The dynamics of network communities and venture capital performance: Evidence from China

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ABSTRACT

This paper examines the impact of the dynamics of network communities on venture capital (VC) investment performance in China. We use Chinese VC market data for the period 2000 to 2015 and find that VCs' cross-community movements have significant positive impacts on their subsequent performances, such as exit probability via initial public offerings (IPOs) and internal rate of return (IRR).

1. Introduction

Venture capital investment is risky and resource intensive. For the purpose of risk and resource sharing, VCs frequently jointly invest with others in syndicated investments that result in VC networks. According to Sytch and Tatarynowicz (2014), the existing research looks at networks from three perspectives: the ego network (micro-level), the global network (macro-level), and the network community (meso-level). The ego network perspective mainly looks at the actors' ties to their partners and the partners' ties among themselves (Ahuja, 2000; Zaheer and Bell, 2005). For example, the work of Hochberg et al. (2007) takes the ego network perspective and looks at the VC's centrality and closeness to and betweenness with other VCs. The global network perspective emphasizes the overall structure of firms and their ties within their industry (Abrahamson and Rosenkopf, 1997; Schilling and Phelps, 2007). For instance, Hochberg et al. (2010) investigate the density of the entire network from the perspective of the global network. Network communities are located between the structure of a firm's ego network and their industry's network structure (global network). They are "dense, non-overlapping structural groups within a global network" (Sytch and Tatarynowicz, 2014). In each network community, actors are connected more closely to each other than they are to the actors outside their community (Knoke, 2009: 1697). In other words, the connections within network communities (internal connections) are dense; the connections between communities (external connections) are sparse (Girvan and Newman, 2002; Newman; 2004). As a result, knowledge is relatively more homogeneous within a community and relatively more heterogeneous between communities.

Network research has been attracting wide interest from both scholars and practitioners for a long time (Abrahamson and Rosenkopf, 1997; Ahuja, 2000; Schilling and Phelps, 2007; Zaheer and Bell, 2005). Although the earlier literature on statistical physics states that "many networks display community structure" (Girvan and Newman, 2002; Newman; 2004), most of the current network research is from the perspective of either the ego network or the global network. In the management and finance literature, investigations on network communities are limited and still in their early stages. In early social-network studies, network

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communities are called "cliques". Rowley et al. (2004, 2005) examine how the heterogeneity of firms in a community can affect their decisions to leave the community and also the community's market performance. Recently, Sytch et al. (2012) investigated the determinants of bridge ties between network communities. Sytch and Tatarynowicz (2014) show that firms' moderate cross-community movements can enhance their innovation output. In the VC literature, only one paper addresses the network community: Bubna et al. (2016) use computational techniques to identify VC communities; they find that community VC-funded firms display more innovation, especially for funded earlier-stage firms that have limited innovation histories. This paper attempts to fill in the gap in the literature by investigating how a VC's move from one network community to another affects its performance.

It is well known that sharing resources and information is important for VC investment performance. Within a network community, the internal connections are close and the network distances are short (Rowley et al., 2005). This can reduce transaction costs and facilitate the exchange of resources among community members (Ahuja, 2000). Thus, VCs within network communities can easily absorb and acquire and utilize a series of locally available resources from a shared pool. Moreover, VCs can have access to more potential actors with which to make deals. As a result, a VC's investment performance may improve due to the improved quality and flow of deals (Hochberg et al., 2007). However, the frequent exchange of resources may lead to resource homogeneity within communities (Gulati et al., 2012; Lazer and Friedman, 2007), which limits the possibility of VCs acquiring heterogeneous resources and all of the inherent advantages thereof. In addition, different network communities are structurally independent (Sytch and Tatarynowicz, 2014). The inter-community connections are sparse and transaction costs are high (Girvan and Newman, 2002; Newman; 2004). Consequently, resource exchange among different network communities will become more difficult (Gulati, 1995) and lead to the heterogeneity of resources among communities (Rowley et al., 2005; Sytch et al., 2012). Thus, VCs in one network community may find it difficult to obtain heterogeneous resources from different network communities, thereby limiting their resource-and-information set, which leads to lower investment performance. Therefore, the overall effect on VC performance of joining a network community is not obvious.

This paper addresses this dilemma by focusing on the dynamics of VC network communities, that is, a VC's movement from one network community to another and how this movement affects its investment performance. Joining different network communities means that a VC is moving across the boundaries of a number of network communities. On the one hand, this movement enables the VC to gain access to the resource pools of different network communities, thus, facilitating the diffusion of information, contacts and resources among VCs (Bygrave, 1988). A more heterogeneous resource implies that a VC can gain more information on more promising companies, thereby improving its selection ability in terms of investments. On the other hand, moving across network communities also helps the VC provide more value-added services to their portfolio of firms, including expanding the potential range of their strategic alliance partners, suppliers and customers; they can also gain better access to other VCs' service providers, such as investment banks, also for their portfolio of companies (Hochberg et al., 2007). Therefore, moving across network communities will improve VC performance by affecting the two main drivers of a VC's investment performance: the ability to select promising companies, and the ability to add value to their portfolio of companies. However, it is worth noting that a VC's movement across communities may potentially result in losing access to the resources of the former community, which thereby reduces the VC's investment performance. Thus, how VC cross-community movements affect VC performance remains an empirical question.

This paper uses data for the period 2000 to 2015, for China's VC market, to examine the impact of cross-community VC movements on their subsequent investment performance. It finds that cross-community movements have significant positive impacts on subsequent VC performance, such as in the probability of exit via IPOs and internal rate of return. This implies that the benefits of obtaining new heterogeneous resources from VC cross-community movements are important to VC investment performance and outweigh the costs of losing access to the resources of their former communities.

This research contributes to the literature in the following ways. First, while there is a vast literature on the network, most look at the topic from the perspective of either the ego network or the global network (Sytch and Tatarynowicz, 2014). Limited attention is paid to network communities. This paper contributes to the social-networks literature by focusing on network communities. By taking this perspective, we are able to identify new ways to examine VCs' access to diverse knowledge and information inputs and their impacts on VC performance. Second, among the limited literature on network communities (Greve, 2009; Rowley et al., 2004, 2005; Sytch et al., 2012; Sytch and Tatarynowicz, 2014 etc), little work has been done on the dynamics of network communities; the exception is Rowley et al. (2005) and Sytch and Tatarynowicz (2014). However, research on dynamics of network communities of VCs is still rare. This paper's unique focus on the movement of VCs across different network communities provides a new way of investigating how access to heterogeneous resources and information is diffused throughout an inter-organizational system over time.

The remainder of this paper is organized as follows: Section 2 describes the sample selection and empirical strategy; Section 3 presents our empirical results; and the final section provides a conclusion.

2. Research design

Our sample includes all VC investments and performances, in China, for the period 2000 to 2015.[1] All of the data used in this paper are obtained from Zero2IPO, China's largest VC data vendor. To examine investment performance, we require data on investments that are five years old or more. Thus, we include only VC investments made before 2010. Following the previous literature (Cumming et al., 2009; Nanda and Rhodes-Kropf, 2013), we only use first-round investments. This helps avoid funds' strategic round-to-round investment considerations (Cumming et al., 2009); this also allows us to focus on VCs' initial investment decisions and to

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[1] Data prior to 2000 are excluded as VC was less developed in earlier years and data availability is not as good as recent years.