Dancing with the Giants: CVC Investments and Startup Outcomes

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ABSTRACT

This paper examines the impact of Corporate Venture Capital (CVC) investments on startup outcomes using an instrumental variable approach. The approach exploits the institutional fact that CVC investments are typically funded through the parent company's balance sheet and therefore uses segment cash flow shocks unrelated to the startup industry as an exogenous shock to CVC funding. The results indicate that CVC investments generally reduce the likelihood of a failed exit. When exits are successful, startups backed by CVCs are more likely to achieve an IPO rather than an acquisition. Additionally, the probability of acquisition by the CVC parent company increases. These findings suggest that CVCs provide valuable resources and support, enhancing startup success. However, the study also reveals potential anti-competitive effects. The positive effects are attenuated when CVCs are dominant investors in a particular industry, and more strikingly, the results are reversed when CVCs invest in early-stage startups. Such effects may constrain the startup's ability to compete independently and reinforce the market power of the CVC parent. These effects cannot be solely attributed to synergy. Overall, the impact of CVC investments on startup outcomes is nuanced, and both entrepreneurs and regulators should exercise caution when a CVC's influence is unchecked by other investors.

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1 Introduction

In a corporate venture capital ("CVC") investment, an established firm provides capital in return for equity in a nascent company. Over the past decade, corporate venture capital has grown more than tenfold and as of 2021, CVC-sponsored deals constitutes 20% of total venture funded deals[1]. Corporate venture capital initiatives represent a significant component of corporate investments and serve as a crucial source of financing for young firms.

As a corporation-sponsored venture capital organization, the CVC assumes a dual role. First, akin to traditional venture capital, the CVC pursues financial return from its investment, leveraging the industry expertise of its parent company. Second, the CVC seeks to make investments that are complementary with the strategic objectives of its parent company. These could be investing in startups to gain insights into new technologies or industries, fostering products and technologies that increase the value of its own business. In addition, the startups can benefit from resources and support provided by the CVC parent company, spanning production process, distribution channel and brand recognition. However, the potential for market entry by startups could pose a threat to the existing product market of the CVC parent. Consequently, the CVC parent may be incentivized to safeguard its market power by influencing the trajectory of startups through CVC investments. While increases in efficiency and market power both lead to higher private values of the parent, they potentially have opposite effects on social welfare.

This paper aims to provide evidence on the impacts of CVC investment on the startups with these non-mutually exclusive objectives. On the positive side, if the startups receive support and resources from the CVC parent, they are expected to achieve more successful exits. Furthermore, within successful exits, if IPO exits are assumed to be more advantageous than acquisitions–providing greater returns for entrepreneurs and increasing competition in the product market– one should expect CVC-invested startups to exhibit a higher likelihood of exiting via IPO if they benefit from the investment.

On the negative side, however, if the CVC's primary incentive is to mitigate entry threat, CVC-invested startups may struggle to establish themselves as independent players against their incumbent CVC parent firm. This could result in both an increased likelihood of failure and a shift from IPO exits to acquisition exits. While the synergy channel could also explain the shift from IPOs to acquisitions—as collaborations between the CVC and the startup during the investment stage may create synergistic value, making acquisition by the CVC parent more attractive than an IPO—it predicts a lower failure rate, as the

[1] From Bain & Company 2022 Report "Harnessing the True Value of Corporate Venture Capital" (https://www.bain.com/insights/corporate-venture-capital-m-and-a-report-2022/).

startup benefits from the resources and support provided by the CVC. In contrast, the anti-competitive channel suggests a higher failure rate, as the startup's growth potential may be constrained to safeguard the CVC parent's market position.

This paper assesses the impact of CVC investments on startup outcomes. I consider a sample of 1,941 CVC funds and a universe of 62,065 startups that secured startup financing rounds between the year 1982 and 2023. To identify the treatment effects of CVC investment on startup outcomes, I use an instrumental variables (IV) approach. Specifically, I exploit the institutional fact that CVC invests from its parent company's balance sheet, and thus use the segment cash flow shocks of the CVC parent that are unrelated to the startup as an exogenous shock to the funding available to CVC and allocate such shocks to the startups according to an ex ante CVC-startup matching probability.

Using this instrument, I examine the impact of CVC investments on startup outcomes. The findings indicate that receiving a CVC investment generally reduces the likelihood of startup failure at exit, increasing the chances of exit through IPO or acquisition. Additionally, CVC-invested startups are more likely to secure subsequent funding and achieve higher valuations. These results suggest that CVC parents positively influence startups by providing resources and support, thus fostering growth.

However, the effects of CVC investments on startups are not uniform. I find that the anti-competition effects of CVC are significant when CVC has a greater control over the startups. First, CVC investments in early-stage (pre-A Series) startups increase the likelihood of failure and reduce the likelihood of IPO exit, likely because early-stage CVC investors acquire larger shares of the firm and have a longer timeframe to influence the company's direction. Conversely, CVC investments in more mature stages are constrained by other investors, limiting the potential for CVCs to induce conflicts of interest. Second, the positive effects of CVC investment on IPO likelihood diminish if the CVC has greater dominance in investing in certain industries, measured by the past 5-year total number of invested deals in the industry. In such cases, startups are more likely to exit through acquisitions. Overall, the findings provide a nuanced view of CVC investments: while the effects of CVC are generally beneficial, entrepreneurs should be cautious if the CVC exerts significant control over the startup.

What leverage do CVCs have to influence startup outcomes? The answer may not be immediate apparent, especially considering that CVC typically acquires minority stakes in companies (Strebulaev and Wang, 2021). Nevertheless, three possible avenues exist through which CVC could impact startups. First, as outlined in Strebulaev and Wang's (2021) survey of CVC managers, the majority of respondents express a preference for obtaining either full board membership or board observer rights in the portfolio firms. These privileges empower CVC to exert influence and monitor the strategic movements of startups, enabling preemptive responses, including acquisition if the startup presents a viable threat to its product market. Second, approximately half of the surveyed CVC managers stipulate the requirement for a "Right of First Notice", granting them priority notification in the event of takeover bids received by portfolio firms, allowing them to make counteroffers. Moreover, a notable 12% of respondents even require "Right of First Refusal", providing them with veto power over any takeover bids directed at portfolio firms. Finally, a CVC can provide resources that complement the existing product positions of the CVC parent company. Entrepreneurs naturally find themselves better off by aligning their corporate strategy with these offerings, thereby reducing substitutability and enhancing complementarity to better leverage the assistance provided by CVC.

A key to understanding the impact of a particular investment is the issue of selection vs. treatment. Do the differences between CVC investments in startups, occur because CVCs choose different types of firms, or because they affect the startups in a different manner? We would expect that unlike a traditional VC, a CVC would choose its investments not just because of potential financial returns from the startup itself, but also because investing in the startup could potentially increase the profits of the parent. To mitigate the treatment effect of a CVC separately from the selection effect, I adopt an Instrumental Variables (IV) approach that exploits exogenous fluctuations in the availability of fundings to CVC for a particular startup in a given year. The instrument derives from a distinct institutional characteristic of CVC. Unlike traditional VC, whose capital comes from capital commitments of Limited Partners, most of the CVCs allocate funds directly from the balance sheet of their parent companies Strebulaev and Wang (2021). Consequently, the availability of funds for CVC investment is contingent on the cash flow of the parent company.

Specifically, I construct the instrument, termed as "CVC Flow", to be a product of two components: a cash flow shock originating from segments unrelated to the startup industry within the CVC parent company, and an ex ante probability of CVC investment in the startup. To construct the former, I use the Compustat Segment cash flows from the CVC parent company that are unrelated to the focal startup industry. I further purge out the common correlations in investment opportunities caused by common productivity or demand shocks between the focal industry and other industries. To construct the latter, I estimate a CVC-specific probability regression using historical CVC investment records and lagged startup characteristics to mitigate concerns regarding forward-looking bias. Taken together, the instrument creates an exogenous variation in CVC funding coming from industries unrelated to the startup. Firms that exhibit a higher likelihood of being CVC investees ex ante are more susceptible to this shock and consequently allocated a proportionate share.

The essence of the instrument is to create an exogenous variation in the supply of CVC funding that is uncorrelated with the startup's investment opportunities. Therefore, it represents a counterfactual scenario where the CVC's ability to invest is marginally constrained by an external factor. However, it does not imply a random assignment of CVC investment to any given firm; rather, the IV allows CVCs to invest according to their historical patterns, maintaining the existing matching between CVCs and startups. This counterfactual is arguably more informative than a random assignment process, as it helps policymakers to answer the "what-if" question where the CVC's investment capacity is moderated while still allowing them to choose optimal investment targets.

The rest of the paper proceeds as follows. Section 2 reviews the related literature and the contribution of this study. Section 3 discusses the data and sample. Section 4 introduces the instrument and the empirical methodology. Section 5 discusses the estimation results. Section 6 concludes.

2 Literature Review

This paper relates to separate streams of literature that have analyzed (1) the impacts of CVC on parent company and invested startups, (2) conflicts of interest between financial investors and invested firms, and (3) the strategic behavior of the incumbent firms. In this section, I review the relevant literature and discuss the contribution of the current study.

2.1 Impact of CVC investments

Prior studies has documented positive returns of CVC investments for the parent company. Gompers and Lerner (2000) show that the CVC investments yield financial returns comparable to those of average VC. Additionally, CVC provides avenues for learnings and experimentation. CVC parent companies benefit from knowledge transfer acquired through invested ventures, thereby enhancing their innovation capacity (Dimitrova, 2015; Dushnitsky and Lenox, 2005; Kim, Gopal, and Hoberg, 2016; Ma, 2020). CVC also facilitates firms' expansion into new industries (Zhang, 2021), and aids in identifying acquisition opportunities (Benson and Ziedonis, 2010; Dyer, Kale, and Singh, 2004).

On the startup side, existing evidence suggests that there's positive effects of CVC investment on the startups, but the results are mixed. Startups backed by reputable CVCs tend to launch faster IPOs and obtain higher market valuations at IPO (Ivanov and Xie, 2010; Stuart, Hoang, and Hybels, 1999). Additionally, they receive higher acquisition premium as targets (Ivanov and Xie, 2010), particularly when there is strategic fit between the CVC and the startup. Post-IPO, CVC-backed startups are more innovative (Chemmanur, Loutskina, and Tian, 2014). In terms of startup exit, Kim and Park Kim and Park (2017) shows that CVC investment reduces IPO likelihood but increases innovation. while Liu (2022) shows that CVC investment increases the startup's likelihood of IPO and innovation. While most of the aforementioned literature adopts a matched sample approach to address the selection effects of CVC, the considerable heterogeneity among startups and the limitations in available information highlight the potential benefits of employing more rigorous identification approaches.

The study most closely related to this one is Liu (2022), which employs a shift-share design to instrument the variation in industry funding supply by CVC and traditional venture capital (TVC). However, the industry-level variation in CVC supply may obscure important heterogeneous relationships at the CVC-startup level and within the startup's time series. In contrast, this study proposes a more granular CVC-startup-year level instrument using segment cash flow, allowing for a more nuanced analysis of CVC effects. Findings indicate that, on average, CVC investment has positive effects on startups, such as increased IPO and acquisition likelihood and a reduced failure rate. However, when CVC invests in early-stage startups or has greater market dominance, these positive effects are diminished or even reversed, suggesting the presence of alternative anti-competition motives in CVC investment.

Relatedly, a theoretical strand of literature has explored the potential competitive dynamics between the startup and the CVC, evaluating how strategic motivations shape the CVC investment. Hellmann (2002) models the optimal financing choice between strategic investors (CVCs) and VCs in scenarios where differing degrees of strategic alignment exists between the startups and the CVC parent companies. Mathews (2006) proposes an alternative mechanism wherein CVC investment aligns interests between startups and CVC parent companies, particularly in contexts where potential competition arises between the two parties. Both studies predicts a softened competition between the CVC parents and the startups, when their businesses are substitutive in nature. Despite these theoretical insights, the empirical evidence remains rare. This paper contributes to this literature by providing novel evidence that sheds lights on the conditions where potential anti-competitive effects of CVC investments are more likely.

2.2 Conflicts of Interests between Financial Investors and Invested Firms

Several existing papers study the conflicts of interest between the VC and entrepreneurs regarding exit choices between acquisition and IPO, stemming from differences in private benefits or investment horizon differences (Bayar and Chemmanur, 2011; Ewens and Farre-Mensa, 2020), asymmetric cash flow rights (Cumming, 2008; Hellmann, 2006), or liquidity pressure toward the end of the investment period (Bhattacharya and Ince, 2012; Bian, Li, and Nigro, 2023; Masulis and Nahata, 2009). Moreover, VCs might transfer growth opportunities from one portfolio firm to other competing portfolio firms to maximize the portfolio returns, potentially at the expense of individual entrepreneur's interests (Leccese, 2023; Li, Liu, and Taylor, 2023; Ueda, 2004). This paper augment the extensive literature by documenting a distinct source of conflict of interests arising from the strategic disparities between the CVC parent and the startups.

2.3 Strategic Behavior of Incumbent Firms

Finally, the paper contributes to a growing literature examining the strategic behavior of the incumbent firms. Kamepalli, Rajan, and Zingales (2020) theoretically establish how the possibility of incumbent firms creating kill zones around their product territory and quickly acquire any competing entrants leads concerned VCs to underinvest in such startups. Argente, Baslandze, Hanley, and Moreira (2020) empirically documents that market leaders exhibit lower rates of product innovation but rely on patents to restrict competition. Akcigit and Goldschlag (2023) illustrate that incumbent firms strategically offer higher wages to inventors to dissuade them from implementing new ideas that could threaten their existing product market positions. In a more extreme scenario, Cunningham, Ederer, and Ma (2021) documents how incumbents may acquire firms with competing products to eliminate rivals from the market. While acquisitions are commonly employed by incumbent firms to soften competition from firms with mature products or established product pipelines, this paper sheds light on how CVC can serve as a device for incumbents to engage with the startups at early stages. Specifically, it shows that although the overall effects of CVC investment are generally beneficial to startups, entrepreneurs and regulators should be more cautious when CVC invests in early-stage startups and when CVC has greater market dominance.

3 Data and Sample

3.1 Data Sources and Sample Construction

I obtain startup funding data from CB Insights. The data vendor provides the financing company basic information, the deal information including valuation, as well as the investor information. To construct the sample of startups, I select companies with at least one round of equity financing[2] of deal size greater than or equal to $1 Million USD, and the

[2] I define the deal as equity financing if the investment stage is in any of the follow categories: "Convertible Note", "Seed / Angel", "Series A", "Series B", "Series C", "Series D", "Series E+", "Other Venture Capital", "Private Equity", "Growth Equity".

company's total funding exceeds $2 Million USD. I further obtained all the financing deals of the selected company. To be in the final sample, the startup should also have completed at least one startup equity financing deal in the sample period[3]. To identify corporate venture capital investors, I rely on the classification of CB Insights and select all investors whose investor type is labeled as "Corporate Venture". I also require that the investor to have completed at least one deal in the sample period. The final sample includes 62,065 startup companies which are included in 244,091 deals (with or without CVC investment), and 1,941 corporate venture capital funds, which in total invested in 34,676 deals.

I obtain the CVC parent company segment cash flow data from the Compustat Segment database, which contains the segment accounting information of US public firms. I manually match the CVC funds to its parent company in the Compustat Segment data, and obtained 1,009 CVC funds with matched GVKEY and 395 CVC funds with at least one segment cash flow data in the sample period. These funds represent 55.5% of the total capital invested in CVC.

To construct the startup-unrelated cash flow shock, one needs to link the industry classifications used in the Compustat Segment data (SIC, NAICS) and the CB Insight industries, the latter of which does not contain any unified industry classification other than a platform defined one. I manually created the link between the CB Insights industries and SIC 4 digit, based on the description of the SIC code and the corresponding Post-IPO SIC code of those that eventually went public. Because one just need to exclude Compustat segments that are related to the focal startup industry, it is not necessary to create one-on-one match between the two lists. Therefore, I adopt a conservative approach and select as many SIC industries that pertain to relate a focal CB Insights industry as possible.

3.2 Startup Exit Options

I obtain the exit outcomes of the startups from the history of startup deals. Specifically, I look for deals that attribute to an Acquisition (with Simplified Rounds belonging to either of "Acq- P2P", "Acquisition", "Acquisition (Financial)", "Acquisition (Talent)", "Merger", or "Asset Sale"), IPO ("IPO" or "PIPE") or Failure ("Bankrupt/Admin", "Bankrupt/Liquidation", "Dead", "Distressed & Special Situation", or "Dead") event. In case that the firm experiences more than one exit events, I use the earliest exit event to label the exit outcome of the firm[4].

[3] I define the deal as startup equity financing if the investment stage is in any of the following categories: "Angel", "Pre-Seed", "Seed", "Seed VC", "Series A", "Series B", "Series C", "Series D", "Series E+", "Venture Capital".

[4] There are a number of firms with an IPO and an Acquisition exit on the same day (54 observations), which upon checking, all indicates reverse merger + PIPE. Therefore, I label them all as IPO instead of

As Ewens and Farre-Mensa (2020) noted, CB Insights database might under-report failure events, resulting in falsely positive active firm statuses. To capture additional failure exits, I match the sample with PitchBook data to collect additional information on company failure events and dates. Besides, some failures are misrepresented as acquisitions, with returns to investors and entrepreneurs being close to zero ("rescue acquisition"). I identify such acquisitions based on the firm valuation discounts at exit or, if exit valuations were missing, from the previous funding round. Furthermore, in case where none of the aforementioned failure events are identified, but CB Insight lists a company status as "Bankrupt" or "Dead / Inactive", I also classify the company exit as failure. Companies not identified by these criteria are marked as "Active." Figure I presents the evolution of firm exit outcomes by the year of first funding.

I also gauge the CVC-startup specific exit information. Specifically, for each CVC-startup, if the startup exits in an acquisition, I can classify the identity of the acquirer with respect to the CVC. I label the startup acquisition exit as (1) whether the startup is acquired by CVC parent; (2) whether the startup is acquired by CVC competitors. Since the latter requires the acquirer to have a SIC code, which is not available for private firms, this measure will only be available to acquisition deals with public acquirers.

Table I Panel A presents the startup-level exit distribution. Active firms make up 30.24% of the sample, while another 40.99% have exited through an acquisition, 10.09% through IPO and 18.68% have failed. Panel B presents the startup exit outcomes by the last funding round before exit. As startups mature, the likelihood of an IPO increases from 3.03% at the Seed round to over 13.68% for Series D and even higher for later rounds. The likelihood of acquisition remains stable after Seed round and slightly decreases for D+ rounds, indicating a tendency for startups that stays private longer to choose IPO as eventual way of exits. Additionally, as startups raise more rounds of financing, the likelihood of failure rate decreases from 23.11% at Seed round to 17.5% at Series D round and even lower for D+ rounds.

Panel C presents the statistics of Acquirer Type at CVC-startup level. The table presents the CVC-startup pair, for all the startups regardless whether the startup was invested by the CVC (column "All startups"), and for startups that were invested by the CVC (column "CVC-invested startups"). The percentage is calculated as the number of CVC-startup pairs of which the acquirer is the focal CVC parent/CVC parent competitors over the total number of such CVC-startup pairs. It is noteworthy that the acquirer SIC code is obtained from Compustat, which is only available for US public firms. Therefore, the percentage of CVC parent competitors are calculated only within the CVC-startup pairs

Acquisition.

where the acquirer SIC code is non-missing.

3.3 CVC Investment Stylized Facts

Figure II shows the annual startup equity financing deal volume of the firms in the sample, where the value represents the inflation-adjusted deal size in 2000 USD. The sample starts in year 1982 and ends in year 2023. There is a surge around year 2000 during the Internet Bubble, and there is an exponential growth of the startup financing deals in the recent 10 years. The red represents the volume of deals with at least one CVC investors. There is also a steady increase in the share of CVC-sponsored deals in the past 10 years.

Table II presents the financing round distribution of CVC investments. Judging from the absolutely terms, the majority of the CVC investments are concentrated in Seed Round (15.98%), Series A (27.99%), Series B (23.27%), and Series C (13.53%), while the share of later rounds (Series D+) takes less than 10% each. However, the lower share of the later rounds of CVC could result from a smaller pool of eligible firms seeking such funding. Panel B shows the proportion of CVC-invested deals in proportion to the total number of deals for each individual financing rounds, and the CVC investment in Series D+ rounds actually constitutes around 15% - 25% of the total deal counts. Taken together, CVC investment constitutes an important part of the startup funding across all stages of financing, although there are more deals in Seed and Series A to Series C rounds in absolute counts.

CVC differs from other investors in terms of its investment style. First, CVCs are more likely to be the sole investors of a deal round. Panel A of Table III presents the regression results comparing CVC's probability of being the sole investor with that of other investors. Column (1) indicates that CVC are 6% more likely to be sole investors compared with an average investor, and when CVC invests in a follow-up deal of a round (for example, there could be multiple deals attributing to Series A financing, and the follow-up deals are not the first deal of the Series), it is 77.3% more likely to be the sole investor of the deal, compared against other follow-up deals.

In addition, CVC seems to be willing to pay for a higher valuation than average investors. Column (1) of Panel B shows that CVCs are more likely to pay higher valuation when it is the sole investor of the deal, and comparing across firms within the same investment stage, CVCs tend to pay 13.4% more in valuation compared with other investors. Nonetheless, this result could be purely driven by the fact that CVC tend to select higher valuation targets to invest. In Column (2), when a more stringent firm-round fixed effects are included, the CVC's paid valuation is compared with other deals within the same firm and the same series, which alleviates any concern for firm quality difference. CVC is still shown to pay a 4.91% higher valuation when it's investing as a sole investor of the deal.

Why does CVC strive to be single round investors and accept higher valuations? To begin with, entrepreneurs may anticipate potential conflicts of interest arising from the strategic motives of CVC, leading them to demand higher compensation initially. Additionally, as Strebulaev and Wang (2021) shows, CVC often seek additional contractual rights in exchange for their investment, increasing the overall cost compared to typical investors. Thus, by being the sole investor, CVCs gain more freedom to negotiate such rights and potentially more flexible valuations. Moreover, contractual rights acquired in a deal are shared among all investors, necessitating majority consent for their exercise, such as Rights of First Refusal. Therefore, for CVCs to exert significant influence over startups, it is crucial that they become single-round investors.

4 Empirical Methodology

This section discusses the identification strategy using the instrumental variable (IV) approach to estimate the causal effects of CVC investments on startups' outcomes. Suppose that a startup's outcome is generated by the following model:

$$y_{ijt} = \delta D_{ijt} + X_{ijt}\beta + \epsilon_{ijt} \tag{1}$$

for startup i, CVC j, and year t. The varaible y_{ijt} is the startup's outcome, D_{ijt} is an indicator variable with value of one if the startup i receives investment from CVC j in year t (and zero otherwise), and X_{ijt} is a vector of other observable characteristics of the startup i, CVC j, or the joint characteristics between i and j, in year t. The error term ϵ_{ijt} represents the part of the startup's outcome unexplained by these variables. Under this model, the coefficients δ are the causal effects of a CVC investment into startup i's outcome after the investment.

OLS regression of the above equation would likely lead to biased and inconsistent estimates, because a CVC's investment decision into a startup (D_{ijt}) is likely to be correlated with the startup's outcome due to its unobserved characteristics (ϵ_{ijt}). For this reason, I instrument the CVC investment decision variable D_{ijt} with the following instrumental variable: the expected amount of funding available to a CVC to invest in a particular startup. Specifically, it is

$$CVCFlow_{ijt} = CF_{jt}^{-i} \times E_{t-1}D_{ijt} \tag{2}$$

for all startups i, CVCs j, and years t. The variable CF_{jt}^{-i} denotes the cash flow shock to the CVC's parent firm that are unrelated to the industry of startup i, and $E_{t-1}D_{ijt}$

denotes the focal CVC j's ex ante investment probability to invest in the startup i in year t estimated using information on or before year $t-1$. If the variable $CVCFlow_{ijt}$ is relevant (correlated with D_{ijt}) and exogenous (uncorrelated with the error term ϵ_{ijt}), the corresponding IV-estimator of the causal effects δ is consistent.

The use of CVC parent firm cash flow shock (CF_{jt}^{-i}) as the first part of the IV is driven by an institutional feature of CVC. Unlike traditional VCs which start with a fundraising cycle and invest out of the committed capital of Limited Partners, most CVCs invest from the parent company's balance sheet (Strebulaev and Wang, 2021); as a result, the funding available for CVC investment is highly sensitive to the cash flow of the parent company. While the total cash flow of the parent company is correlated with the amount of funding available for CVC investment, it is not exogenous to the outcome of the CVC-invested startups because the cash flow of the parent company might be correlated with the investment opportunity of the startups if they are from the same industry. I construct my instrument using the segment cash flow of the CVC parent company that are unrelated to the investment opportunities of the startup's industry.

The unrelated segment cash flow from the focal startup's industry is constructed in two steps. First, I establish a crosswalk between the industry classification of the startup sample and the 4-digit SIC codes from the Compustat Segment database. This allows for the exclusion of Compustat segments of the CVC parent company that overlap with the startup's industry. Second, although the cash flows excludes the focal startup industry, there might still be common productivity or demand shocks between the focal industry and other industries. Therefore, to further eliminate correlations in investment opportunitie caused by these common shocks, I orthogonalize the resulting cash flow from the total annual cash flow of the startup's industry. This is achieved by conducting a 10-year rolling window regression at the CVC-industry level and extracting the residual term. This approach also helps mitigate concerns that overly aggregated segment reporting (as noted by Hoberg and Phillips 2022) may attribute unreported focal industry cash flows to other closely related reported industries, thereby preserving the exogeneity of the cash flow.

The resulting unrelated cash flow is uncorrelated with the investment opportunities of the focal industry. Table A.1 demonstrates that CVC-industry level unrelated cash flow is not statistically significant in predicting the startup-industry deal flows, with the economic magnitude being minimal. Column (1) indicates that a 1% increase in the unrelated cash flow corresponds to an industry-year deal flow increase of only 0.0019% from the mean. In Column (2), with the inclusion of additional year fixed effects, the correlation becomes insignificantly negative, resulting in a 0.0068% decrease from the mean. Overall, the results provide suggestive evidence supporting the exogeneity of unrelated cash flow as the shock part of the instrument.

While the cash flow shock creates an exogenous variation for a CVC-industry-year, in the second step the cash flow shock is assigned to individual firms within the industry depending on their pre-determined exposure to the CVC cash flow, which is estimated as the CVC-startup ex ante investment probability[5], reflecting the likelihood of a startup receiving CVC funding based on its characteristics. Specifically, for a CVC j in year t, the ex ante probability of it investing in a startup i is calculated in the following steps. First, for every CVC j – year t, I estimate the following probability regression using startup's characteristics to predict next period probability that the CVC investing in the startup, using the CVC's historical investment on or before $t-2$:

$$D_{ij(\tau+1)} = \beta X_\tau + \epsilon_{ij(\tau+1)}, \quad \text{where } \tau \leq t-2 \tag{3}$$

X_τ represents a battery of startup characteristics as of year τ, including patent stock, past 3 year patent growth and patent citation growth, indicators of financing stage (Pre-A/Round A-C/Post-C/Other), business description similarity with CVC's past invested firms (median and maximum similarity with firms of past 3 year deals and all past deals, respectively), inflation-adjusted total funding raised in the past 1/2/3 years, number of active firms in the focal industry for the current year, number of years since founded, and indicators for industry. I denote the β estimated from Equation (3) as $\widehat{\beta_{\leq t-2}}$ as it is estimated using historical data on or before $t-2$.

Next, I define the ex ante probability of CVC investment in startup of year t using the startup's characteristics from $t-1$ and the estimated regression coefficients from $t-2$:

$$E_{t-1}D_{ijt} \equiv \widehat{\beta_{\leq t-2}} X_{t-1} \tag{4}$$

The specification using historical CVC investment records ensures that there is no forward-looking bias when calculating the instrument, as everything is determined one year before the focal year t. The ex ante investment probability $E_{t-1}D_{ijt}$ reflects the historical pattern of CVC investment, and is a reduced-form way to estimate a matching probability between the CVC and the startup, reflecting both how the startup fits the profile of likely CVC investees, and how the startup is likely to accept the CVC's funding.

Finally, the instrument is calculated by taking the product of the unrelated cash flow generated in step one and the ex ante predicted likelihood of CVC investment generated

[5] For readers familiar with the mutual fund literature, this specification is analogues to Edmans, Goldstein, and Jiang (2012) who use the mutual fund redemption as an instrument for price pressures of the a given stock. In this paper, the instrument is calculated as the product of mutual fund flow and a lagged portfolio allocation of the mutual fund.

in step two. Since both parts represent continuous degrees of change, I normalize both variables by adding a positive constant to all observations, ensuring that both parts are non-negative. This normalization prevents discontinuities around zero that could result from a sign flip.

The instrument $CVCFlow_{ijt}$ introduces an exogenous shock to the CVC funding available to the startup, akin to a quasi-natural experiment where the CVC's ability to invest is exogenously constrained, compelling the startups to accept the alternatives to receiving CVC funding. These alternatives could be in either of the two scenarios: either the startup receives alternative source of funding (for example, from a VC) or the startup receives no funding at all. The treatment effects of CVC, as estimated by the instrumental variable (IV), represent an average of the impacts from both scenarios.

5 Estimation Results

5.1 Baseline Regression Results

In this section, I discuss the effects of CVC investment on startup exit options using various estimation methods. The panel consists of CVC-startup-year panel which is constructed as follows. For each CVC-subindustry in which the CVC investments are made, I obtain the dates of its initial and final startup equity financing deals, thereby generate a panel of CVC-subindustry-year spanning all the years between the first and last deal date. Next, I include all the startups from the subindustry that are active in the focal year[6]. The sample includes firms with first funding deals on or before 2012 to allow for at least ten years to observe firm exits. I estimate the following Two-Stage Least Square (2SLS) regressions:

$$\text{(First Stage)} \quad \mathbb{1}(CVC\text{-}startup)_{ijt} = \alpha + \beta_0 IV_{ijt} + \alpha_{st} + u_{ijt} \tag{5}$$

$$\text{(Second Stage)} \quad Y_{ijt} = \gamma + \beta_1 \mathbb{1}(\widehat{CVC\text{-}startup})_{ijt} + \beta_2 X_{it} + \gamma_{st} + \epsilon_{ijt} \tag{6}$$

The dependent variables, denoted as Y_{ijt}, are a set of dummy variables indicating specific outcomes for a startup, including IPO, failure, acquisition, or acquisition by the CVC parent. The vector X_{it} captures a range of time-varying control variables, such as startup age, as

[6] A startup is considered active from its start year, defined as the year of its initial equity financing deal, until the end year. The end year is determined by either its exit deal (IPO, bankruptcy, or acquisition) or, if its record becomes stale, up to 5 years after its last equity financing deal with startups.

well as controls from year t-2, including patent stock, patent citations and growth rates, funding size over the past 1, 2, and 3 years, and the number of peer startups within the focal industry. Both first and second stages also include startup industry-year fixed effects (denoted as α_{st} and γ_{st}). The standard errors are clustered at the startup industry level.

The baseline estimation results are presented in Table IV. Column (1) of each table presents the OLS regression results where the dependent variable, the exit option dummies, are regressed directly on the endogenous variable 1(CVC-startup), which take the value of one if the CVC invests in the focal startup in the current year. Column (2) and (3) presents the Two-stage least square (2SLS) IV regression estimation results. Column (2) presents the first-stage results where the endogenous variable 1(CVC-startup) is regressed on the instrumental variable. Column (3) presents the second-stage results where the dependent variable, the exit outcome dummies, are regressed on the instrumented endogenous variable 1(CVC-startup). Both stages are estimated in a linear probability model. In Column (4), the dependent variable is directly regressed on the instrument in a linear probability model.

Panel A presents the effects of CVC investment on the probability of the startup having an IPO exit. Column (1) shows the OLS regression results. The positive coefficients indicate that CVC-invested startups show a significantly higher likelihood of IPO exit compared with non-CVC-invested startups. Column (2) to (4) of Panel A presents the results of IV regressions. Column (2) of Panel A shows that the IV strongly predicts the probability of CVC investment in the startup with an F-statistics of 29.3, which exceeds the recommended threshold of 10 by Stock and Yogo (2015). In Column (3), the instrumented probability of CVC investment is estimated to have a statistically significant positive effect on the likelihood of IPO exit. The implied economic magnitude is substantial: for 1 percentage point exogenous increase in the CVC likelihood of investment, the startup's IPO likelihood increases by 2.87 percentage point. To put it into perspective, 1% increase in CVC likelihood from the current mean is associated with 0.11% increase of IPO likelihood, also evaluated at the mean[7]. The results from the reduced form IV estimation in Column (4) is consistent with the effects in Column (3): the increase in IV is strongly correlated with the increase in the IPO likelihood.

Panel B shows the effects of CVC investment on the startup's probability of failure exit. Column (1) shows that CVC-invested startups are significantly less likely than non-CVC-invested startups to have a failed exit. the IV estimates in Column (3) and (4) shows that receiving CVC investment induces a statistically significant reduction in the likelihood of failed exit: for 1 percentage point exogenous increase in the CVC likelihood of investment,

[7]In the current panel data, the mean likelihood of IPO likelihood is 0.14 and mean of 1(CVC-startup) is 0.006. Therefore, the economic magnitude for 1% increase in the CVC likelihood from the current mean evaluated at the mean of IPO likelihood is calculated as: 2.87% $\times$ 0.006/ 0.14 = 0.11%.

the startup's failure rate decreases by 1.73 percentage point, which is equivalent to 0.04% reduction in failure likelihood from mean for 1% increase in CVC investment likelihood from the mean.

Panel C demonstrates the effects of CVC investment on a startup's probability of an acquisition exit. Column (1) shows that, on average, CVC-invested startups are more significantly likely to experience an acquisition exit than an average non-CVC-invested startups. However, the IV regression indicates that receiving CVC investment ia only associated with a marginally significant reduction in the acquisition likelihood. Nonetheless, this IV estimate reflects an average change in the acquisition exit likelihood for startups at different funding stages. As Section 5.2 will show, there is a heterogeneous response in this likelihood across different stages.

Panel D shows the effects of CVC investment on a startup's probability of exiting through an acquisition by the focal CVC's parent company. Column (1) indicates that CVC-invested startups are more likely to be acquired by the CVC parent compared to non-CVC-invested startups. Notably, the panel includes all CVC-startup pairs encompassing the universe of active startups, regardless of whether the focal CVC actually invests in them. It is also possible for a startup to be acquired by the CVC parent company even if it did not initially receive CVC investment. Therefore, we can estimate the likelihood of non-CVC-invested startups being acquired by the CVC parent. The IV results in Columns (3) and (4) show that a 1 percentage point exogenous increase in the likelihood of receiving CVC investment results in a 0.44 percentage point increase in the likelihood of a startup being acquired by the CVC parent company, with the effects being statistically significant. Economically, this corresponds to a 1.76% increase in the likelihood of acquisition by the CVC parent, evaluated at the mean, for a 1% increase in the likelihood of CVC investment from the mean.

Overall, the results in this section are consistent with positive effects of CVC investments on the startup outcomes. On average, the CVC-invested startups become less likely to fail and more likely to experience successful exits through either IPOs or acquisitions by the CVC parent company. However, the effects of CVC investment may differ by the stages of startups or the dominance of CVC, due to variations in the duration of influence and the degree of CVC's control over the startup. Therefore, in the next sections, I explore the heterogeneous effects of CVC investments along these dimensions.

5.2 Exit by Different Investment Stages

The influence CVC can exert on a startup varies depending on the stage at which the investment is made. An early investment could be associated with a larger share of acquired stake, and in the meantime providing CVC with more time to shape the direction of the startup's business and product market plan during its formative stages. Therefore, in this section, I investigate the heterogeneous treatment effects of CVC investment across various stages of startup funding.

I estimate the 2SLS IV regression by interacting the CVC investments with indicators of different startup funding stages. Specifically, I estimate the following regression:

$$\begin{aligned}\text{(First Stage)}\quad & 1(\text{CVC-startup})_{ijt} \times 1(\text{Stage})^{k}_{ijt} \\ & = \sum_{k} CVCFlow_{ijt} \times 1(\text{Stage})^{k} + 1(\text{Stage})^{k} + \alpha_{st} + u_{ijt}\end{aligned} \tag{7}$$

$$\text{(Second Stage)}\quad 1(\text{Exit})_{ij} = \sum_{k} \gamma^{k} \left[1\widehat{(\text{CVC-startup})_{ijt}} \times 1(\text{Stage})^{k} \right] + \beta X_{it} + \gamma_{st} + \epsilon_{ijt} \tag{8}$$

where k denotes various investment stages of the startup funding: Seed/Angel, A-C Rounds, D+ Rounds, respectively. This specification effectively captures the heterogeneous effects of receiving CVC investments during different stages of the startup on the exiting outcomes.

Table V presents the IV regression results. Two observations of the results are in place. First, the effects of CVC investments on late stage startups (Post-C Rounds) are similar to that of the baseline results. The coefficients of 1(CV C-startup) $\times$ 1(Post-C Rounds) of Column (1) is -2.27, statistically significantly at 10% level, which indicates that startups, when receiving CVC investments in the last stages, become less likely to fail. The coefficients from Column (2) to (4) also exhibit a similar pattern with the baseline: for 1 percentage point increase in CVC investment likelihood, startups are 10.8% more likely to have an IPO exit and 8.56% less likely to have an acquisition exit. This result indicates a shift of exit probability from acquisition to IPO, conditional on a successful exit. In the meantime, consistent with the baseline regression result, receiving CVC investment also increases the likelihood of acquisition exits by CVC parent.

Second, and more noteworthy, the effects of CVC investments on early stage startups exhibit contrasting results from the late stage counterparts. The coefficient of 1(CVC-startup) $\times$ 1(Pre-A Rounds) of Column (1) indicates that when invested by CVC in Pre-A rounds, the startups are significantly more likely to fail (1 percentage point increase in the CVC likelihood increases the failure rate by 5.35%). Among startups that achieve a successful exit, the likelihood of an IPO decreases by a substantial 7.34% for one percentage point increase in CVC investment likelihood, which is statistically significant at the 1% level. Additionally, there is a 1.99% increase in the likelihood of an acquisition exit, though this effect is statistically insignificant at the 10% level. It's noteworthy that include controls for the startup life cycle (e.g., startup age) and other lagged firm characteristics. Therefore, the observed differences between early-stage and late-stage investments are not attributable to variations in firm quality at the time of receiving these investments. Overall, these findings suggest that CVC investment in early stages increases the risk of failure for startups. Furthermore, among those that do exit successfully, there is a notable shift from IPOs to acquisitions, implying that such startups may face greater challenges in establishing themselves as independent competitors in the product market.

The shift from IPO exits to acquisition exits could be explained by two potential mechanisms: synergy and anti-competition. If CVC provides complementary resources and realigns the startup's business with the CVC parent's, thereby creating synergistic value, the startup becomes a more attractive acquisition target for the CVC parent company compared to remaining a stand-alone public company. This would increase he likelihood of an acquisition exit. On the contrary, if CVC investments diminish the startup's growth potential and limit its ability to become an independent market competitor, a similar shift form IPO to acquisition exits would also be observed. However, these two mechanisms offer different predictions regarding the firm's survival rate: while the synergy channel suggests a higher likelihood of survival due to improved startup growth prospects, the anti-competition mechanism predicts a lower survival rate. To the extent that CVC investments in early stage deals increases the likelihood of startup failure, the evidence would support anti-competition effects rather than synergy.

5.3 Exit by CVC Market Dominance

The influence CVC can exert on a startup also varies depending on the its power as an investor. While a CVC new to an industry might be more inclined to learn and experiment, whereas an established CVC with market dominance is more likely to have anti-competitive incentives and greater bargaining power over startups. Therefore, this section investigates the heterogeneous treatment effects of CVC investment across CVCs with high and low market dominance.

I estimate the 2SLS IV regression by interacting the CVC investments with indicators of the CVC market dominance indicators for a particular industry. Specifically, I estimate the following regression:

$$
\begin{aligned}
\text{(First Stage)} \quad & 1(\text{CVC-startup})_{ijt} \times 1(\text{Dominance})^k_{ijt} \\
& = \sum_k CVCFlow_{ijt} \times 1(\text{Dominance})^k + 1(\text{Dominance})^k + \alpha_{st} + u_{ijt}
\end{aligned}
\tag{9}
$$

$$
\text{(Second Stage) } 1(\text{Exit})_{ij} = \sum_k \gamma^k \left[1(\widehat{\text{CVC-startup}})_{ijt} \times 1(\text{Dominance})^k \right] + \beta X_{it} + \gamma_{st} + \epsilon_{ijt}
\tag{10}
$$

where k indexes high and low market dominance respectively. Market dominance is measured by the total number of deals invested within the focal industry over the past five years. The High Market Dominance dummy variable is defined to be one if the CVC's invested deals are among the top 10% of the all CVC investors and the variable Low Market Dominance is defined conversely. This specification effectively captures the heterogeneous effects of CVC investing power on the startup exits.

Table VI presents the estimation results. Column (1) shows the effects of CVC investment on the likelihood of an IPO exit. Both coefficients of 1(CVC-startup)$\times$ 1(High Dominance) and 1(CVC-startup)$\times$ 1(Low Dominance) are significantly positive, although the magnitude of 1(CVC-startup)$\times$ 1(High Dominance) is smaller than its counterpart. An F-test confirms the difference in the magnitude is significant at 1% level. Column (2) and (3) indicate that higher CVC market dominance also significantly attenuates the positive effects of CVC investment, as evidenced by a decreasing exit failure rate (statistically insignifican) and an increasing rate of acquisition exits (significant at 5% level). Overall, the results in this section suggest that the positive effects of CVC investment diminish with increased CVC market dominance, consistent with the anti-competition effects.

6 Conclusion

This study offers a nuanced perspective on the impact of CVC investment on startup outcomes. On the one hand, Evidence supports positive effects of the CVC investment on startups. On average, startups receiving CVC investments generally reduce the likelihood of failure and increase the likelihood of IPOs or acquisitions, aligning with the hypothesis that CVCs provide resources that foster startup development and success.

However, the effects of CVC investments are not uniform. Notably, CVC investments in early-stage startups increase the likelihood of failure and shift successful exits from IPOs to acquisitions. This shift, extending beyond acquisitions by the CVC parent company, suggests anti-competitive effects that limit startups' independence in the market. Furthermore, the positive effects of CVC investments on IPO likelihood, failure rates, and acquisitions diminish when CVC has greater dominance in investing in certain industries. In such cases, CVCs, wielding significant influence due to their bargaining power, can induce conflicts of interest, undermining the social benefits of their investment. Overall, while CVC investments are generally beneficial, entrepreneurs and regulators should be cautious when CVs exert significant control over the startups.

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Figure I. Startup Exit Outcomes by Year of First Funding The table reports the exit outcomes of startups with first funding deal between 1982 and 2012. This figure shows the fractions of startups that have an IPO exit, acquisition exit, failed exit, or remain private as of the of the current sample. We observe exits through 2022, so the sample is ended to allow at least 10 years to observe the exits.

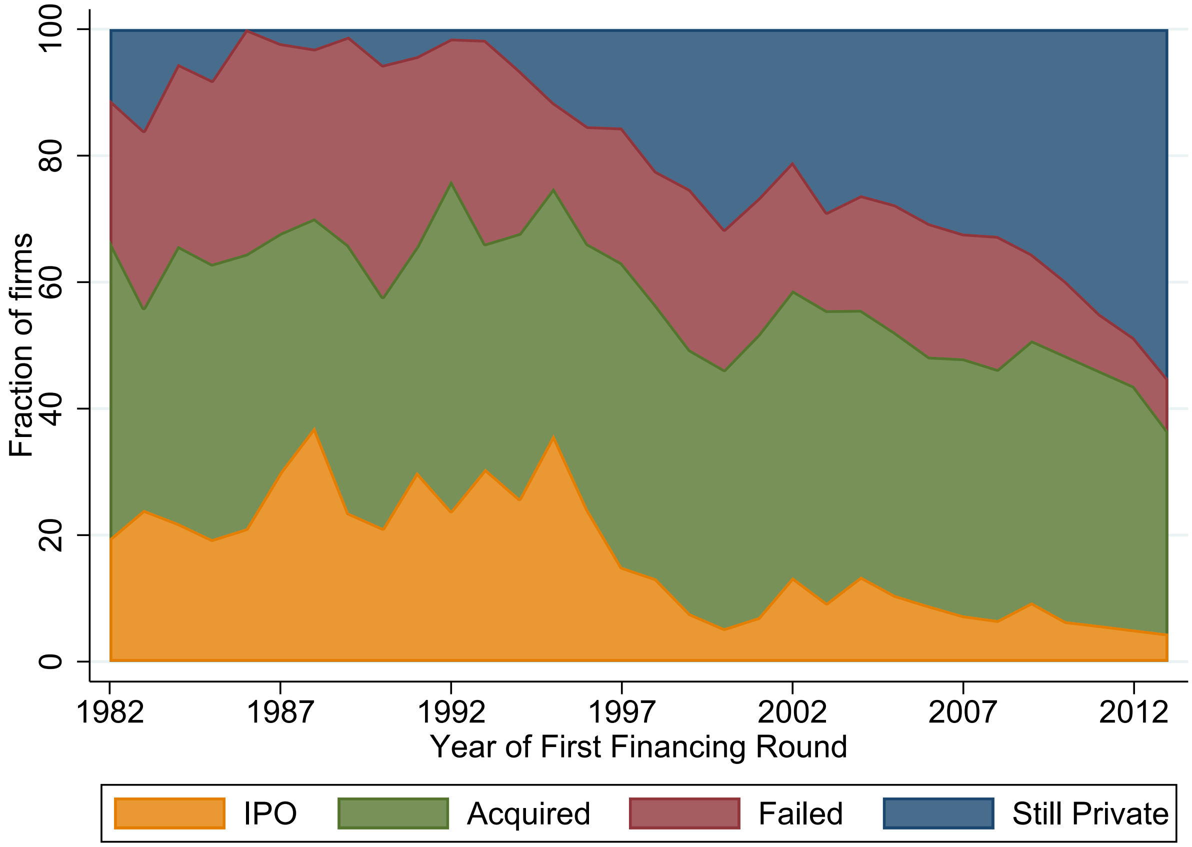

Figure II. Startup Annual Deal Volumes. The figure shows the startup equity financing volume, for deals with or without at least one CVC investors, respectivley. The value is the inflation-adjusted deal size in 2000 USD.

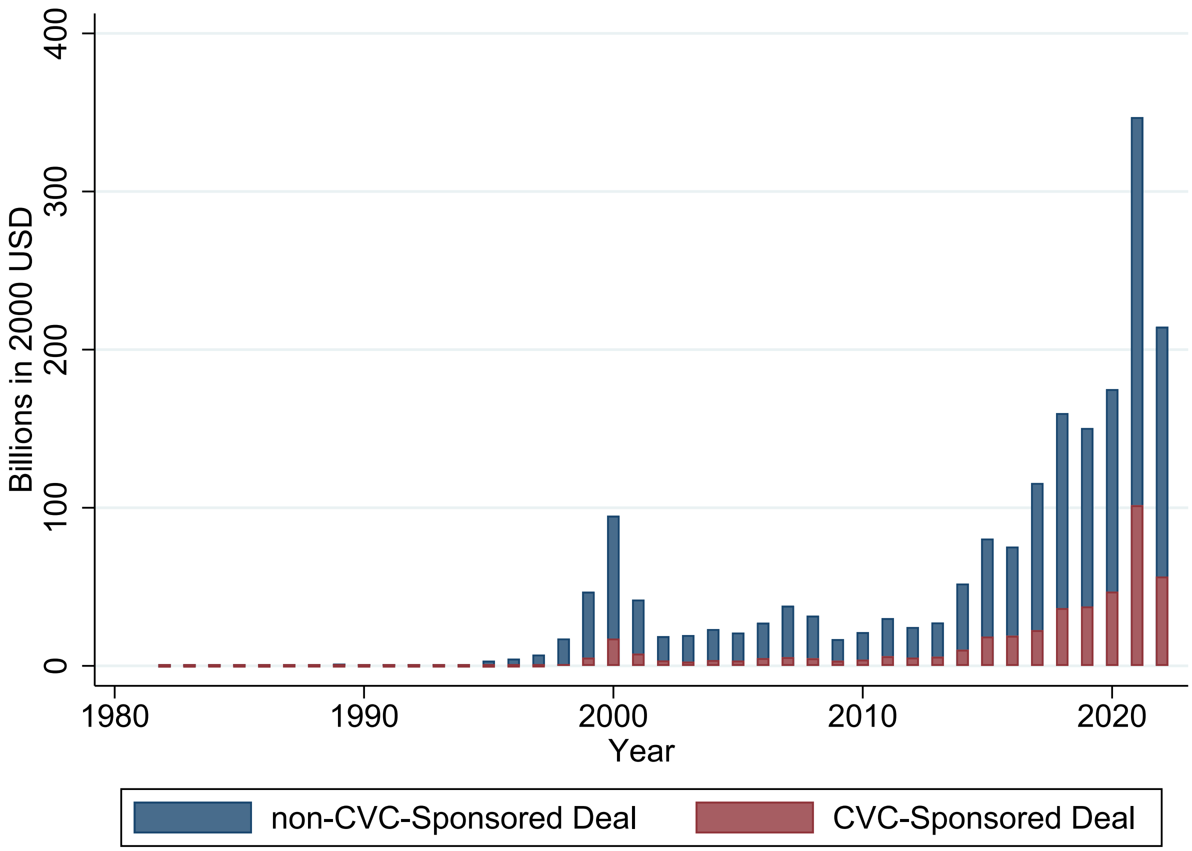

Table I. Startup Exit Outcomes

The table shows the distribution of startup exit outcomes in the sample. Panel A shows the exit outcomes at the startup-level, using the sample of the universe of startups. Panel B shows the startup exit outcomes by last funding rounds. Panel C shows the acquirer type of acquisition exits at the startup-CVC level, where the sample is constructed as follows. For each CVC-subindustry in which the CVC investments are made, I obtain the dates of its initial and final startup equity financing deals, thereby generate a panel of CVC-subindustry-year spanning all the years between the first and last deal date. Next, I include all the startups from the subindustry that are active in the focal year. The summary statistics are drown from unique CVC-startup pairs from the panel. Note that the sample include CVC and the universe of startups satisfying above criteria, including those that are not actually invested by CVC.

Panel A: Startup-level

	Frequency	%
IPO	1756	10.09
Acq	7135	40.99
Failed	3252	18.68
Active	5264	30.24

Panel B: Startup Exit Outcomes (by last funding round)

	IPO (%)	Acq (%)	Failed (%)	Active (%)
Angel	5.43	26.24	15.38	52.94
Pre-Seed	0.00	50.00	0.00	50.00
Seed	3.03	37.88	23.11	35.98
Series A	4.93	40.83	24.47	29.77
Series B	6.51	43.49	19.67	30.33
Series C	9.83	44.71	18.97	26.49
Series D	13.68	43.13	17.50	25.68
Series E	15.88	42.34	15.88	25.91
Series F	21.88	33.52	10.51	34.09
Series G+	31.64	24.36	11.64	32.36

Panel C: Acquirer Type by CVC-startup pair level

Acquirer Type	All startups	CVC-invested startups
CVC parent	0.12%	3.03%
CVC parent competitor (SIC 4 digit)	7.05%*	11.41%*
CVC parent competitor (SIC 3 digit)	14.01%*	18.9%*
CVC parent competitor (SIC 2 digit)	18.07%*	25.65%*

*Only within sample of which acquirers have matched SIC codes from Compustat.

Table II. CVC Investment Distributions

The table shows the summary statistics of the startup equity financing deals invested by CVC, broken down by funding round. Panel A shows the frequency of CVC-invested deals by funding round and its percentage from the total number of CVC invested deals. Panel B shows the distribution of CVC- and non-CVC-invested deals as a percentage of the total number of deals for each funding round.

Panel A: CVC-Invested Deals Funding Round Distribution

Funding Rounds	Frequency	Percent
Angel	14	0.05%
Pre-Seed	54	0.21%
Seed	261	1.01%
Seed VC	4121	15.98%
Series A	7217	27.99%
Series B	6001	23.27%
Series C	3488	13.53%
Series D	1707	6.62%
Series E	733	2.84%
Series F	242	0.94%
Series G	86	0.33%
Series H	38	0.15%
Series I	11	0.04%
Series J	7	0.03%
Series K	3	0.01%
Unclassified	1805	7%

Panel B: Distribution of CVC-Invested Deals vs. Non-CVC-Invested Deals

Funding Rounds	CVC Invested?	
	Yes	No
Angel	0.20%	99.80%
Pre-Seed	5.70%	94.30%
Seed	1.60%	98.40%
Seed VC	14.26%	85.74%
Series A	15.47%	84.53%
Series B	21.35%	78.65%
Series C	23.89%	76.11%
Series D	24.95%	75.05%
Series E	24.74%	75.26%
Series F	22.32%	77.68%
Series G	19.37%	80.63%
Series H	21.84%	78.16%
Series I	15.49%	84.51%
Series J	18.92%	81.08%
Series K	18.75%	81.25%
Unclassified	14.54%	85.46%

Table III. CVC Investment Styles

The table shows the regression results related to CVC investment styles. Panel A shows the CVC's likelihood of being a sole investor of a deal. The sample includes all deal-investor pair information for all startup equity financing deals in the sample. The dependent variable, D(Sole Investor), is a dummy variable that takes the value of one if the focal investor is the only investor of the deal, and zero otherwise. The independent variable, CVC, takes the value of one of the focal investor is a CVC investor, and zero otherwise. Follow-up Deal is a dummy variable is a dummy variable that takes the value of one if the focal investor is not the first deal of an investment stage, judging from the deal date. An investment stage is defined using the Simplified Round variable from CB Insights that classifies the startup equity financing deals into "Angel", "Pre-Seed", "Seed", "Seed VC", "Series A", "Series B", "Series C", "Series D", "Series E+", "Venture Capital" (unclassified). Panel B shows the regression results of CVC investor identity on deal valuation. Valuation is a variable that indicates the deal implied post-money valuation, inflation-adjusted to million USD in 2000 year term. The independent variables CVC and Sole Investors are defined similarly to Panel A. Both regressions also include Round fixed effects and robust standard errors are reported in the parenthesis.

Panel A: Probability of Being a Sole Investor

	D(Sole Investor)	
	(1)	(2)
CVC	0.00636***	-0.00773***
	(0.00171)	(0.00187)
CVC * Follow-up Deal		0.0782***
		(0.00455)
Follow-up Deal		0.0166***
		(0.00131)
Constant	0.0970***	0.0942***
	(0.000453)	(0.000488)
Obs	443,762	443,251
Adjusted-R^2	0.038	0.038
Round Fixed Effects	Yes	Yes
Econ. Mag. [CVC]	0.0628	
Econ. Mag. [CVC * Follow-up Deal]		0.773

Panel B: Deal Valuation

	Valuation	
	(1)	(2)
CVC * Sole Investor [A]	142.6**	37.60*
	(63.41)	(22.01)
CVC [B]	-64.16***	0.00142
	(14.36)	(2.144)
Sole Investor [C]	-44.78***	-25.28***
	(14.48)	(7.043)
Constant	257.5***	261.2***
	(3.710)	(0.491)
Obs	193,806	182,735
Adjusted-R^2	0.082	0.988
Round Fixed Effects	Yes	
Firm-Round Fixed Effects		Yes
Econ. Mag.[A+B+C]	0.134	0.0491

Table IV. Baseline Regression: CVC Investments on Exit Outcomes

The table reports the regression results of the effects of CVC investment on various exit outcomes. The sample includes CVC-startup-year observations for each CVC-subindustry-year between its first and last investments in the subindustry and the startups from the subindustry that are active in the focal year. The dependent variable is a dummy variable that takes the value of one if the exit has an exit by IPO (Panel A), Failed (Panel B), Acquisition (Panel C) and Acquisition by CVC parent (Panel D). The independent variable, 1(CVC-startup), is the endogenous variable that takes the value of one if the CVC invests in the startup in the current year. The IV, is the instrumental variable, CVCFlow defined in Section III. For each table, Column (1) presents the OLS regression results where the dependent variable is directly regressed on the endogenous variable 1(CVC-startup). Column (2) and (3) presents the Two-stage Least Square (2SLS) IV regression results, where in Column (2) the endogenous variable 1(CVC-startup) is regressed on the IV, and in Column (3), the exit outcome dependent variable is regressed on the instrumented endogenous variable 1(CVC-startup). In Column (4), the dependent variable is regressed directly on the IV. All regressions include control variables startup age, as well as startup characteristics from year t-2, including patent stock, patent citations and growth rates, funding size over the past 1, 2, and 3 years, and the number of peer startups within the focal industry. All regressions also include startup industry-year fixed effects and the standard errors are clustered at the startup industry level. The t-statistics are reported in the parenthesis.

Panel A: IPO

	IPO			
	OLS (1)	IV First Stage (2)	IV Second Stage (3)	IV Reduced Form (4)
1(CVC-startup)	0.10***		2.87***	
	(4.63)		(4.11)	
IV		0.073***		0.21***
		(5.41)		(4.61)
Obs	140,813	140,813	140,813	140,813
Ajusted-R^2	0.13	0.00091		0.13
Y mean	0.14	0.14	0.14	0.14
First Stage F-stat		29.3		
Controls	Yes	Yes	Yes	Yes
Ind-Year FE	Yes	Yes	Yes	Yes

Panel B: Failed

	Failed			
	OLS (1)	IV First Stage (2)	IV Second Stage (3)	IV Reduced Form (4)
1(CVC-startup)	-0.073***		-1.73**	
	(-4.05)		(-2.48)	
IV		0.073***		-0.13***
		(5.41)		(-2.61)
Obs	140,813	140,813	140,813	140,813
Ajusted-R^2	0.11	0.00091		0.11
Y mean	0.26	0.26	0.26	0.26
First Stage F-stat		29.3		
Controls	Yes	Yes	Yes	Yes
Ind-Year FE	Yes	Yes	Yes	Yes

Panel C: Acquisition

	Acquisition			
	OLS (1)	IV First Stage (2)	IV Second Stage (3)	IV Reduced Form (4)
1(CVC-startup)	-0.028		-1.14*	
	(-1.17)		(-1.77)	
IV		0.073***		-0.083*
		(5.41)		(-1.78)
Obs	140,813	140,813	140,813	140,813
Ajusted-R^2	0.16	0.00091		0.16
Y mean	0.60	0.60	0.60	0.60
First Stage F-stat		29.3		
Controls	Yes	Yes	Yes	Yes
Ind-Year FE	Yes	Yes	Yes	Yes

Panel D: Acquisition (CVC Parent)

	Acq (CVC Parent)			
	OLS	IV First Stage	IV Second Stage	IV Reduced Form
	(1)	(2)	(3)	(4)
1(CVC-startup)	0.022***		0.44**	
	(4.20)		(2.26)	
IV		0.073***		0.032***
		(5.41)		(2.69)
Obs	140,813	140,813	140,813	140,813
Ajusted-R^2	0.010	0.00091		0.0088
Y mean	0.0015	0.0015	0.0015	0.0015
First Stage F-stat		29.3		
Controls	Yes	Yes	Yes	Yes
Ind-Year FE	Yes	Yes	Yes	Yes

Table V. Startup Exit by Investment Rounds

The table reports the estimation results of a Two-stage Least Square regression of the effects of CVC investment on startup exit outcomes, separately for various investment stages. Panel A reports the first stage regression results. The interacted variable $1(CVC - startup) \times 1(Stage^k)$ is regressed on a set of interactions between instrument CVCFlow the set of $1(Stage^k)$ dummies where $1(Stage^k)$ is defined as Pre-A Rounds, A-C Rounds, and Post-C Rounds, respectively. Panel B reports the estimation results of the second stages. The dependent variable is a dummy variable that takes the value of one if the exit has an exit by Failed (Panel A), IPO (Panel B), Acquisition (Panel C) and Acquisition by CVC parent (Panel D). In the second stage, the dependent variable is regressed on the set of instrumented interaction terms $1(CVC - startup) \times 1(Stage^k)$. All regressions include control variables startup age, as well as startup characteristics from year t-2, including patent stock, patent citations and growth rates, funding size over the past 1, 2, and 3 years, and the number of peer startups within the focal industry. All regressions also include startup industry-year fixed effects and the standard errors are clustered at the startup industry level. The t-statistics are reported in the parenthesis.

Panel A: IV First Stage

	1(CVC-startup) × ...		
	(Pre-A Rounds) (1)	(A-C Rounds) (2)	(Post-C Rounds) (3)
IV × (Pre-A Rounds)	0.10***	-0.052***	-0.011***
	(3.61)	(-4.24)	(-3.00)
IV × (A-C Rounds)	-0.0049**	0.10***	-0.017***
	(-2.51)	(6.74)	(-5.29)
IV × (Post-C Rounds)	-0.0016	-0.019**	0.15***
	(-1.49)	(-2.55)	(6.46)
Obs	140,813	140,813	140,813
Controls	Yes	Yes	Yes
Ind-Year FE	Yes	Yes	Yes

Panel B: IV Second Stage

	Failed	IPO	Acq	Acq (CVC Parent)
	(1)	(2)	(3)	(4)
1(CVC-startup) × (Pre-A Rounds)	5.35**	-7.34***	1.99	0.55*
	(2.17)	(-2.99)	(0.89)	(1.83)
1(CVC-startup) × (A-C Rounds)	-0.27	0.037	0.24	0.43**
	(-0.25)	(0.04)	(0.24)	(2.56)
1(CVC-startup) × (Post-C Rounds)	-2.27*	10.8***	-8.56***	0.20*
	(-1.77)	(5.03)	(-4.96)	(1.70)
Obs	140,813	140,813	140,813	140,813
Y mean	0.26	0.14	0.60	0.0015
First Stage F-stat	11.8	11.8	11.8	11.8
Controls	Yes	Yes	Yes	Yes
Ind-Year FE	Yes	Yes	Yes	Yes

Table VI. Startup Exits by CVC Market Dominance

The table reports the estimation results of a Two-stage Least Square regression of the effects of CVC investment on startup exit outcomes, separately for various investment stages. Panel A reports the first stage regression results. The interacted variable $1(CVC - startup) \times High\ Dominance$ is regressed on a set of interactions between instrument CVCFlow and two dummy variables *High Dominance* and *Low Dominance* respectively. Variable *High Dominance* is defined to be one if the CVC's total number of invested deals are among top 10% of all CVC investors in the focal statrtup industry, and zero otherwise. Variable *Low Dominance* is defined reversely. Panel B reports the estimation results of the second stages. The dependent variable is a dummy variable that takes the value of one if the exit has an exit by IPO (Panel A), Failed (Panel B), Acquisition (Panel C) and Acquisition by CVC parent (Panel D). In the second stage, the dependent variable is regressed on the two instrumented interaction terms $1(CVC - startup) \times High\ Dominance$ and $1(CVC - startup) \times Low\ Dominance$. All regressions include control variables startup age, as well as startup characteristics from year *t*-2, including patent stock, patent citations and growth rates, funding size over the past 1, 2, and 3 years, and the number of peer startups within the focal industry. All regressions also include startup industry-year fixed effects and the standard errors are clustered at the startup industry level. The t-statistics are reported in the parenthesis.

Panel A: IV First Stage

	1(CVC-startup) × ...	
	High Dominance	Low Dominance
	(1)	(2)
IV × High Dominance	0.14***	-0.0017
	(4.77)	(-0.21)
IV × Low Dominance	0.00051	0.040***
	(0.30)	(3.44)
Obs	140,813	140,813
Controls	Yes	Yes
Ind-Year FE	Yes	Yes

Panel B: IV Second Stage

	IPO	Failed	Acq	Acq (CVC Parent)
	(1)	(2)	(3)	(4)
1(CVC-startup) × High Dominance [A]	2.30***	-1.51**	-0.79	0.31**
	(3.88)	(-2.59)	(-1.43)	(2.27)
1(CVC-startup) × Low Dominance [B]	4.41***	-2.56**	-1.84**	0.45
	(3.72)	(-2.12)	(-2.00)	(1.56)
Obs	140,813	140,813	140,813	140,813
Y mean	0.14	0.26	0.60	0.0015
First Stage F-stat	8.76	8.76	8.76	8.76
Coefficients [A]-[B]	-2.10	1.05	1.05	-0.14
Coefficients [A]-[B] p-stat	0.0076	0.14	0.016	0.48
Controls	Yes	Yes	Yes	Yes
Ind-Year FE	Yes	Yes	Yes	Yes

Appendix A Additional Figures and Tables

Table A.1. Placebo Test: Unrelated Cash Flow on Industry Deal Flow

This table shows the estimation results of an OLS regression of CVC-industry-year panel. The dependent variable is industry-year level deal flow (inflation adjusted) and the independent variable *Unrelated Cash Flow* is the shock component of the instrument, which is the residuals after purging out industry common shocks. Column (2) also includes year fixed effects. The standard errors are clustered at the industry-year level. The t-statistics are reported in the parenthesis. The economic magnitude indicates the percentage change in the dependent variable associated with one percent increase in the *Unrelated Cash Flow* from the mean.

	Industry-Year Deal Flow (inflation-adjusted)	
	(1)	(2)
Unrelated Cash Flow	2.26	-8.17
	(0.36)	(-1.50)
Obs	6,479	6,471
Adjusted R^2	-0.00014	0.23
Y mean	1506.9	1506.9
Econ. Mag.	0.0019	-0.0068
Year Fixed Effects	No	Yes