). Institutions define "the rules of the game in a society […] that shape human interactions" (North, 1990: 3) and provide stability in interpersonal relationships (Scott, 1995).

For VC activity, research has focused on gauging the effect of cultural attributes and institutions on VC activity (for an overview, see Grilli et al., 2019). For instance, uncertainty avoidance is

negatively associated with VC activity (e.g., Aggarwal & Goodell, 2014; Cumming, Henriques, & Sadorsky, 2016; Li & Zahra, 2012). In terms of formal institutions, a variety of research finds that VC activity is more pronounced in countries with a higher quality of formal institutions (e.g., Cumming et al., 2016; Li & Zahra, 2012), more developed financial markets (Cumming et al., 2016; Groh & Wallmeroth, 2016; Ning, Wang, & Yu, 2015), and more powerful investor protection rules (Aggarwal & Goodell, 2014; Bedu & Montalban, 2014; Groh & Wallmeroth, 2016). Formal institutions affect the legal constraints of firm strategies and guide economic activities between firms and countries (Peng, 2002). Literature additionally shows that VC activities are also influenced by other contexts, such as the capital raised and the timing of deals (Dai, Jo, & Kassicieh, 2012), syndication (Gu & Lu, 2014), and governance strategies (Cumming, Schmidt, & Walz, 2010).

Although much research in this area has been done on VC activity, literature evaluating how the national culture and formal institutions affect the VCI – P relationship is rare. In line with the findings on VC activity, Rosenbusch et al. (2013) find in a meta-analysis that uncertainty avoidance is negatively related to the VCI – P relationship. We expect that the quality of financial institutions and the efficient allocation of financial resources in financial markets have a significant impact on the VCI – P relationship.

2.3.1. Quality of Formal Institutions

While cultural and institutional distance is generally perceived to have adverse effects on the success of VC-funded firms (Li et al., 2014), Cumming et al. (2010) illustrate that legal quality reduces the costs and time of deal screening and potential agency problems in dealing with business partners and VC syndicates. The quality of formal institutions may affect the VCI – P relationship through the extent of resources provided by the venture capitalist, the VC-funded firm's interaction with its stakeholders, and the interaction between venture capitalists and their portfolio firms.

First, as venture capitalists prefer to invest in young and innovative firms, they can be expected to devote more attention to exploiting the firm's intellectual property in order to successfully capitalize on it (Engel & Keilbach, 2007). As countries with more powerful formal institutions protect innovative firms as well as their investors from patent infringements and deceptive business practices, venture capitalists can be expected to be willing to devote a more considerable amount of financial and value-adding resources, such as access to their network, to their portfolio firms.

By contrast, in countries with weaker formal institutions, venture capitalists may allocate their resources more restrictively and spread their funds to a broader portfolio to mitigate their overall risk (Li & Zahra, 2012). Besides the lower investments per individual portfolio firm, venture capitalists may further be reluctant to support them with deeper integration into their networks as well as with managerial and human capital resources. As a result, these restrictions hinder the pursuit of growth activities and limit the value added by venture capitalists.

Second, in fast-growing environments, young and innovative firms are challenged by frequently changing customer needs, technological revolutions, and competitors who adapt quickly to demanding market conditions (Gompers, 1995). Young firms in particular can be expected to engage more heavily in innovation when intellectual property protection laws safeguard them from being exploited by competitors, business partners, suppliers, and also investors. For these young firms, a secure environment could safeguard the promotion of innovation, as this, in return, might foster a VCI. Hence, a country's ability to provide laws to protect intellectual property of innovative firms encourages further innovation (Groh & Wallmeroth, 2016).

In countries with more pronounced formal institutions, patent infringements and deceptive business practices are more effectively suppressed. As a result, the probability that an innovative firm can attract VC funding and grow faster is considerably higher (Hellmann & Puri, 2000).

Besides fewer concerns arising from predatory patent infringement litigation, stakeholders and other business partners (e.g., employees, suppliers, other investors) in countries with more profound institutional quality benefit from reduced uncertainty in dealing with those inherently uncertain young firms. On the contrary, in countries with lower institutional quality, these business partners might be reluctant to collaborate with highly innovative firms that have uncertain prospects. Instead, they may prefer working with and for established firms, as the absence of formal institutions complicates reliable contracting and jeopardizes contract enforcement (Wan & Hoskisson, 2003). In these cases, stakeholders and business partners may expect discounts or premiums to compensate for the additional uncertainty arising from the higher contractual risks associated with the business models of VC-backed firms. Moreover, these stakeholders may preferably engage with non-VC-backed firms, as their business models are perceived as less risky, even though the upside potential of such firms may be limited (Fama & MacBeth, 1973; Markowitz, 1952). As a result, it can be expected that this burden arising from weak formal institutions puts pressure on the VC-funded firms' margins, decreases their growth, and, ultimately, significantly weakens the VCI – P relationship.

Third, as countries with stronger formal institutions restrict opportunistic behavior, this leads to reduced uncertainty and, hence, more orderly and predictable economic activity (North, 1990). As with all investments, the provision of VC suffers from both information asymmetry and potential opportunism (Amit et al., 1998; Gompers, 1995). Formal institutions generally provide political, contractual, and economic rules that decrease both transaction costs and misconduct by portfolio firms (Li & Zahra, 2012). Through properly designed and enforced formal institutions, VC investors may overcome their disadvantages in terms of asymmetric information (Amit et al., 1998; Li & Zahra, 2012; Sahlman, 1990).

In countries with more pronounced formal institutions, opportunistic agent behavior may be expected to decline as contracts can be designed to alleviate these problems. This higher quality for a set of rules can be designed and enforced in a way that fosters entrepreneurship, innovation, and investor protection. Under these circumstances, venture capitalists may be willing to provide more funding and other value, such as deeper integration into their networks. As a result, venture capitalists may be able to monitor less and focus more on active value-adding on-site involvement (Bernstein et al., 2016). This way, more pronounced formal institutional quality reduces agency problems and misconduct in their portfolio firms. Consequently, venture capitalists can use their resources more effectively and foster growth and profitability of their portfolio firms. Therefore, higher institutional quality in a country may positively influence the VCI – P relationship. Drawing attention on formal institutions, we posit the following:

H3a: *The strength of a country's formal institutions positively affects the relationship between a VCI and performance.*

2.3.2. Efficiency of Financial Markets

The magnitude to which VC can benefit some startups to finance growth depends, to some extent, on the development of the financial market (Armour & Cumming, 2006; Black & Gilson, 1998). Greater market efficiency, as indicated by, e.g., a high stock market turnover ratio, suggests a higher degree of liquidity and vitality in the stock market (Svirydzenka, 2016). A vibrant and sound financial market is essential for venture capitalists to achieve successful exits, cash out the return on investment, and bring wealth to the venture capitalist and its investors (Grilli et al., 2019). Black and Gilson (1998) argue that a more developed stock market results in higher returns. Further studies support this view and show that VC activity increases in countries with higher stock market capitalization, more IPOs, and a more dynamic mergers and acquisitions environments (e.g., Bonini, Alkan, & Salvi, 2012; Félix, Pires, &

Gulamhussen, 2013). Multiple studies suggest that higher activity in financial markets positively affects VC activity and the success of VC-funded firms (Cumming et al., 2010; Grilli et al., 2019; Li & Zahra, 2012). Therefore, venture capitalists may be willing to provide a larger amount of financial and non-financial resources if they can expect to realize more substantial returns through an exit (Black & Gilson, 1998; Cumming et al., 2006; Li & Zahra, 2012).

Correspondingly, more efficient markets can quickly ensure the efficient allocation of financial resources toward more highly valued recipients. Furthermore, more liquid markets allow for investing in more innovative but risky startups. Through successful IPOs and high returns in the past, and especially in more liquid markets, venture capitalists may be able to trigger additional funds from their investors (Black & Gilson, 1998). The more efficient these markets work, the better venture capitalists can raise funds and invest them in a promising portfolio. Venture capitalists may use these funds to invest in better human capital to scout and coach the VC-backed firms, hence, achieving better performance with their portfolio firms. These markets may even provide excess financial resources, allowing successful venture capitalists to support their portfolio firms through more intense active on-site engagement.

We expect that the VCI – P relationship depends on the vitality and efficiency of the financial markets. Hence, we predict the following:

H3b: *The efficiency of a country's financial market positively affects the relationship between VCI and performance.*

3. Data and Method

3.1. Sampling and Coding

The main goal of this study was to obtain a large number of studies in order to perform a meta-analysis on the most common types of the VCI – P relationship. Therefore, we followed Lipsey and Wilson (2006) and recently published meta-analyses in management research (e.g., Carney, Gedajlovic, Heugens, Van Essen, & Van Oosterhout, 2011; Marano, Arregle, Hitt, Spadafora, & van Essen, 2016) to perform a comprehensive search strategy and subsequently develop an advanced coding scheme.

3.1.1. Search Strategy

We applied a search strategy based on several steps: First, we consulted existing meta-analyses and reviews (e.g., Drover et al., 2017; Rosenbusch et al., 2013; Tanda & Manzi, 2019) and

searched for papers included in those reports to verify their results as a minimum requirement. To extend this knowledge with further and newer articles, we systematically searched in scholarly article databases, such as ABI/INFORM Global, EconLit, Google Scholar, JSTOR, and SSRN. We also conducted a manual search in leading academic journals across the disciplines of entrepreneurship, finance, and management.

We used broad search terms, related to "venture capital" in combination with "performance", to uncover as many studies focusing on this relationship as possible. To be included in our sample, we only considered primary studies focusing on VC in general and not on its subtypes, such as government VC or VC provided by individuals. Furthermore, we considered multiple dimensions of performance (Combs et al., 2005). More specifically, we included samples using measures of financial performance, growth, productivity and efficiency measures, and indications regarding firm survival. We also applied a backward and forward search using Google Scholar and ISI Web of Knowledge. Finally, if the required information was not provided or could not be obtained by other means, we directly contacted the authors and asked them to provide the effect size information required.

3.1.2. Coding Scheme

To capture this information, we developed an advanced coding scheme that included various sections on general information, VC characteristics, characteristics regarding venture performance, and moderator and effect size information. To capture the difference between selection and guiding capabilities of venture capitalists, we followed recent practice (Lohwasser, Wagner, Van Essen, Lander, & Marano, 2019; Marano et al., 2016) and coded both bivariate Pearson product-momentum correlation coefficients r (Borenstein, Hedges, Higgins, & Rothstein, 2009; Hunter & Schmidt, 2004; Lipsey & Wilson, 2006) and partial correlation coefficients $r_{xy.z}$ (Stanley et al., 2013) if provided by the primary study. This procedure is advantageous in two ways: First, including multiple measures increases the statistical power of our meta-analysis and improves the methodological validity (Bijmolt & Pieters, 2001; Nelson & Kennedy, 2009). Second, this approach allowed us to distinguish between simple bivariate correlation effects, where the general VCI – P relationship can be gauged. Additionally, the VCI – P relationship was able to be assessed by capturing the effect of all control variables on the VCI – P relationship. This way, we captured industry effects as in Rosenbusch et al. (2013) but also the influence of other control variables, which allowed for a more sophisticated assessment of the selection and value-added capabilities of a VCI.

With this approach, we were able to collect a sample of 984 effect sizes, which we derived from 71 individual samples. Approximately 94% of the effect sizes originated from published studies. Our sample covers 15 individual countries[1] from 1964 through 2014.

3.2. Meta-Analytic Procedures

3.2.1. HOMA Procedure

We calculated the meta-analytic mean correlation between a VCI and funded firm performance by following recent studies (e.g., Marano et al., 2016; Tanda & Manzi, 2019), and used Hedges and Olkin meta-analytical techniques (HOMA) (Hedges & Olkin, 1985). As mentioned before, we coded both bivariate Pearson product-momentum correlation coefficients r, and partial correlation coefficients $r_{xy.z}$. Bivariate Pearson product-momentum correlation coefficients are generally easily interpretable, scale-free measures that capture the linear association between independent (x, i.e., a VCI) and dependent (y, i.e., funded firm performance) variables. If other descriptive statistics, such as means and standard deviations for two or more comparison groups were reported, we transformed them to an r value. Partial correlation coefficients not only capture the linear association but they also take into account the effect of the n control variables included in the primary study (z, i.e., different funding and funded-firm characteristics, country, size, and others). These coefficients had to be computed based on the t-statistics and degrees of freedom provided in each individual primary study (Greene, 2003; Peterson & Brown, 2005; Tanda & Manzi, 2019). Furthermore, if primary studies reported measures for multiple types of a VCI or funded-firm performance, we first stratified the primary data based on panel groups for each primary study (Rosenberger & Loomis, 2000). In a second step, we unpacked them again and reported subgroup analyses, as Monte Carlo simulations show that multiple measurements in an analysis are superior in terms of parameter estimation, accuracy, and significance testing (Bijmolt & Pieters, 2001). To identify duplicate sets of data, we applied duplicate detection techniques to remove them, as suggested by Wood (2008). For our meta-analysis, we applied random effects (Field, 2001; Hedges & Vevea, 1998) and weighted the effect sizes by their inverse variance to account for the higher variability (Hedges & Olkin, 1985; Overton, 1998).

[1] Australia, Austria, Belgium, Canada, China, France, Germany, India, Italy, Japan, Singapore, Spain, Taiwan, United Kingdom, and the United States. We further included samples that use economic regions, such as Europe, and global samples. Due to the large heterogeneity of these countries in terms of the configuration of formal institutions and financial markets, we did not use averaged values to derive home-country analyses.

3.2.2. MARA Procedure

To test our hypotheses, we applied a multivariate meta-analytic regression analysis (MARA), as suggested by Lipley and Wilson (2006), which can be interpreted similarly to multiple regression approaches. Specifically, MARA allows us to estimate a linear regression between a dependent variable and multiple predictors. In MARA, the dependent variable represents the focal relationship we captured in HOMA, more specifically, the relative relationship between VC-backed firms and performance compared to non-VC-backed firms. The predictors are potential moderators of this focal relationship, such as the type of performance, the quality of institutions, or the efficiency of financial markets, as well as other controls for methodological artifacts. This way, we can include institutional variables that primary studies did not consider and model their variance in the effect size distribution (Lohwasser et al., 2019). For computation, we applied a mixed-effects meta-analysis based on weighted least squares (WLS), which produces sensible, unbiased estimates and appropriate standard errors, especially in comparison to ordinary least squares (OLS) (Nelson & Kennedy, 2009; Olsson, Foss, Troye, & Howell, 2000). This way, we were able to overcome heteroscedasticity (Feld & Heckemeyer, 2011), which is considered a possible threat to the validity of a meta-analysis (Chandrashekaran & Walker, 1993). All effect size estimates were weighted by the inverse variance weight w (Hedges & Olkin, 1985). We included only controls related to the focal relationship in the first models and then added institutional variables (Raudenbush & Bryk, 2002). The restricted maximum likelihood (REML) algorithm was applied. To capture effects from the combined use of r and $r_{xy.z}$ effect sizes, we used a dummy variable.

3.3. Measures

3.3.1. VC Involvement

We considered types of a VCI that can be summarized as dummy measures of VCI or as continuous variables of VCI. The *VC Dummy Measure* represents a binary variable, capturing whether a funded firm received VC or not. Contrary, the *VC Continuous Measure* captures the ratio of a VCI in a funded firm. By distinguishing between both measurements of involvement, we were able to assess methodological differences and provide advice for further research.

3.3.2. Funded Firm Performance

To test our hypotheses, we distinguished between market and accounting measures of performance in our coding. *Accounting Measures* consist of *Earnings per Share*, *Return on Assets*,

Return on Equity, *Return on Sales*, *Profit Measures*, and *Other Accounting Measures* and represent the ventures' past performance. Contrary, *Market Measures* include *Abnormal Returns*, *Market-to-Book Ratio*, *Sharpe Market Measure*, *Stock Performance* (i.e., total stock return), *Tobin's Q*, and *Other Market Measures*. We included not only the *Financial Performance Measures* outlined above but also *Growth Measures* (i.e., *Employee Growth* and *Financial Performance Growth*). Furthermore, we incorporated *Productivity* and *Venture Survival*, as they are further frequently used measures to capture the performance of young and innovative firms.

3.3.3. Quality of Formal Institutions

We merged our coded data with the Economic Freedom of the World index (Fraser Index)[2]. The Fraser Institute established this index in collaboration with the Cato Institute and more than 70 international think tanks. It measures five dimensions of the quality of formal institutions (size of government, legal system and property rights, sound money, freedom to trade internationally, and regulation). It is a complex composite indicator to measure how countries support economic freedom and efficient markets through their institutional rules. A large number of studies have used this index in cross-country comparisons to measure how efficiently and effectively institutions support markets (e.g., Banalieva & Dhanaraj, 2013; Cumming & Li, 2013; Marano, Tashman, & Kostova, 2017). In our sample, the Fraser Index ranges from 5.6 to 8.7, with higher values representing higher-quality formal institutions. Additionally, we ran the analyses with an alternative measure to test the robustness of our results. The measure *Investor Protection* consists of a set of formal institutions that involve investor protection laws and limit the threats of shareholder expropriation (Klapper & Love, 2004; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000)[3]. In our sample, the index for *Investor Protection* ranges from 43.9 to 93.3, with higher values representing better protection from expropriation. This index has been used by numerous studies for this purpose (Aggarwal & Goodell, 2014; Grilli et al., 2019; Groh & Wallmeroth, 2016).

3.3.4. Efficiency of Financial Markets

To capture the efficiency of the financial markets in the respective countries, we used the index of financial development provided by the International Monetary Fund (Svirydzenka, 2016) and focus on the variable *Financial Market Efficiency* ranging from 0 to 1, which captures the

[2] Source: https://www.fraserinstitute.org/studies/economic-freedom-of-the-world-2019-annual-report.

[3] Source: https://www.doingbusiness.org.

available liquidity and efficiency in the market. The efficiency of financial markets is important as "the efficiency of and access to these financial services help shape the level and rate of increase in economic prosperity" (Sahay et al., 2015: 10). In our sample, the variable ranges from 0.15 to 1, with higher values indicating higher liquidity and greater efficiency in the market (Svirydzenka, 2016). As an alternative measure to test the robustness of our results, we use the *Financial Development Index*, also provided by the International Monetary Fund (Svirydzenka, 2016). This variable is an indicator comprising multiple variables referring to the depth, access, and efficiency of financial institutions and financial markets. The index of financial development has been applied in several studies to measure country-level information regarding financial institutions and markets (e.g., Alter & Elekdag, 2016; Fendoğlu, 2017).

3.3.5. Control Variables and Measurement Artifacts

To account for differences in study design and quality, we controlled for various methodological artifacts. First, we included a dummy variable, indicating whether effect sizes are derived from a *Published Study* with peer-review or not (i.e., working papers, conference papers, or dissertations). Apart from controlling for the study quality, this measurement also tests for the "file drawer problem" (Rosenthal, 1979 and 1991). Second, a dummy variable was used to distinguish between bivariate correlation and *Partial Correlation* coefficients to check whether the type of coefficient affected the results in our MARA-analysis. Third, we checked whether the studies included performed *Endogeneity Controls*. Fourth, we included the dummy variable *IPO Firms* to account for the stage of the venture funding. Finally, we included the *Sample Median Year* and the *Sample Period Length* of the primary study samples to account for time effects.

4. Results

4.1. HOMA Results

Table 1 yields HOMA results based on both r and $r_{xy.z}$. Our HOMA results illustrate that a VCI has a small albeit statistically significant positive effect on funded-firm performance (r-based mean = 0.04, $p < 0.001$; $r_{xy.z}$-based mean = 0.01, $p < 0.001$). Regarding the individual measures for performance, we find a positive effect on *Financial Performance* ($r = 0.03$, $p < 0.01$; $r_{xy.z} = 0.01$, $p < 0.001$), hence, confirming our Hypothesis 1a, which states that a VCI increases financial performance. In detail, we find higher values for *Market Measures* ($r = 0.06$, $p < 0.001$; $r_{xy.z} = 0.03$, $p < 0.001$) than for *Accounting Measures* ($r = 0.01$, *n. s.*; $r_{xy.z} = 0.01$, $p < 0.001$).

We find further support regarding Hypothesis 1b, stating that VC-funded firms report higher *Productivity Measures* than non-VC-backed firms ($r = 0.05$, $p < 0.001$; $r_{xy.z} = 0.00$, $p < 0.001$). Further, the HOMA provides support for our Hypothesis 1c, suggesting that a VCI has a positive effect on *Growth* of the funded firm ($r = 0.03$, $p < 0.001$; $r_{xy.z} = 0.01$, $p < 0.001$) in terms of *Employee Growth* ($r = 0.04$, $p < 0.01$; $r_{xy.z} = 0.02$, $p < 0.001$) and *Financial Performance Growth* ($r = 0.03$, $p < 0.01$; $r_{xy.z} = 0.01$, $p < 0.001$). Interestingly, the negative result for *Venture Survival* suggests that the only negative performance measure associated with a VCI is the chance of survival. Further subgroup HOMAs show that the VCI – P relationship varies somewhat depending on different measures and controls (see Table 1 for specific results).

With regard to Hypothesis 2, our HOMA shows that the association between a VCI and the performance of funded firms is lower for all performance measures when controls are included, measured by partial correlations, except for *Accounting Measures*. In addition, our HOMA shows that the type of VC measure plays a role, as *Continuous Measures* (i.e., the ratio of a VCI in a funded firm) only show a positive effect for partial correlations ($r = 0.02$, n. s.; $r_{xy.z} = 0.03$, $p < 0.001$), whereas *Dummy Measures* (i.e., a binary measure of involvement or no involvement of a venture capitalist in a funded firm) has a positive effect on both types ($r = 0.04$, $p < 0.001$; $r_{xy.z} = 0.01$, $p < 0.001$). Supplementary results of the controls applied are also provided in Table 1.

	Pearson Product-momentum Correlation (r)							Partial Linear Correlation Coefficient ($r_{xy.z}$)						
Predictor	k	N	Mean		SE	Q test	I^2	k	N	Mean		SE	Q test	I^2
VCI to Performance	262	591,874	0.04	***	0.01	3,207.10	0.96	722	15,969,648	0.01	***	0.00	3,670.9	0.90
Type of VC-Measure														
Continuous Measures	2	2,710	0.02		0.02	0.00	0.00	65	51,032	0.03	***	0.00	67.01	0.01
Dummy Measures	260	589,164	0.04	***	0.01	3,207.02	0.96	657	15,918,616	0.01	***	0.00	3,572.85	0.90
Type of Performance														
Financial Performance	150	175,449	0.03	**	0.01	2,468.77	0.95	362	1,153,340	0.01	***	0.00	785.36	0.84
Accounting Measures	88	124,445	0.01		0.02	1,691.45	0.97	206	854,059	0.01	***	0.00	388.63	0.43
Market Measures	62	51,004	0.06	***	0.01	759.13	0.86	156	299,281	0.03	***	0.00	317.98	0.56
Growth Measures	100	374,339	0.03	***	0.01	601.96	0.92	266	4,835,716	0.01	***	0.00	2,428.68	0.89
Employee Growth	29	248,915	0.04	**	0.01	243.99	0.95	86	1,494,250	0.02	***	0.00	881.58	0.83
Financial Performance Growth	71	125,424	0.03	**	0.01	358.31	0.87	180	3,341,466	0.01	***	0.00	1,489.99	0.91
Productivity Measures	11	40,067	0.05	***	0.01	58.61	0.79	46	8,004,538	0.00	***	0.00	69.4	0.11
Venture Survival	1	2,019	0.03		0.02	0.00	0.00	48	1,976,054	-0.01	***	0.00	75.21	0.05
Controls for Primary Study Attributes														
Publication														
Published Study	208	577,234	0.03	***	0.01	2,902.43	0.96	592	5,431,936	0.01	***	0.00	3,421.30	0.82
Unpublished Study	54	14,640	0.07	***	0.02	268.27	0.80	130	10,537,712	0.00	***	0.00	238.47	0.38
IPO														
IPO Firms	163	170,476	0.03	**	0.01	2,239.88	0.93	275	2,915,300	0.01	***	0.00	2842.8	0.92
Pre IPO	99	421,398	0.04	***	0.01	838.49	0.96	447	13,054,348	0.01	***	0.00	833.42	0.47
Endogeneity Control								313	4,051,278	0.01	***	0.00	490.84	0.28

k=number of effect sizes; N= total sample size; Mean=estimate of population correlation, SE=standard error of mean; Q=Cochran's homogeneity test statistic; I^2=scale-free index of heterogeneity.

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1: HOMA Results

Table 2 provides HOMA results for the VCI – P relationship according to the home-countries of the funded firms. The variance of those results suggests that the VCI – P relationship varies across the countries included in our sample. More precisely, our results suggest that the VCI – P relationship is significantly positive in Canada, China, Germany, Italy, and Spain and significantly negative in Belgium (for $r_{xy.z}$) and France (for r).

	Effect Size: r						Effect Size: $r_{xy.z}$					
Country	k	N	Mean	SE	Q test	I^2	K	N	Mean	SE	Q test	I^2
Australia	20	5,340	0.01	0.00	31.52	0.40	1	237	-0.04	0.10	0.00	0.00
Austria	4	67,914	0.12 †	0.10	30.90	0.99						
Belgium	16	15,782	0.02	0.00	457.53	0.96	15	6,811	-0.04 *	0.00	23.25	0.39
Canada	31	19,256	0.06 ***	0.00	97.06	0.70						
China	63	175,717	0.06 ***	0.00	1,356.88	0.97	122	532,259	0.02 ***	0.00	231.65	0.40
France	7	1,973	-0.08 ***	0.00	1.00	0.00	12	8,531	-0.02	0.00	34.96	0.77
Germany	7	186,073	0.01 ***	0.00	3.82	0.00	4	853	0.10 **	0.00	0.00	0.00
India							3	588	0.05	0.00	0.27	0.00
Italy							38	80,046	0.04 ***	0.00	49.58	0.18
Japan	8	2,607	0.02	0.00	8.20	0.27	10	2,074	-0.07 **	0.00	9.36	0.22
Singapore	21	3,094	-0.03	0.00	39.38	0.49						
Spain							18	36,372	0.03 ***	0.00	23.32	0.25
Taiwan	12	3,204	0.18 ***	0.02	9.73	0.00	18	4,940	0.01	0.00	12.52	0.01
United Kingdom	2	4,652	0.02	0.00	0.00	0.00	15	8,403	0.03 *	0.00	16.42	0.27
United States	41	64,253	0.02	0.00	595.98	0.95	180	10,465,592	0.02 ***	0.00	2,593.72	0.98
Europe	18	41,625	0.01	0.00	13.22	0.23	272	4,800,653	0.01 ***	0.00	388.53	0.25
Global	12	384	-0.02	0.10	18.12	0.39	14	22,289	0.00	0.00	34.33	0.73

k=number of effect sizes; N= total sample size; Mean=estimate of population correlation, SE=standard error of mean; *Q*=Cochran's homogeneity test statistic; I^2=scale-free index of heterogeneity.
† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Country-specific HOMA Results

4.2. MARA Results

Table 3 reports the MARA-results for our hypotheses on institutions. Models 1 and 2 serve as our baseline models and include only different performance measures and methodological artifacts (Model 1: AIC = -2,714.42; R^2 = 0.13) and Model 2 additionally *log(GDP/Capita)* as the institutional control variable (Model 2: AIC = -1,476.51; R^2 = 0.06). Models 3 and 4 include our two main explanatory variables *Fraser Index* (Model 3: AIC = -1,475.81; R^2 = 0.06) and *Financial Market Efficiency* (Model 4: AIC = -1,423.98; R^2 = 0.07). Models 5 and 6 include the variables *Investor Protection* (Model 5: AIC = -1,469.89; R^2 = 0.06) and *Financial Market Development* (Model 6: AIC = -1,414.94; R^2 = 0.05). The models indicate a good model fit and only low levels of information loss through their large and negative AIC values (Baguley, 2012). In our results, multicollinearity is of minor concern, as the variation inflation factors of all variables are below the conservative threshold of 10 with an average of 2.87 (Hair, Anderson, Tatham, & Black, 1995; O'Brien, 2007). To avoid the chance of multicollinearity, we do not provide full models with all institutional variables. Following up on Hypothesis 2,

our MARA reveals an unclear picture regarding *Partial Correlations*. While all variables suggest a negative moderation by measures from models of primary studies that take the effect of the *n* control variables into account, only those in Models 1 (β = -0.02, $p < 0.001$) and 4 (β = -0.02, $p < 0.05$) are statistically significant, indicating that the importance of the institutional setting might even outweigh selection effects.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Institutional Measures						
log(GDP/Capita)		-0.00	-0.01 *	0.00	-0.01 *	-0.01
		(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Fraser Index			0.02 *			
			(0.01)			
Financial Market Efficiency				0.06 ***		
				(0.02)		
Investor Protection					0.00 *	
					(0.00)	
Financial Development						0.07 †
						(0.04)
Performance Measures						
Accounting Measures (d)	0.01	0.00	-0.01	0.00	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Market Measures (d)	0.02 **	0.03 *	0.02 *	0.03 *	0.03 *	0.03 *
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Growth Measures (d)	0.01	0.02	0.02	0.02	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Productivity Measures (d)	0.01	0.00	-0.01	0.02	0.00	0.01
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)
Methodological Artifacts						
Published Study (d)	-0.01	-0.02 *	-0.02 **	-0.03 **	-0.02 **	-0.02 **
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Dummy Measure (d)	-0.01	0.01	0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
IPO Firms (d)	0.00	-0.01	-0.01 †	-0.02 **	-0.02 *	-0.02 *
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Sample Median Year	0.00 †	0.00 **	0.00 **	0.00	0.00 **	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sample Period Length	-0.00 *	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Endogeneity Control (d)	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Partial Correlation (d)	-0.02 ***	-0.01	-0.01	-0.02 *	-0.01	-0.01
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-1.39 †	-3.54 *	-3.87 **	-1.12	-3.89 **	-2.07
	(0.83)	(1.39)	(1.40)	(1.57)	(1.40)	(1.63)
AIC	-2714.42	-1476.51	-1475.81	-1423.98	-1469.89	-1414.94
BIC	-2650.99	-1414.13	-1409.01	-1357.03	-1404.14	-1348.49
K	984	649	649	634	649	634
R2	0.13	0.06	0.06	0.07	0.06	0.05

† p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table 3: MARA Results

Model 3 presents a test for Hypothesis 3, which predicts that the quality of formal institutions positively moderates the VCI – P relationship. The coefficient estimate for the *Fraser Index* is

significantly positive ($\beta = 0.02$, $p < 0.05$), providing support for this hypothesis. The coefficient estimate for *Financial Market Efficiency* in Model 4 is also significantly positive ($\beta = 0.06$, $p < 0.001$), confirming our Hypothesis 4 that the VCI – P relationship is positively moderated by the efficiency of a country's financial market.

The results of our MARA deliver two further insights: Surprisingly, our results also indicate that published studies negatively moderate the VCI – P relationship. Furthermore, market measures have a particularly positive influence on the VCI – P relationship.

4.3. Robustness Checks and Publication Bias

To test the robustness of our results, we computed a sensitivity analysis by eliminating standardized residuals (standardized z-values) that fall outside the interval of -5 to 5 (Hox, 2010; Stanley et al., 2013; Viechtbauer & Cheung, 2010). The direction and significance of our results for both HOMA and MARA remain stable, suggesting that outlying effect sizes do not drive our findings. As a second robustness test, we used alternative measures to assess the quality of a country's formal institutions (*Investor Protection*: $\beta = 0.00$, $p < 0.05$) and its financial market (*Financial Development Index:* $\beta = 0.07$, $p < 0.1$). These results are also significantly positive, suggesting that the VCI – P relationship is positively moderated by higher-quality institutions and more efficient financial markets.

To determine the threat of potential publication bias in this meta-analysis, we applied a triangulation method, as suggested by Harrison, Banks, Pollack, O'Boyle, and Short (2017). More specifically, we applied Trim and Fill (Borenstein et al., 2009; Duval & Tweedie, 2000b, 2000a), cumulative meta-analysis (Borenstein et al., 2009; Chalmers & Lau, 1993; Lau, Schmid, & Chalmers, 1995), and selection model (*p*-curve approach) (McShane, Böckenholt, & Hansen, 2016; Simonsohn, Nelson, & Simmons, 2014). The results of these tests suggest the absence of "file drawer" bias (Rosenthal, 1979) in our data. Additionally, we conducted funnel plots and calculated Egger's test (Egger, Smith, Schneider, & Minder, 1997). Neither the symmetrical funnel plot nor the insignificant result of Egger's test indicate any evidence of publication bias. Nevertheless, our MARA results suggest that published journal articles have slightly lower results than unpublished papers. This surprising finding, however, is in line with the prior meta-analysis by Rosenbusch et al. (2013). Furthermore, the small effect does not raise any concerns regarding publication bias.

5. Discussion

Our meta-analysis on the VCI – P relationship shows that research in this field is extensive, and yet, its findings have been inconclusive so far. A first attempt to reconcile these inconsistencies was conducted by Rosenbusch et al. (2013). However, this first meta-analysis has also yielded inconclusive findings. One reason may be that the study did not clearly differentiate between potential selection advantages and superior capabilities to add value to the VC-funded firms (e.g., Baum & Silverman, 2004; Bertoni et al., 2019; Brander et al., 2002; Rosenbusch et al., 2013). By assessing this issue, our empirical review further reveals that the first reason for the inconclusiveness of prior findings is the methodological heterogeneity in VCI – P research.

The second reason for this lack of consistency in the VCI – P relationship is that scholars have neglected the moderating influence of the institutional context. Although literature has argued that cultural and formal institutions influence the effect of VC activity (Grilli et al., 2019), to the best of our knowledge, their effects on funded firm performance have been disregarded. Our study is the first to address this research gap and finds that the relationship between a VCI and funded firm performance depends on certain aspects of formal institutions. More specifically, we show that the quality of formal institutions as well as the efficiency of the financial markets moderate the VCI – P relationship. Therefore, we identify that one fundamental problem in the literature is the lack of attention devoted to the importance of formal institutions. In addition, our results contribute to research on both the benefits of VC financing and the institution-based view by providing evidence that the quality of norms and rules, as set by formal institutions, as well as the soundness and vibrancy of the financial markets encourage venture capitalists to provide financial resources and beneficial active engagement. In the subsequent sections, we illustrate our main contributions and their implications for future research on VC financing.

5.1. Performance-Implications of VC

Our results show that the VCI – P relationship is generally positive, independent of whether bivariate or partial correlations were used across samples of 591,874 observations for the bivariate and 15,969,648 observations for the partial correlation analyses ($r = 0.04$, $p < 0.001$; $r_{xy.z} = 0.01$, $p < 0.001$). In general, our results indicate that a VCI increases the profitability, productivity, and growth of their portfolio firms. Hence, venture capitalists are able to add value in their portfolio firms through active on-site involvement and monitoring. More specifically, through the integration of the venture into the venture capitalist's professional network, costs

for administration, accounting, legal advice, and other services can be shared. While this facilitates access to these superior resources and simultaneously reduces costs, it also empowers human capital and managerial capacities to be used more efficiently to innovate and increase the value and growth of the venture. This effect may be even more pronounced if the venture capitalist actively engages on site (Bernstein et al., 2016).

However, this effect diminishes when focusing on partial correlations (*Financial Performance:* $r = 0.03$, $p < 0.01$ vs. $r_{xy.z} = 0.01$, $p < 0.001$; *Productivity*: $r = 0.05$, $p < 0.001$ vs. $r_{xy.z} = 0.00$, $p < 0.001$; *Growth:* $r = 0.03$, $p < 0.001$ vs. $r_{xy.z} = 0.01$, $p < 0.001$), suggesting the presence of "selection and post-investment value added effects" as proposed by Rosenbusch et al. (2013: 348). Nevertheless, they solely included bivariate correlations and controlled for the mere presence of an industry control in the primary study with a binary variable. By contrast, our approach, focusing on both bivariate and partial correlations, benefits from significant improvements in meta-analytical reviews (Marano et al., 2016; Stanley et al., 2013). From a methodological point of view, the incorporation of information from regression coefficients rather than from simple descriptive statistics allows us to account for all control variables included in the primary study. Through this procedure, we can account for differences in the characteristics of the sample, hence providing a much more accurate comparison between both selection effects and the true value added by venture capitalists. As a result, we can assess the selection effect more precisely. We conclude that the benefits of a VCI slightly outweigh concerns in terms of performance. Besides, a high number of effects (approximately 43% of all $r_{xy.z}$ effect sizes) contained an instrumental variable to address potential endogeneity issues. As strength and significance of the effect remain consistent for studies using endogeneity corrections, this finding further supports our conclusion about the selection and value-added assumptions.

We extend recent findings by showing that venture capitalists not only have advantages in terms of selection but, considering the versatile characteristics of the sample, they also use their capabilities to enhance growth as well as financial performance and productivity of their portfolio firms. Hence, it can be argued that the positive VCI – P relationship does not only result from selection advantages but also from superior capabilities of the venture capitalist to guide and actively involve on-site, even though this effect is smaller than expected.

The decreasing effect may result from the general risk associated with VC-funded firms, as our HOMA results show that they are more likely to not survive. This finding is supported by Puri and Zarutskie (2012), who note that VC-funded firms are more likely to survive short term, but after five years, their chance of survival reverses, also because venture capitalists hold their

portfolio firms only for a limited time (Sahlman, 1990). Furthermore, it can be expected that venture capitalists push growth and professionalization over further innovation, even for very innovative portfolio firms (Davidsson et al., 2009; Engel & Keilbach, 2007). Another reason for this finding may be found in asymmetrical information and agency costs. Even though venture capitalists might be advantageous in obtaining information about firms to be funded and aligning their goals, the threats of hidden information and hidden action remain (Amit et al., 1998; Gompers, 1995). This threat may diminish with prestigious entrepreneurial teams, allowing venture capitalists to accept lower levels of control and monitoring (Matusik, George, & Heeley, 2008). The implementation of professional and appropriate governance structures in combination with intense monitoring and consulting may increase venture capitalists' monitoring costs and the funded firm's costs of administration and accounting (Wijbenga et al., 2007).

Farag et al. (2014) argue that venture capitalists exert considerable influence on the funded firm's governance when preparing it for an IPO. The higher market-based measures of the VCI – P relationship (HOMA: $r = 0.06$, $p < 0.001$; $r_{xy.z} = 0.03$, $p < 0.001$; MARA: $\beta = 0.02$ to .03, $p < 0.01$ to $p < 0.05$) suggest that follow-up investors appreciate the venture capitalists' professionalization efforts and their development of suitable monitoring systems. Hence, through a VCI, ventures can demonstrate reputation, professionalization, and other social signals that are important for an IPO and the time beyond (Drover et al., 2017; Nahata, 2008). Even in later stages of an investment period, such as after an IPO, venture capitalists exercise power as members of the funded firm's board (Wijbenga et al., 2007), through covenants (Bengtsson, 2011), and stock options (Arcot, 2014). These contractual mechanisms further secure the alignment of interests between the venture capitalists and the entrepreneurs and help to reduce information asymmetries between both (Arcot, 2014).

5.2. The Moderating Role of Institutions

We illustrate that a venture capitalist's ability to provide post-investment value and the extent to which this can be done depends on situational factors (Rosenbusch et al., 2013), the experience of the venture capitalist (Sørensen, 2007), the quality of the venture's entrepreneurial team (Beckman, Burton, & O'Reilly, 2007; Drover et al., 2017), and its business model (Baum & Silverman, 2004). Furthermore, our results, based on a multinational sample of 15 individual countries, contribute to the notion that institutions moderate the VCI – P relationship (*Fraser Index:* $\beta = 0.02$, $p < 0.05$; *Financial Market Efficiency*: $\beta = 0.06$, $p < 0.001$). More specifically,

our MARA illustrates that the quality of formal institutions and the efficiency of financial markets influence the extent to which a venture capitalist is willing to provide support. The nature of this effect lies in the protection of rights and the feasibility of launching a successful exit.

First, investors and entrepreneurs may withhold investments and innovation in countries with weak protection of intellectual property. Founding and funding startups that are based on highly innovative business models is risky in itself, as a variety of potential pitfalls can jeopardize their success, which in reality leads to high failure rates (Li & Zahra, 2012; Puri & Zarutskie, 2012). In uncertain environments with high risks and less vital financial markets, venture capitalists may withhold many investments or at least reduce their financial support for and active engagement in their individual portfolio firms in these countries. If, besides the already highly risky nature of the investment, the lack of investor or intellectual property protection increases the overall risk and threat from the asymmetric distribution of information, venture capitalists may be forced to spread their risk by investing smaller amounts in a larger portfolio. The resulting lower investment ratios naturally lead to a reduced provision of active engagement and integration into the venture capitalist's network, which, among other factors, slows down the portfolio firms' growth. In environments with lower institutional quality, entrepreneurs may generally refrain from innovation to avoid threats from weaker intellectual protection. Furthermore, their financial performance may suffer from additional compensation requirements by business partners through higher premiums. As a result, increased uncertainty leads to fewer resources being made available and desiccating innovation in business models, ultimately causing weaker relative performance of VC-funded firms.

Second, if the feasibility of launching an IPO increases, both the venture capitalist and the entrepreneur in the VC-backed firm may perceive higher chances of a successful exit and are more dedicated to providing the capital and engagement required to achieve this goal. Under these circumstances, experienced financiers, such as venture capitalists, have greater motivation and knowledge to proceed with their portfolio firms quickly towards an IPO (Sørensen, 2007). Additionally, an investment by a reputable venture capitalist may be a more valuable signal in these environments to trigger further investors. In conclusion, we argue that venture capitalists benefit from an institution-based reduction of uncertainty and an increasing feasibility of a successful exit in the future. Besides, more efficient and better-developed markets reduce information asymmetries between potential investors and VC-funded firms when preparing for an IPO.

5.3. Implications for Practice

Our study has implications for venture capitalists, entrepreneurs/startups, other investors, and governments. First, venture capitalists should orientate themselves on the institutional configuration of the country in which they invest. In countries with a higher quality of institutions, they should foster deeper integration of their portfolio firms into their network and not refrain from providing sufficient resources and support. This implication is also applicable to countries with more efficient markets. Furthermore, they should focus on beneficial monitoring, which means actively identifying weaknesses in their portfolio firms and eliminating them.

Second, entrepreneurs should determine their extent of innovation activities depending on the institutional configuration. In countries with well-developed formal institutions, they can rely on intellectual property protection rules and increase their innovation efforts, which will also attract greater funding by venture capitalists. If business partners demand premiums, they may be able to decrease those by referring to the institutional protection rules safeguarding them from substantial losses. On the contrary, in countries with weaker institutional protection, entrepreneurs should be cautious about providing details on their innovations. Once a young firm based in a country with low institutional quality has developed strong innovations, it should seek VC from a reputable venture capitalist, preferably in a country with strong formal institutions. After successful VC funding, these firms should focus on growth to outrun predatory competitors and copycats. Even though its business partners might demand premiums in the beginning due to the higher risk, entrepreneurs might be able to renegotiate these conditions after they have been able to successfully handle the business for a while.

Third, investors can see a VCI as a sign of quality, as venture capitalists professionalize operational and governance structures and nourish their portfolio firms with necessary skills and other resources. This way, even after a successful IPO, VC-backed firms outperform firms with other financing histories. As these firms usually still grow after an IPO, investors should primarily focus on market measures in terms of performance.

Fourth, governments should be encouraged to properly design and enforce policies and regulations, helping to safeguard innovators and helping investors to stimulate VC activity and innovation by young firms. For instance, policy-makers can implement formal institutions that promote investor and intellectual property protection. This would allow venture capitalists to support more innovative startups, as better formal institutions reduce their overall risk.

5.4. Limitations and Recommendations

Naturally, this meta-analysis is subject to several limitations. First, methodologically, meta-analyses are threatened by the 'file drawer problem' (Rosenthal, 1979; Rust, Lehmann, & Farley, 1990) and depend on the quality of the primary studies included (Wachter, 1988). To overcome these problems, we included peer-reviewed published and unpublished studies and conducted various tests for publication bias. Nevertheless, there are likely other unpublished studies that were not identified. We conducted a systematic search to review the literature comprehensively, but meta-analyses inherently risk overlooking generally relevant publications. Second, this study considers a wide definition of performance, and one could argue that innovation performance and underpricing may also be considered as a certain type of firm performance. However, an aggregation of all these measures requires caution and may lead to misinterpretation. Third, meta-analyses regularly suffer from redundant datasets that have been used in more than one publication, as this is likely to bias the aggregated measures. Therefore, we applied duplicate detection heuristics (Wood, 2008) to reduce the threat to the validity of our results. Fifth, a large number of empirical studies were excluded in the MARA analyses because they did not provide individual effect sizes for each home-country included. Instead, they only provided information on mixed samples, such as global, European, or even individual sets of countries. As such, we were only able to run the regressions based on 15 individual countries that, however, represent countries from four continents with different sets of institutions. As discussed above, we believe that future research should reassess the effect of formal institutions and financial markets on the VCI – P relationship. To do so, scholars could develop research designs relying on primary data from a large number of more heterogeneous countries of developed and emerging markets. Sixth, researchers could also assess the effect of informal institutions on the VCI – P relationship on a multinational sample. Indeed, some research has considered how informal institutions affect VC-backed firms' performance (e.g., Rosenbusch et al., 2013) or VC activity (for an overview, see Grilli et al., 2019). However, the consequences for firm performance remain inconclusive. Seventh, our study is not able to provide any indication regarding the intensity of a VCI or the different types of VC (Drover et al., 2017). Further empirical assessments would very much benefit from future research determining the 'optimal' percentage of a VCI. For instance, an interesting objective for future research might be to determine whether the positive influence of formal institutional quality on VC activity also leads to higher individual investments and results in superior performance of portfolio firms.

6. Conclusion

While the importance of VC is widely acknowledged as a critical issue in the field of startup financing, empirical findings regarding the VCI – P relationship remain inconsistent. Our meta-analysis illustrates that firms with a VCI, on average, present higher performance figures compared to firms receiving other types of financing. However, we argue that no general conclusion can be made and that the extent a venture capitalist is able to provide value depends on several factors, such as its experience of selecting promising firms, its ability to providing value beyond financial capital, and the quality of the funded firm's entrepreneurial team and business model.

Furthermore, we also provide evidence that institutions and situational factors influence the degree to which a venture capitalist is willing to provide support. For instance, while a functioning and efficient financial market increases the general probability of a profitable exit, well-developed formal institutions reduce uncertainty for investors and innovative firms, especially for contexts with a high degree of innovativeness and risk.

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Herausgeber:
Prof. Dr. Alexander Dilger
Westfälische Wilhelms-Universität Münster
Institut für Organisationsökonomik
Scharnhorststr. 100
D-48151 Münster

Tel: +49-251/83-24303
Fax: +49-251/83-28429

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