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journal homepage: [www.elsevier.com/locate/jfec](http://www.elsevier.com/locate/jfec)The causes and consequences of venture capital stage financing<sup>☆</sup>

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## ABSTRACT

This paper examines the causes and consequences of venture capital (VC) stage financing. Using information about the physical location of an entrepreneurial firm and the geographic distance between the VC investor and the firm, I show that VC investors located farther away from an entrepreneurial firm tend to finance the firm using a larger number of financing rounds, shorter durations between successive rounds, and investing a smaller amount in each round. However, VC investors' propensity to stage is independent of whether the firm is located in a close-knit community. I also find that VC staging positively affects the entrepreneurial firm's propensity to go public, operating performance in the initial public offering (IPO) year, and post-IPO survival rate, but only if the firm is located far away from the VC investor. However, the effect of VC staging on entrepreneurial firm's performance is independent of whether it is located in a close-knit community. The findings are robust to a variety of alternative proximity measures, instrumental variables, and econometric approaches for dealing with endogeneity problems.

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## 1. Introduction

The staging of capital infusions by venture capital (hereafter VC) investors is the stepwise disbursement of capital from VC investors to entrepreneurial firms.

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Although various theoretical models have been developed to explain the causes and consequences of VC stage financing, empirical studies of VC staging are relatively sparse. The objective of this paper is to disentangle the alternative hypotheses developed by the existing theoretical literature regarding the causes and consequences of VC stage financing. I empirically investigate the conditions under which VC investors tend to engage in stage financing of their portfolio firms and examine the situations in which VC staging helps to improve the entrepreneurial firm's subsequent performance.

The prevailing view from the existing literature is that VC staging is a way to mitigate agency problems. This is because the VC investor retains the option to abandon the entrepreneur's project if it fails to meet stage targets, leading to more efficient investment decisions and better investment outcomes (e.g., Admati and Pfleiderer, 1994; Gompers, 1995; Kaplan and Stromberg, 2003, 2004).<sup>1</sup>

<sup>1</sup> As Sahlman (1990, p. 506) has noted, "The most important mechanism for controlling the venture (by the venture capitalist) is staging the infusion of capital."

The seminal empirical analysis of Gompers (1995) finds that VC staging occurs more frequently in industries that have a higher level of asset intangibility, a higher market-to-book ratio, and a greater intensity of research and development (R&D) activities, and that are therefore characterized by more severe agency problems. However, since Gompers' (1995) analysis focuses only on the determinants of VC staging and is limited to industry-level variables, there is a need to better understand the causes and consequences of VC stage financing at the entrepreneurial firm level.

I build on agency models of VC staging and argue that monitoring by VC investors and the staging of capital infusions are substitutes, hereafter referred to as the “monitoring hypothesis.” While it is costly for the VC investor to monitor the entrepreneur, staging is also costly. First, staging incurs negotiation and contracting costs. Before each round of capital infusion, VC investors need to commit significant time and resources to negotiating and writing new contracts. Second, staging could induce the entrepreneur to aim for short-term success rather than long-term value creation, that is, “window dressing,” to secure the VC investor's next round of capital infusion.<sup>2</sup> Third, lags in the implementation of projects due to divided capital infusions can increase costs for the entrepreneurial firm. Finally, staging could incur under-investment problems, as suggested by Wang and Zhou (2004). Therefore, the VC investor will balance the costs of monitoring the entrepreneur and the costs of staging specified above, and will engage in stage financing of the entrepreneurial firm only if effective monitoring of the entrepreneur is too costly.

Alternative theoretical models suggest that VC stage financing can help to mitigate the hold-up problem by the entrepreneur [see, e.g., Neher (1999), who builds on the idea of the inalienability of human capital discussed by Hart and Moore (1994)], hereafter referred to as the “hold-up hypothesis.” This stream of literature argues that once the VC investor invests in the entrepreneurial firm, the entrepreneur has the ability to hold-up the VC investor by threatening to leave the firm for a better career. Staging mitigates such a hold-up problem because it reduces the amount of the VC investor's investment in the entrepreneurial firm at any given time and therefore allows the gradual embodiment of the entrepreneur's human capital in the venture's physical capital, i.e., the build-up of collateral, which reduces the entrepreneur's incentives to leave the firm.

A third stream of theoretical literature argues that staging allows the VC investor to learn about the entrepreneurial firm over time (see, e.g., Bergemann and Hege, 1998; Fluck, Garrison, and Myers, 2007), hereafter referred to as the “learning hypothesis.” The learning hypothesis suggests that staging creates value by generating a real option for the VC investor to abandon financing the project at each financing round, depending

on what the VC investor learns between rounds about the venture or the entrepreneur.

To empirically disentangle the implications of the above three streams of theoretical models regarding the causes and consequences of VC staging, I make use of geographic location information about the entrepreneurial firm and the distance between the VC investor and the firm. Specifically, I calculate the geographic distance between the VC investor and the entrepreneur and use it as a proxy for the VC investor's monitoring costs.<sup>3</sup> Based on the monitoring hypothesis, if the entrepreneurial firm is located close to the VC investor such that it is less costly to monitor the entrepreneur, the VC investor will tend to reduce the number of financing rounds to save the costs of staging. On the other hand, if the entrepreneurial firm is located far away from the VC investor such that effective monitoring of the entrepreneur is very costly, the VC investor will have to rely instead on staging to mitigate agency problems. The same logic applies to the impact of VC stage financing on the entrepreneurial firm's subsequent performance. If it is less costly for the VC investor to monitor the entrepreneur, that is, the geographic distance between them is short, less staging should be associated with better firm performance. However, if effective monitoring of the entrepreneur is too costly due to a greater distance between them, financing in a larger number of rounds helps to mitigate agency problems and improves firm performance.

Based on the hold-up hypothesis, the VC investor is more likely to stage investment in the entrepreneurial firm if the firm is located in a close-knit community where many entrepreneurial firms are clustered together. This is because when many peer entrepreneurial firms are located close by, the entrepreneur's threat to leave the firm for a better career is more credible and his ability to hold-up the VC investor is greater. Therefore, VC staging will be able to mitigate this hold-up problem and improve the entrepreneurial firm's performance to a greater extent when the hold-up problem is more severe, that is, when the entrepreneurial firm is located in a close-knit community.

Finally, the learning hypothesis predicts that there will be no relationship between geographic distance and the VC investor's propensity to stage. This implication is based on the assumption that there is no relationship between the VC investor's ability to learn about the firm and the distance between them. The learning hypothesis

<sup>2</sup> Sahlman (1988) describes how the entrepreneur may try to improve short-term performance to ensure that the project will be refinanced.

<sup>3</sup> One may think that modes of transportation and communications have developed rapidly in the last few decades, decreasing the costs of collecting and transmitting information. However, this has not made it easier for VC investors to collect soft information about the entrepreneurial firm from a distance. Soft information is, by definition, difficult to put down on paper, store electronically, or communicate to others (see, e.g., Petersen and Rajan, 2002), but it is especially critical to a venture's success because significant risks are associated with information asymmetries between the entrepreneur and the VC investor in venture projects. Collecting soft, as well as hard, information through on-site monitoring and face-to-face meetings with the entrepreneur is an effective way for the VC investor to reduce the information gap, monitor the entrepreneur, and improve a project's viability. Therefore, the geographic distance between the VC investor and the entrepreneur directly determines the VC investor's monitoring costs.

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