THE ROLE OF VENTURE CAPITAL AND PRIVATE EQUITY IN THE ENTREPRENEURIAL FINANCE ECOSYSTEM

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Abstract This paper researches the role of venture capital and private equity in the entrepreneurial ecosystem by reviewing the literature within that domain. The existing literature, studies and other literature reviews are included in this paper to learn if there is a progress in the field and to collect the most critical data regarding venture capital and private equity in entrepreneurial finance. An analysis is limited to scholarly journal articles and reviews published during the last five years (2014 – 2019) and available within the ISI Web of Science database. To detect current themes in the field, we performed a bibliometric analysis of entrepreneurial equity financing research. By dividing the literature into four clusters that are presenting the main findings within the area, this study provides a better understanding of venture capital and other sources of entrepreneurial funding. The results of this study indicate that the essential benefit that venture capitalists offer to entrepreneurs after financing consists of their involvement, monitoring and advising. This paper highlights the main points that can assist entrepreneurs in understanding the role of venture capital better.

Keywords: venture capital, private equity, bibliographic coupling, literature analysis, clusters.

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1 Introduction

In about 20 years from the 1980s to 2000s, venture capital (VC) and private equity (PE) industries experienced enormous growth. The main reasons are great companies such as Apple, Google and Microsoft that were at some point, supported by VC. That additional push of capital made an impact on society, created more value to PE investors, but also institutional and individual investors in mentioned companies (Lerner, Leamon, & Hardymon, 2012). With the real sector practice development, the research in this field has also advanced. The rapid increase in publications has shown that the VC and PE as research streams are highly appreciated in the research community. Still, with the increased interest in VC and PE, we witness that field lacks the proper research outline, as well as the structured literature reviews. Currently, there are available only few structured literature reviews of the VC and PE research (Cumming & Vismara, 2017; Drover et al., 2017; Reverte & Badillo, 2019; Wallmeroth, Wirtz, & Groh, 2018; Wright & Robbie, 1998).

From the literature reviews previously published, we saw that there were significant accomplishments in the theoretical approach to literature reviews, still, so far, there is only one literature review which used a quantitative approach to frame the research in the entrepreneurial finance field. We believed it would be beneficial to provide also a mixed-methods approach in framing the literature reviews in this field as it would give a more bias-free approach to the most important studies.

With this said, in this article, we provided a bibliometric review of the literature. Using the bibliographic coupling analysis, we analysed in-depth the literature streams in the entrepreneurial finance field and provided a new view on the VC and PE research accomplishments briefly. We showed how the field is emerging, and what the research frontiers of the VC and PE research through cluster analysis are. Through bibliographic coupling, those clusters were analysed individually, meaning only relations between documents within a cluster were revealed and conclusions regarding the role of VC and PE in entrepreneurial finance were drawn. Based on the researches and findings of the papers whose interest is closest to the area of interest of this specific paper, mentioned above, clusters will be explained. When referring to PE, in this paper, the focus is on professionally managed funds (excluding business angels), which include VC investing as a form of PE.

2 Background

PE and VC are firms investing in companies for a share of equity in that company. However, there is more to it. Differences are in the types and sizes of the companies they are investing in, the amount of money being invested, and the percentage of equity they request. Also, there is a distinction in interpreting the terms venture capital and PE in Europe and the USA. In Europe, VC usually represents all of the investments that fall under PE. While in the USA, PE investments include all investments except the VC ones (Lerner et al., 2012). On the other hand, VC finances young companies and start-ups that have the possibility and potential to thrive but are less likely to obtain bank loans. Mostly they are in the domain of technology, biotechnology, and clean technology. The investment, other than financial means, can also be expressed through technical or managerial expertise. The percentage of equity they seek is usually 50% or less, and to diversify their risk, they invest in many different companies. Since venture capitalists invest mostly in start-ups whose probability of success or failure is more unpredictable, their investment range is usually $10 million or less in each company. VCs are one of the most appealing investors in the PE industry because of their knowledge, personal networks they use to boost young companies (Zeisberger, Prahl, & White, 2017).

As the field was emerging, there were also several literature reviews published in the field. First one was provided back in the end-1990s by Wright and Robbie (1998). They opened the discussion on the differences between VC and mainstream corporate finance and provided the first time analyses of the issues involved in VC at two interrelated levels, that is from the industry/market level and the VC firm level. Their review of literature served as a basis for all upcoming papers in the field. After a severe time gap, field was enriched for another structured theory-based literature review by Cumming and Vismara (2017). They discussed the origins and the effects of academic literature segmentation in the entrepreneurial finance field, as well as gave future research directions to help de-segmenting the research in the given field. Followed by the comprehensive theory-driven study on entrepreneurial equity financing, Drover et al. (2017) integrated, organised, and assessed the vast body of literature on venture financing; and identified vital considerations relevant for the domain of venture financing moving forward. Final available, again theory-based literature review was provided by Wallmeroth, Wirtz and Groh (2018). They structured their literature review around the growing body of research on VC, angel

financing and crowdfunding using a theoretical framework that linked all given sub-fields in the entrepreneurial equity finance. The final literature review which provides the first quantitative literature review, was provided recently by Reverte and Badillo (2019). They used a co-occurrence analysis of keywords to identify the significant themes in entrepreneurial finance research. They investigated 1,321 articles of research on entrepreneurial equity financing published during 1984–2017, retrieved from the Web of Science database.

In general, Zupic and Čater (2015) state that the use of bibliometric methods is beneficial even before reading the literature as it maps the field of interest without any bias and leads the person researching the most influential works while providing objectivity when forming an opinion based on the scholars' work. It is called science mapping and it suitable for any field of research as long as there are connections between documents used in the study.

3 Methodology

To review the literature in the VC and PE field, we used one of the bibliometric research methods - bibliographic coupling. A bibliographic coupling connects documents that share one or more cited papers, that is, two articles reference the same, third paper (or any written work). This indicates that there is a probability the two papers that are bibliographically coupled, share the common subject. The strength between two documents is measured by the number of cited documents they share and is stronger the more publications they have in common. Also, the advantage of bibliographic coupling is that the citations don't have to be accumulated, and it applies to the papers that are newly published and have not yet been cited (Zupic & Čater, 2015).

Following Zupic and Čater's (2015) five-step approach to the process of bibliographic coupling, a document search in ISI Web of Science (WOS) database was first conducted. To obtain relevant papers, the search was based on several criteria: the time of publications was 2014-2019, using all journal articles and literature reviews published in English. Key search terms included in database search are *venture capital*, *private equity* and *entrepreneurial finance*. Next, relevant documents were filtered and exported from WOS to VOSviewer software (Van Eck & Waltman, 2016).

Once the data from WOS was imported to VOSviewer, a map was created based on bibliographic data. When choosing a type of analysis, the bibliographic coupling was selected as well as documents as a unit of analysis. Also, for the counting method, the full counting was selected, as it meant that each bibliographic coupling link was of the same weight. Next step required choosing the minimal number of citations in documents, and for this article, we decided to remove the threshold (set to 0), as the papers that have not yet been cited we included to see the progress in VC and PE domain in entrepreneurial finance.

While creating a network, VOSviewer provided a total link strength of each document, as well as the number of citations. According to van Eck and Waltman (2016) VOSviewer software, as a visualisation method, provided distance-based visualisations of links between documents. Meaning, it displayed the nodes in a bibliometric network, and the distance between them suggested they are related. The nodes that VOS software displayed, represented units (articles or reviews) that were analysed (Zupic & Čater, 2015). Total link strength was taken as the measure of similarity and was showing how much the documents were linked to each other. Higher link strength of a document within a cluster represents the stronger connection with the higher number of other documents (Meyer et al., 2014). Also, it showed the proximity of scientific contributions, theories in the domain of VC and PE in entrepreneurial finance, and it pointed out the research frontiers. Given that documents, that were not yet cited, were included in the analysis, it was beneficial to use the strength of links among certain documents. After setting the parameters, the software provided a sample of 42 documents that were bibliographically coupled and created a visual map of four clusters associated with the network. Every node in the map belonged to one cluster (set of closely related nodes).

4 Results

An analysis showed relatively homogenous bibliographical coupling network of documents in the field of VC and PE in entrepreneurial finance in the period from 2014 – 2019. Initially, WOS provided 49 publications, but one was not shown in the network map and was not assigned to any cluster as it is not connected to any of the remaining articles. We saw that there is a growth in a number of publications each

year. In 2015 were published 3 and in 2019 even 14 articles in the given field. The most essential measure that represented the growth in this specific field was total link strength which showed relations among documents, showing how close science contributions of various authors were. Total link strength of this network was 6,528 (on average per document total link strength is 136) as of November 2019. Following, the VOSviewer provided four clusters in which 48 documents were distributed. All given clusters were explained briefly in the next subchapters.

4.1 Cluster A

The visualization of documents in Cluster A we provided in Figure 1. It showed 16 documents with the total link strength of 1,947 (out of total link strength of the whole network of 6,528). A couple of documents were positioned further away than the ones gathered closer together in the middle of the map, and their size was smaller, meaning they have a lower weight. The weight of an item represented its importance in comparison to the others, so the documents with higher weight were presumably more important (Waltman & Van Eck, 2012).

Documents with the highest link strength among each other, in Cluster A, are Bertoni, Martí and Reverte (2019) and Reverte and Badillo (2019). Mentioned papers were examining the influence of financial supports on entrepreneurial firms, but the difference is that Bertoni et al. (2019) were focused on participative loans which are a form of governmental support, while Reverte and Badillo (2019) conducted a literature review on the venture capital financing of start-ups.

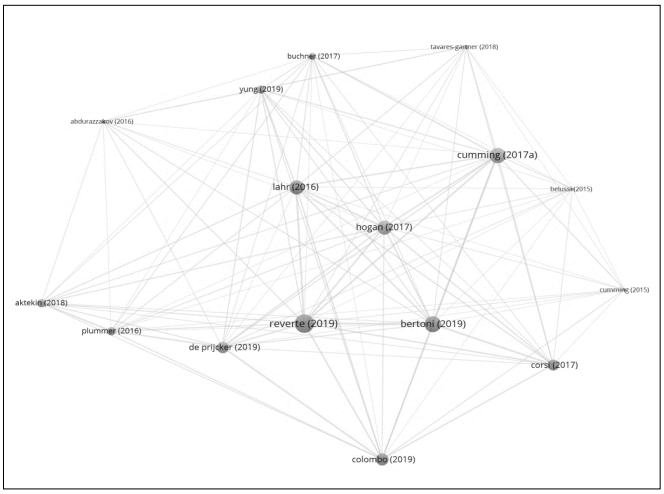

Figure 1: Cluster A network map in total link strength (n=16).
Source: Thomson Reuters, WOS. Visualisation: VOSviewer.

Bertoni et al. (2019) in their study on participative loans, also mentioned government-supported equity through VC; however, it has been shown that the effect of that government support on entrepreneurial firms is insignificant. Participative loans are appealing as they have similarities to regular loans due to the fact they require interest payments and specified maturity but are also similar to equity because payments depend on the firm's profit. The effect on the growth of the young firms is meaningful as it increases annual growth of employment by 10.6%, and sales by 18.0%.

In their literature review Reverte and Badillo (2019), examine, and briefly compare the roles of business angels, venture capital and crowdfunding for startup firms. In the paper, they mention how venture capital firms, other than financial means, provide "value-adding" resources through coaching. Those manifested through managerial, strategic, financial, administrative and marketing knowledge and advice that will also diminish problems related to information asymmetry. As they are conducting due diligence on the firm they are investing in, venture capital firms can help with innovation, productivity, sales and employment growth for young firms. One of the emerging equity financing sources were business angels that differ from VCs in the sense that they are individuals, wealthy businesspeople, that are unlike VCs more focused on mentoring, rather than on financial rewards.

Other studies in this cluster that are complementing the strongest ones discuss the impact of venture capital financing on patenting, also the impact of government and private venture capital financing of entrepreneurial firms on their exit strategies (Cumming, Grilli & Murtinu, 2017a), and the impact of foreign venture capital and private equity on the access to external financing.

4.2 Cluster B

Cluster B contains 12 documents with total link strength of 1,327. Figure 2 shows not such a dense network. Articles in this cluster mostly explain the need for unifying segmented literature on entrepreneurial finance, and others describe newer sources of funding available to entrepreneurs.

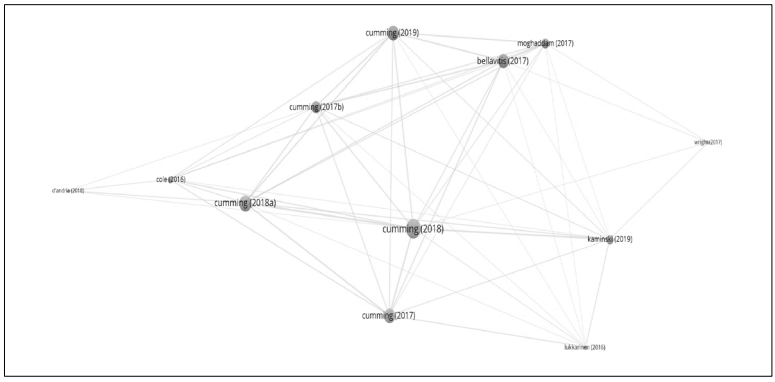

Figure 2: Cluster B network map in total link strength (n=12).
Source: Thomson Reuters, WOS. Visualisation: VOSviewer.

The document in the centre with the highest total link strength in the cluster is by Cumming et al. (2018) about categories of entrepreneurial finance, and the results of their intertwining. The authors point out that to keep up with the advancement and changes of technology, markets, sources of financing, a connection between public policy and entrepreneurial finance must be evaluated. Most of the time researches do not explain different sources of capital available to entrepreneurs before, during and after one type of financing they obtained. But there is interconnection and spillovers among financing sources that are in some cases negative. The point of Cumming et al. (2018) is that those negative side effects can be eased through

government policies in order for young ventures to become successful, large companies. Public policies can reduce information asymmetry by potentiating more transparent venture capital and private equity investments. Authors are noticing that the excessive diluting of the ownership in the companies' early stages, can reduce opportunities for additional funding. Also, it can even bring the firm to its end. With multiple investors, that are also playing the role of advisors, the conflict can occur, and for that reason business angels and venture capitalists do not complement each other.

4.3 Cluster C

Three articles with the highest total link strength in the whole network map, are also the ones with the highest link strength in this cluster C. The cluster consists of 10 documents, with total link strength of 1,701.

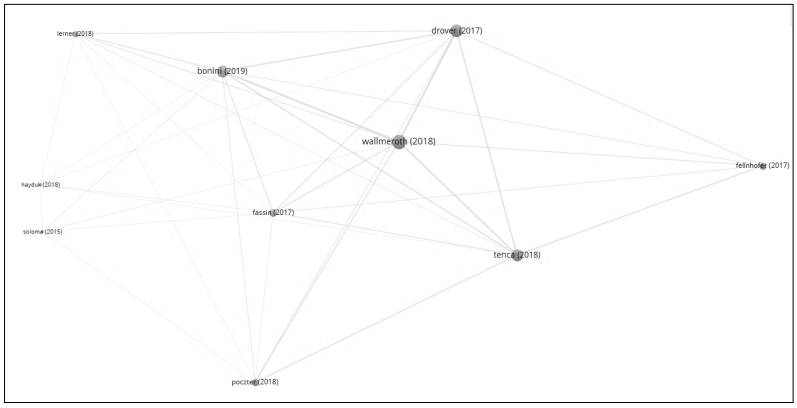

Figure 3: Cluster C network map in total link strength (n=10).
Source: Thomson Reuters, WOS. Visualisation: VOSviewer.

Among other authors in this cluster, in their paper Bonini and Capizzi (2019) point out how, even though in the past decade many of alternative sources of funding emerged, due to their valuable role, VC funds remained to be prominent investors in early stages of startup firms. Accordingly, Wallmeroth et al. (2018) constructed their article as a literature review of entrepreneurial finance to provide an overview of novelties regarding sources of financing in early stages of firms while explaining their roles, characteristics and possibilities of them overlapping. This article links

VC, business angels and crowdfunding that also have differences and usually happen in different investment stages.

As was mentioned before, many alternatives to early-stage funding of entrepreneurial firms are at disposal nowadays, and they are changing the native entrepreneurial ecosystem. Some of them that Bonini and Capizzi (2019) mention are incubators, accelerators, corporate seed funds, business angels that now have various kinds from super-angels, angel groups, and angel investment funds. Also, there are different crowdfunding platforms. All these developments in entrepreneurial funding types have influenced the dynamics of traditional financing through VC and are encouraging innovation.

Based on the reviewed articles, it can be concluded that the cluster C gave the most insight into the role of VC in entrepreneurial finance ecosystem, thus is considered the most important cluster in the field network.

4.4 Cluster D

In cluster D most authors interpret the role of government VC and its effect on the entrepreneurial ecosystem with an emphasis on specific geographic positions.

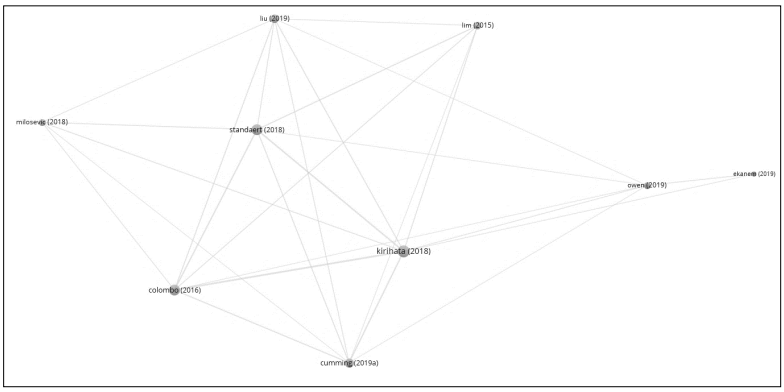

Figure 4: Cluster D network map in total link strength (n=9).
Source: Thomson Reuters, WOS. Visualisation: VOSviewer.

According to Colombo et al. (2016), innovative firms are vital as they create jobs, boost the economy and productivity, but they lack funds to realise their ventures.

Raising external capital from, for example, VCs is difficult due to asymmetric information and agency problems, but as investors, they provide entrepreneurs many benefits other than financial ones, including coaching, business contacts, knowledge and expertise about the industry. However, many governments across the world have founded governmental venture capital funds for young firms to bridge the equity gap. The potential defect is that it can discourage private investments. VCs are fighting the information asymmetry through studying firms before providing the funds and monitoring them after. No matter mentioned governmental VC could help in the earlier phase, and later in obtaining additional funds, by signalling venture's high potential to private investors. Governmental VC funds are not guided with all of the same guidelines as private VC. They may consider ventures that might not have the potential of high return for risk but can create job and economic growth. Also, they can provide opportunities in regions lacking the VC industry.

5 Conclusion

This paper presents the bibliographic coupling analysis of the role of VC and PE in entrepreneurial finance. To see the structure of the field, we conducted a bibliometric analysis as part of the literature review. From the network map retrieved from VOSviewer, we concluded that entrepreneurial finance field is homogeneous, with four related clusters, meaning that authors refer to some of the same literature, and also conduct new studies upon previous findings. The field is expanding as more literature reviews and analyses emerge.

Dominating points drawn from this literature review are regarding VC value-adding influence, manifested through their managerial, strategic, financial, administrative and marketing knowledge and advice that is also diminishing the problem of information asymmetry. VCs are attracted to and are likely to invest in ventures that show a formed entrepreneurial team, perspective financial future, or established ownership position. Studies are presenting a connection between VC and immigrant entrepreneurship, and also show if there is gender disparity in entrepreneurial financing. Literature is also explaining possible ethical difficulties that can occur within entrepreneurial finance in VC funds.

Also often are mentioned emerging sources of capital, including business angels and crowdfunding which can send positive signals to venture capital investors. It is

mentioned that even though there are more sources of financing entrepreneurial ventures, venture capital remains one of the most important ones due to its role towards entrepreneurs. Many articles mention the role of government venture capital whose purpose is to create more jobs and to bridge the equity gap. In the emerging economies, it is more likely entrepreneurs will obtain venture capital funds when there are stable, regulated institutions and regulations. Generally, we concluded that the venture-backed start-ups have more successful initial public offerings, and the more involved venture capitalists are, the more successful the venture.

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