Does Corporate Entrepreneurship affect Dividend Policy? Evidence from Corporate Venture Capital Investments

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Abstract

Corporate Venture Capital (CVC) investments create strategic benefits for CVC investing firms. Consistent with the signaling theory that firms usually pay cash dividends to signal positive prospects, we find that CVC investors pay higher dividends compared to non–CVC firms. Specifically, CVC investment leads to a 9% increase in dividend payout. The results are driven by strategically oriented CVC firms rather than financially oriented CVC firms. We also find that our results are more pronounced for late stage CVC investments, firms with stable cash flows and firms faced with low information environment. We also find a positive relationship between CVC investment and share repurchases. Two possible channels that influence the relationship between CVC investment and dividend payout are future earnings and excess cash.

Keywords : Corporate Venture Capital, Dividend Payout, Signaling Theory

JEL Classification Codes: G32–Financing Policy, M13–New Firms, Startups

1 Introduction

Over the past decade, Corporate Venture Capital (CVC) has experienced a remarkable surge, with established corporations increasing their investments in entrepreneurial firms to drive innovation and shape the future of their industries. CVC represents minority equity investments in entrepreneurial firms by established corporations. Today, more than 75% of Fortune 100 companies have established their own CVC units, integrating them into their innovation activities. Notable examples of companies with CVC programs include 3M, Alphabet Inc, Adobe Systems, Chevron Corporation, BMW, Pfizer, Alibaba, Intel, Cisco, Dell, General Electric, Johnson & Johnson, Novartis, Walt Disney, BP, Shell, Microsoft, and many others. Through CVC investments, corporations are able to explore external innovative ideas and identify potential acquisition opportunities.

Despite the strategic importance of CVC investments, little is known about how CVC investments affect the financial policies of CVC investing firms. Recent literature has started to explore the link between CVC and the financial policies of CVC firms. Tawiah and Keefe (2022) find that CVC investments influence the financial flexibility of investing firms, leading to higher cash holdings and reduced debt levels. However, whether and how CVC investment affects firms' dividend payout decisions remains unanswered. An answer to this question is important because of the well-documented implications of dividend policy for firm value. We thus, address this research gap by investigating the effect of CVC investments on firms' dividend policies.

We empirically test two competing CVC views of dividends. The first view, called "the value creation" channel posits that CVC may positively affect firm value and earnings, which in turn affects dividend policy. When companies engage in CVC investments, they gain exposure to innovative ideas, technologies, and business models that can enhance their competitiveness and drive future growth. To signal the value creation resulting from their CVC investments, companies may choose to pay out dividends to shareholders today. Prior studies show that CVC investment leads to an increase in innovation for the parent company (Dushnitsky and Lenox, 2005b, Ma, 2020). Other studies also show that innovative companies have increased market share, improved performance, high future earnings and enhanced market value (Herrera (2015), Plečnik, Yang, and Zhang (2021), Roper (1997) and Bronwyn H. Hall and Trajtenberg (2005)). Dushnitsky and Lenox (2006) also show that CVC investors experience higher firm value. Accordingly, managers of CVC firms may exhibit greater confidence in future corporate performance and be more inclined to signal future profitability through cash dividends. The second view, termed the "investment opportunity" channel, suggests that CVC investments create high-growth opportunities that encourage firms to retain cash or invest instead of distributing it as dividends. Apart from driving corporate innovation, one of the primary motivations for firms to engage in CVC is to identify potential acquisition targets. Prior studies have shown that a significant portion of CVC investing firms acquire their portfolio companies (Ma, 2020, Benson and Ziedonis, 2010) and these acquisition represents a notable share of their overall acquisitions. This acquisition and innovation strategy opens up growth opportunities for CVC firms. Companies with substantial growth prospects are likely to pay lower dividends since they have lower free cash flows and less flexibility in their dividend policy. Furthermore, these firms may opt for lower dividend payouts to reduce their reliance on costly external financing.

Given these competing perspectives, the effect of CVC investments on dividend payouts is not immediately evident. Our study addresses this question by examining the relationship between CVC firms and their dividend payouts. We use a sample of CVC units affiliated with US publicly listed firms from the Refinitiv Eikon database and we manually match each CVC unit with a unique corporate parent during the period 1980 - 2018. Our measure of CVC investment is based on an indicator variable that is set to one if a firm makes CVC investment and zero otherwise. We control for a battery of variables that explain dividend payout. Consistent with the "value creation" hypothesis, our results show that CVC investments are associated with higher dividend payouts. We then test whether the relationship between CVC investment and dividend payout is more pronounced for CVC firms that are more strategy oriented or those that are more financially oriented. We find the effect to be more pronounced for strategy-oriented CVC firms. We also find that our findings are more pronounced among later stage CVC investments. CVC investors might have more confidence and visibility into the strategic benefits and fits of their investments at the late stage compared to the early stages as early stage investments may have inherent uncertainties surrounding the prospects of companies. We also find that our results are more pronounced for firms with stable cash flows and firms faced with low information environment. Further, we explore plausible channels by which CVC investment leads to higher dividend payout. Consistent with the value creation hypothesis, we directly test for the impact of CVC investment on excess cash holdings and future profitability and find evidence of a positive and statistically significant relationship in both cases. We conduct several tests to confirm the robustness of our results. Specifically, we include firm fixed effects to account for time-invariant factors that are likely to affect firms' dividend payouts. We also use alternative measures of both CVC investment and dividend payout. Further, we examine the effect of CVC investment on share repurchases, an alternative payout method to dividends and find that firms with CVC investments are associated with higher share repurchases. Finally, we use an instrumental variable-two Stage Least Squares (IV-2SLS) model and an entropy balancing regression technique to address potential issues of endogeneity. In all cases, we find results consistent with those of our baseline regressions. .

Our paper contributes to the literature in two main ways. First, we extend the literature on CVC investment from the perspective of the parent company. Specifically, we provide strong evidence of a positive effect of CVC investment on dividend payouts. From the CVC investing firm's perspective, prior studies examine the drivers of CVC adoption and termination (Ma, 2020, Joseph J. Cabral and Kumar, 2020, Gaba and Bhattacharya, 2012, Dushnitsky and Lenox, 2005a); CVC syndicate networks (Eric Braune and Teulon, 2019); financial policies (Tawiah and Keefe, 2022); strategic and financial outcomes of CVC investments to parent companies (Ma, 2020, Mohamed and Schwienbacher, 2016, Benson and Ziedonis, 2010, Dushnitsky and Lenox, 2005b). Our results, thus, show that CVC investments also affect an important corporate financial policy of firms, i.e dividend payouts. Second, we contribute to the broad literature on the determinants of firm dividend policy. Previous studies document a wide-range of factors affecting firms dividend payout policy including; agency problems, governance and monitoring (Brockman, Tresl, and Unlu, 2014, De, Amedeo, and Ozkan, 2015, Short, Zhang, and Keasey, 2002, John, Knyazeva, and Knyazeva, 2015, La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2000); corporate social responsibility (Adrian, Hu, and Schwiebert, 2018), industry peers (Adhikari and Agrawal, 2018, Grennan, 2019); signaling effect (Miller and Modigliani, 1961, Deeptee and Roshan, 2009); carbon risk (Balachandran and Nguyen, 2018), family and non-family female directors (Herdhayinta, Lau, and Shen, 2021) and executive overconfidence/risk preference (Caliskan and Doukas, 2015, Deshmukh, Goel, and Howe, 2013). To the best of our knowledge, our study is the first to demonstrate that firms' investment in CVCs also has significant effect on their dividend policy. This study extends prior work by examining the effect of CVC investment on corporate managers' decisions to pay dividends.

The remainder of the paper is as follows. We provide some background to CVC studies in Section 2 and develop our hypotheses in Section 3. In Section 4, we describe the sample, data sources and methodology. Section 5 presents the main results. We carry out robustness checks and further analysis in Section 6. Section 7 concludes.

2 Background to CVC

CVC refers to equity investments by established corporations in entrepreneurial or innovative ventures. These firms usually set up separate entities in place to manage their CVC programs. Typically, a CVC is made up of a triad. The CVC triad consists of a parent firm (CVC investing firm), a CVC unit and an entrepreneurial venture. The CVC unit, which is established by the corporate parent firm, interacts and maintains contact with many private-held ventures that are in search of funding. Acting as an intermediary, CVC units invest, support and monitor new entrepreneurial ventures that are likely to help meet the strategic and financial goals of the corporate parent.

CVCs invest for both strategic and financial reasons. In financially focused CVC programs, the goal of CVC investment is to earn returns on investments. In strategically focused CVC programs, the goal of CVC investment is to derive strategic benefits for the parent company. CVCs contributes to startups that are developing complementary products as such products may increase the demand for the corporate parent's own products (Dushnitsky and Lenox, 2006). Furthermore, CVCs use their investments to learn about potential targets (Sykes, 1990). Consistent with these strategic motives of investing in CVC, prior research reveal the benefits of investing in CVC. Dushnitsky and Lenox (2005b) show a positive relationship between CVC investment and firm patenting rates. Ma (2020) shows that CVCs are used by firms experiencing deteriorating internal innovation to expose themselves to new technologies and regain their innovation edge. Benson and Ziedonis (2010) also reveal that firms use CVC programs as a way to identify acquisition opportunities.

Prior literature have also examined drivers of CVC initiation and termination. These drivers include innovation performance (Dushnitsky and Lenox, 2005a), the intellectual property regime

(Dushnitsky and Lenox, 2005a, Sandip Basu and Koth, 2011); networks (Erik Noyes and Smith-Doerr, 2014), technology-related circumstances of a firm (Ma, 2020) and job security of managers (Joseph J. Cabral and Kumar, 2020). Some emerging studies highlights the role of CVC investment on corporate financial policies such as cash holdings and capital structure (Tawiah and Keefe, 2022).

3 Hypotheses development

CVC investment can affect dividend payouts through two major channels. One is the "value creation" channel and the other is the "investment opportunity" channel.

The value creation channel argues that CVC may affect firm value or earnings, which in turn affects dividend policy. Evidence shows that firms pursue CVC investment for strategic reasons, with the objective of benefiting corporate innovation. For example, in a survey of 52 corporate venture programs, Robin Siegel (1988) reports that corporations rank exposure to new technologies and markets as the most important objective for investing in a corporate venture capital program. Recent studies have also shown that CVC investment leads to an increase in innovation for the parent company (Dushnitsky and Lenox, 2005b, Ma, 2020). Prior researchers show that corporate innovation helps firm increase market share, improve performance, grow significantly faster and help increase market value and future earnings (Herrera, 2015, Plečnik, Yang, and Zhang, 2021, Roper, 1997, Bronwyn H. Hall and Trajtenberg, 2005). Plečnik, Yang, and Zhang (2021) find a positive relationship between innovation output and future earnings. Gu (2005) also finds that patent citation impact, a leading indicator of technology firms' innovation capabilities, is positively associated with future earnings. Given the positive relationship between CVC investments and innovation, one may also expect a positive relationship between CVC investments and future earnings. The literature shows that earnings are a key determinant of dividend policy (Zhou and Ruland, 2006a, Healy and Palepu, 1988). Firms with higher earnings ability are more likely to pay more in dividends. Dushnitsky and Lenox (2006) shows that firms that pursue corporate venture capital experience more value creation, compared to firms who do not. The authors show that the results are more pronounced for strategically focused CVC firms as such firms use CVC to attaining a window on technology. Mohamed and Schwienbacher (2016) find that there is a significant positive relationship between CVC investment announcement and positive abnormal returns. The authors argue that CVC firms use disclosure of some of their investments in innovative startups strategically as a way to convey valuable information to the market.

Given the strategic benefits firms gain from CVC investment, CVC firms may be more motivated to signal good future performance through cash dividends. The signaling theory argues that managers pay cash dividends as a credible signal to the market for the prediction of future prospects and earnings. Many studies provide empirical support for the signalling effect of dividends (Chemmanur, Paeglis, and Simonyan, 2009, Chemmanur and Tian, 2014, Konstantinos Bozos and Ramgandhi, 2011, Deeptee and Roshan, 2009). Such studies show that dividend changes convey information about a firm's future prospects and profitability. Hence, CVC firms could potentially have a higher incentive to communicate positive future performance through cash dividends. Taking these together, we hypothesize that:

Hypothesis 1. *All else being equal, CVC investment leads to higher dividend payout.*

In contrast, the investment opportunity channel argues that CVC investments may create high-growth opportunities for firms, leading them to prioritize cash retention or investments rather than paying out cash dividends. Previous empirical studies have identified various factors that influence firms' dividend payout ratios, including investment opportunities. The decision regarding dividends is closely linked with investment and financing decisions. Previous studies shows that there is a direct link between dividend payout, firm growth and financing needs. Higgins (1972) shows that payout ratio is negatively related to a firm's need for funds to finance growth opportunities. CVC investments create growth opportunities for the investing firms, as they not only foster corporate innovation but also serve as a means to identify potential acquisition targets. Studies have revealed that a considerable proportion of CVC investing firms acquire their portfolio companies, contributing substantially to their overall acquisition activities. Ma (2020) shows that about one-fifth of CVC investing firms acquire their portfolio companies and those acquisitions represent 20% of all acquisitions by those CVC investing firms. Benson and Ziedonis (2010) provide further empirical evidence to support the acquisition of CVC portfolio companies by CVC investing firms. The authors show that one out of every five start-ups purchased by CVC investors from 1987 to 2003 were in the venture portfolio company of its acquirer. CVC investment represents a strategy to increase a firm's innovation and acquisition opportunities. Lerner (2000) found that venture capital appears to be approximately three times more effective in stimulating patenting than traditional corporate R&D, further emphasizing the growth potential associated with CVC investments. This competitive acquisition and innovation strategy creates growth opportunities for CVC firms. Firms with high growth opportunities are likely to pay lower dividends since they have lower free cash flows and less flexibility in their dividend policy. These firms may also pay lower dividends to reduce their reliance on costly external financing. CVC firms might have to cut back on dividend payout so they can reserve more cash to fund innovation and acquisition opportunities when they become due. Amidu and Abor (2006) show a significant negative relationship between growth opportunities and dividend payout. Motivated by this we also test the following competing hypothesis;

Hypothesis 2. *All else being equal, CVC firms pay lower dividends*

4 Data and methodology

4.1 Sample

We collect a sample of CVC units that are affiliated with US public listed firms for the period 1980-2018. We start with a list of CVC firms identified from the Refinitiv Eikon database. In the database, we predefine Corporate Private Equity/Venture as a firm type in Eikon. We obtain 1037 Unique CVCs. This initial sample serves as a starting point for the subsequent data cleaning exercise. As a next step, we drop 31 CVC units described as Undisclosed Investors in the Eikon database leaving us with 1,006. Using various sources of information such as Google, Factiva, Bloomberg, we manually match CVCs to a unique corporate parent. Accordingly, we drop 438 firms that do not have unique corporate parents. These firms include independent and private equity investors, NGOs, and Universities. This results in 568 CVC firms with unique parent companies. Although we limit our search to US investors, we still identify a substantial number of non-US investors from our sample construction among the 568 remaining firms. This is consistent with the findings of Röhm, Merz, and Kuckertz (2019). For example, European-based firms BMW and Dunnhumby, undertake investment vehicles in the USA and are classified as US based CVC Units in the database although their parent companies are based in Germany and the UK respectively. Hence, we remove 35 CVC units with corporate parents from the excluded geographical regions outside the US. This leaves us with 533 distinct CVC firms, out of which 262 are affiliated with unlisted parent firms. Hence, we end up with a final list of of 271 CVC units that are uniquely affiliated with US public listed parent firms. We then merge this data with data from compustat. We winsorize the variables at the 1% and the 99% level to limit the impact of outliers.

4.2 Variable construction

4.2.1 Dividend measure

We construct *Dividend* as cash dividend scaled by sales. Dividend to sales ratio can be more robust than dividend payout ratio for several reasons. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) note that because sales are less dependent on accounting conventions, they are less subject to manipulation or smoothing through accounting practices, compared to earnings.

4.3 Variable of interest

Our primary independent variable of interest in this study is *CVC(0/1)*. *CVC(0/1)* is an indicator variable equal to one if a firm makes a corporate venture capital investment and zero if otherwise.

4.4 Control variables

In the regressions, we control for *Profitability*, *BDR1*, *Cash*, *MarketToBook*, *Tangibility*, *FirmSize*, *Earnings Yield*, *Research and Development* , *Investments*, *Industry Cashflow volatility* and *Firm Age*. *Research and Development* is the ratio of Research and Development scaled by total assets. *Profitability* is measured as operating income before depreciation scaled by total book asset. *MarketToBook* is measured as the ratio of total book assets less the book value of common equity plus the total market value of equity all divided by the total book assets. *Investments* is also measured as the sum of total acquisitions and capital expenditure scaled by total assets. *Earnings Yield* is earnings before interest and tax scaled by the total market value of equity. *Tangibility* is calculated as the ratio of fixed assets to total assets. *FirmSize* is defined as the natural logarithm of sales. *Industry Cashflow volatility* is measured as Standard deviation of industry average cash flows for the previous 10 years, we require at least 3 years of observations. *BDR1* is the ratio of short plus long-term debt to short plus long-term debt plus common shareholder's equity. and dividend. *Firm Age* is the natural logarithm of the number of years a firm has been listed in the merged CRSP/Compustat database. *Cash* is defined as cash and marketable securities scaled by beginning total book assets. We winsorize the variables at the 1% and the 99% level to restrict the impact of outliers. Detailed definitions of all variables as well as their sources are in Table 1.

Insert Table 1 here

4.5 Summary statistics

Table 2 presents summary statistics of the variables. On average, the ratio of firms' dividends to sales is 1%. Averagely, 0.6% of firms in our sample engage in CVC investments. Mean values of remaining variables, i.e controls, are consistent with the literature.

Insert Table 2 here

4.6 Testing

To test H1 and H2, we estimate;

$$Dividend_{i,t} = \alpha + \beta CVC(0/1)_{i,t} + \gamma X_{i,t-1} + \delta_t + \rho_j + \epsilon_{i,t} \quad (1)$$

where $Dividend_{i,t}$ is a cash dividend scaled by sales. $X_{i,t-1}$ is a matrix of lagged control variables listed in Table 1, δ_t represents year dummies and ρ_j is a set of Fama-French 49 industry dummies to control for industry linear trends. *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. We cluster standard errors by firm.

5 Results

5.1 CVC investment and dividend payouts

In Table 3, we report the baseline regression results from estimating Eq.(1). The table shows that the coefficient associated with *CVC(0/1)* in column (1) is 0.012 and is statistically significant at the 1% level. The result is significant not only statistically but also economically. Based on the coefficient, all else being equal, a one standard deviation increase in CVC investment increases dividend payout by 0.0009 (0.012*0.076), which amounts to a 9% increase in dividend payout. Our baseline results are consistent with hypotheses 1. By investing in CVC, companies gain strategic benefits such as exposure to new technologies and markets, increased innovation, and potential acquisition opportunities. These advantages can enhance their future prospects and growth potential. To signal this positive outlook, CVC firms choose to pay higher cash dividends, providing a clear message to investors about their confidence in the future performance of the firm. All in all, our results reinforce the idea that CVC investments can lead to higher dividend payments as a means of signaling optimism and promising future prospects.

Insert Table 3 here

5.2 Strategically versus financially oriented CVC firms

Our baseline results provide evidence supporting a positive relationship between Corporate Venture Capital (CVC) investment and dividend payout. This finding is consistent with the value creation channel of CVC investment, which suggests that CVC investments have the potential to generate value that ultimately influences a firm's dividend policy. To delve deeper into the dynamics of this relationship, it is important to consider the orientation of CVC programs. Previous research by Dushnitsky and Lenox (2006) has demonstrated that firms with a strategic orientation in their CVC programs tend to experience greater value creation compared to those with a purely financial orientation. Firms that actively engage in CVC for strategic purposes establish various mechanisms to facilitate interaction and knowledge transfer with the ventures they invest in. This does not imply that they disregard the financial return on their investment; rather, it highlights that they also derive additional value from their investments beyond purely financial gains. Hence, the relationship between CVC and dividend payout is expected to be pronounced among strategically oriented CVC firms as such firms will be well placed to signal good future prospects.

Following Tawiah and Keefe (2022), Ma (2020) and Dushnitsky and Lenox (2006), we group CVC programs into strategic or financially oriented by collecting information disclosed during the announcement of venturing programs. For each CVC firm, we conduct an extensive search to determine the program objective during the announcement of the CVC fund formation using Nexis, Google, Factiva, Bloomberg etc. Overall, 70% of these firms in our sample state a strategic orientation for starting their program, and 30% state a financial orientation for starting a CVC program.[1] The study espoused CVC objectives for 173 CVC firms and this data matches with Tawiah and Keefe (2022).

In Table 4, our variables of interest are *CVC(0/1)*Strategic* and *CVC(0/1)*Financial*. *CVC(0/1)*Strategic* is an interaction variable between *CVC(0/1)* and *Strategic*. *CVC(0/1)* is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. *Strategic* is an indicator variable equal to one if a firm runs a strategically oriented CVC program and zero if otherwise. *CVC(0/1)*Financial* is an interaction variable between *CVC(0/1)* and *Financial*. *Financial* is an indicator variable equal to one if a firm runs a financially oriented CVC program and zero if otherwise. We find a positive and statistically significant relationship between *CVC(0/1)*Strategic* and *Dividend*. This indicates that strategically oriented CVC firms, that prioritize long-term strategic objectives, show a stronger association between CVC investment and dividend payout. These firms are better equipped to signal positive future prospects to the market, leading to increased dividend payments. However, we find no statistically significant relationship between *CVC(0/1)*Financial* and *Dividend*. Thus, the results show that the relationship between CVC investment and dividend payment is driven by strategically oriented CVC firms.

Insert Table 4 here

[1] A CVC program is coded as strategically oriented when the following or similar statements were made "Agilent Ventures .... will actively partner with Agilent to jointly develop new technologies and products" (Agilent ventures; venture capital arm of Agilent Technologies Inc) "...invests in products or services that have the potential to provide benefits to UPS, or strategically are aligned to UPS business objectives." (The UPS Strategic Enterprise Fund; venture capital arm of United Parcel Service) On the other hand, a CVC program was coded as financially oriented when the following or similar statements were made "the first priority of Oracle's venture effort is financial returns"(Oracle ventures; venture capital arm of Oracle Corp), "companies that provide the potential for outstanding financial returns"(Chevron Technology Ventures; venture capital arm of Chevron Corp)

5.3 Cross-sectional analysis

5.3.1 Later Stage Investments

One could argue that it takes time for CVCs to establish, to source startup deals, to make investments, and if successful to signal future prospects through cash dividends. Consequently, it becomes important to distinguish between different investment stages due to the potential variations in the signaling impact of CVC investments on dividend. Seed and early-stage CVC investments might be used to fund initial product research and developments of the portfolio companies. Given the inherent uncertainties surrounding the prospects of companies in these early stages, where some ventures may not succeed, it becomes less likely that CVC investors will signal future prospects through cash dividends. On the other hand, later stage CVC investments are made in companies that have already progressed beyond the early stages of development and have achieved significant milestones, such as product development, market validation, and revenue generation. CVC investors might have more confidence and visibility into the strategic benefits and fits of their investments at the late stage compared to the early stages. This higher confidence may lead CVC investors in late stage investments to be more willing to signal positive future performance through the distribution of cash dividends.

In Table 5, our variable of interest is *CVC(0/1)*LateStage(0/1)*. *CVC(0/1)*LateStage(0/1)* is an interaction variable between *CVC(0/1)* and *LateStage(0/1)*. *CVC(0/1)* is an indicator variable equal to one if a firm makes a cvc investment and zero if otherwise. Our stage of investment in our data comprises seed stage, early stage, expansion stage, late stage and acquisition stage. *LateStage(0/1)* is a dummy variable equal to one if a firm invests at the late or acquisition stage and 0 otherwise. Our findings show that there is a statistically significant positive relationship between *CVC(0/1)*LateStage(0/1)* and dividend payout. This shows that the impact of CVC investments on dividend payout is more pronounced among later stage CVC investments.

5.3.2 Cash flow volatility

Firms with high cash flow volatility are expected to be more reliant on internal funds and are more likely to pay low dividends. Prior studies show that there is a significant negative relationship between cash flow uncertainty and dividend payout (Bradley, Capozza, and Seguin, 1998, Chay and Suh, 2009). Although CVC investments enable companies to signal value by paying more dividends, we hypothesize that CVC investors will pay lower dividends when faced with higher cash flow volatility. We therefore test whether the relationship between CVC investment and dividends varies amongst firms based on cash flow volatility.

To construct the cash flow volatility measure, we follow Keefe and Tate (2013) and use the method of Emmanuel De Veirman and Levin (2018) and Keefe and Yaghoubi (2016)

$$\omega_{i,t} = \alpha_i + Year\beta_1 + \epsilon_{i,t} \tag{2}$$

where $\omega_{i,t}$ represents the first difference of operating income (oi) scaled by net assets from $t-1$ to t for firm i and $Year$ is a vector of year dummies. The residual $\epsilon_{i,t}$ represents the difference between the observed and the estimated value of operating cash flow of firm i when controlling for time. Our measure of cashflow volatilty is;

$$\hat{\sigma}_{i,t} = \sqrt{\pi/2} * |\hat{\epsilon}_{i,t}| \tag{3}$$

where $\hat{\epsilon}_{i,t}$ is the estimated residual from Equation (2). We estimate Equation (3) and define *CFV1* as cash flow volatility measured using the method of Emmanuel De Veirman and Levin (2018); using operating income (oi) for one year which is referred to as *CFV1* in this study. We also define *CFV1R5* as the rolling five year average of $\hat{\sigma}_{i,t}$.

The analysis in Table (6) is similar to our baseline regression. Our variables of interest are *CVC(0/1)*CFV1* and *CVC(0/1)*CFV1R5*. *CVC(0/1)*CFV1* is an interaction variable between *CVC(0/1)* and *CFV1*. *CVC(0/1)* is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. *CFV1* is cash flow volatility measured using the method of Emmanuel De Veirman and Levin (2018); using operating income (oi) for one year. *CVC(0/1)*CFV1R5* is an interaction variable between *CVC(0/1)* and *CFV1R5*. *CFV1R5* is the rolling five year average of $\hat{\sigma}_{i,t}$. We find a negative and statistically significant relationship between *CVC(0/1)*CFV1* and *Dividend* as well as *CVC(0/1)*CFV1R5* and *Dividend*. This implies that the relationship between CVC investment and dividend payout is pronounced among firms with stable cash-flows.

Insert Table 6 here

5.3.3 Corporate information environment

We next examine whether the dividend payout of CVC investing firms is influenced by their firm information environment. In low-information environments, where firm-specific information may not be fully incorporated into stock prices, it could be challenging for investors to accurately assess a firm's prospects. In such cases, we hypothesize that CVC firms may signal confidence in the firm's future prospects by paying cash dividends, which can positively influence investor sentiment and investment.

To determine a firm's information environment, we compute its level of stock return synchronicity. Stock synchronicity measures the extent to which a firm's stock price moves in conjunction with overall market movements, rather than being driven by firm-specific information (Morck, Yeung, and Yu, 2000). We rely on the R-Squared measure of Roll (1988) to determine the percentage of stock returns that are explained by market factors. Consistent with the literature (Gul, Kim, and Qiu, 2010, Le, Nguyen, and Sila, 2021), firms with low information environments are characterised by higher R-Squared as stock returns are driven by less firm-specific information. Following Le, Nguyen, and Sila (2021), we estimate the following Fama and French three-factor model for each year:

$$r^d_{i,t} - r^f_{i,t} = \alpha_{i,t} + \beta_{mkt,i,t}(r^d_{mkt,t} - r^d_{f,t}) + \beta_{smb,i,t} r^d_{smb,t} + \beta_{hml,i,t} r^d_{hml,t} + +\epsilon^d_{i,t}, \tag{4}$$

Where $r^d_{i,t}$ is the daily return for firm i on day d of year t, and $r^d_{f,t}$ is the daily risk-free rate. The variables $r^d_{mkt,t}$, $r^d_{smb,t}$, $r^d_{hml,t}$ are daily returns on the market, the small-minus-big factor, and the high-minus-low factors respectively.

We then regress dividends on the interaction term between our CVC measure and Synch. The results are presented in Table (7). As can be seen from the table, the interaction term *CVC(0/1)*SYNCH* is positive and statistically significant, albeit at the 10% level. We interpret this to mean that when faced with low information environments, CVC firms may be able to signal their future prospects through an increase in dividends payout.

Insert Table 7 here

5.4 Mechanisms

5.4.1 CVC investments and excess cash holdings

Tawiah and Keefe (2022) find that firms that invest in CVC maintain financial flexibility by holding more cash and less debt to fund CVC-driven innovation and acquisition opportunities. This raises the question of how such firms can simultaneously hold cash and increase dividend payments. One possible explanation is that CVC firms maintain excess cash reserves to pursue these two competing strategies. Opler, Pinkowitz, Stulz, and Williamson (1999) show that firms that hold excess cash are able to surprisingly increase corporate investments and payouts to shareholders. Hence, in this section, we explore whether CVC investment results in the accumulation of excess cash.

To determine excess cash, we rely on prior studies that explore the determinants of cash holdings (Opler, Pinkowitz, Stulz, and Williamson (1999), Simutin (2010)), by first estimating the following model

$$\begin{aligned} Cash_{i,t} = \alpha &+ \beta_1 \mathit{FirmSize}_{i,t} + \beta_2 \mathit{Profitability}_{i,t} + \beta_3 \mathit{MarketToBook}_{i,t} \\ &+ \beta_4 \mathit{Cashflow}_{i,t} + \beta_5 \mathit{Research\ and\ Development}_{\ i,t} + \beta_6 \mathit{BDR1}_{i,t} + \beta_7 \mathit{Investments}_{i,t} \\ &+ \beta_8 \mathit{Industry\ Cashflow\ volatility}_{i,t} + \beta_9 \mathit{Div(0/1)}_{i,t} + \rho_j + \delta_t + \epsilon_{i,t} \end{aligned} \tag{5}$$

where *Cash* is defined as cash and marketable securities scaled by beginning total book assets and the independent variables are defined in Table 1. δ_t represents year dummies and ρ_j is a set of Fama-French 49 industry dummies. The predictions from the estimated models can be interpreted as generating an optimal level of cash holdings which can be used to define excess cash firms.

We then classify excess cash firms as those that maintain a cash level greater than 1.5 standard deviations above that predicted by Equation (5), which we compute from below:

$$EC_{i,t} = ACash_{i,t} - (BCash_{i,t} + 1.5\sigma_i) \tag{6}$$

where $EC_{i,t}$ is excess cash for firm i in time t, $ACash_{i,t}$ is actual cash, $BCash_{i,t}$ is the baseline cash holdings estimated from equation (5) and σ is the standard deviation of the time-series of the firm's cash holdings.

Finally, to examine whether CVC investment leads to excess cash holdings, we estimate the following equation:

$$EC_{i,t} = \alpha + \beta CVC(0/1)_{i,t} + \gamma X_{i,t-1} + \delta_t + \rho_j + \epsilon_{i,t} \quad (7)$$

where $EC_{i,t}$ is the measure of excess cash. $X_{i,t-1}$ is a matrix of lagged control variables listed in Table 1, δ_t represents year dummies. ρ_j is a set of Fama-French 49 industry dummies to control for industry linear trends. *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. We cluster standard errors by firm.

Table 8 shows that there is a statistically significant positive relationship between CVC investment and excess cash. CVC firms invest in entrepreneurial firms to explore innovation and acquisition opportunities. Thus, they will need to maintain financial flexibility in order to fund future innovation and acquisition opportunities when they become due. Excess cash can be used to fund these CVC-driven innovation and acquisition opportunities. Simutin (2010) finds that excess cash does proxy for growth opportunities and high excess cash firms invest more in the future which is consistent with CVC firms holding excess cash to fund future innovation and investment opportunities. Also, if CVC firms hold excess cash then this could probably explain why they are able to maintain financial flexibility and simultaneously signal good future performance through cash dividends. In support of this argument, Opler, Pinkowitz, Stulz, and Williamson (1999) show that firms that hold excess cash are able to surprisingly increase corporate investments and payouts simultaneously. In summary, the excess cash reserves held by CVC firms play a dual role: providing the financial capacity to fund future CVC-driven opportunities and enabling CVC firms to simultaneously signal their positive outlook through cash dividend payments.

Insert Table 8 here

5.5 CVC investments and future earnings

Dividend payout is strongly linked to the current or future earnings of companies. Arnott and Asness (2003) find that future earnings growth is associated with high dividend payout. This shows that a high dividend payout is a sign of strong future earnings. Conducting a company-by-company analysis of the relationship between payout and future earnings growth, Zhou and Ruland (2006b) find that high dividend-paying firms experience strong future earnings growth. Given the strategic benefits of investing in CVC, future earnings is likely to increase and managers of CVC firms might signal future prospects through cash dividends. To explore future earnings as a channel by which CVC investment leads to higher dividend payouts, we regress current earnings on the three, four, and five year lagged values of *CVC(0/1)* by estimating the following equation.

$$Earnings_{i,t} = \alpha + \beta CVC(0/1)_{i,t-k} + \gamma X_{i,t-1} + \delta_t + \rho_j + \epsilon_{i,t}, \tag{8}$$

where $Earnings_{i,t}$ is the dependent variable and is measured as earnings before interest and tax scaled by total book asset. $X_{i,t-1}$ is a matrix of lagged control variables listed in Table 1, δ_t represents year dummies. and ρ_j is a set of industry dummies to control for industry linear trends. $CVC(0/1)_{i,t-k}$ is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise, with k being the number of lags.

Table 9 presents the result of our analysis. We find a positive and statistically significant relationship between CVC investment in prior years and *Earnings*. This shows that CVC investment leads to future earnings and it is a channel through which CVC affects dividend payout.

Insert Table 9 here

6 Robustness checks

6.1 Firm fixed effects

In our main regression, the study includes year fixed effects and industry fixed effects to control for time and industry trends. However, an empirical challenge associated with estimating a relation between CVC and firm policies is possible omitted variable bias. Firm fixed effects control for any time-invariant firm-specific factors related to both CVC investment and dividend payout. This method alleviates concerns relative to time-invariant omitted variables. The results are robust to the firm fixed effects. In Table (10), the coefficient associated with *CVC(0/1)* is 0.004 when controlling for year and firm fixed effects and is statistically significant at the 5% level of significance.

Insert Table 10 here

6.2 Alternative measure of CVC and dividend

We conduct a robustness check on the measure of the independent and dependent variables. Following Dushnitsky and Lenox (2006), we redefine CVC investment as the the log[2] of total corporate venture capital invested ($M) by a firm in a year. We also redefine dividend as (1) cash dividend scaled by asset total and (2) cash dividend scaled by earnings. Column (1) of Table (11) reports the effect of *Log CVC Investment* on our baseline measure of *Dividend* while column (2) and (3) re-estimates our baseline regression with alternate measures of *Dividend*. Our results are robust to the alternative measure of CVC and dividend.

Insert Table 11 here

6.3 Consideration of share repurchases

Prior research show that repurchase and dividend can be viewed as substitutes (Grullon and Michaely, 2002, Jagannathan, Stephens, and Weisbach, 2000). Many of the theoretical arguments that address dividend policy can be attributed to share repurchase as well. These include the early signaling model of Bhattacharya (1979). These models broadly state that dividends and share repurchases are credible signal of the firm's future prospects. Thus the signaling hypothesis, will imply that share repurchase is a credible signal of the future performance of a firm. In support of the signaling hypothesis and our baseline results, we test whether there is any association between CVC investment and share repurchases.

Therefore, following the methods of (Ye, Deng, Liu, Szewczyk, and Chen, 2019, Evgeniou and Vermaelen, 2017, Floyd, Li, and Skinner, 2015) this paper measures *Share Repurchases* as

[2]The CVC investment variable have been log-transformed because they were highly skewed and kurtotic. This variable has the desirable trait of being continuous.

a dummy variable that equals 1 if a firm repurchases shares in year t and 0 otherwise. We substitute *Dividend* for *Share Repurchases*, and we report the results In Table 12. The results show that there is a significant positive relationship between CVC investment and share repurchases.

Insert Table 12 here

6.4 IV-2SLS approach

We further address endogeneity concerns by using the instrumental variable - two-stage least squares (IV-2SLS) approach. It is possible that time-varying omitted variables explain both CVC and dividend. To address this, we use an instrumental variable that is correlated with the endogenous explanatory variable (CVC investment) but is unrelated to the error term in the baseline equation.

Following Tawiah and Keefe (2022), we use *CVC State Percentage* as our instrumental variable. The importance of location in the venture capital industry has been established in the literature (Butler and Goktan (2013). "Corporations are more likely to invest in CVC when they operate in a state with high VC activities. Innovative start-up firms choose to locate and operate in high VC concentration states. Established corporations located in such regions are likely to invest in a CVC program with the motive of tapping into the entrepreneurial ideas of the start-up firms" (Tawiah and Keefe (2022), p.7)

CVC State Percentage is the percentage of total annual CVC investment per state which is time varying. The number of CVC investment by state per year is calculated and is then divided by the total number of CVC investment. *CVC State Percentage* is used as an instrument because it is less probable to be correlated with dividend payout of CVC investing firms except for its effect in facilitating CVC investment. To validate this assumption, *CVC State Percentage* is included as a further control in the baseline regression and the coefficient of the non-instrumented *CVC(0/1)* is still significant. This confirms that the higher dividend payout is caused by CVC investment rather than the instrumental variable (*CVC State Percentage*).

The first stage regression results are reported in Table 13. The coefficient on *CVC State Percentage* is positive and statistically significant at 1% level in explaining CVC. This shows that our instrumental variable is highly correlated with our endogenous variable, *CVC(0/1)*.

The second stage results are reported in Table 14. These show that the coefficient associated with estimated *CVC(0/1)* is positive and statistically significant at the 1% level in explaining *Dividend*. Overall, the results of the IV-2SLS regressions provide empirical support for the prediction that CVC investment is positively related to dividend payout.

Insert Table 13 here

Insert Table 14 here

6.5 Matched sample and entropy balancing

CVC firms might differ from non-CVC firms. Thus, one could argue that selection bias might exist in the sample and that could be driving the results. To mitigate this concern, the study considers a matched sample of non-treated firms based on the likelihood of being treated. In the first stage of the propensity score matching a logit model using covariates of all the control variables is employed. In the second stage, each treated firm is matched with the closest propensity scores based on the probabilities calculated in the first stage of the regression (logit model). Lastly, the entropy balancing model of Hainmueller and Xu (2013) is employed on the matched sample which helps to ensure comparability of the treatment and the control group. This technique assigns a weight to each observation of the control group directly so that the mean moments of the control variables of the reweighted control group are equal to the mean moments of the treated group. As reported in Table 15, the results show that, even after controlling for firm characteristics, CVC firms still pay higher dividends compared to non-CVC firms. This alleviates concern that differences in firm characteristics influence the results.

Insert Table 15 here

7 Conclusion

We examine how CVC investments influence dividend policy. Using a sample of US firms, we find that CVC investments are associated with increased dividend payouts. This is consistent with the view that by enhancing the firms' future prospects, CVC investments allow managers to increase dividend payments in order to signal future performance. Our results further show that the positive effect of CVC investment on dividend payout is more pronounced in firms that pursue CVC investment for strategic reasons rather than for purely financial motives. Overall, our findings contribute to the existing literature that explores the determinants of dividend payout. We also extend the literature on CVC investment by showing its impact on corporate financial policies. CVC firms can draw upon these findings in their decision-making process as they consider financial policy concerning dividend payout.

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Table 1: Variable definitions

This table provides the definition of the key variables used. Accounting data are from Compustat and CVC Investment data is from Refinitiv database

Variable	Definition
Dividend	Cash Dividend scaled by sales
CVC(0/1)	*CVC(0/1)* is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise.
BDR1	The ratio of short plus long-term debt to short plus long-term debt plus common shareholder's equity
Cash	Cash and marketable securities scaled by beginning total book assets
FirmSize	Natural logarithm of total sales
Research and Development	Research and Development Expenditure scaled by beginning total book assets
Profitability	Operating income before depreciation scaled by total book asset
MarketToBook	Ratio of total book assets less the book value of common equity plus the total market value of equity all divided by the total book assets
Earnings Yield	Ratio of earnings before interest and taxes scaled by market value of equity
Tangibility	The assets tangibility of a firm is the ratio of net property, plant and equipment scaled by beginning total book assets
Investments	Sum of total acquisitions and capital expenditures scaled by beginning total book assets
Capital Expenditure	Capital expenditure scaled by beginning total book assets
Industry Cashflow volatility	Standard deviation of industry average cash flows for the previous 10 years, we require at least 3 years of observations
CVC State Percentage	The number of CVC investment by state per year divided by the total number of CVC investment
Log CVC Investment	The log of total corporate venture capital invested ($M) by a firm in a year.
Earnings	Ratio of earnings before interest and taxes scaled by beginning total book assets
Firm Age	Natural logarithm of the number of years a firm has been listed in the merged CRSP/Compustat database

Table 2: Summary Statistics

This table presents summary statistics of the main variables used in this study from 1980 to 2018. All the variables are winsorized at 1% level in both tails of the distribution before the summary statistics are calculated. The table reports the number of observations, mean, 25th percentile, median, 75th percentile and standard deviation. Variable generations are provided in the in Table 1

Variable	Observations	Mean	p25	p50	p75	DD
Dividend	180,284	0.010	0.000	0.000	0.004	0.075
CVC(0/1)	180,284	0.006	0.000	0.000	0.000	0.076
Cash	180,284	0.316	0.026	0.097	0.299	0.842
Log CVC Investment	180,284	0.037	0.000	0.000	0.000	0.501
FirmSize	180,284	4.687	3.039	4.614	6.304	2.419
Profitability	180,284	-0.127	-0.060	0.054	0.114	1.054
MarketToBook	180,284	3.046	1.062	1.457	2.355	12.979
Tangibility	180,284	0.286	0.091	0.216	0.419	0.242
Research and Development	180,284	0.120	0.000	0.000	0.061	0.391
Earnings	180,284	-0.257	-0.105	0.045	0.111	1.594
Industry Cashflow volatility	180,284	1.156	0.151	0.371	1.814	1.500
Investments	180,284	0.086	0.022	0.053	0.110	0.101
Earnings Yield	180,284	-0.074	-0.080	0.048	0.122	0.665
Firm Age	180,284	1.849	1.098	1.945	2.639	0.976

Table 3: CVC Investment and Dividend Payout

This table reports estimation results of Equation (1) which estimates the baseline regression of the effect of CVC Investment on dividend payout. *Dividend* is the dependent variable. *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

	(1)
VARIABLES	*Dividend*
CVC(0/1)	0.012***
	(0.004)
FirmSize	0.002***
	(0.000)
Profitability	0.002***
	(0.000)
BDR1	-0.003***
	(0.000)
Cash	-0.001***
	(0.000)
MarketToBook	0.000***
	(0.000)
Research and Development	0.000
	(0.000)
Investments	-0.015**
	(0.001)
Tangibility	0.007***
	(0.002)
Industry Cashflow volatility	-0.000
	(0.000)
Earnings Yield	0.002***
	(0.000)
Firm Age	0.000*
	(0.000)
Constant	0.012**
	(0.005)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	154,248
R-squared	0.091

Table 4: Strategic and Financially Oriented CVC Firms

This table breaks down CVC Investment by the espoused goal of the CVC program. The study re-estimates the baseline regression in Eq(4) and Eq(5), with the addition *CVC(0/1)*Strategic* and *CVC(0/1)*Financial* as our independent variables. *CVC(0/1)*Strategic* is an interaction variable between *CVC(0/1)* and *Strategic*. *CVC(0/1)* is an indicator variable equal to one if a firm makes a cvc investment and zero if otherwise. *Strategic* is an indicator variable equal to one if a firm runs a strategically oriented CVC program and zero if otherwise. *Financial* is an indicator variable equal to one if a firm runs a financially oriented CVC program and zero if otherwise. The dependent variable is *Dividend*, which is cash dividend scaled by sales. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

VARIABLES	*Dividend*
*CVC(0/1)*Strategic*	0.012**
	(0.005)
*CVC(0/1)*Financial*	0.014
	(0.012)
FirmSize	0.002***
	(0.000)
Profitability	0.001***
	(0.000)
BDR1	-0.002***
	(0.000)
Cash	-0.001***
	(0.000)
MarketToBook	0.000***
	(0.000)
Research and Development	0.002***
	(0.001)
Investments	-0.016***
	(0.002)
Tangibility	0.008***
	(0.002)
Industry Cashflow volatility	-0.000
	(0.000)
Earnings Yield	0.002***
	(0.000)
Firm Age	0.000
	(0.000)
Constant	0.012**
	(0.005)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	154,248
R-squared	0.022

Table 5: Later Stage CVC Investments and Dividend Payout

This table breaks down CVC Investment by the stage of investment with focus on later stage investments. *CVC(0/1)*LateStage(0/1)* is the variable of interest which is an interaction variable between *CVC(0/1)* and *LateStage(0/1)*. *CVC(0/1)* is an indicator variable equal to one if a firm makes a cvc investment and zero if otherwise. *LateStage(0/1)* is a dummy variable equal to one if a firm invests at the late or acquisition stage and 0 otherwise. The dependent variable is *Dividend*, which is cash dividend scaled by sales. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

	(1)
VARIABLES	*Dividend*
CVC(0/1)	0.006**
	(0.003)
LateStage(0/1)	-0.021***
	(0.003)
*CVC(0/1)*LateStage(0/1)*	0.036***
	(0.007)
FirmSize	0.002***
	(0.000)
Profitability	0.001***
	(0.000)
BDR1	-0.002***
	(0.000)
Cash	-0.001***
	(0.000)
MarketToBook	0.000***
	(0.000)
Research and Development	0.002***
	(0.000)
Investments	-0.016***
	(0.002)
Tangibility	0.008***
	(0.002)
Industry Cashflow volatility	-0.000
	(0.000)
Earnings Yield	0.002***
	(0.000)
Firm Age	0.000*
	(0.000)
Constant	0.012**
	(0.005)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	154,248
R-squared	0.080

Table 6: CVC Investment, cashflow volatility and dividend payout

This table reports the results for the association between CVC investment, cashflow volatility and dividend policy. *CVC(0/1)*CFV1* and *CVC(0/1)*CFV1R5* are the independent variables. *CVC(0/1)*CFV1* is an interaction variable between *CVC(0/1)* and *CFV1*. *CVC(0/1)* is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. *CFV1* is cash flow volatility measured using operating income (*oi*) for one year. *CVC(0/1)*CFV1R5* is an interaction variable between *CVC(0/1)* and *CFV1R5*. *CFV1R5* is the rolling five year average of $\hat{\sigma}_{i,t}$. The dependent variable is *Dividend*, which is cash dividend scaled by sales. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

VARIABLES	*Dividend*	*Dividend*
CVC(0/1)	0.013***	0.013***
	(0.004)	(0.004)
CFV1	0.000	
	(0.000)	
CFV1R5		0.000
		(0.001)
*CVC(0/1)*CFV1*	-1.123***	
	(0.405)	
*CVC(0/1)*CFV1R5*		-0.207***
		(0.063)
FirmSize	0.002***	0.002***
	(0.000)	(0.000)
Profitability	0.001***	0.002***
	(0.000)	(0.000)
BDR1	-0.002***	-0.002***
	(0.000)	(0.000)
Cash	-0.001***	-0.001***
	(0.000)	(0.000)
MarketToBook	0.000***	0.000***
	(0.000)	(0.000)
Research and Development	0.002**	0.002**
	(0.001)	(0.001)
Investments	-0.016***	-0.016***
	(0.002)	(0.002)
Tangibility	0.008***	0.009***
	(0.002)	(0.002)
Industry Cashflow volatility	-0.000	-0.000
	(0.000)	(0.000)
Earnings Yield	0.002***	0.001***
	(0.000)	(0.000)
Firm Age	0.000*	0.001
	(0.000)	(0.000)
Constant	0.011**	0.013**
	(0.004)	(0.005)
Year Fixed Effects	Yes	Yes
Industry Fixed Effects	Yes	Yes
Observations	153,891	114,747
R-squared	0.080	0.085

Table 7: CVC investments, information environment and dividend payout

This table reports the results for the association between CVC investment, information environment and dividend policy. *CVC(0/1)*SYNCH* is the independent variables. *CVC(0/1)*SYNCH* is an interaction variable between *CVC(0/1)* and *SYNCH*. *CVC(0/1)* is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. *SYNCH* is a proxy for low information environment and measured as stock price synchronicity. The dependent variable is *Dividend*, which is cash dividend scaled by sales. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

VARIABLES	*Dividend*
CVC(0/1)	0.007*
	(0.005)
SYNCH	-0.005**
	(0.002)
*CVC(0/1)*SYNCH*	0.029*
	(0.015)
FirmSize	0.001***
	(0.000)
Profitability	0.030***
	(0.003)
BDR1	-0.002***
	(0.000)
Cash	-0.004
	(0.001)
MarketToBook	0.001***
	(0.000)
Research and Development	0.004**
	(0.002)
Investments	-0.022***
	(0.002)
Tangibility	0.011***
	(0.002)
Industry Cashflow volatility	0.000
	(0.000)
Earnings Yield	-0.006***
	(0.001)
Firm Age	0.003***
	(0.001)
Constant	0.016***
	(0.006)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	75,220
R-squared	0.130

Table 8: CVC Investment and Excess Cash

This table reports estimation results of Equation (1) which estimates the baseline regression of the effect of CVC Investment on excess cash. *Excess Cash* is the dependent variable, which is measured as excess cash estimated in equation (6). *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

	(1)
VARIABLES	*Excess Cash*
CVC(0/1)	0.026**
	(0.011)
FirmSize	-0.089***
	(0.003)
Profitability	0.002***
	(0.000)
BDR1	0.033***
	(0.004)
MarketToBook	0.002***
	(0.000)
Research and Development	-0.182***
	(0.035)
Investments	0.111***
	(0.015)
Cashflow	-0.033
	(0.028)
Industry Cashflow volatility	-0.004***
	(0.001)
Earnings Yield	0.103***
	(0.023)
Div(0/1)	0.038***
	(0.003)
Constant	-0.229***
	(0.012)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	154,248
R-squared	0.100

Table 9: CVC Investment and Future Earnings

This table reports estimation results of Equation (8), which estimates the effect of CVC Investment on future earnings. The dependent variable is earnings. This table examines how prior years *CVC(0/1)* affects *Earnings*. We regress current earnings on the three, four, and five year lagged values of *CVC(0/1)*. *Earnings* is the dependent variable and it is measured as earnings before interest and tax scaled by total book asset. *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

VARIABLES	*Earnings*
CVC(0/1) $_{t-3}$	0.003**
	(0.002)
CVC(0/1) $_{t-4}$	0.003**
	(0.001)
CVC(0/1) $_{t-5}$	0.003**
	(0.001)
FirmSize	-0.003***
	(0.001)
Profitability	1.059***
	(0.007)
MarketToBook	-0.003***
	(0.001)
BDR1	0.001
	(0.003)
Cash	-0.001***
	(0.000)
Industry Cashflow volatility	0.000
	(0.000)
Firm Age	-0.002
	(0.001)
Constant	-0.031**
	(0.007)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	118,139
R-squared	0.588

Table 10: CVC Investment and Dividend Payout - Firm Fixed Effects

This table reports estimation results of Equation (1) which estimates the baseline regression of the effect of CVC Investment on dividend payout while controlling for firm fixed effects. *Dividend* is the dependent variable, which is cash dividend scaled by sales. *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

	(1)
VARIABLES	*Dividend*
CVC(0/1)	0.004**
	(0.002)
FirmSize	0.001***
	(0.000)
Profitability	0.001***
	(0.000)
BDR1	-0.001***
	(0.000)
Cash	-0.000***
	(0.000)
MarketToBook	0.000***
	(0.000)
Research and Development	0.001***
	(0.000)
Investments	-0.002**
	(0.000)
Tangibility	-0.009***
	(0.001)
Industry Cashflow volatility	-0.000
	(0.000)
Earnings Yield	0.000**
	(0.000)
Firm Age	-0.000
	(0.000)
Constant	0.011***
	(0.001)
Year Fixed Effects	Yes
Firm Fixed Effects	Yes
Observations	154,248
R-squared	0.022

Table 11: CVC Investment and Dividend Payout - Alternative Measures

This table reports estimation results of Equation (1) which estimates the baseline regression of the effect of CVC investment on dividend payout while using alternative measures of CVC and dividend. The independent variable are *CVC(0/1)* and *Log CVC Investment*. *Log CVC Investment* is the log of total corporate venture capital invested ($M) by a firm in a year. *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. In column (1) the dependent variable is *Dividend* which is cash dividend scaled by sales, in column (2) dividend is measured as cash dividend scaled by asset total and in column (3), dividend is measured as cash dividend scaled by earnings. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

	(1)	(2)	(3)
VARIABLES	*Dividend*	*Dividend/Asset Total*	*Dividend/Earnings*
Log CVC Investment	0.002***		
	(0.001)		
CVC(0/1)		0.006**	0.021**
		(0.003)	(0.010)
FirmSize	0.002***	0.002***	0.130***
	(0.000)	(0.000)	(0.000)
Profitability	0.002***	0.001***	0.002***
	(0.000)	(0.000)	(0.001)
BDR1	-0.003***	-0.003***	-0.017***
	(0.000)	(0.000)	(0.001)
Cash	-0.001***	-0.001***	-0.003***
	(0.000)	(0.000)	(0.000)
MarketToBook	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Research and Development	0.000	0.001*	0.004**
	(0.000)	(0.000)	(0.002)
Investments	-0.015**	-0.011***	-0.094**
	(0.001)	(0.001)	(0.006)
Tangibility	0.007***	0.003***	0.020***
	(0.002)	(0.001)	(0.006)
Industry Cashflow volatility	-0.000	-0.000**	-0.002***
	(0.000)	(0.000)	(0.001)
Earnings Yield	0.002***	0.001**	0.008***
	(0.000)	(0.000)	(0.001)
Firm Age	0.000	0.001***	0.008***
	(0.000)	(0.000)	(0.001)
Constant	0.010**	0.009***	0.064***
	(0.004)	(0.004)	(0.020)
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Observations	154,248	154,248	154,248
R-squared	0.091	0.104	0.100

Table 12: CVC Investment and Share Repurchases

This table reports estimation results of the effect of CVC Investment on share repurchases. *Share Repurchases* is the dependent variable and is a dummy variable that equals 1 if a firm repurchases shares in year t and 0 otherwise. *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. Table 1 defines the variables. All control variables are lagged. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

	(1)
VARIABLES	*Share Repurchases*
CVC(0/1)	0.061***
	(0.022)
FirmSize	-0.006*
	(0.003)
Profitability	0.019
	(0.021)
BDR1	0.005
	(0.004)
Cash	-0.001
	(0.055)
MarketToBook	0.000
	(0.000)
Research and Development	0.005
	(0.008)
Investments	0.025
	(0.068)
Tangibility	0.090
	(0.084)
Industry Cashflow volatility	-0.017
	(0.021)
Earnings Yield	-0.002
	(0.002)
Firm Age	-0.174
	(0.390)
Constant	1.000***
	(0.000)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	83,135
R-squared	0.091

Table 13: First stage of 2SLS regression

This table reports the estimation results of the first stage regression using a logistic regression. Our instrumental variable is *CVC State Percentage*. To measure *CVC State Percentage*, the study estimates the number of CVC investment by state per year and is divided by the total number of CVC investment. Table 1 defines the variables. Clustered errors by firm are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

VARIABLES	*CVC(0/1)*
CVC State Percentage	5.187***
	(0.307)
FirmSize	1.007***
	(0.021)
MarketToBook	0.024***
	(0.003)
Research and Development	2.796***
	(0.135)
Tangibility	-2.407***
	(0.192)
Investments	1.484***
	(0.469)
Industry Cashflow volatility	-0.155***
	(0.025)
Earnings Yield	-0.286***
	(0.068)
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	155,554
Pseudo R-squared	0.345

Table 14: Second stage of 2SLS regressions

This table reports the estimation results of the second stage of the 2SLS regression. The study re-estimates the baseline regressions of *CVC(0/1)* on *Dividend*. *CVC State Percentage* is the instrumental variable. To measure *CVC State Percentage*, the number of CVC investment by state per year is calculated and is then divided by the total number of CVC investment. *CVC(0/1)* is the variable of interest and is an indicator variable equal to one if a firm makes cvc investment and zero if otherwise. Table 1 defines the variables. All control variables are lagged. Bootstrapped standard errors are shown in parentheses with 1%, 5%, and 10% significance levels denoted by ***, **, and *, respectively.

	Dependent Variables
Independent Variables	*Dividend*
$\widehat{CVC(0/1)}$	0.042***
	(0.012)
Control Variables	Yes
Year Fixed Effects	Yes
Industry Fixed Effects	Yes
Observations	154,224
R-squared	0.083

Table 15: Panel A: Matched Sample and Entropy Balancing

This table examines the effect of *CVC(0/1)* on *Dividend* from the matched and entropy balanced sample. First, the study finds the nearest neighbor match for the CVC (treated) firms. Then the treated and control firms are matched on the mean moments of all the control variables used in the baseline regression. The dependent variable is *Dividend*, which is cash dividend scaled by sales. *CVC(0/1)* is the variable of interest and is indicator variable equal to one if a firm makes cvc investment and zero if otherwise. Table 1 defines the variables. All control variables are lagged. Linearized standard errors are shown in parentheses with less than 1%, 5%, and 10% levels of statistical significance denoted by ***, **, and *, respectively.

Variables	Dividend
CVC(0/1)	0.004***
	(0.001)
FirmSize	0.004***
	(0.001)
Profitability	0.059***
	(0.016)
BDR1	0.002
	(0.002)
Cash	0.001***
	(0.001)
MarketToBook	0.001**
	(0.000)
Research and Development	0.021***
	(0.005)
Investments	-0.023**
	(0.009)
Tangibility	0.024***
	(0.003)
Industry Cashflow volatility	0.008***
	(0.001)
Earnings Yield	-0.003
	(0.002)
Firm Age	0.000
	(0.000)
Year Fixed Effects	Yes
In Fixed Effects	Yes
Observations	8679
R-squared	0.223

(a) Panel B

	Panel B:Mean of our treated and control groups; pre-matching and post-matching			
	Pre-Matching		Post-Matching	
	Treated Group	Control Group	Treated Group	Control Group
FirmSize	8.761	4.438	8.761	8.759
BDR1	0.337	0.314	0.337	0.337
Cash	-0.025	0.065	-0.025	-0.025
MarketToBook	2.582	3.056	2.582	2.582
Investments	0.078	0.086	0.078	0.078
Research and Development	0.094	0.120	0.094	0.094
Industry Cashflow volatility	1.393	1.030	1.393	1.393
Tangibility	0.227	0.286	0.227	0.227
Earnings Yield	0.062	-0.056	0.062	0.062
Cashflow	0.101	-0.128	0.101	0.101