

# Corporate Venture Capital and Firm Scope

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# Introduction

## Introduction

### Literature

### Data

### Suggestive Evidence

### Mechanism: Experimenta- tion

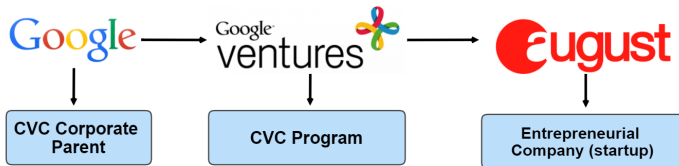
### Formal Identification

### Conclusion

- Firm scope
  - The set of different economic activities (industries, segments, product lines) a firm is engaged in (Jones and Hill, 1988)
- Abundant theoretical work in the topic
- Lack of empirical work on the *determinants* of firm scope
- A broader question motivated by Schumpeter: How does corporate innovation strategy spurs firm's growth and firm scope change?
- Research question: whether and how corporate venture capital spurs the firm scope change
  - Answer: CVC spurs firm scope changes through experimentation process

# Introduction

- What is *corporate venture capital* (CVC)?
  - Venture capital investments conducted by established corporations
  - Many tech giants and industry leaders join the CVC foray
    - Google, Microsoft, Apple, GE, General Motor, AT&T, etc
  - An example of CVC deal:



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- CVC differs from traditional VC (IVC) by strategic goals
  - Learn new technology and innovation (open innovation)
  - Provide and identify new business opportunities
- Why study CVC and not other corporate innovation strategies?
  - Other innovation strategies: strategic alliance and entrepreneur spawning
  - CVC initiated by industry leaders and understanding their firm scope dynamics is of great importance
  - Offers a unique chance to scrutinize a new strategy of firm growth: the experimentation strategy

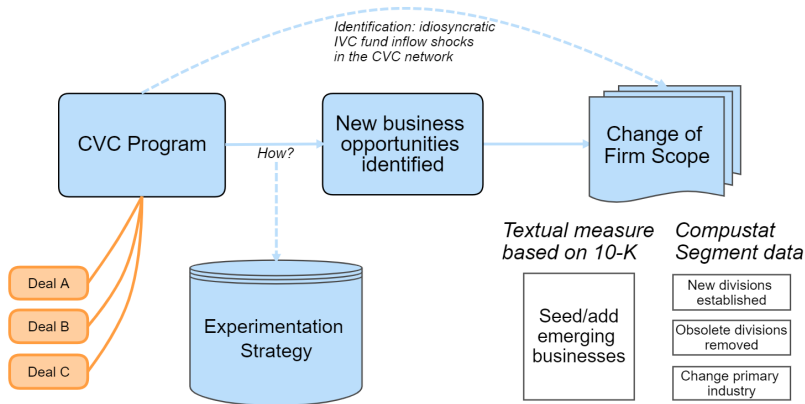
# Introduction



- Main idea of the paper:
  - ① CVC program helps its corporate parent identify new business opportunities (anecdotal evidence)
  - ② CVC parent will naturally adopt or integrate the new business and therefore change the scope
- Anecdotal evidence
  - NVCA survey: Identifying new market and business direction as important strategic objective
  - Ernst & Young (2009): one of the top two strategic objectives is window on new business opportunities
  - Other surveys:
    - Winters and Murfin (1988), Sykes (1990), McNally (1997), etc

# Introduction

- Three folders of contributions and results



# Literature

- Firm scope
  - Dates back to Teece (1980), Panzar and Willig (1981) in economics; Lang and Stulz (1994) and Berger and Ofek (1995) in finance
  - Determinants of firm scope: Maksimovic and Phillips (2001) and Hoberg and Phillips (2018, 2021)
- Experimentation view in entrepreneurial finance
  - Manso (2016) and Ewens, Nanda, and Rhodes-Kropf (2018)
- Large VC literature and specifically on CVC
  - Gompers and Lerner (2000), Hellmann (2002), Dushnitsky and Lenox (2005, 2006, 2009), Fulghieri and Sevilir (2009), Chemmanur, Loutskina, and Tian (2014), Kim, Gopal, and Hoberg (2016), Ma (2020), Tian and Ye (2020)
- VC network
  - Hochberg, Ljungqvist, and Lu (2007, 2010), Keil, Maula, and Wilson (2010)

# Plan

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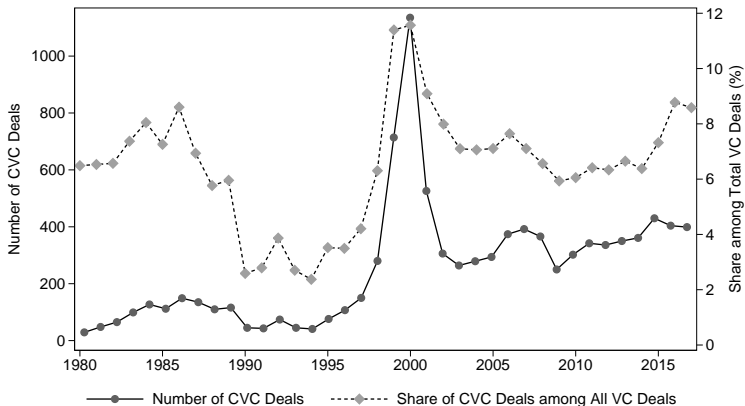
## 7 Conclusion



# Data

- CVC sample
  - Thomson Reuters SDC VentureXpert and PitchBook
  - 497 CVC programs with 448 US public corporations; 11,300 deals
- Firm Scope Measure 1: integrating/seeding emerging business
  - Start-up's business text: VentureXpert
  - Established firms' business text: 10-K Item 1 (Business Description)
- Firm Scope Measure 2: variables capturing large business changes
  - Compustat Historical Segment Database

## Data



The figure plots the annual CVC investments initiated by US public (non-financial) corporations in Compustat database. The left axis is the number of CVC deals in each year, and the right axis is the share (in percentage) of the CVC deals among all VC deals. The data are mainly obtained from SDC VentureXpert. The data range is from 1980 to 2017.



# Data: Firm Scope Measure 1

- Second step: Construct a measure about integrating emerging business by established firms
  - Search each emerging phrase (totally 2520) in each 10-K business descriptions
  - Download 10-K annual fillings for each US listed firm and extract Item 1

## Google's 2016 10-K Item 1 (Business Description)

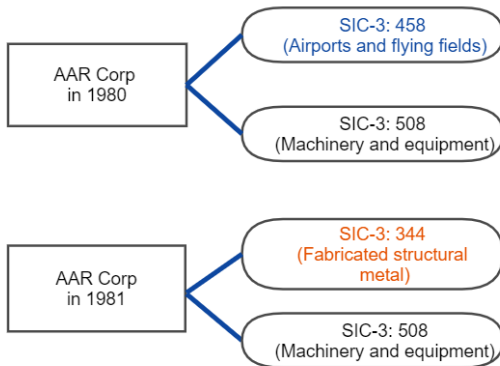
Google's  
businesses and  
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involve search,  
Android, maps,  
Chrome .....

## Google's 2017 10-K Item 1 (Business Description)

Google's  
businesses and  
core products  
involve search,  
Android, maps,  
Chrome, smart  
home service .....

## Data: Firm Scope Measure 2

- Construct dummy measures for firm scope changes
  - Start with the Compustat Segment data
  - Aggregate the raw segment data into firm-year-(SIC-3) level
  - Establish a new division = report a new SIC-3
  - Remove an old division = drop an existing SIC-3



- 6% of firm-year sample with  $D(\text{New Division}) = 1$
- 5% of firm-year sample with  $D(\text{Remove Division}) = 1$

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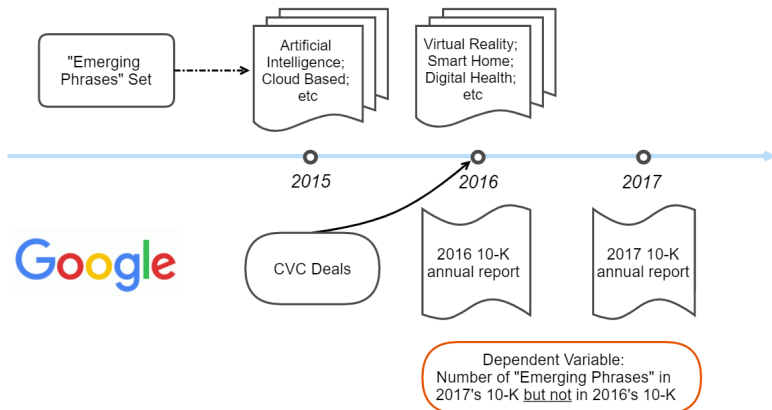
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## Suggestive Evidence: Firm Scope Measure 1

- Exercise 1: the impact of CVC on firm scope
- Firm Scope Change: measured by how many emerging phrases are newly added into each public listed firm's 10-K
- Intuition: CVC helps to identify emerging business (smart home) and Google adds it into its own business description after CVC deals



## Suggestive Evidence: Firm Scope Measure 1

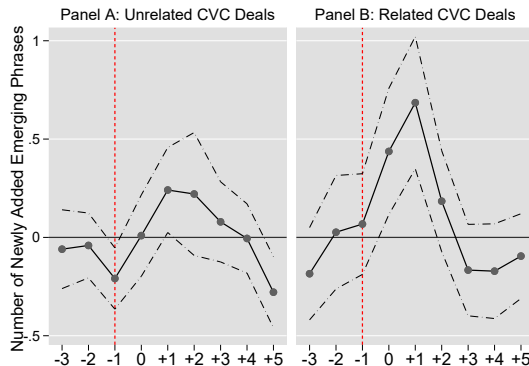
	(1)	(2)	(3)	(4)	(5)	(6)
OLS	Num. of "Emerging Phrases"			Newly Added in 10-K Item 1		
Newly added Emerging Phrases	Added in Year $t+1$ 's 10-K Not Find in Year $t$			Added in Year $t+2$ 's 10-K Not Find in Year $t+1$		
D(CVC)	0.776*** (7.36)			0.676*** (6.53)		
D(CVC Unrelated)		0.442*** (3.82)	0.300*** (2.82)		0.562*** (4.41)	0.331** (2.40)
D(CVC Related)		0.782*** (5.23)	0.873*** (5.45)		0.433*** (3.48)	0.301** (2.31)
Num. Any Short Phrases Added in $t+i$ ( $\div 1000$ )	0.863*** (33.49)	0.862*** (33.58)	0.937*** (30.50)	0.865*** (32.56)	0.865*** (32.58)	0.935*** (31.14)
Firm-level Controls	Firm Size, Tobin's Q, ROA, R&D, Leverage, Cash, Sales Growth, Capx., HHI 10-K (Item 1) Text Length, D(Conglomerate), Firm Age					
Year $\times$ Industry F.E.		✓			✓	
Year F.E.						
Firm F.E.			✓			✓
Num. Obs.	50,931	50,931	49,916	46,749	46,749	45,856
Adj. $R^2$	0.394	0.394	0.425	0.379	0.379	0.419

- Robust with different definitions of emerging phrases
- Robust if studying industry-specific emerging phrases

[More results](#)



## Suggestive Evidence: Firm Scope Measure 1



$$EmergingPhrases_{i,t} = \sum_{k=-3}^{+5} \gamma_k D(CVC\ Unr; k)_{i,t} + \sum_{k=-3}^{+5} \alpha_k D(CVC\ Rel; k)_{i,t} + \beta \mathbf{X} + \tau_i + \nu_t + \varepsilon_{i,t}$$

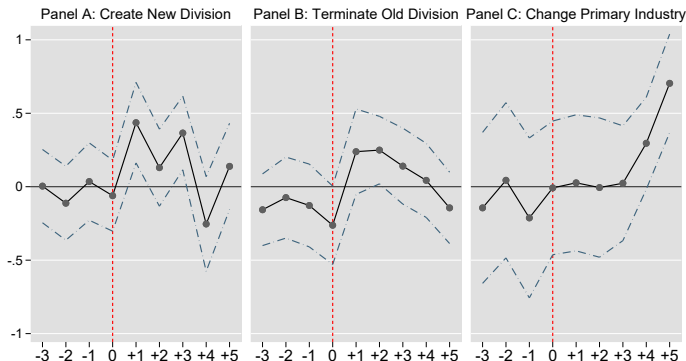
- $EmergingPhrases_{i,t}$ : Number of emerging phrases newly added in Year  $t$  10-K
- $\sum_{k=-3}^{+5} \gamma_k D(CVC\ Unr; k)_{i,t}$ : 9 dummies in the  $[-3, +5]$  year window around each CVC unrelated deal
- Confidence interval at 90% level and with firm and year F.E.
- Standard errors clustered at firm level

## Suggestive Evidence: Firm Scope Measure 2

- Dependent variable: Dummies of establishing new divisions and removing old divisions in the next two years  $[t+1, t+2]$
- Variable of interest: Dummy = 1 if firm has done CVC investments in Year  $t$

Panel A: Creating new divisions and removing old divisions						
Conditional Logit	(1)	(2)	(3)	(4)	(5)	(6)
Period	D(Create New Division) [t+1, t+2]			D(Remove Old Division) [t+1, t+2]		
D(CVC)	0.350*** (2.68)			0.323** (2.57)		
D(CVC Unrelated)		0.531*** (3.74)	0.434*** (2.91)		0.464*** (3.10)	0.195 (1.21)
D(CVC Related)		-0.294 (-1.42)	-0.00921 (-0.04)		-0.195 (-1.00)	-0.231 (-1.06)
Division Creation/Removal in the Past 2 Years	0.189*** (3.82)	0.189*** (3.81)		0.283*** (6.57)	0.284*** (6.59)	
Firm Controls:	Firm Size, Tobin's Q, ROA, R&D, Leverage, Capx., Cash, HHI, D(Conglomerate), Firm Age					
Year $\times$ Industry F.E.	✓	✓		✓	✓	
Year F.E.			✓			✓
Firm F.E.						
Num. Obs.	86,030	86,030	42,584	87,066	87,066	39,191
Pseudo $R^2$	0.026	0.027	0.069	0.166	0.166	0.099
Prob. Increased by D(CVC) = 1	+3.45%	—	—	+3.23%	—	—
by D(CVC Unrelated) = 1	—	+5.86%	4.91%	—	5.02%	2.73%

## Suggestive Evidence: Firm Scope Measure 2



$$D[\text{Scope Change}]_{i,t} = \sum_{k=-3}^{+5} \gamma_k D(\text{CVC Unr}; k)_{i,t} + \sum_{k=-3}^{+5} \alpha_k D(\text{CVC Rel}; k)_{i,t} + \beta \mathbf{X} + \tau_i + \nu_t + \varepsilon_{i,t}$$

- $D[\text{Scope Change}]_{i,t}$ : Dummies of the scope change
- $\sum_{k=-3}^{+5} \gamma_k D(\text{CVC Unr}; k)_{i,t}$ : 9 dummies in the [-3 Year, +5 Year] window around each CVC unrelated deal
- Only  $\sum_{k=-3}^{+5} \gamma_k D(\text{CVC Unr}; k)_{i,t}$  plotted
- Confidence interval at 90% level and with firm and year F.E.

# Plan

## ① Introduction

## ② Literature

## ③ Data

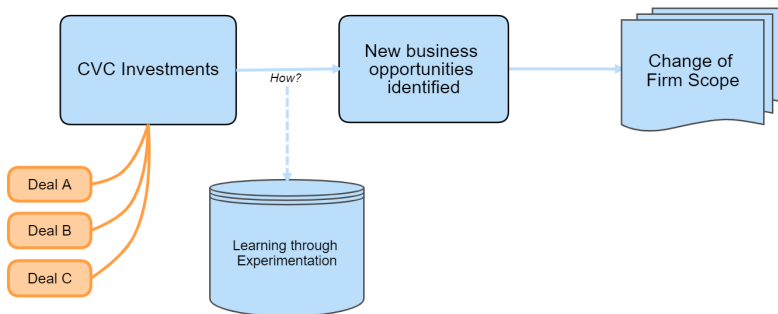
## ④ Suggestive Evidence

## ⑤ Mechanism: Experimentation

## ⑥ Formal Identification

## ⑦ Conclusion

## The Mechanism: Experimentation



- Experimentation
  - CVC allows firm to experiment with future business options
  - Each CVC deal viewed as an experiment creating a real option for a potential new line of products or activities
  - CVC parent firm could collect valuable information (signals) about the future potential of the business through CVC investments

## The Mechanism: Experimentation

- Anecdotal evidence (positive and negative signals)
- “If the [venture] turns out to be something important, you have to put in your own machines (page 1485).” – Interview with CVC managers
- “Sometimes we just speak up and say: ‘That will never work. I have seen it! Guys, that’s complete nonsense, I have seen the total opposite [faliure] here in a start-up.’ (page 1490)” – Interview with CVC managers
- Empirical evidence
  - Focus on CVC signals and the signal response (division creation)
  - Estimate a simple discrete choice model
  - Choice: in which industry to create a new division among 400 industry alternatives
  - Data: Firm-Industry(SIC-3)-Year

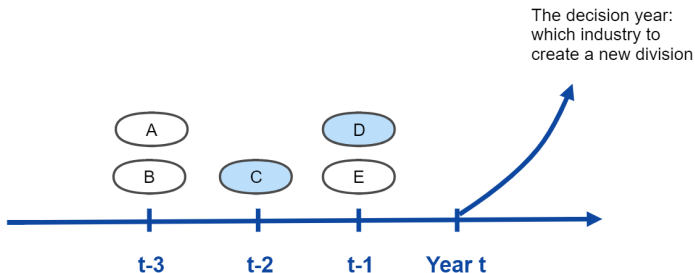
## The Mechanism: Experimentation

- Estimated using conditional logit grouping at the firm-year level
- Dependent Var: Dummy = 1 if the industry is chosen by the firm to create a new division
- D(CVC 3yr): Dummy = 1 if the firm has done CVC investments in the past three years in the given industry
- Construct signal variables using startup's IPO, acquisition, bankruptcy, and patents information
- Interact signal variables with the D(CVC 3yr)

Panel A: Main Setup							
Conditional Logit	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	D(Create New Division)						
D(CVC 3yr)	3.486*** (11.55)	3.729*** (13.34)	3.682*** (12.65)	3.665*** (12.79)	3.606*** (11.61)	3.660*** (12.82)	3.492*** (11.04)
D(CVC 3yr) × D(Ind. Proxy SIC2)	-2.363*** (-5.06)	-2.437*** (-5.12)	-2.454*** (-4.96)	-2.441*** (-5.13)	-2.480*** (-5.21)	-2.448*** (-5.11)	-2.520*** (-5.41)
D(CVC 3yr) × D(Ind. Proxy SIC1)	-1.561** (-2.48)	-1.665** (-2.42)	-1.459** (-2.24)	-1.556** (-2.40)	-1.547** (-2.27)	-1.809*** (-2.68)	-1.836*** (-2.68)
D(CVC 3yr) × Num(Startups IPO)	0.774*** (2.90)						
D(CVC 3yr) × Num(Startups Acquired by Third Party)		0.296 (0.59)					
D(CVC 3yr) × Num(Startups Acquired with Above-median IRR)			0.421** (2.17)				
D(CVC 3yr) × Num(Startups Acquired by CVC Parent Itself)				0.322*** (3.30)			
D(CVC 3yr) × Num(Startups Bankruptcy)					-0.567* (-1.77)		
D(CVC 3yr) × Patents Growth Signal						1.585** (2.52)	
D(CVC 3yr) × Patents Positive Signal							0.796** (2.11)
D(CVC 3yr) × Patents Negative Signal							-0.253 (-0.46)
D(CVC 3yr) × Num(Startups Invested)	-0.0292 (-0.56)	0.0120 (0.14)	0.00222 (0.04)	0.0353 (0.90)	0.144** (2.52)	0.0525 (1.27)	0.0531 (1.28)

## The Mechanism: Experimentation

- An illustrative example of signal construction
- Google invests in some startups in Industry  $j$  (SIC-3  $j$ )
- $D(\text{CVC } 3\text{yr}) = 1$ ;  $\text{Num}(\text{Startups Invested}) = 5$ ;  $\text{Num}(\text{Startup IPO})(\text{signal var.}) = 2$
- About signal:
  - Private information to Google
  - Observed after investment



- denotes the start-up invested by Google
- denotes the start-up invested by Google and finally exits through IPO



# The Mechanism: Experimentation

- Estimate a similar model for adding industry-specific emerging phrases
- 8 VEIC industries as the set of alternatives

Panel B: Interact with the signal variable					
	(1) Number of Newly Added	(2) Emerging Phrases	(3) (VEIC $j$ )	(4) (with ln())	(5) (with ln())
D(CVC VEIC $j$ )	0.120*** (8.17)	0.122*** (7.08)	0.119*** (6.99)	0.122*** (7.07)	0.122*** (7.06)
D(CVC VEIC $j$ ) $\times$ Num(Startups IPO)	0.0216** (1.99)				
D(CVC VEIC $j$ ) $\times$ Num(Startups Acquired by Third Party)		0.000 (0.00)			
D(CVC VEIC $j$ ) $\times$ Num(Startups Acquired by Parent Itself)			0.0251*** (3.51)		
D(CVC VEIC $j$ ) $\times$ Num(Startups Bankruptcy)				-0.00697 (-0.74)	
D(CVC VEIC $j$ ) $\times$ Patent Growth Signal					0.00360*** (3.31)
D(CVC VEIC $j$ ) $\times$ Num(Startups Invested)	0.00818*** (4.90)	0.00999*** (3.45)	0.00935*** (3.98)	0.0102*** (3.49)	0.00997*** (3.71)
Firm F.E.	✓	✓	✓	✓	✓
VEIC*Year F.E.	✓	✓	✓	✓	✓
Num. Obs.	616,544	616,544	616,544	616,544	616,544
Adj. $R^2$	0.183	0.183	0.183	0.183	0.183

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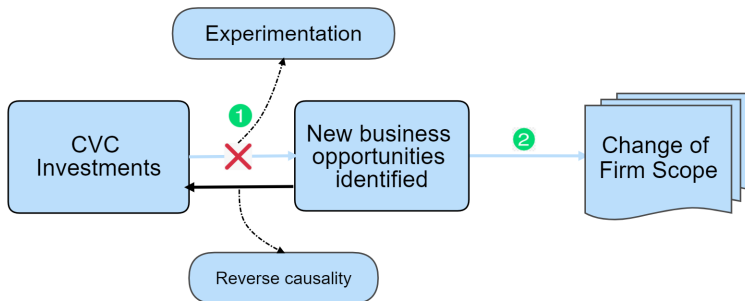
## 5 Mechanism: Experimentation

## 6 Formal Identification

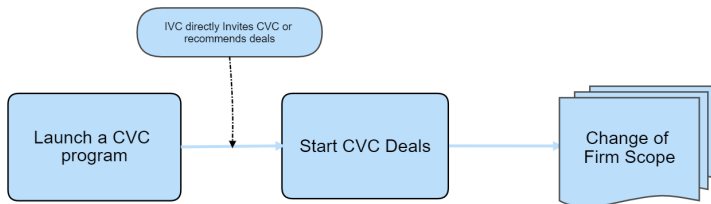
## 7 Conclusion

## Formal Identification

- The alternative story: reverse causality
- In this case, good business opportunity with  $\text{Prob} = 1$

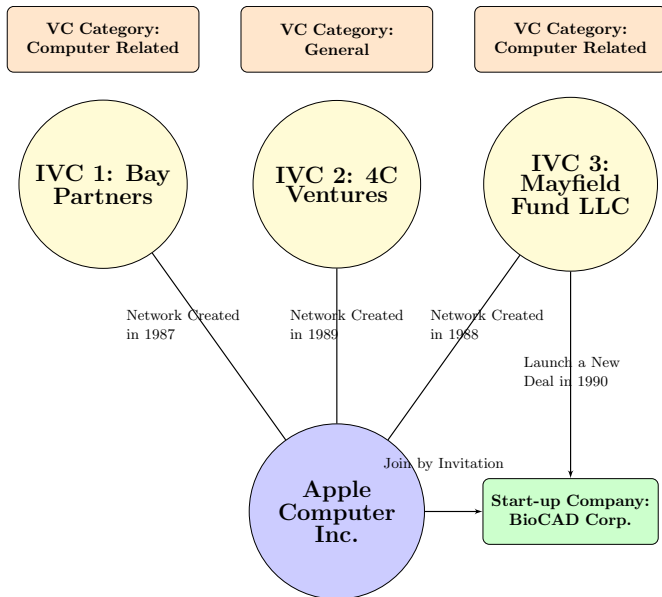


## Formal Identification



- The idea of exogenous variation
  - On the CVC investments (after launching CVC program)
  - Rely on traditional VC (IVC) firm's invitation and recommendation
  - IVC is the largest deal source of most CVC programs (MacMillan et al., 2008)
  - Many IVCs invite their old partners in the previous syndicate network to join in their new deals (Hochberg, Ljungqvist, and Lu, 2007, 2010)
- Explore the Idiosyncratic Fund Inflow Shock of IVCs

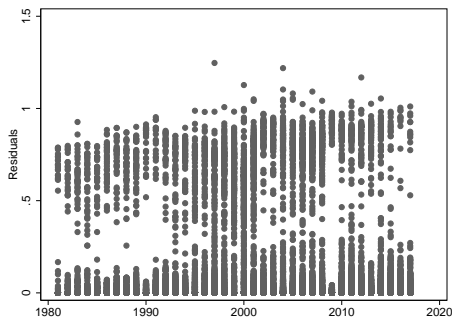
## Formal Identification



## Formal Identification

- Construct/Proxy Idiosyncratic Fund Inflow Shock
  - Follow the Granular IV (Gabaix and Koijen (2021))
  - Proxy raw fund inflow using the dummy of launching a follow-on fund
  - Replicate and estimate Gompers and Lerner (1998)'s fundraising model [▶ Details](#)
  - Use the error term to proxy idiosyncratic fund inflow shock

$$\widehat{GIV}_{i,t} = \sum_{j \in \text{Network}_i} \max\{\hat{\mu}_{j,t}, 0\} \quad (1)$$



## 2SLS Results (First Stage)

\* 2SLS with GIV instrumenting the number of CVC deals  
\* Focus on a small sample: firms having already started CVC programs in the past 5 years  
\* Control the network size and network characteristics \* **Main results:** the positive relationships remain in the 2SLS

	(1)	(2)	(3)	(4)	(5)	(6)
	Num(CVC Deal)			Num(CVC Initial Deal)		
Granular IV (IVC Fund Inflow Shock)	0.100*** (14.59)	0.0987*** (13.73)	0.0937*** (11.48)	0.0866*** (13.62)	0.0858*** (13.90)	0.0824*** (11.17)
Num(IVC in the Network)	0.182*** (5.00)	0.189*** (5.03)	0.218*** (4.69)	0.123*** (4.30)	0.128*** (4.33)	0.148*** (3.99)
IVC's Average Age In the Network		-0.0146*** (-3.84)	-0.0225*** (-4.00)		-0.0144*** (-3.83)	-0.0224*** (-4.04)
IVC's Average Past IPO In the Network		0.00870 (1.00)	-0.00176 (-0.15)		0.0132 (1.53)	0.00279 (0.23)
Industry VC Deal Flow	0.00204 (1.42)	0.00207 (1.45)		0.00197 (1.28)	0.00203 (1.32)	
D(CVC Past 1yr)	0.311*** (12.42)	0.297*** (12.12)	0.302*** (9.17)	0.173*** (7.74)	0.160*** (7.15)	0.155*** (4.75)
D(CVC Past 2yr)	0.0815*** (3.71)	0.0742*** (3.28)	0.0921*** (3.15)	0.0250 (1.26)	0.0179 (0.87)	0.0373 (1.37)
D(CVC Past 3yr)	0.0166 (0.63)	0.0100 (0.38)	0.0257 (0.84)	-0.00219 (-0.09)	-0.00840 (-0.33)	-0.000671 (-0.02)
Firm Controls:	Firm Size, Tobin's Q, ROA, R&D, Leverage, Capx., HHI, D(Conglo), Age					
Year Fixed Effect	Yes	Yes	No	Yes	Yes	No
Industry Fixed Effect	Yes	Yes	No	Yes	Yes	No
Industry*Year Fixed Effect	No	No	Yes	No	No	Yes
Num. Obs.	3,236	3,236	3,236	3,236	3,236	3,236
Adj. R <sup>2</sup>	0.539	0.548	0.560	0.481	0.487	0.497

## 2SLS Results (Second Stage)

\* 2SLS with GIV instrumenting the number of CVC deals

\* Focus on a small sample: firms having already started CVC programs in the past 5 years

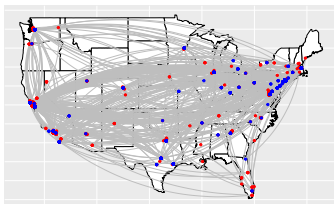
\* Control the network size and network characteristics \* **Main results:** the positive relationships remain in the 2SLS

2SLS	(1)	(2) Textual Measure	(3)	(4)	(5) Segment Dummies	(6)
Time Period	Emerging Phrases [t+1]	Business Changes [t+1]	New Products [t+1]	New Division [t+1, t+2]	Remove Divisions [t+1, t+2]	Change Industry [t+3, t+5]
Num(CVC Initial Deals) (Instrumented by GIV)	0.851*** (2.728)	3.766** (2.501)	0.347** (2.364)	0.079** (2.022)	-0.028 (-0.559)	0.065** (2.158)
Num(IVC in the Network)	-0.033 (-0.241)	-0.180 (-0.228)	-0.033 (-0.528)	0.012 (0.665)	0.008 (0.366)	0.015 (0.749)
IVC's Average Age in Network	0.048** (2.303)	0.128 (1.015)	0.020* (1.793)	0.001 (0.394)	-0.001 (-0.234)	0.000 (0.145)
IVC's Average Past IPO in Network	-0.207** (-2.069)	-0.287 (-1.069)	-0.026 (-0.984)	-0.001 (-0.301)	0.008 (1.519)	-0.006 (-1.047)
D[ CVC Past 1yr]	0.072 (0.474)	0.540 (0.517)	0.114 (1.182)	0.007 (0.355)	0.000 (0.016)	0.007 (0.367)
D[ CVC Past 2yr]	-0.135 (-1.031)	-1.329 (-1.526)	-0.034 (-0.411)	-0.009 (-0.702)	0.010 (0.638)	0.013 (1.156)
D[ CVC Past 3yr]	-0.068 (-0.491)	-0.407 (-0.439)	0.137 (1.550)	0.008 (0.585)	0.012 (0.760)	0.004 (0.323)
Kleibergen-Paap F statistic	192.46	107.99	63.21	127.06	127.06	127.06
Other Firm Controls	✓	✓	✓	✓	✓	✓
Industry*Year F.E.	1450	1569	567	2474	2474	2474
Nm. Obs.	1450	1569	567	2474	2474	2474
R <sup>2</sup>	0.065	0.030	0.419	0.026	0.083	0.051

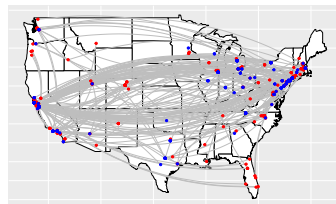


## Alternative Identification

- Alternative identification / treatment intensity
- Whether there is direct airline route between the location of CVC parent firm and the startup



Panel A: CVC Deals with Direct Flights



Panel B: CVC Deals without Direct Flights

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## 5 Mechanism: Experimentation

## 6 Formal Identification

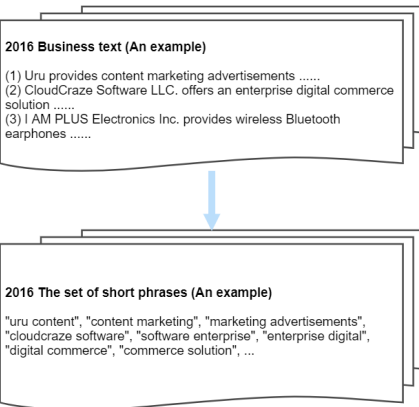
## 7 Conclusion

# Conclusion

- Study whether and how CVC reshape the firm scope of its CVC parent
- Construct novel textual measures – emerging business
- Mechanism: learning-through-experimentation
- New Instrument – fund inflow shock of IVCs in the network

## Appendix: Firm Scope Measure 1

- Use “Emerging Phrases” to proxy emerging business in the economy
  - Raw data: a paragraph of business descriptions for each startup
  - Aggregate startups receiving VC funding in Year  $t$  in a yearly corpus
  - Take the top 5% most popular 2-gram tokens in a given corpus



◀ Back to Data

## Appendix: Summary Statistics

Panel A: Firm-Year sample

Variables	D(CVC) = 1			D(CVC) = 0			Test of Mean
	Mean	S.D.	N.	Mean	S.D.	N.	p value
D(New Div.)	0.139	0.346	2,129	0.086	0.280	152,169	0.000
D(Div. Rem.)	0.171	0.377	2,129	0.099	0.298	152,169	0.000
D(Chg. Ind.) (3-5)	0.088	0.336	2,129	0.053	0.280	152,169	0.000
D(Chg. Ind.) (4-6)	0.083	0.339	2,129	0.045	0.276	152,169	0.000
Firm Size	7.979	1.790	2,096	4.430	2.313	129,622	0.000
Tobin's Q	2.592	3.314	1,894	3.472	17.622	124,357	0.030
R&D Exp.	0.088	0.233	2,125	0.203	1.598	150,678	0.000
ROA	0.130	0.286	2,080	-0.082	1.154	136,788	0.000
Book Leverage	0.322	0.297	2,106	0.338	0.549	148,477	0.169
Capx.	0.071	0.089	2,082	0.081	0.116	136,812	0.000
HHI	0.083	0.077	2,129	0.084	0.083	152,169	0.669
Cash	0.195	0.191	2,127	0.189	0.227	151,034	0.236
D(Conglomerate)	0.469	0.499	2,129	0.232	0.422	152,169	0.000

Panel B: CVC related and unrelated deals

CVC Deal Type	Number	Percentage
Related Deals	4,159	38.17%
Unrelated Deals	5,744	52.72%
The startup's SIC-3 code is missing	992	9.11%

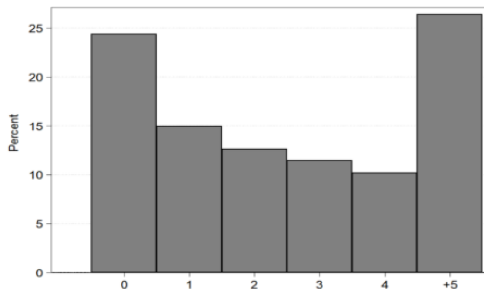


## Appendix: Suggestive Evidence: Firm Scope

- Sort each emerging phrase and each CVC deal into 8 industries
- Dependent variable: Number of newly added emerging phrases [ $\text{Ln}(1+\text{Num}())$ ]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of Newly Added Emerging Phrases (VEIC Industry Specific)							
VEIC Industry	Biotech- nology	Communica- tion	Computer Hardware	Computer Software	Internet Specific	Medical Health	Non-High- Tech	Others
D(CVC in Biotechnology)	0.057** (2.315)	0.006 (0.388)	0.021 (1.517)	-0.000 (-0.013)	-0.027 (-0.803)	0.014 (0.762)	0.012 (0.818)	0.009 (0.442)
D(CVC in Communication)	-0.005 (-1.592)	0.075** (2.761)	-0.002 (-0.176)	0.019 (0.512)	0.052 (1.283)	-0.005 (-1.007)	-0.001 (-0.088)	0.026* (1.864)
D(CVC in Computer Hardware)	0.010 (1.233)	0.004 (0.118)	-0.002 (-0.154)	-0.045 (-1.294)	0.028 (0.825)	-0.004 (-0.349)	-0.004 (-0.258)	-0.021 (-1.260)
D(CVC in Computer Software)	-0.006 (-1.069)	0.016 (0.936)	0.003 (0.385)	0.070** (2.573)	0.022 (0.753)	0.008 (1.333)	0.002 (0.160)	-0.000 (-0.005)
D(CVC in Internet Specific)	0.008 (1.546)	0.008 (0.471)	0.009 (1.224)	0.084*** (3.137)	0.113** (2.380)	-0.002 (-0.606)	0.004 (0.436)	0.012 (1.243)
D(CVC in Medical Health)	0.016 (0.931)	-0.023 (-1.016)	-0.019 (-1.577)	0.049 (1.541)	0.055* (1.801)	0.010 (0.592)	0.008 (0.508)	0.011 (0.835)
D(CVC in Non-high-tech)	-0.009 (-1.487)	-0.005 (-0.260)	0.007 (0.628)	0.034 (1.179)	0.007 (0.270)	-0.012 (-1.540)	-0.024** (-2.196)	0.005 (0.447)
D(CVC in Others)	-0.011** (-2.519)	0.002 (0.071)	0.006 (0.471)	0.001 (0.026)	-0.010 (-0.323)	-0.001 (-0.114)	0.005 (0.659)	0.047*** (3.913)
Firm F.E.	✓	✓	✓	✓	✓	✓	✓	✓
Industry × Year F.E.	✓	✓	✓	✓	✓	✓	✓	✓
Num. Obs.	50,931	50,931	50,931	50,931	50,931	50,931	50,931	50,931
Adj. $R^2$	0.156	0.227	0.049	0.281	0.320	0.055	0.055	0.087

## Appendix: Emerging Phrases Retaining



(d) Years of surviving of “emerging phrases” in the subsequent 10-Ks

[◀ Back to Suggestive Evidence](#)



## Appendix: Post CVC Value Creation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Change of Tobin's Q of the CVC Parent							
$\Delta =$	(t+3)-t	(t+4)-t	(t+3)-t	(t+4)-t	(t+3)-t	(t+4)-t	(t+5)-t	(t+6)-t
D(CVC Unrelated)	0.304*** (3.42)	0.307*** (3.21)						
D(CVC Related)	-0.186 (-1.04)	-0.256 (-1.27)	-0.133 (-0.67)	-0.155 (-0.79)	-0.142 (-0.71)	-0.166 (-0.84)	-0.201 (-0.98)	-0.0983 (-0.40)
D(CVC Unrelated) $\times$ D(New Div.)(t+1,t+2]			0.363*** (2.69)	0.376*** (3.17)				
D(CVC Unrelated) $\times$ (1-D(New Div.)(t+1,t+2])			0.0766 (0.73)	-0.00393 (-0.03)				
D(CVC Unrelated) $\times$ D(Div. Rem.)(t+1,t+2]					0.538** (2.11)	0.592** (2.01)		
D(CVC Unrelated) $\times$ (1-D(Div. Rem.)(t+1,t+2])					0.0857 (0.81)	0.0139 (0.12)		
D(CVC Unrelated) $\times$ D(Chg. Ind.)(t+3,t+5]							0.299* (1.81)	0.321* (1.70)
D(CVC Unrelated) $\times$ (1-D(Chg. Ind.)(t+3,t+5])							0.0271 (0.23)	0.0660 (0.58)
Firm Controls	Firm Size; ROA; Cash; R&D; Leverage; Capital Exp.; HHI; D(Conglomerate)							
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm F.E.	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Num. Obs.	74,128	65,292	74,128	65,292	74,128	65,292	57,747	51,249
Adj. $R^2$	0.080	0.075	0.252	0.257	0.252	0.257	0.287	0.291

## Appendix: Detailed Steps of the Granular IV

Apply Gabaix and Koijen (2021)'s non-loop model (Section 2.2.3 Model with an enriched factor structure):

$$Num\_CVC_{i,t} = \alpha \bar{S}_{i,t} + \beta_1 X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where  $Num\_CVC_{i,t}$  is the number of CVC deals initiated by CVC Firm  $i$  in Year  $t$ ; while  $\bar{S}_{i,t}$  is the sum of raw fund inflow of  $k$  IVC firms in the past 5-year network of the CVC firm, where  $k$  is equal to 3 in the Figure 4's example, the Apple Inc's example. So,

$$\bar{S}_{i,t} = \sum_{j \in Network_i} S_{j,t} \quad (3)$$

And  $S_{j,t}$  is the raw fund inflow of IVC firm  $j$  in Year  $t$ . Next, the raw fund inflow is a function of IVC's firm characteristics  $\bar{X}_{j,t}$  ( $\bar{X}$  includes large sets of fixed effects) and time factors  $\lambda_t$ .

$$S_{j,t} = \gamma_{j,t} \lambda_t + \beta_2 \bar{X}_{j,t} + \mu_{j,t} \quad (4)$$

$\mu_{j,t}$  is assumed to be the idiosyncratic fund inflow shock. The crucial assumption to validate the GIV is then  $E(\mu_{j,t} \varepsilon_{i,t}) = 0$  for any  $i$  and  $j$ . Then the formula of the GIV is,

$$GIV_{i,t} = \sum_{j \in Network_i} \mu_{j,t} \quad (5)$$

Equation (3) is estimated with Gompers and Lerner (1998)'s fund raising model (shown in the next page).

OLS	(1)	(2) D(Launch New Fund)	(3)
<b>Individual IVC characteristics</b>			
Years since raising last fund	-0.00828*** (-10.87)	0.00402*** (2.67)	0.00463*** (3.00)
(Years since raising last fund) <sup>2</sup>	0.0000827** (2.56)	-0.0000563* (-1.79)	-0.0000808** (-2.46)
Age of the venture organization	0.00264*** (10.47)	-0.00286** (-2.50)	-0.00294** (-2.51)
Number of startups brought public this year	0.0304*** (19.88)	-0.0135** (-2.47)	-0.0117** (-2.09)
Number of startups brought public last year	0.0240*** (15.35)	-0.00163 (-1.00)	-0.00164 (-0.98)
Number of past funds launched		0.00679** (2.09)	0.00685** (2.07)
<b>VC funding factors</b>			
Number of startups brought public last year by all VCs	0.000279*** (12.06)		
T-bill return	0.0259 (1.40)		
Real GDP Growth	0.00480*** (5.05)		
CRSP value weighted return	0.112 (0.95)		
<b>Interaction terms <math>\lambda_2</math></b>			
Years since raising last fund*		0.0000424*** (4.99)	0.0000445*** (5.13)
Number of startups brought public last year by all VCs			
Years since raising last fund*		0.0710*** (8.90)	0.0664*** (8.08)
T-bill return			
Years since raising last fund*		0.00181*** (5.03)	0.00175*** (4.75)
Real GDP Growth			

*Continued in the next page*

Years since raising last fund*	0.200*** (4.38)	0.190*** (4.06)
CRSP value weighted return		
Age of the venture organization*	-0.0000605*** (-8.17)	-0.0000617*** (-8.19)
Number of startups brought public last year by all VCs		
Age of the venture organization*	-0.0685*** (-9.30)	-0.0643*** (-8.51)
T-bill return		
Age of the venture organization*	-0.00203*** (-6.37)	-0.00196*** (-6.02)
Real GDP Growth		
Age of the venture organization*	-0.214*** (-5.18)	-0.209*** (-4.92)
CRSP value weighted return		
Number of startups brought public this year*	-0.0000253 (-1.12)	-0.0000285 (-1.22)
Number of startups brought public last year by all VCs		
Number of startups brought public this year*	-0.0290* (-1.73)	-0.0345** (-2.00)
T-bill return		
Number of startups brought public this year*	0.00789*** (6.33)	0.00776*** (6.03)
Real GDP Growth		
Number of startups brought public this year*	0.235 (1.55)	0.204 (1.30)
CRSP value weighted return		
Number of past funds launched*	0.000355*** (16.69)	0.000358*** (16.55)
Number of startups brought public last year by all VCs		
Number of past funds launched*	0.228*** (11.57)	0.215*** (10.65)
T-bill return		
Number of past funds launched*	0.00642*** (7.29)	0.00620*** (6.91)
Real GDP Growth		
Number of past funds launched*	0.934*** (8.25)	0.918*** (7.93)
CRSP value weighted return		
VEIC $\times$ Year F.E.	Yes	Yes
Location $\times$ Year F.E.		Yes
Num. Obs.	33,163	33,163
Adj. $R^2$	0.076	0.203