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On Real Investment by New Ventures

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On Real Investment by New Ventures

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Abstract:

This paper contributes to the literature on new firms in two ways. First, by addressing new venture investment, it focuses on a largely neglected, but important, issue of new firm business decisions. Second, it provides a valuable picture for how real investing by new businesses is going to evolve over time.

Results suggest that investments by new firms are prone to an s-shaped time pattern rather than a random, linear or a gradually growing trajectory, or a capital market driven behavior as is assumed usually in the literature on investment decisions.

By constructing a framework for future research on new venture investment, this article suggests specific research opportunities for future contributions to this body of knowledge. Based on the developed theorem, four main strands for future research can be identified, namely, (1) the empirical validation of the theorem per se, including trajectory, duration, and level of investment; (2) the link between investment and funding of the venture; (3) the link between investment and new venture development; and (4) investment as an adjustment of aggregate capital stock.

Keywords: new ventures, start up, investment, investment dynamics, investment patterns

JEL classification: D92, L25, M13, M21

Introduction

Financing Investment given *into* new firms has always been a key research issue in terms of new venture finance. Motives, risk perceptions, and the investment behavior of investors, such as venture capitalists or banks, have received considerable research attention in the past few decades. Surprisingly, real investment made *by* new firms themselves has not, and the gap between investor and investment research is thus indeed dramatic in both quantity and quality. Literature provides only few exceptions of papers that explicitly focus on new venture real investings (see paragraph below). This paper intends to do so to close this gap.

However, why do new businesses invest anyway? Initial real investments are prerequisites for a start-up to attain further development, and they have strategic importance as a consequence. Initial investing establishes firm readiness to generate or add value, and therefore doing business is not possible until real investing occurs. Later on, early development and establishment of the venture require further real investment. Producer goods especially gain strategic relevance because of long-term usage and the irreversibility of their implementation (Bertola & Caballero 1994; Gelos & Isgut 2001; Nielsen & Schiantarelli 2003). What's more, real investing at different periods is exposed to temporal interdependencies. Within this framework, however, industry differences are quite evident: While service enterprises, which are primarily based on employee capacity, only do little real investing, manufacturing companies need a lot more hardware to get ready for business operations.

As a consequence, initial and early real investing is of extreme importance for growth, development and success of a new venture. However, the theoretical embedding of investing into the early stage of development is still missing. The aim of this paper is to lower this huge gap that exists. Thus, the guiding research questions for this undertaking are the following:

- What is an appropriate conceptual explanation behind the 'ready for take-off' motivation for initial real investing as depicted above?
- Which propositions concerning early real investment trajectories over time can be made applying this theoretical background?

The remainder of the paper is organized as follows: The next paragraph presents a literature review on micro level real investment. The following two sections adress the two questions stated above by some basic considerations driven from theory. Subsequently, new conclusions concerning the time pattern of real investments are derived and put into a devised taxonomy framework. Finally, an agenda for future research is offered.

Literature review

Real investment is supposed to be a major economic measure, counting for macroeconomic output, income, and long-run economic growth. But understanding actual investment behavior on a micro level is more than just difficult (Abel 1980, Abel & Blanchard 1986). It is a well known fact that firm level investment, which is lumpy and intermittent, highly differs from aggregate investment, which is a lot more regular and highly serially correlated over time. These differences in investment dynamics have leaded to the assumption, that aggregate investment is prone to convex adjustment costs, whereas firms face non-convex adjustment costs. Evidence on firm level and aggregate level investment data confirmed these assumptions (Nielsen et al 2009, Bachmann et al 2013, Del Boca et al 2008).

Research has already produced some substantial findings on plant level investments. Van Reenen/Bond (2005) delivered an overview of major investment issues like lumpiness, capital adjustment cost and convexities of capital adjustment, the role of irreversibilities, uncertainties, and demand shocks, as well as their linkages to employment. Besides, there is research linking investment to firm performance and to drivers of investment like financial constraints or financial terms. To place some structure on this vast literature and to sketch a systematic overview of research on investment, which is relevant on enterprise level at least to some extent, one has to point out roughly four streams of literature, which we will discuss briefly in the following. Figure 1 depicts this crude corresponding segmentation.

The first stream of literature is dedicated to features of investment, its optimality, capital adjustment and investment aggregation. It examines these features under different macro conditions and with special regard to irreversibility and uncertainty.

Inter alia, one dominant issue of this research stream is investment dynamics, indicating some important characteristics of investment. According to this thread and as already sketched above, firm level investments are lumpy and intermittent (Whited 2006, Thomas 2002, Nielsen et al 2009, Sakellaris 2004, Bachmann et al 2013, Geylani 2015). Another most often addressed issue characterizing firm level investment is capital adjustment, with regard to capital adjustment cost and convexities of investment (Wang & Wen 2012, Bayer 2006, Del Boca et al 2008, Caballero 1995). Accordingly, there is evidence for non-convex capital adjustment cost on firm level. Bontempi et al (2004) studied determinants of investment decisions on firm level with heterogeneous capital goods and found evidence for convexities with equipment, non-convexities with structures, meaning buildings where the production process takes place. A likewise major issue of this research stream is uncertainty (Kellogg 2014, Carruth et al 2000, Leahy & Whited 1996). It states conditions for optimal sequential investment under uncertainty (Bertola & Caballero 1994, Bloom 2009, Doms & Dunne 1998, Caballero 1991), controlling for labor (Lee & Shin 2000, Nakamura 1999). Micro level investments are affected by uncertainty, which causes cautionary effects. Bloom et al (2007) found evidence for the assumption that the responsiveness of firms to policy stimuli are weaker in periods of high uncertainty. On industry level, Caballero & Pindyck (1996) found entry behavior of firms to be affected by uncertainty of investment and by features of industry equilibrium. According to Whited (1992), asymmetric information causes debt finance problems and impacts a firms' investment behavior over time. Empirical evidence suggests that family firms' investments are significantly more sensitive to uncertainty than nonfamily firms (Bianco et al 2013). Finally, irreversibility tackles real investment of firms (Pindyck 1991, 1988). Most major investment expenditures are at least partly irreversible, as the firm cannot disinvest without heavy discounts, so real investment entails sunk costs. The irreversibility problem usually shows up because real investment is firm specific or at least industry specific, so that capital goods supplied cannot be used by other firms or can sold only at a much smaller amount than invested. Moreover, disinvestment usually comes along with a considerable markdown of net value due to transaction costs and second hand devaluation. Unsurprisingly, firm level capacity is smaller (Pindyck 1988, 969) in view of investment irreversibilities. A general conclusion that can be drawn from this literature is that increasing uncertainty leads to lower investment rates on both industry and firm levels, and therefore an irreversibility effect can be presumed.

A second thread is dedicated to the impact of financial terms on investment. It analyzes the relevance of cash flows, profit terms and financial constraints on investment in general (Bond et al 2003, Bokpin & Onumah 2009), and gives evidence for the role of financial intermediaries in

the investment process and suggests that investment on firm level is affected by information and incentive problems with banks (Whited 1992, Hoshi et al 1991).

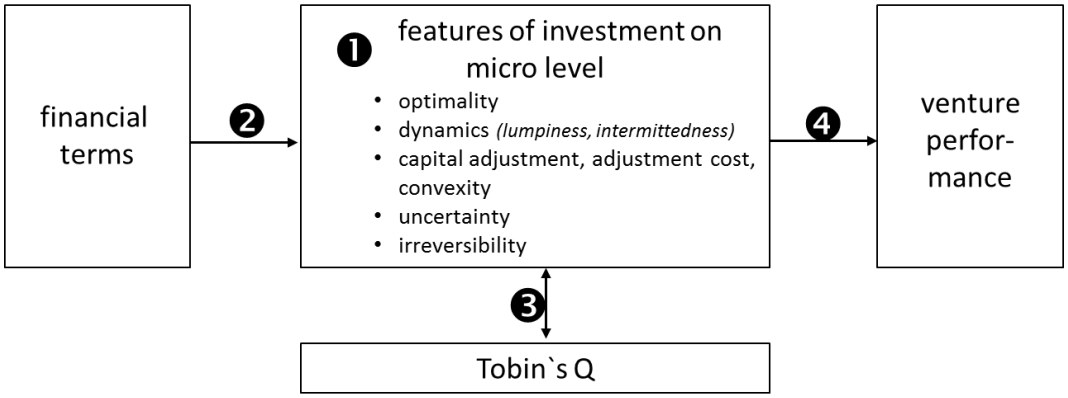
The relationship between investment and Tobin`s Q is features a third stream in firm level investment behavior research (Abel & Eberly 2008). Jovanovic/Rousseau (2014) studied the impact of Tobins Q on firm investment and found investment to respond to Tobin's Q, but in a much different manner, depending on firm incumbency: While established firms react negatively, new businesses respond positively to Q. This research is one of very rare papers dealing explicitly with new ventures in regard to investment timing. However, timing refers to the business cycle, which is an aggregate view and as such differs to early venture development intended to investigate here.

The fourth strand of research, the relation between real investment and economic growth is well established in the macroeconomic theory, but has been tested on micro level as well, using firm performance and profitability as dependent measures (Grazzi et al 2013, Cooper/Haltiwanger 2006, Erickson/Whited 2000, Lang et al 1996). Deviating from the topics already referred to, investment is used as an independent variable in this thread of research. Given this research, there is evidence for impact of real investment on firm growth.

Remarkably, within this framework, a part of research on corporate investing intends the study of investment dynamics in subpopulations like specific industries (i.e. Geylani 2015, claiming that lumpy investment on plant level is evident in the food manufacturing industry as well). On the other hand, new ventures as an at least equally important and very specific subpopulation are merely taken into consideration. With the exception of Jovanovic/Rousseau (2014), who claim that investment of new firms responds positively and elastically to Q, because new firms do not face compatibility costs and step up their investment in response to a rise in Q, none of the contributions presented so far incorporates the indiosyncratic case of new ventures. The Jovanovic/Rousseau paper does, but unfortunately is restricted to companies that provide a firm's asset values and market value and therefore regularly need to be publicly traded.

Studies already available on new venture real investings address the role of taxation (McGee 1998) and human capital (Honjo et al. 2014) for new venture investments, but do not inspect early real investment trajectories over time.

Figure 1. Extant foci of research on firm level real investment



As could be seen, none of the extant streams of literature research done so far is dedicated to new ventures explicitly in a manner that

- considers initial development on micro level
- and includes evidence from time series data of small and not publicly traded businesses, which represent the vast majority of start-ups in almost every major economy.

This opens up a new range for research, which in the first instance requires proper theory development.

As obviously no study has been regarding NVI so far, does this mean NVI being not relevant? We argue NVI to be even highly relevant actually, as it basically concerns development and growth of new ventures. But just that is a major issue of new venture research (McMullen/Dimov 2013, Dimov 2011, McKelvie/Wiklund 2010, 281, Blackburn/Kovalainen 2009, 132), serving to explain developmental dynamics and define impact factors of growth. Against this backdrop, doing something nobody else does means that there must be good reason for this disregard, which most likely is twofold: The collection of comparable data of new firms is difficult and expensive, and the lack of appropriate panel data on micro level hinders secondary research. Moreover, the awareness of new venture peculiarities might be on a low level in real investment research yet.

In this setting we argue that new ventures are special and very different from publicly traded firms and firms that publish financial statements regularly, being listed in public data bases. Why are findings on established enterprises not simply assignable to new ventures? And so why does firm newness justify an idiosyncratic view and analysis of real investing behavior? Differentness results from new ventures' specific features. Newness means that initial development is not finished. So the organizational structure is not finalized, the enterprise is not established to its customers and potential target groups. It has not been a demand shock that triggered initial capital set up, but an individual business opportunity led to the start-up of the company. So newness usually is linked to the need for development. But newness often coincides with smallness. Most new ventures need to grow to achieve long term viability. To set up an operational level adequate for business survival and profitability, they need to adjust, in particular capital, employment, sales, financial means and real economic processes. That's why smallness goes along with limitations concerning market power, access to the market and financial resources. This leads to limited risk spreading, relatively strong dependence on few products and customers, and a high market exit risk (Schulte 2002, 26-28).

Research dedicated to established businesses (for example, Carlsson & Laséen 2005; Chaddad & Reuer 2009; Jovanovic & Rousseau 2014) therefore is not transferable to new businesses, as the latter do not yet have an existing portfolio of capital stock that has to be rearranged or adjusted to an optimal level or size. In fact, new firms need to establish a completely new portfolio starting from zero. Thus, research on SMEs is not appropriate to gain clear insights into new businesses, even if businesses under inspection are small as well. New ventures are entirely different from established enterprises, because they only face positive changes in capital stock alignments and ordinarily do not disinvest in their early development stages as established ventures may do, and only start doing depreciations.

Real Investment Motives Driven by Theory

Following neoclassic theory, real investment is regarded as useful if it has a positive net present value, or in a selection decision between several alternatives, the highest net present value of all

options being available. By investing, firms adjust to an optimal level of productive capital (Jorgenson 1963). So firms need to invest if their existing capital stock is less than optimal. This is given, if unmet demand generates profit opportunities in a setting of availability and the costs of appropriate funding measures. Capital market changes that lead to better financing options may thus make unfavorable investment beneficial or vice versa.

In case of new ventures, a certain amount of initial real investment is first required for the preparation of operational readiness. Thereafter, expansion and maintenance of operational readiness proceed based on the changes in capital stock optimum. Only in exceptional cases initial investments are completely dispensable, e.g. if the start- up business model is entirely driven by its human capital. However, even start-ups' meeting that description, for example, consulting professions, usually need even basic equipment to run their businesses.

Considering only the rational aspects of real investment and leaving aside accordingly the perceptual, motivational, emotional, and other drivers, three basic explanations for real investment by business start-ups can be drawn from the literature. They may occur individually or in combination (Forsfält 1999; Cassar & Friedman 2009):

(1) Real investment is capital market (=externally) driven: Enterprises will invest more, the more the options of funding are favorable, because capital cost influences net present value calculus (Samuelson & Nordhaus 2010, 652ff). Accordingly, the lower the capital market interest rates are, the more capital is presumed to be invested. Applied to the case of business start-ups, this means that favorable possibilities of external financing and a generally easier access to capital also favor the decision to establish a new enterprise. Insofar, financing availability, respectively financing restrictions, correlate to new venture features like anonymity and lack of track records, which lead to information problems that aggravate start-up funding (Schulte 2005; Stein 2003; Hubbard 1998).

(2) Real investment is opportunity (=externally) driven: Thus, it will be invested if a profitable investment opportunity is available. Such considerations need to be separated from capital market considerations and funding opportunities. An opportunity-induced investment activity thus archetypally applies to start-ups: Only if an entrepreneurial opportunity offering future added value is provided, investment is favorable. Therefore, the capital market induced investment driver as explained above (1) only comes into play when a business opportunity with an appropriate feasibility and profitability is present to accordingly lead to start up a new company.

(3) Real investment is resource (=internally) driven: Due to excess of free liquidity, which needs to be used profitably, investment is required. This area can therefore be regarded as profit-induced.

While all of these investment drivers hold for established enterprises, for start-ups and their initial investing only investment drivers (1) and (2) are applicable. In that regard, (3) plays a most subordinate role at least in the early stage of venture development because excess returns need self-financing processes that a young company can unfold only gradually. Consequently, at least the initial investments of a new enterprise dedicated to setting up operational readiness cannot be explained by (3) because of that very lack of internal financing.

To summarize, we can say that the opportunity motive is linked to the feasibility and economic viability of the new business: If the business model wouldn't have any prospect of value adding and of economic viability, it would be omitted. Hence, the capital market motive, when taken by itself and without any opportunity, cannot rationalize the initiation of a new business. More

critical is economic opportunity. Lower capital cost and easier access to capital in accordance with (1) at most allow a reduction of the threshold of profitability of the proposed foundation investment.

Therefore, for business start-ups, the opportunity threshold inevitably is the predominant investment driver, possibly reinforced by capital market-induced considerations, while excess returns will drive investing only if significant internal financing processes are already under way.

Development of Propositions

There is evidence of certain typical time patterns of enterprise real investment (Doms & Dunne 1998). In line with this finding, we now can set some propositions of investment behavior for the theoretic new venture background as derived above. We hereby assume investment goods as having a regular useful economic life and depletion between four and eight years of usage until replacement investment, which is supposed to be the typical duration of use for the factory and the office equipment of new ventures.

Moreover, we restrict the propositions at first to enterprises with fixed operational readiness, i.e. those not intended to be immediately expanded after market entry.

1. To enter the market and build up operational readiness, a new business is forced to do a temporarily, but strongly clenched, initial clump of real investment.
2. Following these initial investment, only fewer amounts of investment will presumably be paid, dedicated to close the gaps remaining, complete the value chain and round out the capital stock. After the first round of investment, however, significantly smaller amounts are expected therefore.
3. The amounts invested presumably will further decrease in the subsequent periods, as the value chain becomes increasingly complete.
4. This decrease does not end until replacement investment is required or new opportunities appear. New opportunities will impact additional capital stock adjustments, whereas replacement investments serve capital stock maintenance, which leads to a second clump of investment, because the first round investments presumably are used up more or less at the same point in time.
5. Following the second clump, the amounts of investment presumably will drop once again. This presumption leads to two maxima of investment activity while the early development of new ventures proceeds.
6. The first maximum (showing the initial investment) is probably higher than the second one (showing replacement investment), because the first contains long term and infinite investment goods as well as those that will need to be replaced after a certain number of years.

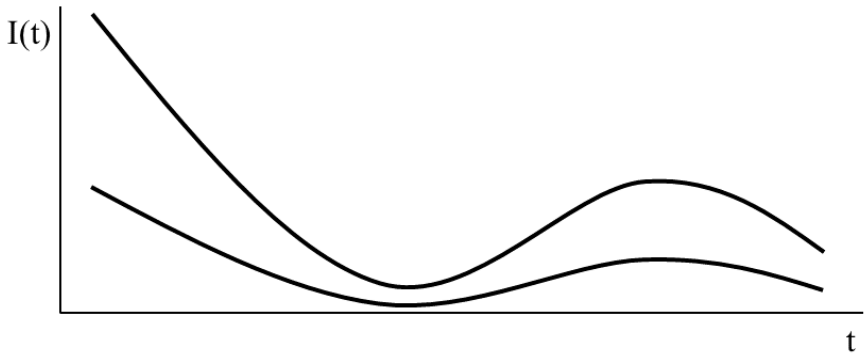
S-shaped Real Investing Time Pattern

What do the propositions stated above mean for the time pattern of new venture real investments? Summarizing them, an S-shaped time pattern of investment can be expected within a time span of

6 to 10 years after market entry. Its duration depends on the useful economic life and depletion of the enterprise's most important investment goods.

This time pattern basically covers all types of business models. Because initial investment is supposed to have a huge span of differing levels depending on the business model, the S-shape itself is expected to have a respective span of different size levels, which is indicated in figure 2 by two exemplary trajectories that both follow the propositions stated above. The curve covers the time span of early business development, starting with the time of foundation of the venture (t=0) and shows proposed investment patterns by depicting real investment subject to time. Please note that starting levels of I(t) can vary over a wide range of real investment activities within this framework.

Figure 2. Expected Time Patterns of Real Investments of New Ventures with Fixed Capacity

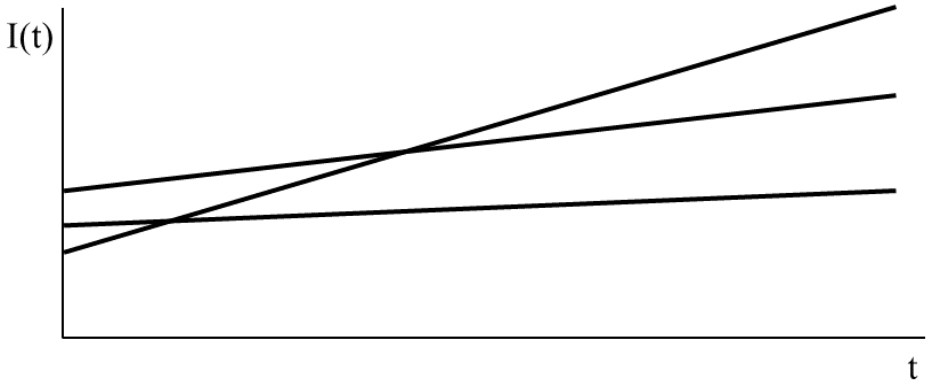


A Taxonomy of Patterns Depending on Development Trajectories

As stated and illustrated above, so far, we have limited our considerations to enterprises with a fixed operational readiness to rationalize the new venture early investment pattern. Extending this limitation, we have to expect extremely different time patterns, because the initial real investment is supposed to be followed by additional capacity-adding investments. In a setting such as this one, the theorem of the S-shaped curve might not be appropriate in any case. Consequently, for expanding new ventures we do not expect a decreasing, but rather a constant or even a continuously increasing curve, depending on the expansion behavior of each venture.

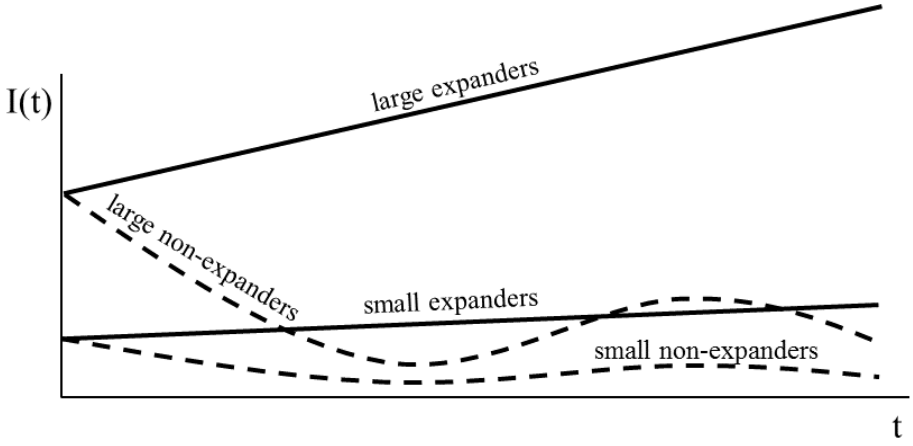
In figure 3, which again shows the respective investment time patterns by depicting real investment subject to time, an expanding investment behavior is indicated exemplarily by three continuously increasing trajectories. Please note that starting levels and increasing rates, as well as curvature, are not limited to these specific patterns. They were chosen arbitrarily for illustration and clarification purposes only. Of course starting level, increasing rate and curvature can vary and compose to a lot more combinations.

Figure 3. Expected Time Patterns of Real Investments of Expanding New Ventures



Combining expansion behavior, differentiated in two types (expanding or nonexpanding), and investment level, differentiated in two types as well (small or large), for a basic typification of new venture investment, results in a simple taxonomy of four types, which we now can use for a raw schematic representation of the initial investment phenomenon (see figure 4).

Figure 4. Taxonomy of New Venture Real Investment Trajectories



Non-expanders are economic sustainable businesses without significant growth intentions and prospects that are equally conceivable at a smaller or a larger scale. Expanders repetitively grow their resources by repeated investing peaks even before replacement is required, a pattern that is feasible in both a smaller or larger scale as well.

Implications: Research Agenda and Outlook

The theorem derived herein implies a search for evidence and its testing. However, further research questions show up as well. The following deliberations serve to set up a respective framework for future research on new venture real investment.

Addressing these issues needs to account for the fact that investment is much different from performance or related other business measures. Annual investment is not a performance measure that is comparable to other period-related variables, such as sales or profit, because it points to changes, namely those of capital stock. Hence, if there are any changes of this kind within a specific period, the starting point for the next (and all following) periods will change as well. Because real investments have long-term effects, there are necessarily interdependencies between annual investment amounts. So it makes sense to look at the accumulated stock of capital as an important additional benchmark as well. At this point, investment indicates an analogy to employment growth, which also describes an intended change in corporate resources. In this respect, the capital stock is more comparable to an enterprise size measure like headcount than it is to performance.

Consequently, a negative adjustment of capital stock by depletion, which is approximately registered by depreciation, must be considered explicitly as well. This effect may be quite insignificant at the beginning of the operations of a newly established company, because no replacement investments are pending. But depletion applies and is reinforced with advancing corporate age.

According to this background, at least four main strands for future research can be identified:

(1) Empirical validation of the theorem per se, including trajectory, duration, and level of real investment

(2) Investment and funding of the venture
(3) Investment and new venture development and growth
(4) Investment as adjustment of aggregate capital stock

A Longitudinal Perspective to Test the Theorem

To validate the two-peak theorem in new venture investment in general, its basic empirical verification is needed. This process requires longitudinal research designs using panel studies that are capable of giving evidence of trajectories, duration and levels of real investment. Calculating standard control variables like industry, legal form, or gender is expedient to use to identify business specific patterns within this strand.

Capturing the Link Between New Venture Investment and New Venture Funding

Investment behavior over time should be connected to its funding so as to recognize time and development specific funding behavior. How were the funds raised that have been invested and how does that funding relate to real investment patterns?

Traditional text books do already distinguish between several funding stages, such as seed, first, second and so on, but having a stage theorem of investment as well in the quiver allows for connecting both sides of such research.

Capturing the Link to New Venture Development

Theorizing about early enterprise investment raises the question of the role and importance of investment for a new company's further development. Hence, clarifying real investment triggered growth is of particular interest. So far, the growth of young companies has been explained mainly by static factors. However, the integration of investment data is promising, as that process can offer much deeper insights into the logic and sequence of the reciprocity of real investment and growth.

Research has already made substantial progress in advancing our knowledge about new venture growth, but linking investment issues to growth may open new research opportunities and help close some gaps that remain.

New Venture Investment and Aggregate Capital Stock

New venture real investment serves to build up productive capacity for an emerging enterprise and thus, investment is built to last. But how do former investings affect future investings? To better understand investment, it may be wise to study the interdependencies between former and current real investment, and the development of its respective capital stock as a measure of productive size. This focus calls for an explicit consideration of depletion and depreciation over time.

Conclusion

While previous work has made substantial contributions to our understanding of how businesses invest and the factors that are driving their respective decisions, we are far from having these linked to the role of time and the initial trajectories of these investments. From a scholarly perspective, the domain of new venture investment offers a broad set of relevant development issues and a research field with significant opportunities for future valuable research. The theoretical considerations given here are intended to stimulate scholars' awareness of the

importance of new venture investment research as well as of longitudinal development data from those new businesses.

The proposed framework is not without a limitation though, because it is purely hypothetetical as yet. This paper focuses on providing a theoretical foundation for new venture investment research while cutting out methodological considerations. The methodological problems of sampling and studying relevant time series data, however, does mirror the theoretical richness of the phenomenon. That is why rich time series data sets are needed for new businesses allowing studies of real investment trajectories.

It is hoped this paper will motivate future research that not only appeals to an academic audience, but also provides practical insights for new enterprises and their counseling counterparts.

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