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When are venture capital projects initiated?

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ABSTRACT

This paper examines how public market information relates to the initiation of venture capital projects. Analysis of venture capital investments in the U.S. between 1980 and 2007 indicates that venture capitalists tend to defer new investment projects in target industries with substantial market volatility. This delay effect of market volatility is reduced if the target industry experiences high sales growth or if competition among venture capitalists is intense in the target industry. The paper provides further evidence to corroborate the view that venture capitalists rationally respond to market shifts in their investment decisions.

1. Executive summary

When an investment opportunity emerges, should the venture capitalist initiate the investment project immediately or should the venture capitalist defer the investment until uncertainty is reduced? This decision concerning the timing of initial investment has received little research attention.

This study addresses this decision from a real options perspective. We propose that the venture capitalist initially has an option to invest or defer when an investment opportunity emerges. Once the initial investment is undertaken, the venture capitalist will obtain access to future investment opportunities or growth options. Whether the venture capitalist should defer investing until more favorable market conditions arrive or initiate the investment project immediately to take better advantage of growth opportunities, depends on factors that affect the relative value of the deferral and growth options.

We suggest that the venture capitalist should defer initiating an investment project when market uncertainty is high, all else being equal. On the other hand, it is not always beneficial to defer investment in an uncertain market. The opportunity costs of deferral are likely high under two conditions. First, the possibility for downside scenarios to occur is lower in high-growth industries, and thus downside loss protection – an important benefit of the deferral option – becomes less valuable for the venture capitalist. Even if the venture capitalist dominates the venture industry, waiting when the industry experiences great growth potential means a potential loss of profit streams. Second, in a competitive industry, the focal venture capitalist's growth opportunities may be eroded or lost when other active venture capitalists invest in ventures with similar growth opportunities.

Our analysis of 18,678 initial investments during 1980–2007 indicates that market uncertainty has a strong delay effect in venture capital investment. Nonetheless, industry sales growth accelerates the time to initial funding of new projects.

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Furthermore, the delay effect of market volatility is significantly reduced by sales growth in target industries and competition among venture capitalists.

Our study indicates that, in determining the timing of investment, venture capitalists should consider factors that affect the value of real options embedded in investment projects. Further, our study suggests that absent sufficient information about ventures and venture capital industries, public market information can be useful in assessing venture prospects.

2. Introduction

Venture capital has been credited with fueling corporate innovation, job creation, and economic growth (Dushnitsky and Lenox, 2005; Global Insight, 2007; Kortum and Lerner, 2000). A critical issue in venture capital investment concerns when to initiate a project in the presence of new investment opportunities. Because of the high uncertainty that typically surrounds venture capital projects (Bygrave et al., 1989; Cochrane, 2005; Ruhnka and Young, 1991), when an investment opportunity emerges, the venture capitalist can defer investing in a portfolio company until more information arrives or the venture capitalist can initiate the project immediately to gain access to subsequent growth opportunities. The current study explains and predicts when the venture capital project is initiated.

The extant research literature has examined venture capital investment decisions primarily from an agency perspective. According to this perspective, the *raison d'etre* of venture capitalists is their capability to reduce the costs of informational asymmetries. Furthermore, venture capital investments should be concentrated in industries where informational concerns are important and where venture capitalists have a comparative advantage over other investors in selecting and monitoring investments (Amit et al., 1998; Gompers, 1995). Existing research studies have also suggested that agency problems have important implications for financial contract design. In particular, convertible securities and stage financing can be used to reduce the entrepreneur's incentive to engage in window dressing and bias towards the short-term performance of the project (Cornelli and Yosha, 2003; Wang and Zhou, 2004).

While these research studies have offered insights concerning how agency problems between the investor and the entrepreneur shape venture capital contracts, existing studies have largely overlooked the role of market uncertainty in venture capitalists' investment decisions. As one exception, Kaplan and Stromberg (2004) differentiate between “internal risk” (such as information and agency concerns) and “external risk” (such as market uncertainty), yet their focus is on how external risk influences venture capital contract design rather than on the timing of new venture capital projects.[2]

The current study extends existing research by examining how market uncertainty influences the timing of new venture capital projects. Venture capitalists can partly resolve information and agency concerns by taking actions to learn about the efforts of entrepreneurs and the quality of ventures. By contrast, because market uncertainty is attributed to unexpected market developments, it is generally beyond the control of individual venture capitalists, and typically resolves with the passage of time.

This study takes a real options perspective to examine how venture capitalists respond to market uncertainty in deciding when to initiate new projects. Classical real options theory has been found a useful theoretical lens to analyze investment under uncertainty (Dixit and Pindyck, 1994; McDonald and Siegel, 1986). This theory has been employed to examine investment level (Guiso and Parigi, 1999), market entry (Campa, 1993; Folta and O'Brien, 2004), R&D investment (McGrath, 1997; McGrath and Nerkar, 2004), and joint ventures (Chi, 2000; Kogut, 1991; Tong et al., 2008), but the application of real options theory to venture capital investment decisions has been limited (Li, 2008; Li et al., 2007).

The current study posits conceptually that the venture capitalist initially has an option to invest or defer when an investment opportunity emerges. Once the initial investment is undertaken, the venture capitalist will obtain future investment opportunities or growth options. Whether the venture capitalist initiates the investment in a portfolio company immediately to take better advantage of growth opportunities, or defers investing until the market becomes less uncertain, depends on the relative value of the deferral and growth options. Market information provides important environmental signals during the investment process. Market uncertainty will increase the value of the deferral option and have a negative effect on the timing of a new investment project: By deferring the investment, the venture capitalist can take advantage of incoming market information and choose to invest only when market conditions turn favorable.

The current study further suggests that it is not always beneficial to defer the initial investment in an uncertain market, especially when the opportunity costs of doing so are high. We investigate industry conditions that may enhance the value of the growth option or decrease the value of deferral option. We follow real options theory and identify two industry factors: growth potential and competition (Dixit and Pindyck, 2000; Smit and Trigeorgis, 2004). First, industry growth potential will increase the value of the growth option relative to the deferral option and will lessen the delay effect of market uncertainty. Second, competition can drive down the value of growth options and the venture capitalist will have a greater incentive to initiate its investment project in a competitive market to capitalize on future growth opportunities.

In the empirical analysis, the current study focuses on how venture capitalists respond to one particular type of market uncertainty – market volatility in target industries – in determining the timing of new investment projects. The high uncertainty of the venture capital market is well documented (Bygrave et al., 1989; Cochrane, 2005).[3] Much of this uncertainty appears to be tied

[2] Kaplan and Stromberg's (2004) analysis of investments in 67 portfolio companies by 11 venture capitalists between 1987 and 1999 shows that higher internal risk is associated with more VC control, more contingent compensation for the entrepreneur, and more contingent financing in a given round, and that external risk is associated with more VC control, more contingent compensation, increases in the strength of VC liquidation rights, and tighter staging.

[3] This volatility manifests itself in a number of ways: the fund commitments to venture capitalists, the investments that firms make in portfolio companies, and the financial performance of portfolio companies and venture capitalists (Gompers and Lerner, 2002).