

INSTITUTIONAL DETERMINANTS OF VENTURE CAPITAL ACTIVITY: AN EMPIRICALLY DRIVEN LITERATURE REVIEW AND A RESEARCH AGENDA

Luca Grilli* , Gresa Latifi  and Boris Mrkajic 

Politecnico di Milano

Abstract. Venture Capital (VC) was born and has flourished in the United States, yet it has only modestly developed in other geographical areas. A vast body of research has been carried out to investigate the factors which are conducive to VC activity, and that may better explain the differences in the degree of development and performance of VC industry across different geographical contexts. However, there has only been a limited effort in the literature to systematize what we know (and what we do not know) about the institutional factors that spur VC activity. This paper tries to close that gap, through a systematic survey of the existing literature on the institutional and related determinants of VC activity. Grounding on the seminal work of North (1990), we consider formal (e.g. laws and formal rules) and informal (e.g. cultural norms and tacit codes of behaviour) institutions which are found in the extant empirical economics and management literature to affect the development of the VC industry. Building on this careful review, our paper aims to propose interesting avenues for future research in this domain.

Keywords. Formal institutions; Informal institutions; Institutions; Literature review; Venture capital

1. Introduction

Venture capital (VC) is the professional asset management activity ('the general partners', GPs) that by rising money from wealthy individuals and institutional investors ('the limited partners', LPs), invest into new ventures with risky ideas, but also with a high potential to grow (Sahlman, 1990). The typical time span of the raised fund ranges from seven to ten years. During this period, VC firms make the selection of portfolio companies, monitor, mentor and provide value-added services to them (Sapienza, 1992; Lerner, 1995), and ultimately exit from the companies, distributing the returns to LPs, after being remunerated as GPs. VC investors are often considered as the preferred intermediary in the financing of young and risky high-tech startups, which would otherwise experience difficulties in attracting traditional sources of financing (Gompers and Lerner, 2001). Moreover, the available empirical evidence points steadily towards a positive impact of VC on a series of economic performances, both at micro-level (e.g. firm growth and innovativeness: Kortum and Lerner, 2000; Puri and Zarutskie, 2012) and at macro-level (e.g. entrepreneurship rates, employment, aggregate income, see for example Samila and Sorenson, 2011).

Venture capital, as we consider it nowadays, is an American 'invention' that emerged after the Second World War. The first venture capital fund was American Research and Development (ARD), created in 1946 by MIT President Karl Compton jointly with a professor Georges F. Doriot at Harvard Business

*Corresponding author contact email: luca.grilli@polimi.it; Tel: +39-02-2399-3955.

School, and a few local businessmen. They made investments in high-risk companies that exploited technology developed during World War II. Following initial uncertainty and the adoption of different organizational models (see Gompers and Lerner, 2001 for a review of the early history), the US VC firms rapidly evolved towards a consolidated organizational model, which comprises limited partnership with a closed-end structure (Gompers and Lerner, 2001).

While remaining a 'cottage' industry until the late seventies (Gompers, 1996), the industry took off starting from the eighties. Crucial triggers were reputed to be specific institutional changes introduced in 1978, that is the different interpretation of the 'prudent man rule' by the US Labor Department of the Employee Retirement Income Security Act (ERISA), which allow pension funds to invest in venture capital, and (probably with a lesser impact, see Gompers, 1996), the Tax Reform Act, which lowered capital gains taxes. Since then, despite cyclical upturns and downturns, the US VC industry has grown substantially. Accordingly, a notable portion of the present-day successful American tech companies has received venture capital in their start-up phase. The list includes Microsoft, Cisco Systems, Apple Computer, Sun Microsystems, Amazon and some more recent examples such as Instagram, Uber, Airbnb, SpaceX.

In spite of its strong locus (most of the investments were made and still are prevalently localized in California and Massachusetts) and technological focus (traditionally, the preferred target industries have been IT and biotech, even if new sectors like health care devices and supplies are becoming more and more relevant, see PitchBook & NVCA, 2018), there were numerous attempts to replicate (Bruton *et al.*, 2005) and export this model of financing for new high-tech ventures in countries around the world with a plethora of policy initiatives aimed at incentivizing the birth and consolidation of thriving VC industries.

Apart from some remarkable exceptions (e.g. Israel, Sweden, United Kingdom), the results were highly unsatisfactorily. VC has been a very much US-centric industry, with the USA currently accounting for 54% of the global worldwide activity (NVCA, 2017). Looking at Europe, the venture capital industry is less than one-fourth compared to the USA (Tykvová *et al.*, 2012; EY, 2014; Florida and King, 2016). Beside the noticeable gap on the VC performance between Europe and the USA (Axelson and Martinovic, 2013), the European Union exhibits a highly heterogeneous performance also across (as well as within) the different Member States (EIF, 2016). Other geographical areas (e.g. Asia *in primis*) are gaining momentum mainly because of an increasing internationalization trend in the industry (Wright *et al.*, 2005; Guler and Guillén, 2010; Florida and King, 2016).

The disappointing results and the importance of the issues at stake have resulted in a growing number of studies on the institutional factors that may foster or hamper the birth and development of the VC industry in multiple fields (management, economics, entrepreneurship, finance) and the evidence provided is still inconclusive. Moreover, there has been no effort in the extant scientific discourse to systematize the existing evidence and developed knowledge.¹ For instance, in their otherwise complete review of the venture capital literature, Da Rin *et al.* (2013), do not take into consideration this crucial aspect. Furthermore, the work of Andrieu (2013) scrutinizes the existing scientific evidence on VC with a narrow perspective on organizational differences between VC firms. With the present work, we aim at filling this gap by means of a systematic survey of the existing empirical literature on the topic. In this study, we portray the influence of institutions, both formal (e.g. laws, rules and regulations) and informal (e.g. cultural norms, tacit codes of conduct), to examine their impact on the development of the VC industry. This holistic overview may facilitate the identification of interesting avenues for future research.

The remainder of the paper is organized as follows. Section 2 describes the theoretical considerations on how the institutional environment can shape the development of VC. Section 3 examines the methodology we followed for enucleating the scientific articles of interest. The results of the literature overview are presented in Section 4. Section 5 is devoted to the critical discussion of the results, and it aims at suggesting a future research agenda. Finally, the concluding remarks are reported in Section 6.

2. Defining Boundaries: Institutions and Venture Capital

North (1990) defines institutions as ‘*the humanly devised constraints that shape human interaction*’ (p. 3), and divides them into two broad groups – formal and informal. In particular, formal institutions constitute a group of economic, political and contractual rules, whereas the informal ones include social norms, codes of behaviour, and conventions embedded within a cultural heritage of a specific geographical context (North, 1990, 1994). According to Hofstede *et al.* (2010), formal institutions have to necessarily fit in a cultural setup because political, economic and contractual rules are all connected to peoples’ conceptions of how things ought to be done. As a result, the same formal institutions that exist in societies with different cultural values can produce different economic outcomes (North, 1990). In other words, the two groups of institutions shape individual characteristics and determine behaviour in a society, both independently as well as in combination; they are strongly intertwined (Hall and Soskice, 2001; Li and Zahra, 2012).

There is a general agreement in the literature that the supply and the allocation of entrepreneurial capabilities in a society are influenced by institutions (e.g. Baumol, 1990, 1993; Acs *et al.*, 2008; Sobel, 2008). Moreover, the literature on entrepreneurship points to many formal rules of particular relevance for the development of entrepreneurship: the protection of property rights, savings policies, taxations as well as regulation of labour markets (Henrekson, 2007). Nevertheless, there are also informal institutions that play a significant role in the entrepreneurial dynamics: they represent the degree to which a society is oriented to and approves entrepreneurial behaviour (e.g. Beugelsdijk, 2007).

As to entrepreneurial finance, ever since the works of Schumpeter (1934), availability and access to financial resources have been identified as a critical determinant of entrepreneurship and technological innovation. The information asymmetries that characterize the relationship between new ventures and suppliers of capital (as debt providers), which are commonly caused by several possible reasons, ranging from the absence of a firm’s track record and the alleged lack of credibility to the objective difficulties to gauge the prospects of innovative projects in many high-tech businesses, are usually shown to be large and relevant (Hall and Lerner, 2010). The market failure prevents startups from accessing traditional sources of funding, that is banks *in primis* (Murphy and Edwards, 2003; Ghosh and Nanda, 2010). In this respect, VC funds are supposed to be able to overcome the typical financing hurdles of promising innovative startups. In fact, general partners (VC managers) are commonly reputed to be capable of mitigating information asymmetries, take high risks and invest in highly innovative and uncertain projects (Hall and Lerner, 2010). First, by usually being experts in the field or experienced entrepreneurs themselves, they may better comprehend the intangible value and potential of the new innovative ventures, and by doing that, alleviate the problem of adverse selection. In fact, they are less likely to impose unfavourable conditions to the demand-side; unfavourable conditions which only the least capable entrepreneurs may be willing to accept. Then, by becoming shareholders and active managers, and by sustaining frequent interactions, they may reduce the moral hazard concerns, since they are given a chance to closely observe the conduct of the entrepreneur, whose involvement in turn, largely influences the eventual success of the new venture (Amit *et al.*, 1993; Hellmann *et al.*, 2000; Baum and Silverman, 2004; Jeng and Wells, 2000; Hellman and Puri, 2002).

Venture capital is hence argued to be a critical component of an advanced entrepreneurial ecosystem. However, despite the advantages with respect to the traditional sources of start-up funding, VC activity is still a process inherently accompanied by information asymmetries and potential opportunistic behaviour. The latter term, in this case, refers to a potential ‘unfair conduct’, that is, prioritization of personal self-interests of the entrepreneur with respect to the funder (Gompers, 1995; Amit *et al.*, 1998; Wright *et al.*, 2005; Zacharakis *et al.*, 2007). To that end, previous research has well documented the role of formal institutions in mitigating market imperfections relevant for VC. One case that relates to information asymmetries as well as to possible opportunistic behaviours by the involved parties is represented by the venture capital contracts, which are specifically designed and detailed to overcome such problems.

Several contract features are directly intended to reduce the transaction costs and are usually related to control allocation (Chan *et al.*, 1990), staging (Sahlman, 1990; Neher, 1999), syndication (Brander *et al.*, 2002) and convertible securities (Repullo and Suarez, 2004) for the investor(s). Of course, such contract properties can only be viable and enforced in the presence of effective political and economic institutions (Li and Zahra, 2012). Accordingly, the literature identifies multiple features of an institutional environment that might be relevant for the well-functioning of the VC industry. Primarily, formal institutions such as government quality, fiscal policy, legal system structure, labour market regulation and the structure of financial markets are reputed to have pertinent influence. In addition, the literature, albeit in a smaller volume, proposes several dimensions of informal institutions, that is, willingness of individuals to engage in entrepreneurship, cultural attitudes inherited in societies, dimensions of social capital (trust, networks, participation in civic life) as significant determinants of VC activity. This literature on the informal institutional determinants of VC activity is by far less conspicuous than the one pointing to formal institutions, but it is still present and, accordingly, will be taken into duly consideration in our review effort.

3. Methodology

We pursue three objectives: (i) to systematize all the scientific empirical evidence produced to date on the institutional determinants of VC activity; (ii) to critically appraise the current state of the literature and (iii) to guide an agenda that reports the gaps and new avenues for future research. In order to comprehensively do that, principles of systematic review suggested by Tranfield *et al.* (2003) were followed. This approach helped us establish a complete list of all peer-reviewed and nonpeer-reviewed studies (Cronin *et al.*, 2008) – so that we made sure to cover a large-scale of works in the respective field. We limited our focus on the literature produced from the year 1998 onwards, aligned with the timing of the development of the related scientific discourse. The search for articles took place between February 2016 and April 2016. Guided by the objective of creating a reliable and reproducible literature review, a list of predesigned steps have been specified. The first step was the systematic search of the literature in the largest international bibliographic databases (Scopus and ISI Web of Science) and Science Search Engines (Google Scholar), based on a keyword search. The primary combination of keywords included the terms ‘venture capital’ and ‘determinants’. In order to be as much inclusive as possible, we also searched for synonyms of the original keywords (i.e. ‘equity capital’, ‘risk capital’, ‘smart capital’, ‘backing capital’ and ‘seed capital’ for ‘venture capital’, and ‘antecedents’, ‘drivers’, ‘driving forces’, ‘motivators’, ‘promoters’, ‘supporting programs’ and ‘institutions’ for ‘determinants’).² After a preliminary screening of the abstract of the emergent articles, 532 of them were preselected. The whole procedure for the selection of papers is illustrated in Figure 1.

In the second step, out of the initial pool of articles, a total of 109 unique contributions were assessed to be relevant for the survey following strict predefined inclusion criteria in line with the research objectives. Table 1 illustrates that these research endeavours include quantitative and qualitative empirical studies that provide novel and concrete evidence on the phenomenon under investigation – which basically is our first inclusion criterion.³ This step is crucial for excluding from the formal list of this literature review a number of purely conceptual works,⁴ that although related to the topic, do not provide any empirically grounded evidence and, thus, are intrinsically unable to determine the impact of institutions on VC activity. The other criterion for the inclusion of scientific articles is the nature of the considered dependent variable – VC activity as defined in Section 1. The last important issue with the selection of the papers relates to the geographical context covered by a certain study. To be selected papers had to study and report original evidence on the relationship between institutions and VC activity in a particular country or region.

Third, we manually reviewed key journals in the fields of management, economics, entrepreneurship and finance to assure that no relevant work was overlooked. We found other 18 potentially appropriate

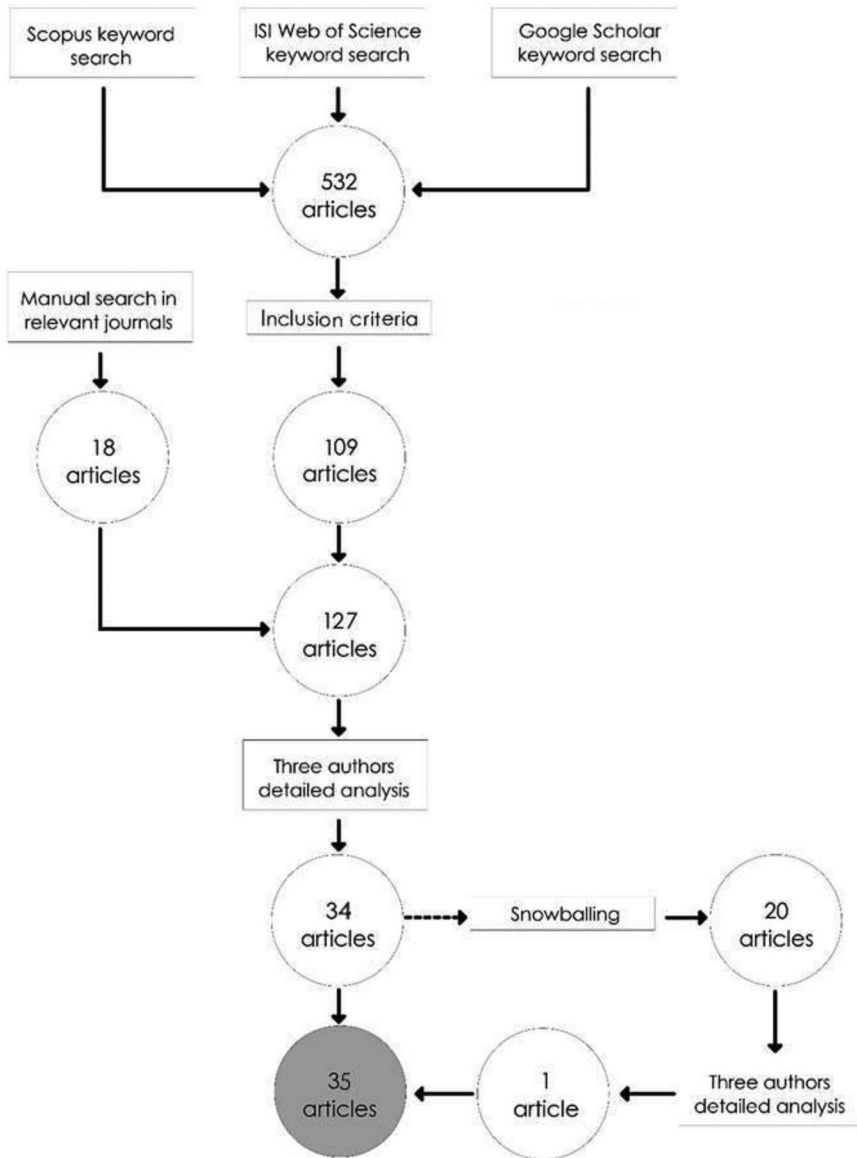


Figure 1. Key Steps in the Process of Article Search.

articles. This pool of 127 manuscripts was separately analysed in details by all three authors of this study (to avoid any bias), who assessed whether the articles should (or should not) be included in the review based on the predefined inclusion criteria. A contribution was included in the final sample only if all three researchers would agree upon its relevance for the survey (no major disagreements emerged).

Table 1. Inclusion Criteria for the Literature Review.

No.	Inclusion criteria	Description
I	Empirical studies	Include the qualitative and quantitative (i.e. empirical) articles that provide novel and concrete evidence on the topic.
II	Dependent variable	Include the articles if their dependent variable is venture capital activity within the scope of the definition that we employ in this work.
III	Geographical dimension	Include the articles that provide novel and concrete evidence for specific geographical regions.

Finally, we employed a supplementary procedure called snowballing technique (Greenhalgh and Peacock, 2005) by examining the cited contributions by the selected articles. This step yielded one more original article. In total, 35 empirical articles were included in the survey: 29 quantitative articles and 6 of a qualitative nature.⁵

4. Formal and Informal Institutions as Determinants of VC

In this section, we report an elaborate and critical review of the existing research on the institutional determinants of VC. All 35 surveyed papers are presented in the Appendix, together with a basic description illustrating their unit of analysis, data and methodology used by these studies, how VC activity was measured and which formal and informal institutions were considered. Here below, following Cowell (2012, page 60), we classify this literature review with respect to the content, which yielded three broad thematic groups. First, we present evidence regarding *formal* institutions as VC determinants, by distinguishing three different subgroups: *regulatory institutions*, *government quality*, and *financial market conditions*. Second, we provide an elaboration of the articles that account for the *informal* institutions. In this regard, three main subgroups are identified: *entrepreneurialism* (i.e. the propensity of individuals to start a firm), *cultural dimensions* and *social capital*. Finally, we present other contextual determinants that are in addition found to play a role in the appliance of VC activity. A cumulative summary of the articles with respect to the above-mentioned institutional classification is illustrated in Table 2, together with the evidence of their impact on VC activity.⁶ This process enables us to depict a clear synopsis of the focal points of research and to identify underinvestigated relationships and research gaps.

4.1 Formal Institutions

4.1.1 Regulatory Institutions

Regulatory institutions have been considered by a growing body of literature which attests their function for VC activity. Under such stream, the selected articles point their attention to the role of both (i) fiscal policy and (ii) other regulation acts which comprise the legal system, investor protection, bankruptcy law and labour market legislation (rigid labour market regulation). Considering that VC is a two-sided activity consisting of both supply and demand sides, these formal institutional arrangements likewise do have a potential to shape VC activity in both ways, that is, by having an influence on both sides.

Table 2. Empirical Findings¹ of Articles Included in the Literature Review, Classified with Respect to the Type of Institutional Dimension They Investigate. The Dependent Variable Is VC Activity.

Row No.	Type of institution	Negative impact (-)	No significant impact (0)	Positive impact (+)
[1]	Formal institutions			
[2]	Regulatory institutions			
[3]	Fiscal Policy			
[4]	<i>High individual/corporate capital gain tax</i> ²	Gompers and Lerner (1999); Da Rin <i>et al.</i> (2006); Bedu and Montalban (2014)	Jeng and Wells (2000)	
[5]	<i>High corporate income tax (or comparable measures)</i>	Romain and van Pottelsberghe (2004); Schröder (2011); Bonini and Alkan (2012); Cumming and Li (2016); ³ Bedu and Montalban (2014); Groh and Wallmeroth (2016) ⁴	Groh and Wallmeroth (2016)	
[6]	Other regulatory aspects			Jeng and Wells (2000);
[7]	<i>Legal system structure (English)</i>		Aggarwal and Goodell (2014); Bottazzi <i>et al.</i> (2016)	Leleux and Surlemont (2003); Guler and Guillén (2010); Bonini and Alkan (2012); Hain <i>et al.</i> (2016)
[8]	<i>Investor protection</i>		Jeng and Wells (2000); Cumming <i>et al.</i> (2016)	Aggarwal and Goodell (2014); Bedu and Montalban (2014); Groh and Wallmeroth (2016)
[9]	<i>Liberal bankruptcy law</i>		Cumming and Li (2016)	Armour and Cumming (2016)

(Continued)

Table 2. Continued.

Row No.	Type of institution	Negative impact (-)	No significant impact (0)	Positive impact (+)
[10]	<i>Rigid labor market regulations</i>	Jeng and Wells (2000); Romain and van Pottelsberghe (2004); Da Rin <i>et al.</i> (2006); Félix <i>et al.</i> (2013); Bonini and Alkan (2012); Cumming and Li (2016); Bozky and Kerr (2014); Groh and Wallmeroth (2016)	Bedu and Montalban (2014)	Schertler (2003)
[11]	<i>Pension investments</i>		Jeng and Wells (2000); Bedu and Montalban (2014)	Gompers and Lerner (1999)
[12]	Government quality			
[13]	<i>Governmental programs</i>	Lelux and Surlemont (2003); Armour and Cumming (2016); Cumming and MacIntosh (2006)		Da Rin <i>et al.</i> (2006); Cumming and Li (2016)
[14]	<i>Governmental effectiveness</i>			
[15]	<i>Regulatory quality</i>		Cumming <i>et al.</i> (2016)	Cherif and Gazdar (2009); Cumming <i>et al.</i> (2016)
[16]	<i>Rule of law</i>	Cherif and Gazdar (2009)	Jeng and Wells (2000)	Cherif and Gazdar (2009)
[17]	<i>Political stability</i>		Bonini and Alkan (2012); Cumming <i>et al.</i> (2016); Hain <i>et al.</i> (2016)	Cumming <i>et al.</i> (2016) Cherif and Gazdar (2009); Guler and Guillén (2010)
[18]	<i>Voice and accountability</i>		Cumming <i>et al.</i> (2016)	Cherif and Gazdar (2009)
[19]	<i>Corruption</i>	Groh and Wallmeroth (2016)	Bonini and Alkan (2012); Cumming <i>et al.</i> (2016)	Cherif and Gazdar (2009)
[20]	<i>World Governance Index⁵</i>			
[21]	Financial market conditions			Li and Zahra (2012)

(Continued)

Table 2. Continued.

Row No.	Type of institution	Negative impact (–)	No significant impact (0)	Positive impact (+)
[22]	<i>Stock market development</i>	Félix <i>et al.</i> (2013)	Jeng and Wells (2000); Bonini and Alkan (2012); Cumming and Li (2016); Hain <i>et al.</i> (2016)	Black and Gilson (1998); Gompers and Lerner (1999); Schertler (2003); Armour and Cumming (2016); Cumming and MacIntosh (2006); Da Rin <i>et al.</i> (2006); Guler and Guillén (2010); Schröder (2011); Bonini and Alkan (2012); Li and Zahra (2012); Carvell <i>et al.</i> (2013); Cumming <i>et al.</i> (2016); Ning <i>et al.</i> (2015); Groh and Wallmeroth (2016)
[23]	<i>IPO activity</i>		Gompers and Lerner (1999); Jeng and Wells (2000)	Black and Gilson (1998); Bonini and Alkan (2012); Carvell <i>et al.</i> (2013); Félix <i>et al.</i> (2013); Ning <i>et al.</i> (2015)
[24]	<i>M&A activity</i>			Félix <i>et al.</i> (2013); Groh and Wallmeroth (2016)
[25]	Informal institutions			Romain and van Pottelsberghe (2004); Bonini and Alkan (2012)
[26]	Entrepreneurialism	Félix <i>et al.</i> (2013)	Armour and Cumming (2016); Li and Zahra (2012)	
[27]	Other cultural attitudes			
[28]	<i>Uncertainty avoidance</i>	Li and Zahra (2012); Aggarwal and Goodell (2014); Cumming <i>et al.</i> (2016)		

(Continued)

Table 2. Continued.

Row No.	Type of institution	Negative impact (-)	No significant impact (0)	Positive impact (+)
[29]	<i>Individualism</i>		Aggarwal and Goodell (2014)	Li and Zahra (2012)
[30]	<i>Power distance</i>		Aggarwal and Goodell (2014)	
[31]	<i>Masculinity</i>	Aggarwal and Goodell (2014)		
[32]	<i>Cultural distance (in terms of the four Hofstede cultural dimensions)</i>	Hain <i>et al.</i> (2016)		
[33]	<i>Corruption perception</i>	Hain <i>et al.</i> (2016)		
[34]	Social capital			
[35]	Trust			Bottazzi <i>et al.</i> (2016); Hain <i>et al.</i> (2016)
[36]	Contextual determinants			
[37]	Technological opportunities			
[38]	<i>Innovation and R&D</i>	Cumming and Li (2016)	Bonini and Alkan (2012); Bedu and Montalban (2014)	Gompers and Lerner (1999); Schertler (2003); Romain and van Pottelsberghe (2004); Da Rin <i>et al.</i> (2006); Schröder (2011); Félix <i>et al.</i> (2013); Groh and Wallmeroth (2016)
[39]	<i>Patents</i>		Armour and Cumming (2016)	Schertler (2003); Romain and van Pottelsberghe (2004); Guler and Guillén (2010); Schröder (2011); Cumming and Li (2016)

(Continued)

Table 2. Continued.

Row No.	Type of institution	Negative impact (-)	No significant impact (0)	Positive impact (+)
[40]	Macroeconomic conditions			
[41]	<i>GDP</i>		Schröder (2011); Bonini and Alkan (2012); Cumming and Li (2016)	Chen <i>et al.</i> (2010); Carvell <i>et al.</i> (2013); Cumming <i>et al.</i> (2016); Félix <i>et al.</i> (2013); Aggarwal and Goodell (2014); Bozkaya and Kerr (2014); Hain <i>et al.</i> (2016)
[42]	<i>GDP growth rate</i>		Jeng and Wells (2000); Cumming and MacIntosh (2006)	Gompers and Lerner (1999); Romain and van Pottelsberghe (2004); Cherif and Gazdar (2009); Li and Zahra (2012); Ning <i>et al.</i> (2015); Armour and Cumming (2016); Hain <i>et al.</i> (2016)
[43]	<i>Industrial production</i>			Ning <i>et al.</i> (2015)
[44]	<i>Interest rates</i>	Cumming and MacIntosh (2006)	Bonini and Alkan (2012)	Romain and van Pottelsberghe (2004); Schröder (2011); Félix <i>et al.</i> (2013); Ning <i>et al.</i> (2015)
[45]	<i>Unemployment rate</i>	Ning <i>et al.</i> (2015)		
[46]	<i>Inflation</i>		Bonini and Alkan (2012)	Ning <i>et al.</i> (2015)

¹As mentioned in Section 4, Table 2 presents only quantitative studies; qualitative studies are excluded from this analysis.

²This tax indicator in some studies (e.g. Bedu and Montalban, 2014) is only a component of more generic indices constructed to measure how favourable/less favourable a specific fiscal environment is.

³The authors measure the difference between corporate and individual top marginal income tax rate.

⁴The study finds that corporate tax influences VC negatively in emerging economies.

⁵This index is constructed by the incorporation of six institutional dimensions, that is government effectiveness, quality of regulatory policies, rule of law, property rights protection, political stability, voice and accountability.

Fiscal Policy

There are nine studies that investigated how fiscal policy rules alter VC activity. Among fiscal arrangements that impact VC, the literature has considered corporate capital gains taxation and the corporate income tax regime.

With regard to capital gains tax rates, the theory explains that they are linked with venture capital in two ways. In the first place, low capital gains taxes could increase the supply of venture capital funds by increasing the posttax returns achievable from this type of investment compared to alternatives. In the same vein, an alteration of the relative tax burdens on wage and capital gains in favour of this latter, may also produce sizeable effects on the demand for VCs, by pushing more talented individuals to opt for an entrepreneurial career, and in doing so, increasing the potential deal flow for VCs (Poterba, 1989). An interesting and representative work on this specific relationship is the one by Da Rin *et al.* (2006). Relying on a unique panel of data about 14 European countries the authors find that among the institutions that foster VC markets, a significant positive impact stems from low corporate capital gains taxation regimes. An unfavourably high taxation regime was found to particularly depress early-stage investments in high-tech projects. Gompers and Lerner (1999) find that reductions in the capital gains taxation in the USA have incentivized individuals to become entrepreneurs thus contributing to the early development of the VC industry in the eighties (similar evidence is provided by Cumming and Li, 2016). However, the evidence is not univocal in this respect. For example, Jeng and Wells (2000) by analysing 21 worldwide countries and using data on individual capital gains tax rates do not find any significant relationship between corporate capital gains taxation and VC activity.

In like manner, several works have appeared in recent years documenting the role of the corporate income tax. Bonini and Alkan (2012), as well as Romain and van Pottelsberghe (2004), find that high corporate income taxes negatively influence the development of VC. Similarly, Schröder (2011) finds coherent results using VC data from 15 European countries in the 1995–2005 period. All these studies suggest that a low corporate income taxation increases the return to both investors and entrepreneurs by increasing the present value of the future (after tax) corporate income.

Another interesting approach has been presented by Bedu and Montalban (2014) who investigate the general role of tax initiatives for VC activity. The authors employ a variable that presents the role of fiscal environment for managers and individuals in investee companies and management funds. This index is an arithmetic mean of six subindexes: (1) capital gains taxation for private individuals, (2) income tax rate for private individuals, (3) timing of taxation of stocks options (before or after the sale of stock), (4) method of taxation of stock options, (5) ability to incorporate performance-related incentives for funds managers and (6) method of taxation of carried interests. They find robust evidence that a favourable tax rate regime strengthens the development of VC activity.

In view of all this evidence, it is possible to assert that fiscal policy is an important institutional driver for VC activity. Overall, six out of eight studies highlight that both low corporate capital gains and favourable corporate income taxation regimes have spurred the development of the VC industry, taking into consideration different time periods and spanning across different geographical contexts. Among the two articles detecting a null impact for fiscal policy, Jeng and Wells (2000) and Groh and Wallmeroth (2016), this latter study finds mixed evidence on the role of corporate income tax on VC activity, depending on the countries under investigation. In the case of emerging economies, the authors find a negative and statistically significant impact; while in developed ones, statistically negligible effects prevail.

Other Regulatory Aspects

The explanation of cross-country variation in VC has commonly been attributed also to other regulations embracing the legal system (investor protection, accounting standards, easing pension investments) and labour market regulations.

Introduced initially by the groundbreaking work of La Porta *et al.* (1997), the legal system of a country quickly became one of the most discussed determinants of VC. The legal system of a country is important

for venture capital activities since it influences the enforcement of contracts between venture capitalists and entrepreneurs including the screening, monitoring and rewarding process (La Porta *et al.*, 1997). La Porta *et al.* (1997) cluster legal schemes in four groups: English, French, German and Scandinavian. While English legal tradition denotes the common law tradition, the other legal traditions are categorized as civil law traditions which differ by the extent to which shareholder and creditor rights are protected. French tradition is considered the weakest in this respect, while the English law tradition provides the best ground for legal protections. Among seven studies that considered this determinant, an emblematic work is represented by the analysis of Bonini and Alkan (2012).⁷ The authors utilize a panel dataset for 16 worldwide countries during the time period 1995–2002 and control for the impact of the legal system prevailing in every Nation. They find solid evidence that legal system captures a significant fraction of the cross-national variation in VC activity. Countries with the English origin legal system have comparatively higher levels of VC investments than countries characterized by the French, German and Scandinavian systems. Another relevant contribution that suggests the importance of the English legal environment in the context of VC internationalization, is provided by Guler and Guillén (2010). Analysing a sample of 216 American venture capital firms that invested in 95 countries during the 1990–2002 period, the authors discover that venture capital firms enter foreign markets based on specific properties of host countries and specifically rely on a strong legal environment that protects investors' rights. In other words, the entry in a new country increases with the local level of protection of investors' rights.

The majority of the reviewed articles, five out of seven articles, strongly support the positive relationship between the English legal system and the development of the VC industry. The significance of English legal origin is found to decline (see Aggarwal and Goodell, 2014), when investor protection is added to the econometric specification, suggesting a potential substitution effect between the two constructs.⁸

Such a situation has influenced an important strand of literature to frequently consider the strength of investor protection as a substitution of legal system, particularly when internationalization of VC is studied. Table 2 (row eight) shows that this thematic area has involved a total of five studies among which two studies found this regulation to have a null impact on VC, whereas three studies suggest its significant role. A recent study that tackles the issue of the relationship between investor protection regulation and strength of VC markets is the one of Groh and Wallmeroth (2016). The authors analyse 118 countries using panel data from the year 2000–2013. For measuring the investor protection in a more detailed manner, they employ a disclosure index which encompasses the obligations of disclosing information related to financial transactions in an economic system. The impact of the variable in attracting venture capital investments as a percentage of GDP, results with a coefficient that is positive and statistically significant at the 5% level.

Another derivative of the legal systems studied in literature is the bankruptcy law. An environment tolerant to bankruptcy is expected to stimulate in turn risky ideas which do not necessarily succeed at the first attempt. How such tolerance towards bankruptcy correlates positively with VC activity was inspected by Armour and Cumming (2016). Using a reduced form measure of different bankruptcy law regimes across 15 Western European and North American countries, they found this index to have a high explanatory power with regard to VC investments. More specifically, less liberal bankruptcy laws are found to severely discourage the demand for venture capital thus reducing VC investments in general.

The influence of labour market regulations on the VC markets has also been largely investigated. A batch of 10 articles have linked this formal institution to VC activity. In fact, these policies are reputed to have an impact especially on the demand-side by modulating the number of entrepreneurs that require ambitious financing (Lerner and Tåg, 2013). Rigid labour market regulations may in fact come as a barrier to entrepreneurs since they increase the costs that relate to the firm entry and growth (Fonseca *et al.*, 2001).

Bonini and Alkan (2012) measure labour market rigidities grounded on the employment protection legislation index taken from OECD. This metric is based on the aggregation of 18 basic items capturing the strength of the legal framework governing the hiring and laying off of employees. They find that VC

investment activity is reduced through increasing rigidity in labour market regulations. Similar results are found by six other studies. Among these ones, it is worthwhile to mention Bozkaya and Kerr (2014) who undertook an exhaustive study, drawing a distinction between systems which are more in favour of employment protection laws, from those that rely on labour market expenditures (e.g. unemployment subsidiaries and insurance), to estimate their influence on VC activity. Analysing the European context over the 1990–2008 period, the authors find that it is particularly the latter dimension that exerts a great impact on the development of VC markets.

Taken together, 8 out of 10 studies point (with difference and nuances) to the positive role that a rather flexible labour market may exert on the development of VC activity.⁹

4.1.2 *Quality of the Governmental Institutions*

The role of formal institutions on VC activity has been also investigated from the lens of governmental programs (including different public intervention forms, i.e. Lelux and Surlemont, 2003) and governance indicators such as government effectiveness, regulatory quality, rule of law, political stability, voice and accountability and control of corruption. We systematize all these dimensions in the research stream named government quality.¹⁰ This stream is composed by 12 articles.

The results are somewhat mixed for most of the dimensions. For example, the governmental direct intervention through ad hoc programs designed to stimulate the emergence and development of VC has been proven to be ineffective by three out of five studies (see Table 2, row 13). Then, Bonini and Alkan (2012) investigate the roles of political stability and control of corruption but they do not find them to be significant for the presence of VC activity. Guler and Guillén (2010) analyse political stability and find its positive impact on VC activity; Groh and Wallmeroth (2016) report a negative impact of a bribery and corruption index on VC activity. Li and Zahra (2012) use a World Government Index which is an index constructed by Kaufmann *et al.* (2009) that considers several of the dimensions aforementioned. The authors find a significant positive relationship between this variable and the VC activity, both on the number and the amount of investments at the 1% statistical significance level. More recently, Cumming *et al.* (2016) investigate the relationship between government quality indicators and VC in a cross-country analysis on Cleantech venture capital investments. Using a unique worldwide dataset of 31 countries spanning over the period 1996–2010, they show that that government effectiveness and rule of law have both positive and statistically significant impacts on VC deals.

4.1.3 *Financial Market-Related Conditions*

VC is a financial instrument. Accordingly, its functionality also depends on how vibrant financial markets are. There is an ongoing debate about the importance of a sound stock market for the development of the VC industry. Our literature review uncovers 18 different studies that deal with this issue among which the majority reveals that the variable has a statistically significant positive effect on VC (14 articles). One of the first seminal piece of evidence that asserts the role of stock exchanges on VC activity was provided by Black and Gilson in 1998. The authors illustrate the importance of developed stock markets by comparing venture capital markets in the United States, United Kingdom, Japan and Germany. Their study suggests that a higher intensity and also higher returns of VC funding are present in countries with a high stock market capitalization/GDP ratio. By the same token, Schertler (2003) brings to light the positive relationship between stock market development and VC using a dynamic panel data model. He finds that stock market capitalization has a significant positive impact on early-stage VC investments. Similar results are obtained by most of the studies, even if also, in this case, there are some exceptions (see Bonini and Alkan, 2012; Félix *et al.*, 2013, which seem nevertheless to be contingent on the specific variables used to proxy stock market capitalization).

VC activity is a process that eventually demands an exit from the investment. One of the preferred mechanism through which venture capitalists cash out their investments is Initial Public Offering (IPO) (see for example Black and Gilson, 1998; Fleming, 2004; Cumming *et al.*, 2006), and so the ability to realize gains through an IPO is often considered critical to the existence of an active VC market. This mechanism permits both venture capitalists and the entrepreneurs to enter into an implicit contract over upcoming control of the portfolio company and this contract may hardly apply in a bank-centred system (Black and Gilson, 1998). Going public will simultaneously return wealth to the venture capitalist but it will also potentially re-confer control to the entrepreneur (assuming that outside ownership following an IPO is sufficiently dispersed), while a sale to another investor will usually not do it. Hence, if only a sale to another single investor can *ex ante* be realistically expected, the entrepreneur's incentives will be lower. Having said that, there is a considerable number of papers that provide a foundation on the importance of an active IPO market for the development of VC activity. Black and Gilson (1998) present one of the earliest empirical work related to this aspect. The authors test the significance of the relation between IPOs and capital contribution to VC funds over time in the USA and find evidence that IPOs trigger fundraising in the succeeding year. In a likewise manner, Bonini and Alkan (2012) highlight the positive role of the number of IPOs on VC early-stage investments. Apart from a few exceptions (e.g. Gompers and Lerner, 1999), the available evidence points to a positive and significant relationship between IPOs and VC activity. It is noticed that IPO activity has been considered overall by seven articles, among which five find the role of IPOs crucial for VC activity, while two of them present no significant evidence for such a relationship.

As to other possible exit modalities, Félix *et al.* (2013) for the first time, incorporate Merger & Acquisition (M&A) as an expected determinant that may stimulate VC markets. They find that M&A dynamics do significantly influence VC investments but not necessarily early-stage investments. Furthermore, such results suggest that the presence of an active M&A market provides support to VC markets even in the presence of weak IPO dynamics. In this respect, it is worthwhile to note that according to Groh and Wallmeroth (2016), the M&A market is found to matter more in developed economies rather than in emerging ones.

4.2 *Informal Institutions*

This literature review pays specific attention to the studies that investigate the role of informal institutions in influencing the VC activity in a given geographical area, both directly and indirectly. Among the included literature for this review, there is a clear imbalance of the studies that consider the role of informal institutional arrangements in understanding the functionality of VC industry. Translating it in numbers, there are only 11 papers altogether that consider the role of such aspect out of the 35 surveyed. We cluster these works according to the three dimensions they investigate: entrepreneurialism, other cultural attitudes and social capital.

4.2.1 *Entrepreneurialism*

In the light of what is mentioned in Section 2, entrepreneurialism is legitimately a trait that enters the informal institutional group of VC determinants. This research line counts a number of five papers that have overall produced inconclusive results. In spite of the evidence that asserts the influence of entrepreneurial culture on VC activity as positive, there are a few studies that either do not find a significant relationship between the two, or find the relationship to be negatively significant. This inconsistency can be attributed to the different mechanisms at hand that measure attitudes towards entrepreneurship.

Among the first to establish an empirical relationship between entrepreneurial activities and the volume of venture capital in markets were Gompers and Lerner (1999). In the same vein, Romain

and van Pottelsberghe (2004) point out that any economic system should provide a minimum level of entrepreneurship and entrepreneurial activities in order to trigger the demand for VC. Apparently, measuring entrepreneurship is a difficult task (Storey, 1991). In the context here considered, studies generally proxy the propensity of individuals to become entrepreneurs through the total entrepreneurship activity (TEA) index. This index was first established by the Global Entrepreneurship Monitor (GEM) Adult Population Survey and represents the prevalence of individuals that are currently starting a business or are owners and managers of young (i.e. aged less than 42 months old) firms (see for further details Reynolds *et al.*, 2002). But this proxy does present relevant shortcomings. First of all, it measures realized entrepreneurial acts rather than a cultural propensity towards entrepreneurship. Second, it fails to distinguish between the high quality startups and those that are driven by other circumstances (e.g. necessity, life-style etc.). This has often led to surprising results. For instance, a higher TEA might equally imply more work for VC investors since more time is needed for the selection of projects and this may be detrimental to the supply of VC (Félix *et al.*, 2013).¹¹ Pointing to the supposed noise of the TEA index, Bonini and Alkan (2012) use an alternative measure in their investigation of the determinants of cross-country variances in venture capital (VC) investments. They weight TEA with the national level of business expenditures in R&D in order to capture only the high potential entrepreneurs. With the use of this refined TEA index, authors find that higher levels of entrepreneurial activity increase the amount of VC capital in a country, at both early- and later-stage entrepreneurial ventures.

4.2.2 Other Cultural Attitudes

Recently, scholars have focused on the link between cultural attitudes and VC finance, measuring culture primarily in terms of the well-known Hofstede dimensions.¹² Five studies deal with this aspect. Amongst them, the uncertainty avoidance index is the most frequent indicator analysed (three articles consider it). Individualism is then investigated by two other articles whereas power distance as well as masculinity are elaborated in just one study.

To understand how aspects such as uncertainty avoidance and collectivism (vs. individualism) influence VC activity, Li and Zahra (2012) analyse 68 countries worldwide during the 1996–2006 period. Their main findings suggest that uncertainty avoidance is a critical dimension. In societies characterized by a high degree of uncertainty avoidance, VC activity is less sensitive (or responsive) to formal regulations, becoming thus the first study to investigate the interaction between formal and informal institutions on VC activity.¹³ Uncertainty avoidance was also found by Hain *et al.* (2016) as a relevant determinant of cross-border VC investments. Similar conclusions are reached by Aggarwal and Goodell (2014) and Cumming *et al.* (2016). The latter focus on VC investment activity in a more specific industrial sector such as the clean-tech. The authors find uncertainty avoidance to be negatively correlated with clean-tech VC activity, implying that the societies where VC clean-tech deals occur are characterized by a significantly lower rate of uncertainty avoidance.

Li and Zahra (2012) additionally consider the impact of the collectivism versus individualism on VC activity. Collectivism (individualism) is another cultural trait of a society that represents members' dependence (independence) with respect to broader associations and groups within the society. This characteristic may also be represented by the preference of members to define themselves in terms of 'We' rather 'I'. In relation to VC activity, they find that collectivism impacts negatively the development of VC. In addition, the authors interact this informal institution with the formal ones and find that this cultural dimension negatively moderates the (positive) impact of formal institutions on VC.

Another example that links the dimension of individualism and VC activity is presented by Aggarwal and Goodell (2014) who find no particular influence of individualism on the development of VC. The authors add in their analysis a third dimension of culture, named power distance. This dimension describes the level to which the less advantaged people (less powerful members) accept the unequal distribution of power among society. No significant evidence is found on the impact of this variable on VC activity.

Masculinity is the last Hofstede's trait taken into account in the literature as a possible VC determinant (yet not extensively). It represents the attitude of society towards achievement, heroism, assertiveness and other material rewards that bring success whereas the opposite is related to the degree of preference for cooperation, modesty, caring for the weak and quality of life (Hofstede, 1980; Hofstede *et al.*, 2010). Aggarwal and Goodell (2014) find evidence that masculinity has a negative impact on VC.

4.2.3 *Social Capital*

Social capital has a great importance for the functioning of any economic system.¹⁴ As to entrepreneurship, it may influence individuals' decision to start-up a firm (e.g. Walker *et al.*, 1997; De Carolis and Saporito, 2006; Bauernschuster *et al.*, 2010), and in a similar fashion, may facilitate access to financial capital resources like VC, by easing the matching process on both the demand and the supply sides (Ahlstrom and Bruton, 2006). Social capital is commonly defined as a fusion of trust, formation of social networks and civic participation.¹⁵ In the context of the institutional determinants of VC activity, the first two dimensions have been particularly studied. In particular, Hain *et al.* (2016) use a distinctive international dataset and propound a multidimensional approach to explain cross-border VC investments over the 2000–2012 period. Among other results, they highlight that, for emerging economies, institutional trust is identified to be a necessary precondition for foreign VC inflows, especially for the formation of foreign-domestic syndicates. Interestingly, in developed economies, relational trust is found to be even more relevant for VC activity. Another empirical study that examines how VC is influenced by trust is represented by Bottazzi *et al.* (2016). Using self-collected data on a sample of 107 VC firms active in the USA and 15 EU countries, the authors find again that trust is a significant driver of VC deals emergence. In their estimates, the probability of a VC investment in one country increases by +7% for a 1% increase in trust in that country.

But apart these two exceptions that strongly point to the importance of trust for VC activity, the theme of social capital has been left rather unexplored, especially in quantitative research, as it can be seen in Table 2. However, the role of the other measures of social capital on VC activity has been treated only in qualitative research especially starting from 2003. In particular, the network dimension has been suggested as an important determinant of VC by four contributions (see Bruton *et al.*, 2002; Bruton and Ahlstrom, 2003; Ahlstrom and Bruton, 2006; Bruton *et al.*, 2009), looking primarily to a specific institutional context, that is Asia, and to the importance of specific typologies of network, for example Guanxi in China (see in particular, Bruton and Ahlstrom, 2003). Overall, the qualitative evidence produced by the means of semistructured interviews and archival data highlights how networks could be important for venture capitalists in terms of firms' selection, as well as for monitoring purposes. Such networks are reported to be helpful also for building relations with institutions (regulatory and normative institutions) so that a better environment is established before venture capitalists invest their funds.

4.3 *Additional Contextual Determinants*

Institutions can influence VC in several indirect ways as well. Technological opportunities are one of the most studied alternative channels. In this category, we find 12 studies (see Table 2, rows 38–39) that have used indicators such as innovation rate and R&D expenditure, patents, and human capital endowment. Broadly speaking, the presence of technological opportunities is found to have a positive impact on the demand for VC mainly through increasing the number of new startups exploiting those available opportunities (Lerner and Tåg, 2013). An example in this stream is the study of Da Rin *et al.* (2006), who found a positive link between public R&D spending and venture capital activities at the aggregate level. Similar findings are obtained by Schertler (2003), Romain and van Pottelsberghe (2004),

Schröder (2011), Félix *et al.* (2013), even if some exceptions do exist in this respect, for example Bonin and Alkan (2012).

Other contextual determinants that have been studied in relation to the development of VC activity are macroeconomic conditions: GDP, GDP growth rate, industrial production, interest rate, unemployment rate and inflation. As it can be seen, GDP and GDP growth are the most considered determinants and both are found to be significantly related to VC activity. In the case of interest rates, four studies document it to be positively correlated with VC activity, while exactly the opposite holds in the case of Cumming and MacIntosh (2006). Bonini and Alkan (2012) do not find it significant at all.

5. Research Agenda

Based on the systematic overview of the existing knowledge in the field, we aim at presenting several highly prominent scientific steps that can be taken in the future to better understand the institutional roots of the heterogeneity of VC markets. In fact, we believe that there are several scientific aspects that remain overlooked, whereas there are also a number of others that are considered only superficially. As such, this survey sheds light on the understudied topics and provides the ground for a future research agenda.

5.1 Formal Institutions and VC

Our literature review uncovered many formal institutional dimensions that have been studied during the last decades. For most of them (e.g. taxations, labour market regulations, financial market conditions), strong evidence has been produced on the significant effect that these dimensions exert on the development of VC.¹⁶ However, few exceptions do exist, which suggest that further research endeavours are needed. Rigorous and robust empirical research on the impact of these formal dimensions on VC activity will enable us to better understand the reasons behind these unexpected results. In this domain, we see two interesting avenues for providing more compelling findings on the impact of formal institutions on VC. First, a very much needed but often neglected aspect (also due to data limitation issues) is the investigation of the effect of these variables not only on the equilibrium (i.e. the development of VC in a given geographical area) but on the demand and supply sides that contribute to that final outcome, separately. This differentiation, which has been rarely pursued in the literature, would enable a more *thorough* comprehension of the phenomena at stake and on the reasons why some studies (e.g. Schertler, 2003) fail to detect the expected impact of a specific institutional mechanism (e.g. labour market regulation). Second, considering that a good portion of VC-backed firms relocate in countries with more developed laws (Cumming *et al.*, 2009), it is important to understand the reasons behind a lack of impact of formal institutional arrangements, highlighted by some studies, which may hide a more nuanced picture than what is generally thought. In fact, the effect of these formal institutions could be neutralized by other specific (formal and informal) institutional characteristics of the geographical area and of the time periods to which these studies refer to. Adhering to this view, a reform that makes more liberal the bankruptcy law is likely to be ineffective (at least in the short run) in areas where the cultural stigma stemming from failure is nevertheless high. Such type of possible interdependencies between formal and informal institutions have been almost completely underscored so far. The inclusion in the empirical analyses of these possible intervening factors could enable us to better elucidate the *boundary* conditions under which we may expect an effect of these formal institutions on the development of VC.

More generally, to the best of our knowledge, there are only two studies (Li and Zahra, 2012; Cumming *et al.*, 2016) which investigate the mutual interrelationships between formal and informal institutions in their impact on VC. While following the well-established views on institutional economics (for instance the *Variety of Capitalism* approach by Hall and Soskice, 2001), the interaction between the two constructs could be the cause of fairly different effects of regulations on the VC activity in different

geographical areas. This type of analysis could also be helpful to the extent that identifies the specific reforms of formal institutions which are likely to produce the most sizeable changes in VC dynamics in any given context. In this respect, it is worthwhile noting that remains fairly unclear, by looking at the literature, how much of the relationships between formal institutions and VC are simply due to 'cross-national and hard-to-change' institutional traits or they are conversely produced also by an active involvement of governments over time. Disentangling this issue would represent another important step towards a better understanding of the institutional reforms that have to be put in place to stimulate the VC industry.

Linked to this, an additional under investigated dimension is the analysis of the effectiveness of direct 'hands-on' public programs aimed at stimulating the VC market. Following the recent economic recession of 2008, there was an immense need for governments' reaction, to reignite economic growth. Such need, and the impact of different programs that were put in place to spur VC and to benefit the high-potential sector of innovation driven startups, are discussed in the Josh Lerner's (2009) book, 'Boulevard of Broken Dreams' which in turn elaborates on the advantages and shortcomings of these policies, calling for more programs that reflect the understanding of the entrepreneurial process itself. Lerner argues that government spending can easily result in an avenue of false and unrealistic expectations, something that also the reviewed studies on the topic uncover to some extent. In particular, Armour and Cumming (2016) and Cumming and Macintosh (2006) find governmental programs to impact VC activity¹⁷ in a negative way (see also the study of Cumming *et al.*, 2017b, for more evidence on how governmental programs in Canada crowded out private investments; or the work of Cumming and Johan, 2009 on the risk that different governmental programs may end up cannibalizing themselves), while Da Rin *et al.* (2006) report the opposite. Exactly for this contrasting result, the work of Da Rin *et al.* (2006) was heavily criticized by Cumming (2011), who duly argues about the use of misleading measures of country VC activity behind such result, pointing to the risk that inaccurate information may have on policy makers about the effect of their own VC investment programs. In this respect, we think, there is a need for more research *tout court* as to increase our information set about the impact of these programs at different latitudes and to investigate in depth the specific contexts and the conditions where successful programs for enlargement of VC activity could prove to be successful (see Cumming, 2007 for a similar point).

Another direction that probably deserves more attention from future research relates to a successful tackling of the identification problem, so to ameliorate the obstacles faced by previous research. The articles reviewed here encountered several institutional changes, while they rarely had the opportunity to focus on a specific institutional change longitudinally and verify, everything else being equal both *ex ante* and *ex post* the change, how does *this unique change* impact VC activity. Needless to say, there is more than a study that to some extent acknowledges the issue and cope with that, with either the use of instrumental variables (e.g. Jeng and Wells, 2000; Schertler, 2003; Armour and Cumming, 2016; Bonini and Alkan, 2012; Li and Zahra, 2012; Cumming *et al.*, 2016) or by performing specific tests on the endogeneity problem (Leleux and Surlemont, 2003; Cumming and MacIntosh, 2006; Cumming and Li, 2016; Ning *et al.*, 2015; Groh and Wallmeroth, 2016) or even by using particularly fine-grained datasets which allows to limit the presence of severe reverse causality problems (see the study of Bottazzi *et al.*, 2016). But, admittedly, within the list of reviewed articles, there was only one (quasi-)natural experiment from Becker and Hellmann (2005) which, using a multidisciplinary historical content analysis combined with field research, looked at how the introduction of WFG (the first ever German VC firm) incentivized VC market in a naturally born bank-based system. They found that the program bore no fruit due to the impossibility to fit the environment, considering that there were no other helpful institutional changes happening in parallel (i.e. reinforcement of investors' protection, incentivizing incumbent firms to seek for the success of the new ventures). Though this example provides more concrete evidence, its application cannot be extended to other contexts, considering that its subject of study is rather narrow. We, therefore, invite scientists to conduct in the future more quantitative analysis in this regard, that is to study a specific institutional change holding others the same and employ more often than what was pursued in

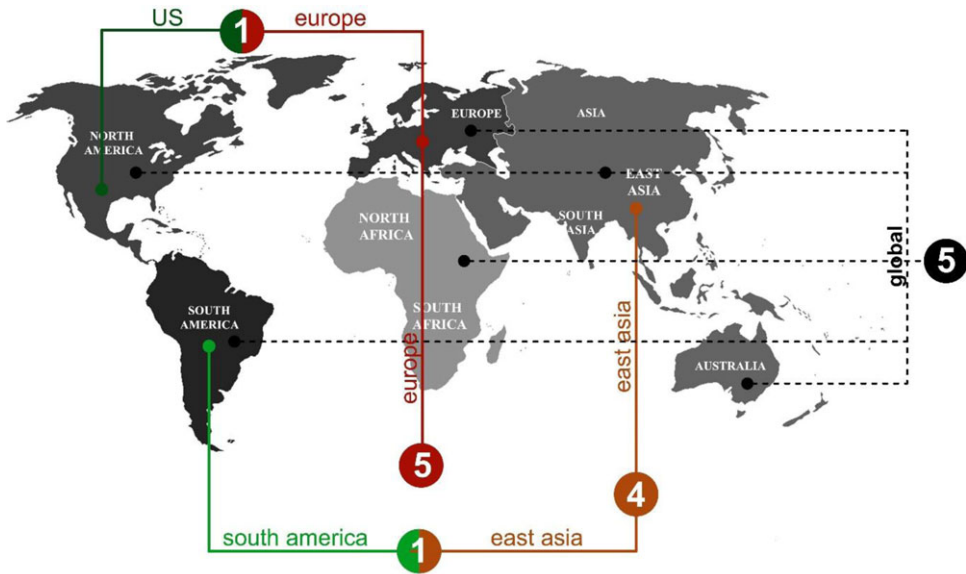


Figure 2. The Geographical Concentration of Scientific Papers That Study Informal Institutions. [Colour figure can be viewed at wileyonlinelibrary.com]

the past longitudinal quasi-natural experiments, (conditional) difference-in-difference regression analyses and other similar techniques.

5.2 Informal Institutions and VC

There is a systematic dominance of formal aspects of institutions when compared to informal ones. The analysed articles predominantly focus on the role of regulatory institutions, government quality and other contextual determinants (35 studies), whereas less than half of them (48.57%) are concerned with the informal dimensions of institutions: entrepreneurialism (six studies, five of a quantitative nature whereas one of qualitative character), other cultural attitudes (four studies of quantitative nature) as well as the endowment of societies in terms of social capital (six studies in total, four of qualitative nature whereas only two of quantitative type). This dearth of studies, particularly the quantitative ones, is worthy of attention, and it is also evident by looking at the geographical coverage of the studies that deal with the informal dimension. Figure 2 portrays that among 16 articles that include in their analysis the role of informal institutions, only five of them take a global approach. Most of the research efforts have been concentrated in the sole Europe that counts for a total of five exclusive studies, with only one article investigating the role of trust as a facet of social capital, while the others do attempt to understand the role of entrepreneurial culture. Countries that include the dimension of networks are generally focused in Asia (four articles) and they are of qualitative nature.

Whether the scholarly interest on the relationship between informal institutions and VC activity is surely larger than what detected by our empirical-based survey (e.g. Batjargal and Liu, 2004; Duffner *et al.*, 2009; Alexy *et al.*, 2012; Liu *et al.*, 2012; Kollmann *et al.*, 2014; Kuen, 2014; Nahata *et al.*, 2014; Omrane, 2014), this lack of quantitative attention (on the characteristics of interest in our review) is worrisome especially with regards to the social capital dimension. Social capital affects the engagement

of entrepreneurs in venture creation and the demand for finance. Moreover, it is also likely to strongly determine the supply of venture funds as it is testified by the case of Guanxi networks in China. Inspecting more deeply how social capital in different institutional contexts may impact the development of VC, and do that in a more quantitative fashion than what has been pursued so far, should figure high in the research agenda of scholars in entrepreneurial finance.

Needless to say, enlarging the spectrum of possible relevant informal institutions (e.g. religion, civic participation and norms) is also advisable (see Chircop *et al.*, 2018 for a recent attempt). Such directions should be a priority of high relevance for future research since informal institutions are persistent in their very nature, and consequently, they can leave a distinguishable imprint in the VC activity. In a nutshell, also in order to deliver sound advices to policy makers, we suggest that there is an urgent need for a more thoughtful analysis on the role of informal institutions in their relationship with VC activity.

5.3 *Institutions and VC: Go Broader and Deeper*

Having observed that the flourishing of the VC industry demands for formal and informal institutional reforms that require political and administrative efforts to be implemented, and time to show their effect, if ever positive, policymakers should gauge the opportunity not to focus exclusively on this entrepreneurial financing model (see also Grilli *et al.*, 2018). Shifting the attention on other recent alternative equity finance models, such as crowdfunding and peer-to-peer lending, that may gain momentum in the near future (see McCahery and Vermeulen, 2016), might be a policy option to uncover that could be more promising for specific landscapes in comparison to VC (Grilli *et al.*, 2018; Estrin *et al.*, 2018).

In turn, this requires more policy-oriented research on these more recent financing channels, aimed at elucidating their still unknown characteristics and interrelationships (Drover *et al.*, 2017), implications for social welfare and regulatory requirements. Furthermore, our literature review highlights how VC activity is (implicitly) considered too often as a relatively homogenous phenomenon. In this respect, despite of an increasing interest by stakeholders and a parallel acknowledgment by the scholarly community of the heterogeneity existing in this domain (see for example Manigart and Wright, 2013b; Drover *et al.*, 2017), it still remains a rather open research question to understand how different institutional arrangements may impact different type of VC activity. In fact, large is the spectrum of characteristics which make investors different one from the other. One prominent example is whether they are captive (e.g. corporate venture capital, bank-based venture capital), governmental or independent (see Bertoni *et al.*, 2013). Increasingly adopting an ‘institutional lens’ with a geographical focus aiming at elucidating which institutional change may impact which *type* of VCs in a given geographical area, does represent, in our view, a promising avenue for future research.

6. Concluding Remarks

VC industry has heterogeneously developed across the world despite extensive efforts of governments to stimulate it. Scholars have studied these dynamics, yet the findings about the causes of this disparity are nonconclusive, while no thorough and complete overview of the produced findings exists. Hence, we review the state-of-the-art empirical literature on the institutional determinants of VC activity. Specifically, drawing on studies in management, economics, entrepreneurship and finance, we have reviewed the literature relating to the determinants of VC activity with a particular focus on institutions. Following a consolidated research protocol (Tranfield *et al.*, 2003), we have enucleated 35 papers that shed light from an empirical point of view on which formal and informal institutions matter (and which not) for the development of a florid VC market. Our systematization effort harmonizes these studies by delineating a research agenda for further advancing our understanding of the institutional roots of VC. The analysis of this literature has revealed that the most frequently investigated institutional dimensions are regulatory

policies, indicators of government quality, financial markets and other contextual determinants. Little effort has been dedicated to the analysis of the role of informal institutions towards the development of VC. And even less attention has been devoted to the analysis of whether informal institutions may represent antecedents, moderating and mediating factors of the 'usual suspects' related to formal institutions (e.g. legal system structure, political stability, the rule of law etc.). Specifically, the role of social capital has been particularly neglected and, in our view, it deserves a supplement of attention in future research endeavours.

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Notes

1. There is a certain number of literature reviews produced so far, which overview the development of the venture capital industry and that are related to the one performed here, albeit they do not possess the same characteristics. One of the first examples includes Gompers and Lerner (2001), then followed by Gompers (2007). The immense scientific work on VC contracts has triggered surveys of literature on the same topic, one conducted by Tykvová (2007) and the other from Zambelli (2014). Jääskeläinen (2012) clusters literature on syndication, one of the most integral components of VC activity. An interesting review that looks at the research output focused on the period of the VCs postinvestments comes from Manigart and Wright (2013a). Among the most recent attempts to systematize research on the equity investment for startups in several different aspects (e.g., Kaplan and Strömberg, 2009; Metrick and Yasuda, 2010; Kerr and Nanda, 2011; Cumming and Johan, 2017; Wallmeroth *et al.*, 2018), one study which is close in spirit to the present work is Lerner and Tåg (2013). In this case, while authors enquire about the institutional causes that may lead to the development of VC, they confine their analysis to the comparison between the USA and Sweden, without enlarging their perspective and analysing evidence produced in other institutional contexts. Finally, the recent review performed by Drover *et al.* (2017) looks, among other things, on how different (formal and informal) governance mechanisms impact the VC-entrepreneur relationship.
2. Following a specific input by a referee (we are thankful for), in a second stage, the keyword search was further extended to embrace new terms such as '*carried interest*', '*bankruptcy*', and '*trust*', along with '*venture capital*'; however, no further additions were generated.
3. This restriction implies exclusion of all purely speculative papers, literature reviews and other works of an anecdotal nature such as essays, personal opinions and perspectives due to the difficulties on the judgement of this type of work (Colling, 2003).
4. A full list of the 92 papers that did not meet at least one of the inclusion criteria is available upon request from the authors. In this respect, please note that these more conceptual works that were related to the topic but which per se do not produce original evidence on the impact of institutions on VC activity, when appropriate, have been nonetheless cited and used to corroborate our findings.
5. In order not to overlook any potentially influential contribution, we also include in our literature review research products such as book chapters and works in progress published in well-known economics and management repositories (e.g. Ideas Repec, SSRN).

6. Since a precise impact of each institution driver can be detected only in the case of quantitative evidence, this analysis is confined only to quantitative studies.
7. See other examples that control for the legal environment: Hain *et al.* (2016); Jeng and Wells (2000); Leleux and Surlémont (2003).
8. See other examples that consider the role of investor protection regulation: Bedu and Montalban (2014); Groh and Wallmeroth (2016); Jeng and Wells (2000).
9. Easing pension fund investments is another regulation categorized under ‘other regulatory aspects’ group. The position of the studies that consider this dimension are reported in Table 2, row 11.
10. Voice and accountability show the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association and free media. Political stability is an indicator that captures the absence of violence/terrorism by unconstitutional mass. Government effectiveness includes the quality of public service, the capacity of the civil service and its independence from political pressures, and the quality of policy. Regulatory quality stands for the potential of the government to provide sound policies and regulations that support the development of the private sector. Rule of law defines the extent to which individuals have confidence in the reliability of rules of a society. It includes the quality of contract enforcement and property rights. Finally, control of corruption reports the level on which public power is used for private gains, including both petty and grand forms of corruptions, as well as ‘capture’ of the State by elites.
11. On the ambiguous impact of self-employment rate on the demand for VC funds see also Li and Zahra (2012).
12. Initially, Hofstede (1980) provided four dimensions of culture: power (equality vs. inequality), individualism (vs. collectivism), masculinity (vs. femininity), uncertainty avoidance (vs. uncertainty tolerance). Later, the group of national culture measures was extended to two new additions: temporal orientation (suggested by Michael Harris Bond), and indulgence (suggested by Michael Minkov) totalling a number of six national culture measures which are assembled and explained in Hofstede *et al.* (2010).
13. The importance of the interaction between formal and informal institutions is pointed out also when looking at the general impact of entrepreneurship in economic development. One of that sort is the example of Cumming *et al.* (2014), who uncover that a formal institution such as strong creditor rights decreases the impact of entrepreneurship in the economy, mainly through restricting entrepreneurs’ risk-taking attitude. This study becomes relevant for our context as, as it adds further information on the regulations that financial seekers (entrepreneurs/demand side) are more sensitive to.
14. For an overview see for e.g., Dasgupta (2005); Knack and Keefer (1997), Paldam (2000); Sobel (2002).
15. Trust includes trust in fellow people and in institutions (see for e.g., Rainer and Siedler, 2009). Networks represent a measure of the nodes and frequency of peoples’ interactions. Civic participation identifies membership in voluntary organizations (hobby activities) where more intense horizontal interactions are promoted and the chances for positive externalities are higher (see Putnam, 1993).
16. The importance of the institutional environment is also studied when one looks at successful exits and not only VC activity in equilibrium. In that regard, a contribution is given by Johan and Zhang (2016) who, by focusing on 35 emerging economies, stress the importance of the legal environment on the realizations of successful exits. The link between the quality of the legal, institutional framework and successful exits is also confirmed by fresh evidence of Tykvová (2018).
17. The nonadded value of governmental programs is also observed in studies that look at the exit performance of VC-backed companies. For example, the analysis of Cumming *et al.* (2017a), based on firm-level data, find that the exit performance of independent VC-backed firms is generally better than the performance of companies backed by governmental VC.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table A1. Summary of the Reviewed Articles.