

Article

The Impact of Experience on Private Target Acquisition in High-Technology Industries

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Abstract: This paper investigates the impact of an acquirer's experience on the acquisition of private firms (i.e., private target acquisition) in high-technology industries by analyzing a dataset of NASDAQ-listed firms operating in information technology (IT) industries. Specifically, this paper examines whether two types of experience (i.e., early venture capital (VC)-backed experience and prior mergers and acquisitions (M&A) experience) matter to the acquisition. We find that both types of experience have positive effects on private target acquisition, while only prior M&A experience positively influences public target acquisition, implying that early VC-backed experience is effective in mitigating information asymmetry related to private target acquisition and exploring opportunities for value creation. We also find that an acquirer's growth performance and absorptive capacity prior to the acquisition enhance the positive effects of the experiences on private target acquisition.

Keywords: private target acquisition; early venture capital backing; M&A experience; information asymmetry; high-technology industry; information technology

1. Introduction

Acquisitions of private firms (or private target acquisitions) have received considerable attention from academic studies as well as from practical fields, mainly because of the discounted values and more intangible assets of private targets compared to those of equivalent public targets [1,2]. In particular, recent studies have shown that private target acquisition has recently been an important means by which publicly listed (hereafter public) firms compete, grow, and innovate in high-technology (hereafter high-tech) industries with fast-changing markets and technology [3,4]. Despite its importance, benefits, and opportunities for value creation, private target acquisition is executed only by certain firms. For example, some NASDAQ firms have aggressively acquired private firms in high-tech industries, such as information technology (hereafter IT) industries, over the last decade, but others have attempted fewer acquisitions of private firms during the same period. We argue that the differences in the likelihood and the number of private target acquisitions in high-tech industries are mainly related to both the existence of high levels of information asymmetry, particularly regarding intangible resources of private targets, which could be imperfectly evaluated, transferred, or integrated through the mergers and acquisitions (M&A) process, and differences in firm-specific abilities to effectively manage the asymmetry and thus adapt to high-tech environments and explore opportunities for value creation through the acquisition [5,6].

Private target acquisition remains less explored than public target acquisition in the literature [1,7] despite the voluminous literature on M&As and the recent fact that the number of private target acquisitions has recently surpassed that of public target acquisitions, particularly in high-tech industries [3,8,9]. The literature of M&A has usually examined factors regarding antecedents

(i.e., motivation and goal) and outcome determinants (i.e., post-M&A performance) of successful M&As [10,11]. In particular, few empirical studies have focused on examining whether information asymmetry matters much more to private target acquisitions by public firms than to public target acquisitions in high-tech industries, although many critical factors in private target acquisition are basically related to asymmetric information on targets with intangible assets [12,13]. Exceptionally, Puranam and Srikanth [14] and Andersson and Xiao [2] considered the main characteristics of high-tech industries, such as intangible assets and complementary capabilities for innovation at the seller (i.e., target) side of private target acquisition, while most existing studies do not discuss buyer-side determinants mitigating information asymmetry in the acquisition.

The purpose of this paper is to investigate which acquirer-specific factors matter to the likelihood and the number of acquisitions among public firms operating in high-tech industries. The paper focuses on two types of experience, including early VC-backed (i.e., being backed by venture capital at an early stage) experience and prior M&A experience, among a range of additional acquirer-side factors. In the literature, prior M&A experience has been regarded as one of the main factors that positively influences the motivation and performance of M&As [10,15]. In contrast, the effect of early VC-backed experience on later-stage (i.e., post-IPO) acquisition behaviors has been imperfectly discussed at the acquirer (i.e., buyer) side in the literature despite the possibility of its lasting impact on the early- to late-stage innovation and growth of high-tech firms. This paper suggests that prior M&A experience and early VC-backed experience are respectively related to the general M&A and innovation-specific abilities of acquirers to effectively manage information asymmetry concerning private target acquisition and seize opportunities for value creation through the acquisition in high-tech industries [16]. Furthermore, unlike existing studies, this study uses a different approach to find which type of experience uniquely matters to private target acquisition by comparing the effects of the two types of experience on private target acquisition with those on public target acquisition for the same sample of acquirers.

This paper finds the positive effects of two types of experience on the likelihood and the number of acquisitions during the period 2011–2013 by analyzing a dataset of NASDAQ-listed firms operating in IT industries. Early VC-backed experience has a significantly positive impact on the likelihood and the number of private target acquisitions, while prior M&A experience positively influences both private and public target acquisitions. This result implies that being VC-backed at an early stage allows entrepreneurial firms to persistently develop the ability to effectively manage information asymmetry concerning the target's intangible resources, thereby obtaining advantages in private target acquisition at a later stage, such as post-IPO. In addition, this paper finds that the positive effects of the two experiences are enhanced by the acquirer's growth rate and R&D intensity prior to acquisition, implying that performance feedback and absorptive capacity magnify the benefits of the experiences.

The rest of the paper is organized as follows. We draw hypotheses by reviewing the literature regarding early VC-backed experience and prior M&A experience. Next, we describe the data, variables, and empirical specifications to be employed to test the hypotheses. Then, we present and discuss empirical results. Finally, we conclude the paper with strategic implications.

2. Hypotheses and Theoretical Background

2.1. Main Effects of Early VC-Backed Experience and Prior M&A Experience

This study focuses on discussing the role of a public firm's experience in private target acquisition in high-tech industries. We propose that two types of experience (i.e., early VC-backed experience and prior M&A experience) can positively influence a public firm's intention to acquire private firms in high-tech industries characterized by uncertainty, information asymmetry, technological innovation, and intangible resources [6,8,9]. The main reasons for choosing these two factors as key variables among a range of preacquisition factors are two-fold. First, prior M&A experience helps acquirers overcome difficulties throughout the M&A process, such as target identification, valuation, negotiation,

and contract. Second, early VC-backed experience is associated with the key success factors and environmental characteristics of high-tech industries. In this subsection, we develop hypotheses regarding the main effects of the two types of experience by critically reviewing the relevant literature and providing background for the hypotheses.

In the literature, acquisition experience has been regarded as one of the key factors for the antecedents of acquisition [15,17,18]. M&A-experienced companies have previously conducted target recognition and selection, due diligence and valuation, negotiation for relevant deals, and post-M&A integration for value creation throughout the process of M&As [18]. It is difficult for firms to learn the tacit and complex knowledge and multidimensional skills involved in M&A-related activities without practical experience, which means that prior M&A activities help experienced firms to effectively develop acquisition-specific capabilities [19,20]. In the same vein, prior M&A experience generates organizational routines that positively influence postacquisition behaviors. Organizational routines are a set of behaviors that reflect the prior experience of an organization with a particular type of task [21,22]. As a firm accumulates experience in a certain organizational routine, it gains competence and expertise in that routine [18]. If firms have ever previously conducted M&As, they gain M&A-specific competence, set strategic directions for M&As, and hence are more likely to subsequently attempt current M&As. Existing studies have found that M&A experience has a positive effect on the execution of related strategies and post-M&A performance [14,15,17].

In particular, compared to public target acquisition, private target acquisition in high-tech industries entails a relatively higher level of information asymmetry due to limited information availability, private information, or uncertainty regarding intangible resources of private targets [1,3]. For example, private firms operating in such industries are likely to hold innovative capabilities and human resources for technological innovation, most of which are usually difficult to precisely evaluate in the market or to appropriately deal with classical M&A tactics. Given these conditions, more M&A-experienced acquirers will be better able to effectively deal with such difficulties throughout the acquisition process in high-tech industries than less experienced acquirers. Existing studies have usually examined the impact of M&A experience on post-M&A performance by using a sample of low-tech industries or by analyzing public target acquisitions [18]. Unlike the existing studies, this paper focuses on investigating the impact of prior M&A experience on a firm's decision for private target acquisition in high-tech industries. Based on these reasons, we propose the following hypothesis:

Hypothesis 1. *The number and the likelihood of a public firm's private target acquisitions in high-tech industries are positively related to the firm's prior M&A experience.*

In addition to previous M&A experience, this study examines whether a public firm's being VC-backed at an early stage (i.e., early VC-backed experience) has a lasting impact on private target acquisition at a later stage, such as post-IPO. Previous studies have provided empirical evidence of VC backing at the seller (or target) side before or at the time of IPO [7,23]. They found that the acquisitions of VC-backed private firms provide the targets and their investors with higher returns than those of non-VC-backed private firms due to the benefits of VC backing, such as reduced information asymmetry through VC signaling, selection, and monitoring effects. Unlike the previous studies, this study analyzes the effect of early VC-backed experience on later-stage private target acquisition in high-tech industries on the side of the acquisition's buyer (i.e., the acquirer). VCs make their investments over multiple rounds that correspond to different stages, which is so-called staged financing [3,24]. In this study, the early stage includes a company's seed, startup, or early state wherein the company does not have positive cash flows or continuous revenue streams from its product and services prior to the middle stage (i.e., expansion stage) and later stages (e.g., IPO, buyout, acquisition, purchase, etc.).

By learning from advertising innovative resources and market potentials to VCs, early VC-backed acquirers will be able to evaluate the commercial values of a private target's intangible resources and

predict their growth potentials. Therefore, they are likely to effectively distinguish between high- and low-quality private companies, thereby selecting better targets. For example, some NASDAQ-listed firms that received VC investment at an early stage (e.g., Cisco, eBay, Facebook, Google, Intel, NVIDIA, etc.) are regarded as entrepreneurial firms that are experiencing successful growth stages from startup to exit via IPO. Such early VC-backed public companies have the competence to identify high-quality targets among private firms and hence to more actively engage in private target acquisitions than their counterparts.

In addition to an ability to resolve the information asymmetry problem, early VC-backed firms tend to be more growth-oriented than do later VC-backed or non-VC-backed firms; therefore, they are likely to attempt private target acquisition for further growth. VCs serve important roles in investment, management, and monitoring by supporting their portfolio firms in terms of financing, managerial resources, technological or commercial information, and external networks and by utilizing valuation skills and industry knowledge. These roles of VCs help entrepreneurial and high-tech companies grow faster in the early stage and sustain higher growth rates even after the early stage [25,26]. The positive effect of early VC backing on firm growth is related to the investment goal of VCs, because the VCs need to maximize the growth of their portfolio companies to ultimately realize the economic returns on investment in the companies by exit strategies via either IPO or acquisition [24,27]. We argue that early VC support has a long-lasting impact on growth orientation at the later stage in high-tech industries; early VC-backed firms are likely to prefer growth at the post-IPO stage. Given that one of main goals of private target acquisition is corporate growth, these firms attempt private target acquisitions due to their tendency for high-growth orientation or additional growth incentives. Accordingly, we propose the following hypothesis:

Hypothesis 2. *The likelihood and the number of private target acquisitions in high-tech industries are greater for early VC-backed public firms than for other firms.*

2.2. Moderating Effects of Acquirer-Specific Variables on the Experience-Acquisition Relationship

In this subsection, we present hypotheses regarding the effects of the interactions between the two types of experience (i.e., early VC-backed experience and prior M&A experience) and preacquisition factors on private target acquisition. Specifically, we focus on the moderating roles of an acquirer's preacquisition growth rate (i.e., performance) and R&D intensity (i.e., absorptive capacity) in the relationship between the experiences and private target acquisition.

2.2.1. Moderating Effects of Preacquisition Growth Rate

In general, an acquirer's preacquisition growth positively influences its acquisition, because growing firms can sustain their growth by adopting M&As as their main strategy [15]. Given the positive effect of preacquisition growth, we expect that an interaction between an acquirer's growth and either M&A experience or early VC-backed experience increases the likelihood and frequency of private target acquisition.

The perspective of adoptive behavior and performance feedback can account for the positive effect of the integration of previous M&A experience and growth [28]. Since a firm's better performance of strategies increases its likelihood of persisting prior strategic actions [29], firms with recently higher rates of growth by previous M&As become more confident that they have the capabilities and knowledge to effectively execute and manage M&A activities than firms with lower rates of growth by previous M&A experience, and thus the M&A-experienced companies with higher growth rates prior to acquisition will make more acquisitions by repeating the same strategic behavior. Hence, we have the following hypothesis:

Hypothesis 3a. *The positive effect of a public firm's prior M&A experience on private target acquisition increases with the firm's preacquisition growth rate in high-tech industries.*

An integration of early VC-backed experience and preacquisition growth provides reliable evidence supporting positive feedback between market performance and firm-specific capability to effectively manage information asymmetry. Venture capital markets in high-tech industries are characterized by high levels of information asymmetry due to an integration of intangible resources, private information, tacit knowledge, and market imperfection [3,7,9]. Early VC-backed firms are likely to have learned how to manage such information asymmetry and to have accumulated dynamic capability to adapt to dynamic and uncertain environments of high-tech industries from their early experience [6]. If such firms have recently obtained higher growth, they are likely to know how to create economic value based on information-processing mechanisms and dynamic capability [15]. Hence, they will actively acquire private firms to explore further value-creation opportunities by counterplotting information asymmetry and finding undervalued private companies with intangible assets [1,13]. Based on this logic, we develop the following hypothesis:

Hypothesis 3b. *The positive effect of a public firm's early VC-backed experience on private target acquisition increases with the firm's preacquisition growth rate in high-tech industries.*

2.2.2. Moderating Effects of Preacquisition R&D Intensity

An acquirer's R&D investment has countervailing effects on its acquisition of private companies due to two facets of R&D, i.e., innovation and learning [30,31]. On the one hand, a firm's R&D contributes to internally generating innovation, technological knowledge, and intangible resources due to the so-called "innovation" effect. On the other hand, it enhances the firm's absorptive capacity (i.e., an ability to recognize new and external knowledge, assimilate it with existing knowledge, and apply it to commercial ends) because of the so-called "learning" effect. Due to the former (innovation) role of R&D, firms with higher levels of R&D intensity are likely to depend upon their own internal innovation for new product and business development, growth or survival instead of upon the acquisition of technology and knowledge, which leads to a negative effect of an acquirer's R&D on private target acquisition. In contrast, due to the latter (learning) role of R&D, R&D-intensive firms with superior absorptive capacity are likely to acquire private companies more actively than are their counterparts to effectively integrate internal resources, such as technology-related or intangible assets, with external ones.

Firms possessing both M&A experience and a higher level of R&D intensity have more incentives to acquire private firms to exploit M&A-specific competence and absorptive capacity together than M&A-experienced firms with a lower R&D intensity. According to Hypothesis 1a, given that firms that accumulate acquisition-specific capabilities through prior M&As are inclined to depend on further acquisitions for the purpose of the search and recognition of valuable resources, such as technology, human capital, and other intangible resources, sufficient absorptive capacity enables M&A-experienced companies to acquire more private firms for value creation based on the integration of internal capabilities and external resources. Hence, we have the following hypothesis:

Hypothesis 4a. *The positive effect of a public firm's prior M&A experience on private target acquisition increases with the firm's preacquisition R&D intensity in high-tech industries.*

An interplay of early VC-backed experience and R&D intensity can positively influence private target acquisition by making the learning effect of an acquirer's R&D greater than the innovation effect. According to Hypothesis 1b, VC backing at an early stage promotes a VC-backed firm's later growth and further investment from other investors and provides learning opportunities for effectively evaluating intangible resources with asymmetric information in high-tech industries. Accordingly, early VC-backed firms with absorptive capacity in terms of a high level of R&D intensity are likely to acquire private targets, because the firms, as technologically competent or innovative acquirers, are able to pick high-quality targets among private firms despite information asymmetry to integrate their

internal resources and externally acquired knowledge through dynamic capability and absorptive capacity for further growth [6,32]. Based on this reason, we draw the following hypothesis:

Hypothesis 4b. *The positive effect of a public firm's early VC-backed experience on private target acquisition increases with the firm's preacquisition R&D intensity in high-tech industries.*

3. Data, Variables, and Empirical Specifications

3.1. Data

For analysis of private target acquisition by public firms in high-tech industries, we selected a sample from 467 firms that were listed on the NASDAQ market in 2014 and operated in the “technology industry” according to the NASDAQ classification. The sample firms cover a diverse range of IT industries, including IT-related manufacturing and services industries (e.g., semiconductors, semiconductor equipment and testing, communications and networking, office equipment, electronic equipment and parts, computer hardware, phones and handheld devices, household electronics, IT services and consulting, software, and Internet services).

We collected the data of M&A activities as well as the general and financial information for the sample firms from the Thomson One database maintained by the Thomson Reuters. The database includes the VentureXpert database, which has often been used in previous studies of venture acquisition [7,33] and provides detailed information on M&A deals (e.g., annual number of a firm's deals, and names of acquirers and targets) and VC backing (e.g., investor information and investment stage). For empirical analysis, we additionally collect annual firm-level data (e.g., corporate establishment date, total sales, accounting profit, R&D expenditure, market value, total assets, and debt) over the period 2008–2010 from the database. We excluded 40 firms founded after 2011 from the sample because these firms do not have M&A data for the period. A total of 41 firms without information on VC backing, and annual financial data over the period were additionally excluded from the sample. These firms have missing values for the dependent and explanatory variables of the regression analysis. The final sample includes 386 firms. Table 1 shows the distribution of sample firms across industries.

Table 1. The distribution of sample firms across industries.

Business Sector	Industry	The Number of Firms
Technology Equipment	Semiconductors	84
	Semiconductor Equipment and Testing	10
	Communications and Networking	52
	Office Equipment	3
	Electronic Equipment and Parts	13
	Computer Hardware	35
	Phones and Handheld Devices	6
	Household Electronics	4
Software and IT Services	IT Services and Consulting	80
	Software	72
	Internet Services	27

3.2. Variables

Two dependent variables are used for empirical analysis, namely, the dummy variable for acquiring private targets during the period 2011–2013 (**PRV_DUM**) and the number of private target acquisitions during the period (**PRV_NO**). We construct the dummy variable and the number of acquisitions over the three years to reduce the fluctuations and potential noise involved in annual data of acquisition. Existing studies have collected the data on acquisitions by using a minimum two- or three-year time-window because of the infrequency or yearly variation of acquisition [1,9,34].

The key explanatory variables for the test of Hypotheses 1 and 2 are prior M&A experience (**PRIORMA**) and early VC-backed experience (**EARLYVC**). We measure prior M&A experience by the average number of M&As during the period of three years prior to the acquisition (i.e., the period 2008–2010). We include prior mergers as well as acquisitions to control for M&A tendency and to consider the effect of previous merger activities on later acquisition behavior. To capture the effect of early VC-backed experience, we construct a dummy variable for the firms that were funded by venture capital(s) at their seed or early stage for the first financing round by following an existing study's approach [33]. From the Thomson One database, we collected information regarding investment round and financing for each sample firm and constructed a dummy variable for firms that received the first-round financing investment from venture capital(s) at the seed or early stage.

To test Hypotheses 3 to 4 regarding the effects of the interaction terms between the two experience variables (**PRIORMA** and **EARLYVC**) and the moderating variables, we use two moderating variables, namely, an acquirer's growth rate (**GROW**) and its R&D intensity (**RDINT**) for three years prior to the acquisition (i.e., the period 2008–2010). Growth rate is measured by the rate of sales growth for the period. R&D intensity is the ratio of R&D expenditures to total sales. For these variables, we employ a three-year average of lagged values to test the effects of preacquisition factors, to control for potential endogeneity between acquisition decision and acquirer characteristics, and to reduce the noise and fluctuation in the annual financial data.

In addition to the above-described explanatory variables, we include control variables to capture the acquirer's characteristics that influence the likelihood and the number of acquisitions. We include firm size (**SIZE**), which is measured by the log of an acquirer's total sales [3,17]. We include a firm's Tobin's Q (**TOBINQ**) to account for the impact of growth potentials [35], which is measured by the ratio of the firm's market value of common stock plus the book value of preferred stock and debt to its book value of total assets [9]. We control for preacquisition accounting profitability (**PROFIT**) by measuring the ratio of operating margin to sales [1]. The firm's financial leverage (**LEVER**), which is measured by the ratio of debt to total assets, is used as an indicator of debt structure or slack resources [9]. We include the firm's ratio of intangible assets to total assets (**INTAN**) to control for the dependence of strategic choice on intangible assets. Firm age (**AGE**) is used, given that corporate strategy, such as acquisition, depends on firm age. For these firm-level control variables, we also employ a three-year average of lagged values during the period 2008–2010.

Finally, we add industry- and country-level variables to control for the difference in acquisition tendency across industries and countries. We include the average number of total acquisitions in each industry for the period 2011–2013 (**INDACQ**) to control for the overall tendency of acquisition at the industry level. Dummy variables for different industries according to the Thomson Reuters Business Classification (TRBC) are also included. According to the TRBC, this study's sample covers the "Technology" economic sector, which is divided into the "Technology Equipment" and "Software and IT Services" business sectors and consists of 11 industries (third-level). Table 1 shows the distribution of sample firms across the industries. Country dummy variables are also included to control for the effects of country-specific and institutional conditions on acquisitions [36]. We classify the sample firms into four country groups according to the headquarter location, namely, the U.S., China, Israel (i.e., the top three countries in terms of the total number of acquisitions for the sample period), and others. Dummy variables are assigned to the Chinese, Israeli and others firms but not the U.S. firms.

Table 2 describes the variables used in the empirical analysis. Table 3 presents the summary statistics for the variables and the correlation coefficients between them.

Table 2. Description of the dependent and explanatory variables.

Dependent Variables	
PRV_DUM	Dummy for acquiring a private target during the period 2011–2013
PRV_NO	The number of private target acquisitions during the period 2011–2013

Table 2. Cont.

Explanatory Variables	
PRIORMA	The average number of mergers and acquisitions (M&As) during the period 2008–2010
EARLYVC	Dummy for firms that were backed by venture capital (VC) at the seed or early stage
GROW	Average growth rate of sales during the period 2008–2010
RDINT	Average R&D intensity (i.e., the ratio of R&D to total sales) during the period 2008–2010
SIZE	Average total sales during the period 2008–2010 (unit: million USD) in log
TOBINQ	Average Tobin's Q (i.e., the ratio of market value to book value) during the period 2008–2010
PROFIT	Average ratio of operating return to total sales during the period 2008–2010
LEVER	Average rate of leverage (i.e., the ratio of debt to total assets) during the period 2008–2010
INTAN	Average ratio of intangible assets to total assets during the period 2008–2010
AGE	Age of a firm in the year 2013 (i.e., 2013—the year of the firm's foundation)
INDACQ	The average number of total acquisitions in each industry during the period 2011–2013

Table 3. Summary statistics and correlation coefficients for the variables.

Variables	Mean	Median	Std.	Correlation Coefficient												
				1	2	3	4	5	6	7	8	9	10	11	12	13
1. PRV_DUM	0.61	1.00	0.49	1.00												
2. PRV_NO	2.15	1.00	4.70	0.37	1.00											
3. PRIORMA	0.97	0.33	1.82	0.23	0.76	1.00										
4. EARLYVC	0.37	0.00	0.48	0.15	0.16	0.07	1.00									
6. GROW	0.07	0.07	0.19	0.18	0.07	0.02	0.06	1.00								
7. RDINT	0.16	0.11	0.37	−0.08	−0.03	−0.04	0.04	−0.03	1.00							
5. SIZE	5.35	5.39	1.81	0.32	0.43	0.05	0.11	0.09	−0.33	1.00						
8. TOBINQ	2.57	1.61	5.27	0.06	0.02	−0.02	−0.03	0.07	0.14	−0.15	1.00					
9. PROFIT	−2.16	0.04	23.9	0.00	0.01	0.02	0.04	0.02	−0.71	0.23	−0.24	1.00				
10. LEVER	0.48	0.33	1.19	0.00	−0.02	−0.01	−0.06	−0.02	0.21	−0.15	0.53	−0.55	1.00			
11. INTAN	0.89	0.92	0.10	−0.02	−0.02	0.04	−0.03	0.10	−0.07	0.24	0.03	0.01	0.08	1.00		
12. AGE	21.3	18.0	11.4	−0.01	0.00	0.03	−0.09	−0.09	−0.04	0.09	−0.09	−0.04	0.01	0.01	1.00	
13. INDACQ	2.46	1.92	1.32	0.13	0.27	0.15	0.07	0.00	−0.07	0.03	0.00	0.04	−0.09	−0.12	−0.12	1.00

Note: Std. means standard deviation.

3.3. Empirical Specifications

The baseline specification is used to test the hypotheses (i.e., Hypotheses 1 and 2) regarding the main effects of the two key explanatory variables (**PRIORMA** and **EARLYVC**) as follows:

$$Y_i = f(\beta_0 + \beta_1 \text{PRIORMA}_i + \beta_2 \text{EARLYVC}_i + \beta_3 X_i + \beta_4 Z_i + \varepsilon_i) \quad (1)$$

where Y_i is the dependent variable (**PRV_DUM** or **PRV_NO**), the β 's are regression coefficients, PRIORMA_i denotes a firm i 's prior M&A experience, EARLYVC_i denotes the variable of being early VC-backed, X_i denotes a set of firm-specific moderating variables such as growth rate (**GROW**) and R&D intensity (**RDINT**), Z_i denotes a set of control variables, and ε_i denotes the error term.

For the test of the hypotheses (i.e., Hypotheses 3 to 4) regarding the effects of the moderating variables, we add the interaction terms between the key explanatory variables and the moderating variables (i.e., **PRIORMA*** X and **EARLYVC*** X) to the baseline specification as follows:

$$Y_i = f(\beta_0 + \beta_1 \text{PRIORMA}_i + \beta_2 \text{EARLYVC}_i + \beta_3 \text{PRIORMA}_i * X_i + \beta_4 \text{EARLYVC}_i * X_i + \beta_5 X_i + \beta_6 Z_i + \varepsilon_i) \quad (2)$$

We employ different regression models to estimate the effects of the explanatory variables on the discrete dependent variables, depending upon the dependent variable's type. The probit model is employed for the dummy variable of private target acquisition (**PRV_DUM**), and the negative binomial model is employed for the number of acquisitions (**PRV_NO**) [37]. To find the unique factors influencing private target acquisition, we employ the same empirical specifications for the dependent variables such as dummy and the number of public target acquisition (**PUB_DUM** and **PUB_NO**). Accordingly, this paper allows us to compare the effects of two experience variables on private target acquisition with those on public target acquisition.

4. Empirical Results

4.1. Main Effects of Two Types of Experience on Acquisition

Table 4 presents the regression results for the main effects of the experience variables on the likelihood and the number of acquisitions. We find in Models (1) and (2) of Table 4 that two types of experience (i.e., **PRIORMA** and **EARLYVC**) have positive effects on the likelihood and the number of private target acquisitions by the NASDAQ firms, which strongly supports Hypotheses 1 and 2, respectively. We also find that the marginal effects of two experience variables are positive. For example, on average, the likelihood and the number of private target acquisitions increase by 8.4% and 0.477, respectively, when the number of prior M&As increases by one. On average, the likelihood and the number of acquisitions for early VC-backed firms are higher by 9.7% and 0.796, respectively, than are those for later VC-backed or non-VC-backed firms. The marginal effects are shown in Table A1 of the Appendix A.

Table 4. Main effects of prior mergers and acquisitions (M&A) experience and early venture capital (VC)-backed experience on acquisitions.

Dependent Variable	Model (1)	Model (2)	Model (3)	Model (4)
	Dummy of Private Target Acquisition (PRV_DUM)	Number of Private Target Acquisition (PRV_NO)	Dummy of Public Target Acquisition (PUB_DUM)	Number of Public Target Acquisition (PUB_NO)
Estimation Model	Probit	Negative Binomial	Probit	Negative Binomial
PRIORMA	0.288 (2.62) ***	0.175 (4.87) ***	0.267 (2.90) ***	0.085 (1.95) *
EARLYVC	0.331 (2.08) **	0.293 (2.63) ***	0.132 (0.77)	−0.029 (−0.15)
GROW	0.972 (2.02) **	1.313 (3.48) ***	1.884 (2.52) **	2.771 (2.60) ***
RDINT	−0.712 (−2.06) **	−0.099 (−0.37)	−0.453 (−0.52)	0.463 (0.40)
SIZE	0.249 (4.30) ***	0.289 (7.05) ***	0.330 (4.97) ***	0.443 (6.42) ***
TOBINQ	0.091 (1.92) *	0.027 (3.94) ***	−0.109 (−1.55)	−0.150 (−1.76) *
PROFIT	−0.016 (−2.81) ***	−0.006 (−1.31)	−0.009 (−0.57)	0.011 (0.44)
LEVER	−0.274 (−1.98) **	−0.038 (−0.48)	−0.085 (−0.22)	−0.148 (−0.30)
INTAN	0.898 (1.19)	1.514 (2.61) ***	0.828 (1.01)	0.294 (0.32)
AGE	−0.028 (−0.18)	−0.064 (−0.56)	−0.162 (−0.87)	−0.196 (−0.86)
INDACQ	1.640 (8.24) ***	0.393 (2.43) **	2.809 (4.27) ***	7.555 (9.75) ***
Log likelihood	−189.5	−564.9	−149.7	−270.9
Wald χ^2	872.2	366.8	388.6	985.0
Pseudo R ²	0.299	0.234	0.343	0.226
Number of firms	386	386	386	386

Note: Heteroscedasticity-consistent *t*-ratios are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The constant and the coefficients of the industry and country dummies are not reported.

In particular, compared with the results in Models (3) and (4) of Table 4, the results in Models (1,2) show that the impact of early VC-backed experience (**EARLYVC**) on private target acquisition tends to be greater in magnitude and more statistically significant than the impact on public target acquisition. Specifically, the positive impact of early VC-backed experience is significant only for private target acquisition and not for public target acquisition, while prior M&A experience (**PRIORMA**) positively influences both private and public target acquisitions. These results imply that early VC-backed experience effectively mitigates information asymmetry related to private target acquisition by NASDAQ firms in high-tech industries. Early VC-backed firms have developed firm-specific abilities to evaluate private companies with intangible resources, to assess and use information in the process of M&A deals, and to hedge risks and uncertainty [38,39]. These abilities allow such firms to explore

opportunities for value creation through private target acquisition in high-tech industries [38,40]. In addition to early VC-backed experience, public firms that have previously conducted M&As are more likely to currently acquire private firms by exploiting their M&A-related competence and private information-processing capability based on their experience [1], which is largely in line with the positive effect of acquisition experience on postacquisition performance [10,17]. Unlike existing studies, this paper shows that two types of experience have differential effects on a firm's private and public target acquisitions in high-tech industries on the buyer side; early VC-backed experience as a high-tech and innovation-related learning capability is relatively more important or matters only to private target acquisition in high-tech industries, while prior M&A experience as a general M&A-related capability is important to both private and public target acquisitions.

4.2. Moderating Roles of Acquirer-Specific Factors in the Experience Effect

We find in Table 5 that the experience effect is significantly moderated by acquirer-specific factors such as preacquisition growth rate and R&D intensity, which reflect preacquisition performance and absorptive capacity, respectively. The key findings regarding these moderating effects and their implications are as follows.

Table 5. Moderating roles of acquirer-specific factors in the experience effect.

	Model (5)	Model (6)	Model (7)	Model (8)
Dependent Variable	Dummy of Private Target Acquisition (PRV_DUM)	Number of Private Target Acquisition (PRV_NO)	Dummy of Public Target Acquisition (PUB_DUM)	Number of Public Target Acquisition (PUB_NO)
Estimation Model	Probit	Negative Binomial	Probit	Negative Binomial
PRIORMA	0.096 (0.70)	0.079 (1.33)	0.087 (0.64)	0.024 (0.24)
EARLYVC	0.226 (1.27)	0.186 (1.31)	0.336 (1.17)	0.443 (1.32)
PRIORMA*GROW	2.512 (4.04) ***	0.101 (0.66)	0.799 (1.35)	0.337 (1.31)
EARLYVC*GROW	1.997 (2.00) **	1.294 (1.82) *	−2.577 (−1.92) *	−5.037 (−2.57) **
PRIORMA*RDINT	1.910 (2.05) **	0.691 (2.29) **	1.608 (2.01) **	0.150 (0.28)
EARLYVC*RDINT	0.823 (2.09) **	0.390 (1.27)	0.009 (0.01)	0.059 (0.04)
GROW	−0.175 (−0.38)	0.984 (2.15) **	2.094 (1.66) *	4.319 (2.57) **
RDINT	−1.823 (−2.31) **	−0.368 (−0.98)	−1.343 (−0.76)	0.190 (0.12)
SIZE	0.232 (3.81) ***	0.286 (6.78) ***	0.341 (4.87) ***	0.472 (6.98) ***
TOBINQ	0.103 (2.05) **	0.026 (3.92) ***	−0.061 (−0.97)	−0.077 (−0.85)
PROFIT	−0.031 (−2.31) **	−0.008 (−1.33)	−0.019 (−1.08)	0.006 (0.27)
LEVER	−0.320 (−1.95) *	−0.103 (−0.99)	−0.259 (−0.70)	−0.263 (−0.54)
INTAN	1.055 (1.29)	1.515 (2.61) ***	0.621 (0.77)	−0.578 (−0.60)
AGE	−0.019 (−0.12)	−0.066 (−0.57)	−0.218 (−1.14)	−0.167 (−0.76)
INDACQ	1.538 (8.08) ***	0.343 (2.41) **	3.212 (3.31) ***	7.826 (6.09) ***
Log likelihood	−180.7	−562.5	−146.2	−265.9
Wald χ^2	866.8	378.4	466.8	330.4
Pseudo R ²	0.335	0.257	0.360	0.241
Number of firms	386	386	386	386

Note: Heteroscedasticity-consistent *t*-ratios are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The constant and the coefficients of the industry and country dummies are not reported.

Along with a positive effect of firm growth by itself in Table 4, the interaction term between prior M&A experience and growth (i.e., **PRIORMA*GROW**) has a significantly positive effect on the likelihood of private target acquisition in Model (5) of Table 5, while the interaction has a less

significant positive effect on the number of acquisitions in Model (6) of Table 5. This result weakly supports Hypothesis 3a. The interaction term between early VC-backed experience and growth (i.e., **EARLYVC*GROW**) has a positive effect on both the likelihood and the number of private target acquisitions, which strongly supports Hypothesis 3b. Taken together, these results show that an interplay of preacquisition performance and the two types of experience regarding an acquirer's ability to effectively manage information asymmetry enhances a high-tech firm's incentive to conduct private target acquisition for further growth. For example, if firms previously executed M&A activities before the current acquisition and then recently obtained high levels of sales growth, they would be confident of the economic benefits of M&As through inertia or performance feedback and hence are more likely to acquire private firms for further growth [18,29]. In a similar vein, if early VC-backed firms have recently obtained better late-stage (i.e., post-IPO) performance in terms of preacquisition growth, they are likely to maintain better growth orientations and potentials by linking information-processing and dynamic learning to market value in high-tech industries [16,25]. Such firms have more incentives for private target acquisition to continuously exploit their internally accumulated resources and their capabilities for further growth.

Interestingly, by comparing the effects of the interaction terms between growth and either prior M&A experience or early VC-backed experience on private and public target acquisitions, we find two results worth mentioning. First, the positive effect of the interaction between prior M&A experience and preacquisition growth is more statistically significant for private target acquisition in Models (5) and (6) than for public target acquisition in Models (7) and (8). This finding indicates that recently fast-growing NASDAQ firms that have previous M&A experience are more likely to try private target acquisitions rather than public target acquisitions. Second, the interaction term between early VC-backed experience and preacquisition growth has a positive effect on private target acquisition in Models (5) and (6), while the interaction has a negative effect on public target acquisition in Models (7) and (8). This finding shows that early VC-backed and fast-growing public firms prefer private target acquisition, but late VC-backed and fast-growing (or early VC-backed and slow-growing) firms prefer public target acquisition.

Although a main effect of R&D intensity on private target acquisition is negative in Tables 4 and 5, an interaction term between prior M&A experience and R&D intensity (i.e., **PRIORMA*RDINT**) has a positive effect on the likelihood and the number of private target acquisitions in Models (5) and (6) of Table 5. The positive effect is significant for both the likelihood and the number of private target acquisitions, which strongly supports Hypothesis 4a. The result implies that an interplay of prior M&A experience and absorptive capacity makes the learning effect more dominant than the innovation effect among the two facets of R&D (i.e., innovation and learning). Even if firms that are intensively investing their resources in internal innovation tend to have weak incentives to obtain external knowledge and technology via acquisition, R&D-intensive firms with M&A-specific capabilities obtained through prior experience will attempt to acquire external knowledge actively by effectively combining their absorptive capacity with the capabilities [40]. An interaction term between early VC-backed experience and R&D intensity (i.e., **EARLYVC*RDINT**) also has a positive effect on the likelihood and the number of private target acquisitions in Models (5) and (6) of Table 5. The positive effect is significant for the likelihood of private target acquisition but not for the number of acquisitions, which weakly supports Hypothesis 4b.

Compared with the results of private target acquisition in Models (5) and (6), the positive effect of the interaction term between early VC-backed experience and R&D intensity on public target acquisition is much less significant in Models (7) and (8). One plausible explanation of this result is that early VC-backed firms with high levels of R&D intensity want to exploit the information-processing and learning-related capabilities and thus are likely to attempt private target acquisition in high-tech industries by seizing the opportunity to innovate from and assimilate a private target's resources. Private targets' intangible assets and undervaluation could give acquirers both the benefit of value creation and the risk of information asymmetry [40]. In contrast, such capabilities of early VC-backed

and high R&D-intensive firms would not provide significantly great advantages in the acquisition of public targets. Given that public targets are less likely to be underevaluated than private targets, even competent firms would not have a strong incentive to attempt public target acquisition with less opportunities of value creation and a higher risk of information asymmetry in high-tech industries.

4.3. Robustness Check

The main results reported in Tables 3 and 4 are based on the dependent and explanatory variables measured for the three-year periods (2008–2010 and 2011–2013), respectively. We conduct additional analysis to check the robustness of the results for a longer period of time (i.e., whether the experience effect can differ depending upon the period of analysis). We measure the dependent variables of acquisition (**PRV_DUM** and **PRV_NO**) for the five-year period (2009–2013). We also measure the explanatory variables such as prior M&A experience (**PRIORMA**), two moderating variables (**GROW** and **RDINT**), and a set of control variables for the five-year period (2004–2008) prior to the acquisition. We employ the same empirical specifications for these variables. The regression results for this analysis are reported in Tables A2 and A3 of the Appendix A, which correspond to Tables 4 and 5, respectively. The results, supporting all the hypotheses, are qualitatively consistent with the above-mentioned main results. It is worth mentioning that Hypothesis 3b regarding a positive interaction between early VC-backed experience and preacquisition growth (i.e., **EARLYVC*GROW**) is more strongly supported for the three-year analysis in Table 5, while Hypothesis 4b regarding a positive interaction between early VC-backed experience and preacquisition R&D (i.e., **EARLYVC*RDINT**) is more strongly supported for the five-year analysis in Table A3. These imply that the positive impact of early VC-backed experience on private target acquisition is enhanced by an integration of the legacy of early VC support's growth-orientation and an acquirer's recent growth performance in high-tech industries with information asymmetry for a relatively shorter period, while the positive impact is effectively magnified by an early VC-backed firm's ability to effectively manage information asymmetry regarding innovation and intangible resources based on superior absorptive capacity in such industries for a longer period.

5. Concluding Remarks

This study investigates how an acquirer's previous experiences (i.e., prior M&A experience and early VC-backed experience) influence its acquisition of private firms in high-tech industries with high levels of information asymmetry and environmental dynamism by analyzing a dataset of NASDAQ-listed firms in IT industries. It also examines the moderating roles of an acquirer's growth rate and R&D intensity (i.e., preacquisition performance and absorptive capacity) in the relationship between experience and acquisition. This study compares the impact of the two types of experience on private target acquisition with the impact on public target acquisition in order to explore whether one type of experience matters more to private target acquisition in high-tech industries than the other type. This study contributes to the literature by specifically showing a lasting impact of a public acquirer's early VC-backed experience on their later-stage private target acquisition in high-tech industries and the impact's dependence upon the acquirer's growth performance and absorptive capacity, as well as clearly showing that early VC-backed experience positively matters to private target acquisition and not to public target acquisition at the buyer (acquirer) side. Previous studies regarding M&As and VC backing demonstrated how VC backing as a seller's signal can help acquirers distinguish high-quality targets from lower-quality targets, but little is known about whether an acquirer's ability developed through early VC-backed experience can have a positive impact on facilitating private target acquisition in high-tech industries [3,13]. We address this lacuna by highlighting the two roles (i.e., an ability to effectively manage and exploit information asymmetry and dynamic capability to search and explore risky opportunity for value creation) of an acquirer's early VC-backed experience in later M&A decisions.

We find that public firms with the two types of experience attempt to acquire private firms more so than their counterparts in high-tech industries. This finding indicates that if such experienced firms effectively deal with information asymmetry by recognizing promising targets and evaluating them, they are willing to actively acquire private firms in high-tech industries for value creation and growth despite the existence of acquisition obstacle such as information asymmetry. We also find that the positive effects of the experiences are moderated by an acquirer's preacquisition growth rate and R&D intensity. For example, a higher rate of growth and a higher level of R&D intensity magnify the experience effect. These findings suggest that the experience obtained through early VC support and prior M&As enable high-tech firms to develop an ability to manage information asymmetry and intangible resources and thus help them effectively maintain their growth by private target acquisition and utilize their absorptive capacity to assimilate the external resources of their targets into existing innovative knowledge.

The findings of this study have several practical implications for private target acquisition in high-tech industries. Entrepreneurial firms need to secure funding from VCs at an early stage so that they possibly will be able to enjoy the early VC-backed advantages in information processing and dynamic learning even at the later stages (i.e., post-IPO) after the VC's exit. These firms should consider the indirect and lasting effects of being early VC-backed, beyond simply the financing, on continuously developing strategic capabilities to recognize and evaluate private information and promising intangible resources, which is ultimately beneficial to their long-term value creation through acquisitions. This study can also shed light on why private target acquisitions have been more frequent in the high-tech industries such as IT industries particularly in some countries such as the U.S. and Israel, but, in contrast, relatively less frequent in the industries in other countries. The study suggests that the primary difference comes from whether VC backing for early-stage entrepreneurial firms is abundantly available.

Despite interesting findings, practical implications, and the contribution to the literature, this paper has two limitations, which can be complemented by further research with an extended agenda and framework. First, the time span considered in the empirical analysis can be short to fully investigate the long-lasting impact of the two types of experiences on acquisitions. The paper chose the period of six to ten years for the sample of surviving acquirers, even if the sample period is meaningful in examining a recent trend of private target acquisition. One of the most serious challenges in research on acquisitions is obtaining longitudinal data of acquirers and targets over a sufficiently long period of time, as data collection from the corporate database can often be a very expensive and time-consuming exercise [10,38]. Examining the longitudinal data also requires additional analysis such as survival analysis in fast-changing industries and needs to consider other variables affecting long-term acquisitions. Nevertheless, it will be worth testing the experience effect for the longer period, consisting a set of successive years, with a newer dataset. Second, the paper chose IT industries as a sample of high-tech industries [38]. It will be interesting to investigate the impact of experience on acquisitions in other high-tech industries such as biotechnology industries. The results could be similar or different depending upon the industry and technology characteristics which affect motivation and mediating factors of private target acquisition [39,40].

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Appendix A

Table A1. Average marginal effect of the explanatory variable on acquisition.

Dependent Variable	Dummy of Private Target Acquisition (PRV_DUM)	Number of Private Target Acquisition (PRV_NO)	Dummy of Public Target Acquisition (PUB_DUM)	Number of Public Target Acquisition (PUB_NO)
Estimation Model	Probit	Negative Binomial	Probit	Negative Binomial
PRIORMA	0.084 (2.67) ***	0.477 (2.73) ***	0.061 (3.03) ***	0.046 (1.12)
EARLYVC	0.097 (2.13) **	0.796 (2.70) ***	0.030 (0.77)	−0.016 (−0.15)
GROW	0.285 (2.05) **	3.569 (2.95) ***	0.429 (2.58) ***	1.506 (2.28) **
RDINT	−0.209 (−2.06) **	−0.269 (−0.38)	−0.103 (−0.51)	0.251 (0.39)
SIZE	0.073 (4.71) ***	0.786 (5.08) ***	0.075 (5.21) ***	0.241 (2.44) **
TOBINQ	0.027 (1.94) *	0.074 (3.37) ***	−0.025 (−1.56)	−0.081 (−1.15)
PROFIT	−0.005 (−2.83) ***	−0.017 (−1.31)	−0.002 (−0.57)	0.006 (0.43)
LEVER	−0.080 (−1.99) **	−0.103 (−0.48)	−0.019 (−0.22)	−0.080 (−0.29)
INTAN	0.263 (1.19)	4.117 (2.30) **	0.188 (1.00)	0.160 (0.31)
AGE	−0.008 (−0.18)	−0.175 (−0.55)	−0.037 (−0.86)	−0.107 (−0.74)
INDACQ	0.481 (7.21) ***	1.068 (2.15) **	0.639 (4.27) ***	4.106 (2.41) **

Note: The marginal effect of the explanatory variable (X) on the dependent variable (Y) indicates the expected change in the dependent variable with respect to a one-unit change in the explanatory variable. Heteroscedasticity-consistent *t*-ratios are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The constant and the coefficients of the industry and country dummies are not reported.

Table A2. Robustness check for main effects of the experiences on acquisition.

	Model (1)	Model (2)	Model (3)	Model (4)
Dependent Variable	Dummy of Private Target Acquisition (PRV_DUM)	Number of Private Target Acquisition (PRV_NO)	Dummy of Public Target Acquisition (PUB_DUM)	Number of Public Target Acquisition (PUB_NO)
Estimation Model	Probit	Negative Binomial	Probit	Negative Binomial
PRIORMA	0.405 (1.78) *	0.218 (5.31) ***	0.417 (2.59) ***	0.103 (1.94) *
EARLYVC	0.373 (2.18) **	0.297 (2.60) ***	0.088 (0.54)	0.091 (0.72)
GROW	0.722 (1.83) *	0.399 (2.99) ***	0.523 (2.15) **	0.375 (2.68) ***
RDINT	−1.292 (−2.04) **	−0.393 (−1.43)	−0.478 (−0.77)	−0.465 (−0.76)
SIZE	0.218 (3.29) ***	0.224 (5.15) ***	0.297 (4.51) ***	0.295 (6.51) ***
TOBINQ	0.067 (1.24)	0.065 (2.35) **	0.023 (0.53)	−0.012 (−0.29)
PROFIT	−0.025 (−1.34)	−0.003 (−0.56)	0.002 (0.22)	−0.002 (−0.23)
LEVER	−0.248 (−0.82)	−0.227 (−0.92)	0.042 (0.11)	−0.067 (−0.17)
INTAN	0.727 (0.88)	0.436 (0.88)	0.642 (0.76)	0.608 (0.97)
AGE	0.222 (1.22)	0.093 (0.80)	−0.090 (−0.48)	−0.092 (−0.64)
INDACQ	1.260 (5.58) ***	0.234 (1.74) *	0.783 (3.80) ***	1.154 (2.68) ***
Log likelihood	−144.0	−583.1	−161.9	−224.5
Wald χ^2	544.7	430.5	70.0	123.9
Pseudo R ²	0.260	0.216	0.269	0.218
Number of firms	328	328	328	328

Note: Heteroscedasticity-consistent *t*-ratios are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The constant and the coefficients of the industry and country dummies are not reported.

Table A3. Robustness check for moderating roles of acquirer-specific factors.

	Model (5)	Model (6)	Model (7)	Model (8)
Dependent Variable	Dummy of Private Target Acquisition (PRV_DUM)	Number of Private Target Acquisition (PRV_NO)	Dummy of Public Target Acquisition (PUB_DUM)	Number of Public Target Acquisition (PUB_NO)
Estimation Model	Probit	Negative Binomial	Probit	Negative Binomial
PRIORMA	0.117 (0.64)	0.144 (1.11)	0.137 (0.58)	0.104 (0.67)
EARLYVC	0.179 (0.89)	0.271 (1.57)	0.190 (0.77)	0.138 (0.51)
PRIORMA*GROW	2.596 (3.07) ***	0.017 (0.18)	0.076 (0.10)	0.003 (0.04)
EARLYVC*GROW	1.845 (2.05) **	0.045 (0.23)	−0.280 (−0.58)	−0.986 (−2.91) ***
PRIORMA*RDINT	2.033 (1.57)	0.810 (1.85) *	0.587 (0.51)	0.010 (0.02)
EARLYVC*RDINT	3.574 (2.54) **	1.431 (1.81) *	−1.086 (−1.05)	−0.537 (−0.60)
GROW	1.569 (2.21) **	0.485 (2.95) ***	1.052 (2.09) **	0.706 (2.47) **
RDINT	−1.131 (−1.71) *	−0.515 (−1.56)	−0.008 (−0.01)	0.307 (0.63)
SIZE	0.268 (3.77) ***	0.224 (5.12) ***	0.314 (4.62) ***	0.383 (6.40) ***
TOBINQ	0.002 (0.04)	0.043 (1.60)	−0.002 (−0.05)	0.014 (0.31)
PROFIT	−0.007 (−1.13)	−0.005 (−0.91)	0.002 (0.29)	0.010 (1.36)
LEVER	−0.339 (−1.17)	−0.250 (−1.02)	0.106 (0.28)	0.296 (0.95)
INTAN	1.108 (1.27)	0.539 (1.07)	0.797 (0.88)	−0.395 (−0.47)
AGE	0.347 (1.69) *	0.084 (0.71)	−0.088 (−0.44)	0.137 (0.68)
INDACQ	1.242 (5.65) ***	0.225 (1.74) *	0.670 (3.80) ***	1.003 (2.86) ***
Log likelihood	−129.5	−579.1	−156.2	−336.6
Wald χ^2	728.5	447.2	89.4	291.1
Pseudo R ²	0.319	0.223	0.276	0.221
Number of firms	328	328	328	328

Note: Heteroscedasticity-consistent *t*-ratios are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The constant and the coefficients of the industry and country dummies are not reported.

References

1. Capron, L.; Shen, J.-C. Acquisition of private vs. public firms: Private information, target selection, and acquirer returns. *Strateg. Manag. J.* **2007**, *28*, 891–911. [\[CrossRef\]](#)
2. Officer, M. The price of corporate liquidity: Acquisition discounts for unlisted targets. *J. Financ. Econ.* **2007**, *83*, 571–598. [\[CrossRef\]](#)
3. Lerner, J.; Leamon, A.; Hardyman, F. *Venture Capital, Private Equity, and the Financing of Entrepreneurship*; John Wiley & Sons Inc: Hoboken, NJ, USA, 2012.
4. Andersson, M.; Xiao, J. Acquisitions of start-ups by incumbent businesses: A market selection process of “high-quality” entrants? *Res. Policy* **2016**, *45*, 272–290. [\[CrossRef\]](#)
5. Barney, J. Firm resources and sustained competitive advantage. *J. Manag.* **1991**, *17*, 99–120. [\[CrossRef\]](#)
6. Teece, D.; Pisano, G.; Shuen, A. Dynamic capabilities and strategic management. *Strateg. Manag. J.* **1997**, *18*, 509–533. [\[CrossRef\]](#)
7. Masulis, R.; Nahata, R. Venture capital conflicts of interest: Evidence from acquisitions of venture-backed Firms. *J. Financ. Quant. Anal.* **2011**, *46*, 395–430. [\[CrossRef\]](#)
8. Graebner, M.; Eisenhardt, K. The seller’s side of the story: Acquisition as courtship and governance as syndicate in entrepreneurial firms. *Adm. Sci. Q.* **2004**, *49*, 366–403.
9. Ragozzino, R.; Reuer, J. Initial public offerings and the acquisition of entrepreneurial firms. *Strateg. Organ.* **2007**, *5*, 155–176. [\[CrossRef\]](#)
10. Halebian, J.; Devers, C.; McNamara, G.; Carpenter, M.; Davison, R. Taking stock of what we know about mergers and acquisitions: A review and research agenda. *J. Manag.* **2009**, *35*, 469–502. [\[CrossRef\]](#)

11. Barkema, H.; Schijven, M. How do firms learn to make acquisitions? A review of past research and an agenda for the future. *J. Manag.* **2008**, *34*, 594–634. [\[CrossRef\]](#)
12. Akerlof, G. The market for “lemons”: Quality uncertainty and the market mechanism. *Q. J. Econ.* **1970**, *84*, 488–500. [\[CrossRef\]](#)
13. Wu, C.-W.; Reuer, J.; Ragozzino, R. Insights of signaling theory for acquisitions research. In *Advances in Mergers and Acquisitions*; Cooper, C., Finkelstein, S., Eds.; Emerald Group Publishing Limited: Bingley, UK, 2013; Volume 12, pp. 173–191.
14. Puranam, P.; Srikanth, K. What they know vs. what they do: How acquirers leverage technology acquisitions. *Strateg. Manag. J.* **2007**, *28*, 805–825. [\[CrossRef\]](#)
15. Hitt, M.; King, K.; Krishnan, H.; Makri, M.; Schijven, M.; Shimizu, K.; Zhu, H. Creating value through mergers and acquisitions: Challenges and opportunities. In *The Handbook of Mergers and Acquisitions*; Faulkner, D., Teerikangas, S., Joseph, R., Eds.; Oxford University Press: Oxford, MA, USA, 2012.
16. Sirmon, D.; Hitt, M.; Ireland, R. Managing firm resources in dynamic environments to create value: Looking inside the black box. *Acad. Manag. Rev.* **2007**, *32*, 273–292. [\[CrossRef\]](#)
17. Hayward, M. When do firms learn from their acquisition experience? Evidence from 1990–1995. *Strateg. Manag. J.* **2002**, *23*, 21–39. [\[CrossRef\]](#)
18. Haleblan, J.; Kim, J.-Y.; Rajagopalan, N. The Influence of acquisition experience on acquisition behavior: Evidence from the U.S. commercial banking industry. *Acad. Manag. J.* **2006**, *49*, 357–370. [\[CrossRef\]](#)
19. Villalonga, B.; McGahan, A. The choice among acquisitions, alliances, and divestitures. *Strateg. Manag. J.* **2005**, *26*, 1183–1208. [\[CrossRef\]](#)
20. Reuer, J.; Ragozzino, R. The choice between joint ventures and acquisitions: Insights from signaling theory. *Manag. Sci.* **2012**, *23*, 1175–1190. [\[CrossRef\]](#)
21. Nelson, R.; Winter, S. *An Evolutionary Theory of Economic Change*; Harvard University Press: Cambridge, MA, USA, 1982.
22. Levitt, B.; March, J. Organizational learning. *Annu. Rev. Sociol.* **1988**, *14*, 319–338. [\[CrossRef\]](#)
23. Poulsen, A.; Stegemoller, M. Moving from private to public ownership: Selling out to public firms versus initial public offerings. *Financ. Manag.* **2008**, *37*, 81–101. [\[CrossRef\]](#)
24. Gompers, P. Optimal investment, monitoring, and the staging of venture capital. *J. Financ.* **1995**, *50*, 1461–1489. [\[CrossRef\]](#)
25. Davila, A.; Foster, G.; Gupta, M. Venture capital financing and the growth of startup firms. *J. Bus. Ventur.* **2003**, *18*, 689–708. [\[CrossRef\]](#)
26. Bertoni, B.; Colombo, M.; Grilli, L. Venture capital financing and the growth of high-tech start-ups: Disentangling treatment from selection effects. *Res. Policy* **2011**, *40*, 1028–1043. [\[CrossRef\]](#)
27. Black, B.; Gilson, R. Venture capital and the structure of capital markets: Banks versus stock market. *J. Financ. Econ.* **1998**, *47*, 243–277. [\[CrossRef\]](#)
28. Greve, H. *Organizational Learning from Performance Feedback*; Cambridge University Press: New York, NY, USA, 2003.
29. Miller, D.; Chen, M. Sources and consequences of competitive inertia: A study of the U.S. airline industry. *Adm. Sci. Q.* **1994**, *39*, 1–23. [\[CrossRef\]](#)
30. Cohen, W.; Levinthal, D. Innovation and learning: The two faces of R&D. *Econ. J.* **1989**, *99*, 569–596.
31. Cohen, W.; Levinthal, D. Absorptive Capacity: A new perspective on learning and innovation. *Adm. Sci. Q.* **1990**, *35*, 128–152. [\[CrossRef\]](#)
32. Grant, R. Prospering in dynamically-competitive environments: Organizational capability as knowledge integration. *Organ. Sci.* **1996**, *7*, 375–387. [\[CrossRef\]](#)
33. Giot, P.; Schwenbacher, A. IPOs, trade sales and liquidations: Modelling venture capital exits using survival analysis. *J. Bus. Financ.* **2007**, *31*, 679–702. [\[CrossRef\]](#)
34. Cefis, E.; Marsili, O. Crossing the innovation threshold through mergers and acquisitions. *Res. Policy* **2015**, *44*, 698–710. [\[CrossRef\]](#)
35. Villalonga, B. Intangible resources, Tobin’s Q and the sustainability of performance differences. *J. Econ. Behav. Organ.* **2004**, *54*, 205–230. [\[CrossRef\]](#)
36. Cumming, D.; Flemming, G.; Schwenbacher, A. Legality and venture capital exits. *J. Corp. Financ.* **2006**, *12*, 214–245. [\[CrossRef\]](#)

37. Long, S.; Freese, J. *Regression Models for Categorical Dependent Variables Using Stata*, 3rd ed.; Stata Press: College Station, TX, USA, 2014.
38. Benson, D.; Ziedonis, R. Corporate venture capital as a window on new technologies: Implications for the performance of corporate investors when acquiring startups. *Organ. Sci.* **2009**, *20*, 329–351. [[CrossRef](#)]
39. Antarciuc, E.; Zhu, Q.; Almarri, J.; Zhao, S.; Feng, Y.; Agyemang, M. Sustainable venture capital investments: An enabler investigation. *Sustainability* **2018**, *10*, 1204. [[CrossRef](#)]
40. Graebner, M.; Eisenhardt, K.; Roundry, P. Success and failure in technology acquisitions: Lessons for buyers and sellers. *Acad. Manag. Perspect.* **2010**, *24*, 73–92.



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