

Board dynamics over the startup life cycle

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Board composition, control, and dynamics

- Board has ultimate authority ⇒ board composition and who has **board control** is key for how decisions are made
- Especially important in VC-backed startups:
 - major shareholders have different payoffs from key decisions
 - investors play an active role in management and operations
 - founders' and investors' roles **evolve** as startup matures
- **Independent directors** on startup boards:
 - not required by law; monitoring role is relatively less important
- Existing databases on startup boards have important gaps and do not allow to study these questions

This paper

What we do:

- Comprehensive dataset on dynamic evolution of about 7,800 startup boards over 2002-2017
 - observe full composition; director types; start and end dates
- New facts about composition, allocation of control, and evolution from first VC financing to exit
- Explore these facts in the context of financial contracting theories

Questions we ask:

- What determines board composition and allocation of control over the life cycle and across firms?
- What are the roles of independent directors (IDs)?

This paper

What we show:

1. There is a shift of control from entrepreneurs to VCs over the life cycle, with IDs playing a key role in between
2. These dynamics align with key financial contracting theories, but also suggest a unique mediation role of IDs
 - IDs' roles evolve over the life cycle: from mediation to advising
3. Over years, board control has shifted from investors to founders

Literature

- **Startup boards**
 - Lerner 1995; Kaplan, Stromberg 2003, 2004; Amornsiripanitch, Gompers, Xuan 2019; Venugopal, Yerramilli 2020; Montag 2021
 - Our paper: all director types ⇒ full composition, allocation of control, and within-firm dynamics
- **Public boards**
 - Monitoring and advisory roles of IDs
 - Dynamics: Boone et al. 2007; Denis, Sarin 1999; Graham et al. 2020
 - Role of VCs: Baker, Gompers 2003; Field et al. 2013; Iliev, Lowry 2020
 - Our paper: mediation role of IDs and transition from mediation to advising
- **Mediation role**
 - Law: Broughman 2010, 2013; Blair, Stout 2001; Blair 2014
 - Finance: Burkart, Miglietta, Ostergaard 2023; Villalonga et al. 2019

What do startup boards do?

“Startup boards – unlike public company boards – are frequently and intimately involved in strategic decision-making and personnel issues ...

... initiate fundamental transactions such as mergers, IPOs, and liquidations” (Fried and Ganor, 2006)

Financing decisions: from whom, how much, and at what price

Exits: consideration of acquisition offers or liquidation; IPO timing

Executive turnover: CEO and other C-level hiring and firing

Investment decisions: budget approval; large investments

- disagreements over these decisions ⇒ board control matters

Data

1. **Form D filings** on SEC EDGAR

- must be filed within 15 days of first sale of securities
- data on all directors, including executive-directors
- start and end dates

2. Supplement with **VentureSource**

- data on investors + some independent directors

3. **Manual categorization** (CrunchBase, LinkedIn, Pitchbook, Google)

⇒ dynamics of 7,780 startup boards over 2002-2017

Pelago Inc.: Form D in 2008

Check Box(es) that Apply: Promoter Beneficial Owner Executive Officer Director

Full Name (Last name first, if individual)

Holden, Jeff

Co-founders



Business or Residence Address (Number and Street, City, State, Zip Code)

1201 Third Avenue, Suite 800, Seattle, WA 98101

Check Box(es) that Apply: Promoter Beneficial Owner Executive Officer Director

Full Name (Last name first, if individual)

Vengroff, Darren

Business or Residence Address (Number and Street, City, State, Zip Code)

1201 Third Avenue, Suite 800, Seattle, WA 98101

Check Box(es) that Apply: Promoter Beneficial Owner Executive Officer Director

Full Name (Last name first, if individual)

Gossman, William E.

Independent
director



Business or Residence Address (Number and Street, City, State, Zip Code)

1110 – 112th Avenue NE, Suite 300, Bellevue, WA 98004

Check Box(es) that Apply: Promoter Beneficial Owner Executive Officer Director

Full Name (Last name first, if individual)

Murphy, Matt

VC investors



Business or Residence Address (Number and Street, City, State, Zip Code)

2750 Sand Hill Road, Menlo Park, CA 94025

Check Box(es) that Apply: Promoter Beneficial Owner Executive Officer Director

Full Name (Last name first, if individual)

Noll, Stephan

Director types

- 1. Executive director (E):** founder or executive
- 2. Investor director (VC):** VC representative or angel
- 3. Independent director (ID):** not affiliated with either party, jointly elected



(e) [As the Mutual Director, one] [One] individual not otherwise an Affiliate of the Company or of any Investor who is [mutually acceptable to (i) the holders of a majority of the Shares held by the Key Holders who are then providing services to the Company as officers, employees or consultants; and (ii) the holders of a majority of the Shares held by the Investors] [mutually acceptable to the other members of the Board]; and

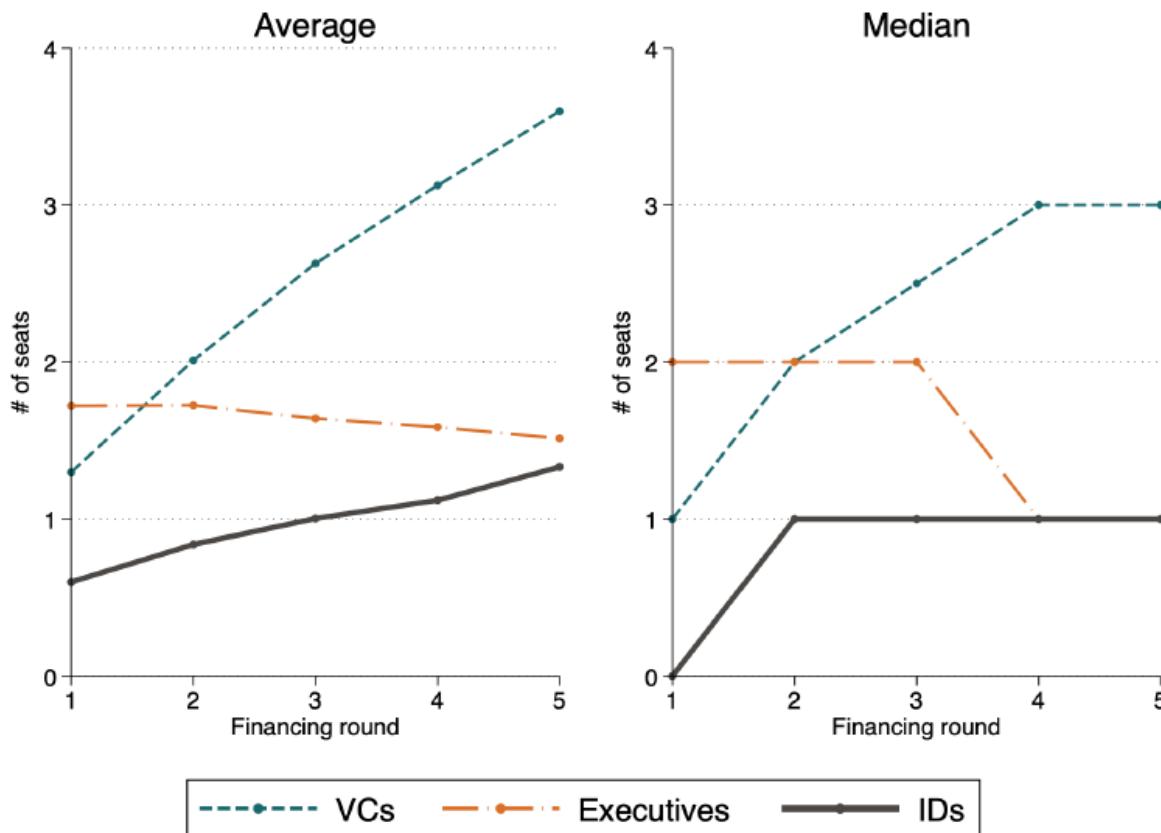
Summarizing all board-years

- Median board has four directors
- Independent directors are present in nearly half of board-years
 - fraction with an independent director increases with rounds
- Sharing control:
 - Independent directors often hold a tie-breaking vote

	Firm-financing years; all boards					
	Obs	Mean	25th	Median	75th	Std dev
Board size	18,303	4.513	3.000	4.000	6.000	2.039
# VC directors	18,303	2.008	1.000	2.000	3.000	1.571
# executive directors	18,303	1.684	1.000	2.000	2.000	0.794
# independent directors	18,303	0.821	0.000	0.000	1.000	1.082
% VC directors	18,303	0.399	0.250	0.429	0.600	0.246
% executive directors	18,303	0.449	0.250	0.400	0.500	0.263
% independent directors	18,303	0.153	0.000	0.000	0.250	0.188
Has ID	18,303	0.489	0.000	0.000	1.000	0.500

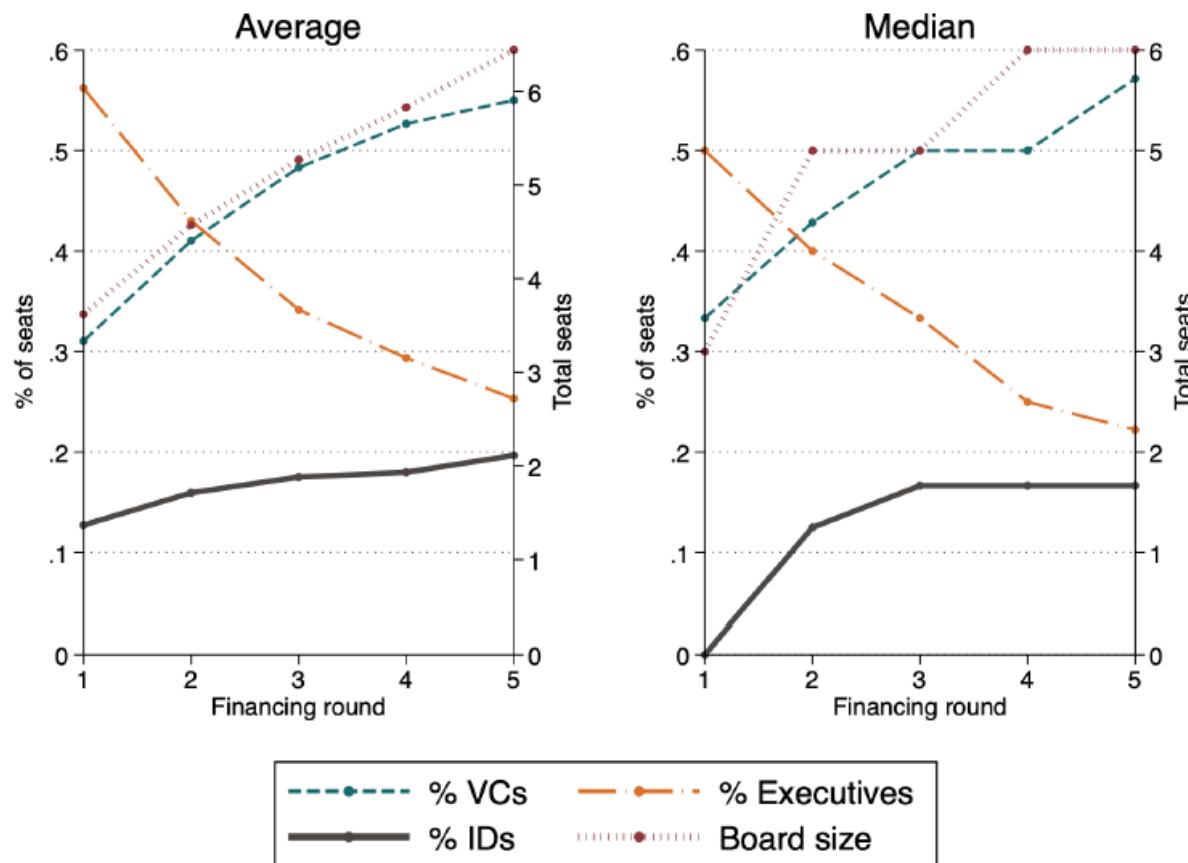
Board dynamics over the life cycle

Board composition over the life cycle: Counts



- Number of VC directors and IDs grows over time
- Independent directors are typically added in round 2

Board composition over the life cycle: Percentages

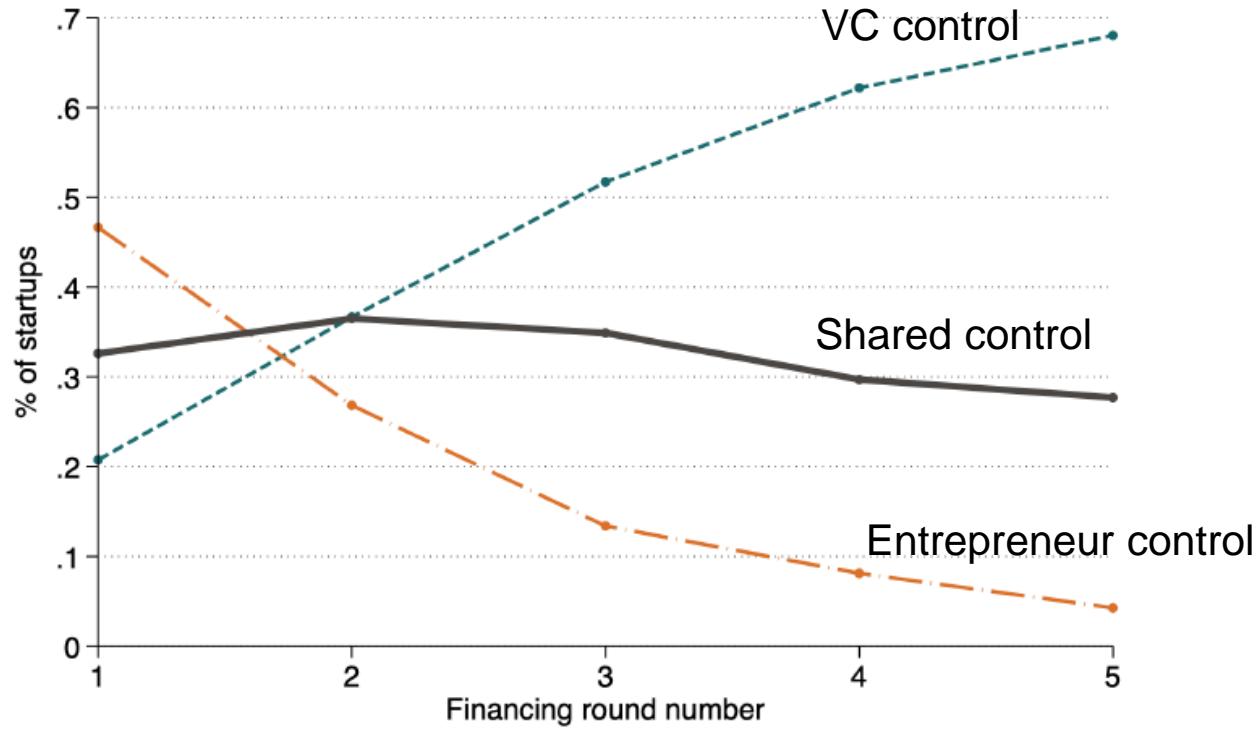


- % of entrepreneur-controlled seats decreases with age
- % of VC-controlled seats increases with age

Defining allocation of control

- **VC control** = VC has $> 50\%$ of seats
- **E control** = E has $> 50\%$ of seats
- **Shared control** = both E and VC have $< 50\%$, and thus ID plays a tie-breaking role (or both have 50%)

Board control over the life cycle



- E control is most common in early stages
- VC control is most common in late stages
- Shared control is most common in between

Putting it all together

Board control changes over the startup life cycle:

- Entrepreneurs gradually lose control of the board
- VCs control the late-stage board
- Shared control emerges in the second financing round

Independent directors play a key role in these changes

Can we explain these shifts in the allocation of control by key financial contracting theories?

Theories of allocation of control

- Shift in control may reflect the evolution of ownership

Grossman, Hart 1988; Harris, Raviv 1988; Burkart, Lee 2008

	E control (5)	VC control (6)
Round # 2	-0.085*** (0.018)	0.10*** (0.021)
Round # 3	-0.17*** (0.023)	0.25*** (0.027)
Round # 4	-0.22*** (0.025)	0.34*** (0.031)
Round # 5+	-0.25*** (0.028)	0.41*** (0.037)
Log capital raised	-0.062*** (0.0050)	0.076*** (0.0063)
Founder equity %	0.27*** (0.036)	-0.19*** (0.038)
Observations	10828	10828
R ²	0.19	0.20
Industry × Year FE	Y	Y
Location FE	Y	Y

- Ownership is positively associated with control
- But E (VC) control ↓ (↗) over the life cycle even after controlling for ownership

Theories of allocation of control

Incomplete contracting theories highlight the role of control allocation beyond its relationship with ownership:

1. Firm-specific investments

Grossman, Hart 1986; Hart, Moore 1990; Burkart, Gromb, Panunzi 1997; Aghion, Tirole 1997; De Bettignies 2008; Cestone 2014; Hellmann, 1998

2. Efficient information use

Dessein 2002; Adams, Ferreira 2007; Harris, Raviv 2008; Baldenius, Melumad, Meng 2014; Grenadier, Malenko, Malenko 2016

3. Financing constraints

Aghion, Bolton 1992; Berglof 1994; Bascha, Walz 2001; Hellmann 2006

Life cycle dynamics align with #1 and #2; we next explore #3

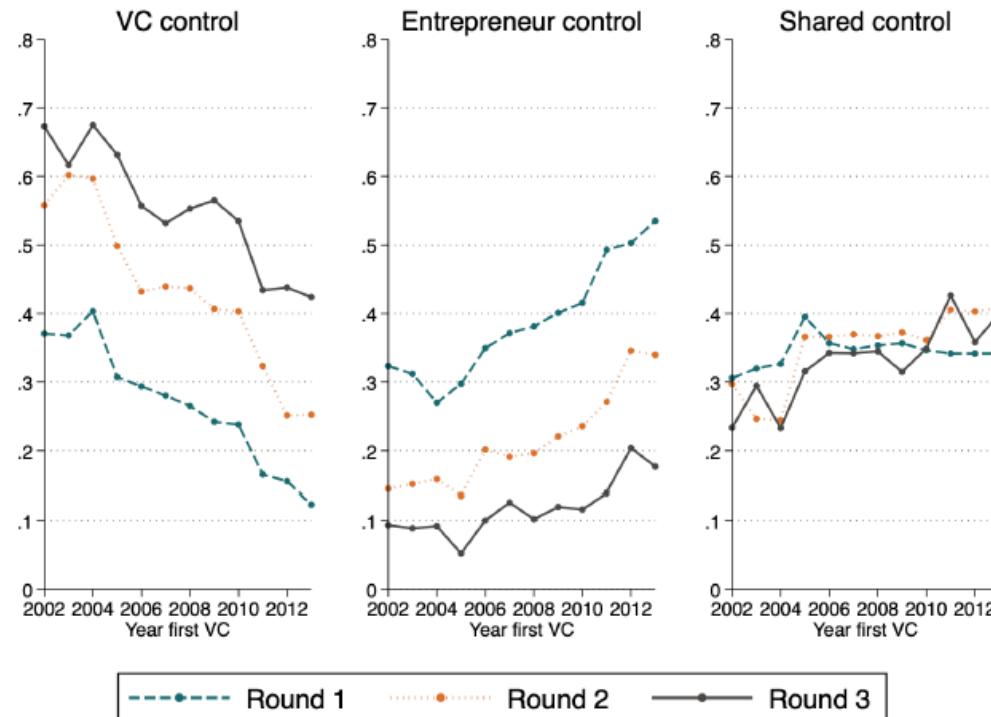
Financing constraints and board control

- **Prediction 1:** *Negative shock to the required amount of VC capital should shift board control from VCs to entrepreneurs*
- Introduction of Amazon Web Services in 2006 ⇒ lower early-stage capital needs (Ewens, Nanda, Rhodes-Kropf 2018)
- Treated industry segments ≡ most affected by cloud computing

	E control	VC control
Treated x Post-2005	0.067** (0.025)	-0.073*** (0.023)
Treated	-0.022 (0.032)	0.0096 (0.033)
Observations	3429	3429
R ²	0.062	0.10
Mean dependent variable	0.36	0.29
State FY	Y	Y
Industry FE	Y	Y
Year FE	Y	Y

Financing constraints and board control

- **Prediction 2:** When E 's (VC's) relative bargaining power is higher, E (VC) control over the board is more likely



These trends align with Prediction 2 given the growing availability of PE capital

Ewens, Farre-Mensa 2020; Fang, Ivashina, Lerner 2015; Chernenko, Lerner, Zeng 2021

Financing constraints and board control

- **Prediction 2:** When E's (VC's) relative bargaining power is higher, E (VC) control over the board is more likely

Equity stake proxy for b.p.	E control	VC control
Lowest VC b.p.	0.067*** (0.020)	-0.025 (0.017)
Low VC b.p.	0.053** (0.021)	-0.029** (0.013)
High VC b.p.	-0.061*** (0.019)	0.055*** (0.012)
Highest VC b.p.	-0.15*** (0.016)	0.12*** (0.013)
Observations	7543	7543
R ²	0.12	0.12
Mean dependent variable	0.46	0.21
Industry FE	Y	Y
Location FE	Y	Y
Log capital control	Y	Y

Independent directors and shared control

- The above theories cannot explain the prevalence of shared control and the tie-breaking role of independent directors
- To explain these patterns, we explore the **mediation** role of IDs
 - mediation ~ resolving potential conflicts between Es and VCs

*“These outsiders can **mediate** issues that arise between the company and investor-elected board members”*

(“Venture Deals” by Brad Feld and Jason Mendelson)

“One of the really important roles for independents is to serve as a catalyst and bridge between management and investors”

(Reid Hoffman, LinkedIn co-founder; VC)

Mediation role: Idea

We formalize the mediation role in a toy model that builds on Brughman 2010, 2013; Aghion, Bolton 1992

Key forces:

1. IDs as tie-breakers \Rightarrow board's decision is more efficient, since IDs are more independent than either VCs or Es
2. Ex-ante, IDs as tie-breakers = commitment by both VCs and E to not engage in future opportunistic behavior
 - \Rightarrow E is willing to contribute human capital (relative to VC control)
 - \Rightarrow VC is willing to contribute capital (relative to E control)

Mediation role: Predictions

(1) Over the firm's life cycle (Rajan 2012; Kaplan et al. 2009; Khanna-Mathews 2016)

E-control → **Shared control with IDs** → **VC control**

- Earlier evidence aligns with this prediction
- To study within-firm dynamics, explore transition probabilities next

Board control transition probabilities

		Board control at t		
		E	Shared	VC
Board control at t-1	E	55.79%	31.36%	12.85%
	Shared	5.41%	63.81%	30.78%
	VC	1.25%	10.06%	88.68%

- Conditional on a change in board control:
 - E control is 71% likely to switch to Shared control
 - Shared control is 85% likely to switch to VC control

E-control → **Shared control with IDs** → **VC control**

Mediation role: Predictions

(1) Over the firm's life cycle (Rajan 2012; Kaplan et al. 2009; Khanna-Mathews 2016)

E-control → **Shared control with IDs** → **VC control**

(2) Across firms

- IDs and shared control should be more likely when the ex-ante probability of future conflicts is high

Ex-ante conflicts and IDs in first round

1. If VC was aggressive in replacing CEO in the past
⇒ higher need for mediation
2. If VC has invested in E's startups in the past
⇒ lower need for mediation

	Has ID	Shared control with ID
Has top CEO replacer	0.070*** (0.014)	0.029** (0.012)
Log VC experience	-0.019*** (0.0042)	-0.019*** (0.0034)
Observations	7777	7777
R ²	0.054	0.031
Mean dependent variable	0.37	0.18
State FY	Y	Y
Industry FE	Y	Y
Year FE	Y	Y

Ex-ante conflicts and IDs in first round

1. If VC was aggressive in replacing CEO in the past
⇒ higher need for mediation
2. If VC has invested in E's startups in the past
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	Has ID	Shared control with ID
VC - founder/CEO past interaction	0.011 (0.022)	-0.034** (0.017)
Log VC experience	-0.021*** (0.0043)	-0.018*** (0.0034)
Has past founder	Y	Y
Has past CEO	Y	Y
Observations	7777	7777
R ²	0.051	0.031
Mean dependent variable	0.37	0.18
State FY	Y	Y
Industry FE	Y	Y
Year FE	Y	Y

Mediation and advising over the life cycle

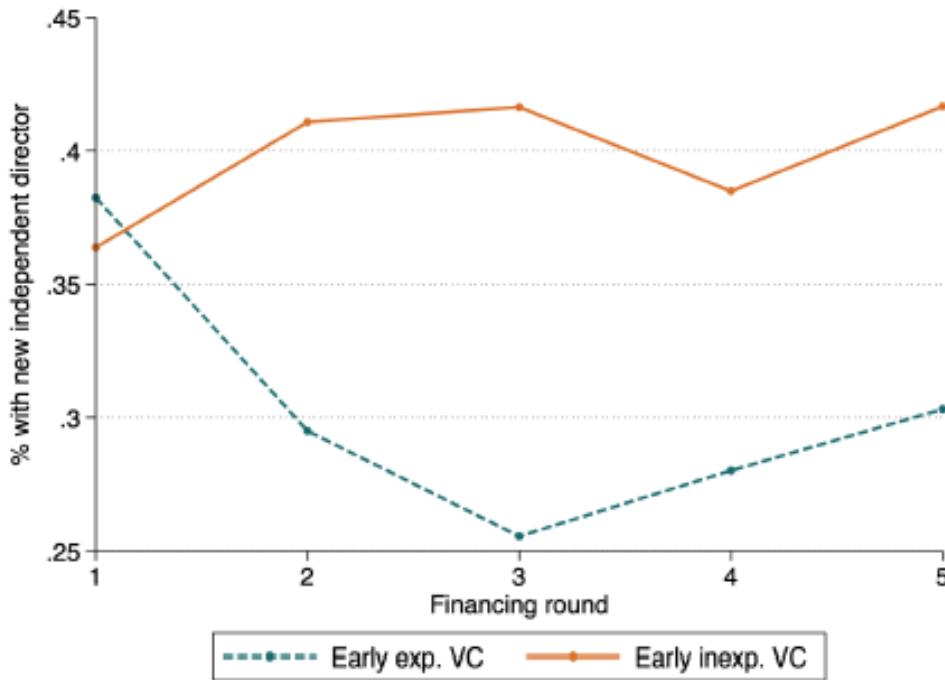
- IDs could also play an **advisory** role
 - complement the value-add of VC investors
 - facilitate the professionalization of the startup to public firm
(Hellmann and Puri 2002; Rajan 2012)
- The relative importance of mediation and advising is likely to **change over the life cycle**
 - mediation early on
 - advising later on

ID characteristics change over the life cycle

	Panel B: Joined board at shared or E-control				
	(1)	(2)	(3)	(4)	(5)
Past founder	0.023*				
	(0.014)				
Unconnected		0.058***			
		(0.013)			
Log # C-level			-0.033**		
			(0.013)		
Log # VP-level				-0.054***	
				(0.014)	
Sat on public board					-0.054***
					(0.020)
Log # job titles	-0.038***	-0.019	-0.010	-0.011	-0.031***
	(0.012)	(0.012)	(0.015)	(0.013)	(0.012)
Observations	5108	5108	5108	5108	5108
R ²	0.072	0.076	0.073	0.074	0.073
Mean dep. var.	0.73	0.73	0.73	0.73	0.73
Year FE	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y
Firm age FE (year)	Y	Y	Y	Y	Y

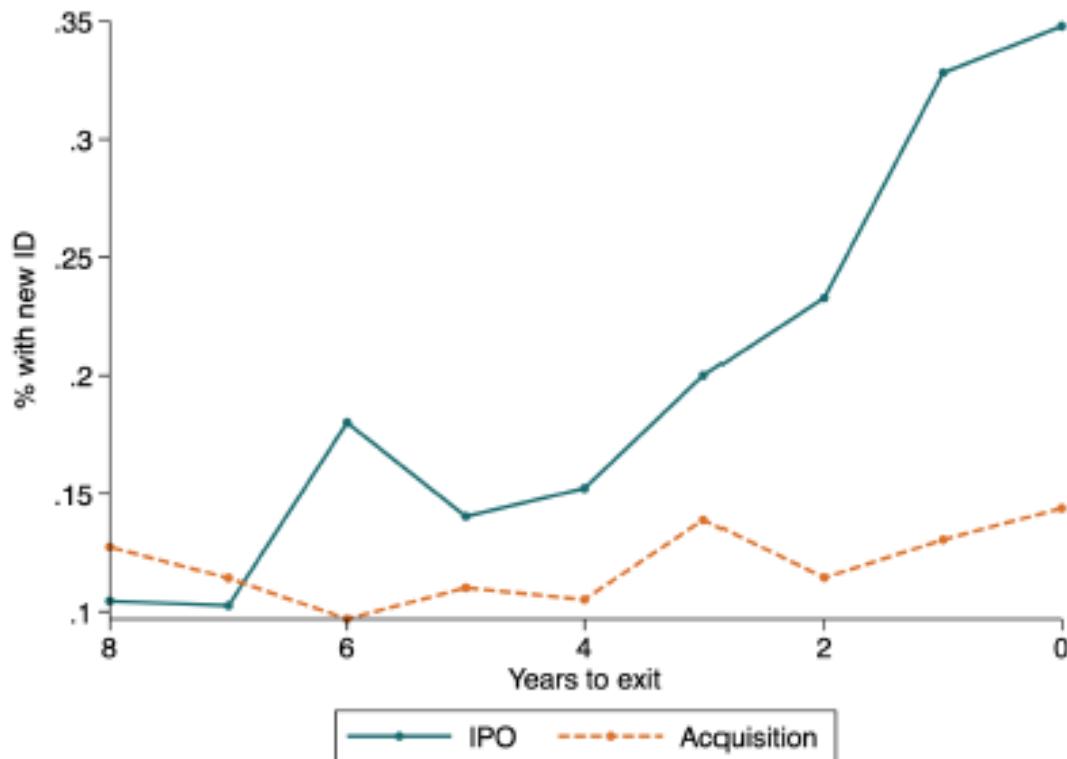
- IDs that join **early**-stage boards are more likely to be former **founders** and be **unconnected** → mediation
- IDs that join **late**-stage boards are more likely to have **executive** and **public board** experience → advising

VC experience and use of IDs over the life cycle



- Early stages: Use of IDs is unrelated to VC experience → mediation
- Late stages: Inexperienced VCs add new IDs → advising

Independent directors by exit type



- Firms doing an IPO add new IDs in later stages → professionalization

Conclusion

- Build the first comprehensive dataset of full startup board composition, control, and dynamics
- Board dynamics reveal changes in the allocation of control and unique role of independent directors
 - IDs as **mediators** between VCs and entrepreneurs
 - Mediation early on; advising later on
- Time trends suggest a changing balance of power between VCs and entrepreneurs