“Screening and Coaching: Empirical Examination of Syndicated Venture Capitals”

Japan- Korea Workshop on Productivity Analysis
in honor of Professor Pyo’s Retirement from SNU
@ Seoul National University
December 7th, 2012

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Based on ver.3 paper

1. Introduction & Motivation (1)

- **IPO** as an important exit option for investors
  - ✓ As well as trade sale, liquidation, LBO etc.

Screening（☆）, Coaching（★）
&
Others (diversification, deal-flow)

- **Syndicated VC** is typical and its role is examined by focusing on
  - ✓ Size of VC syndicate (e.g., investment volume, #(VCs) included in investments)
  - ✓ Experience of VCs in a syndicate
  - ✓ Member heterogeneity etc.

- **How to disentangle**（☆）and（★）?
  - ✓ An important research question
  - ✓ Being studied in somewhat naive ways
  - ✓ It might be helpful to sort out **the dynamics in the interventions of VCs**

E.g., screening ⇒ lower return
while coaching ⇒higher return

1. Introduction & Motivation (2)

– **This paper**

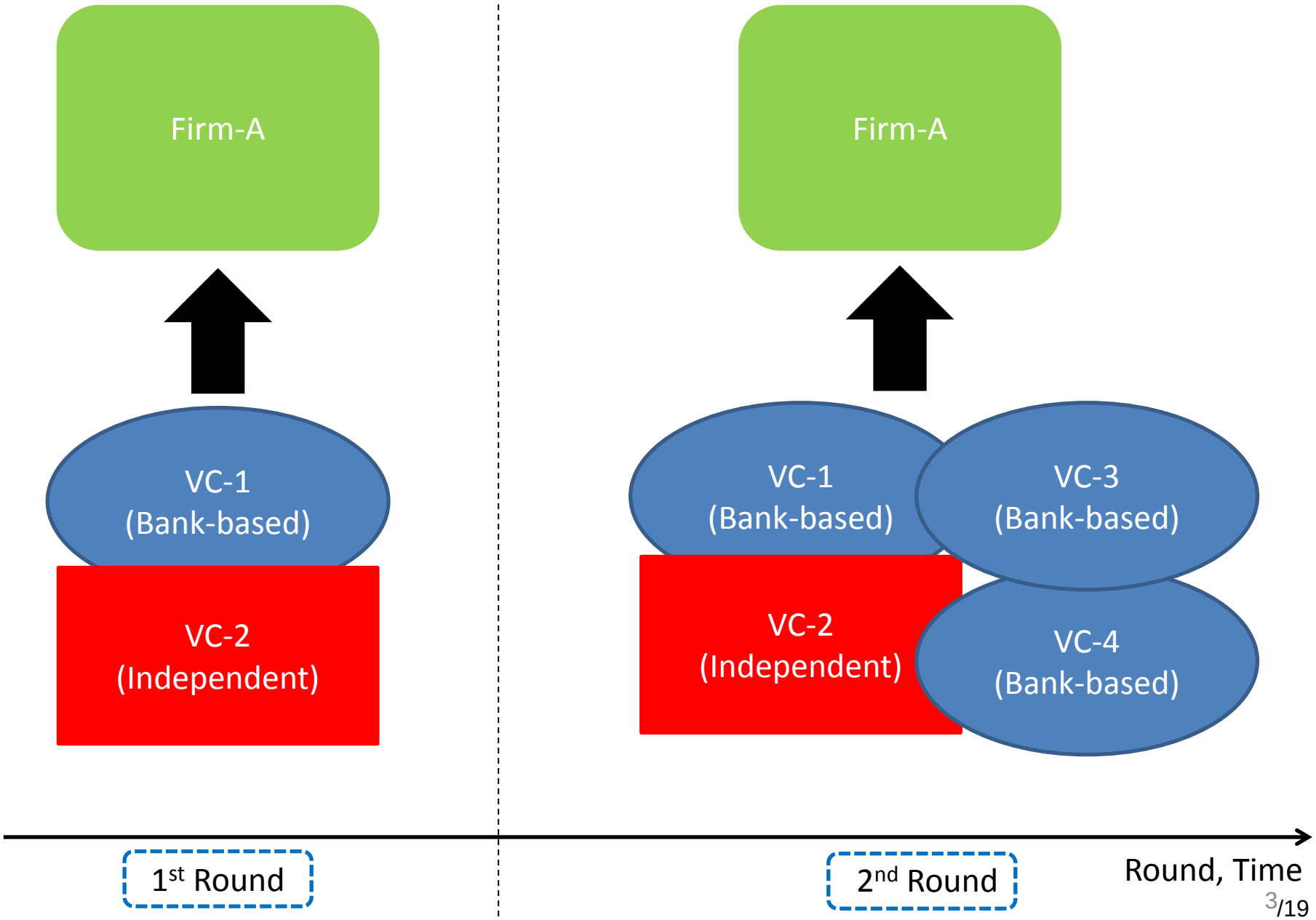
Screening & Coaching

- ✓ Empirically study how the characteristics of syndicated VCs at the **first-round investment** and that of the **follow-up rounds** affect the **probability of their client firms' IPO**

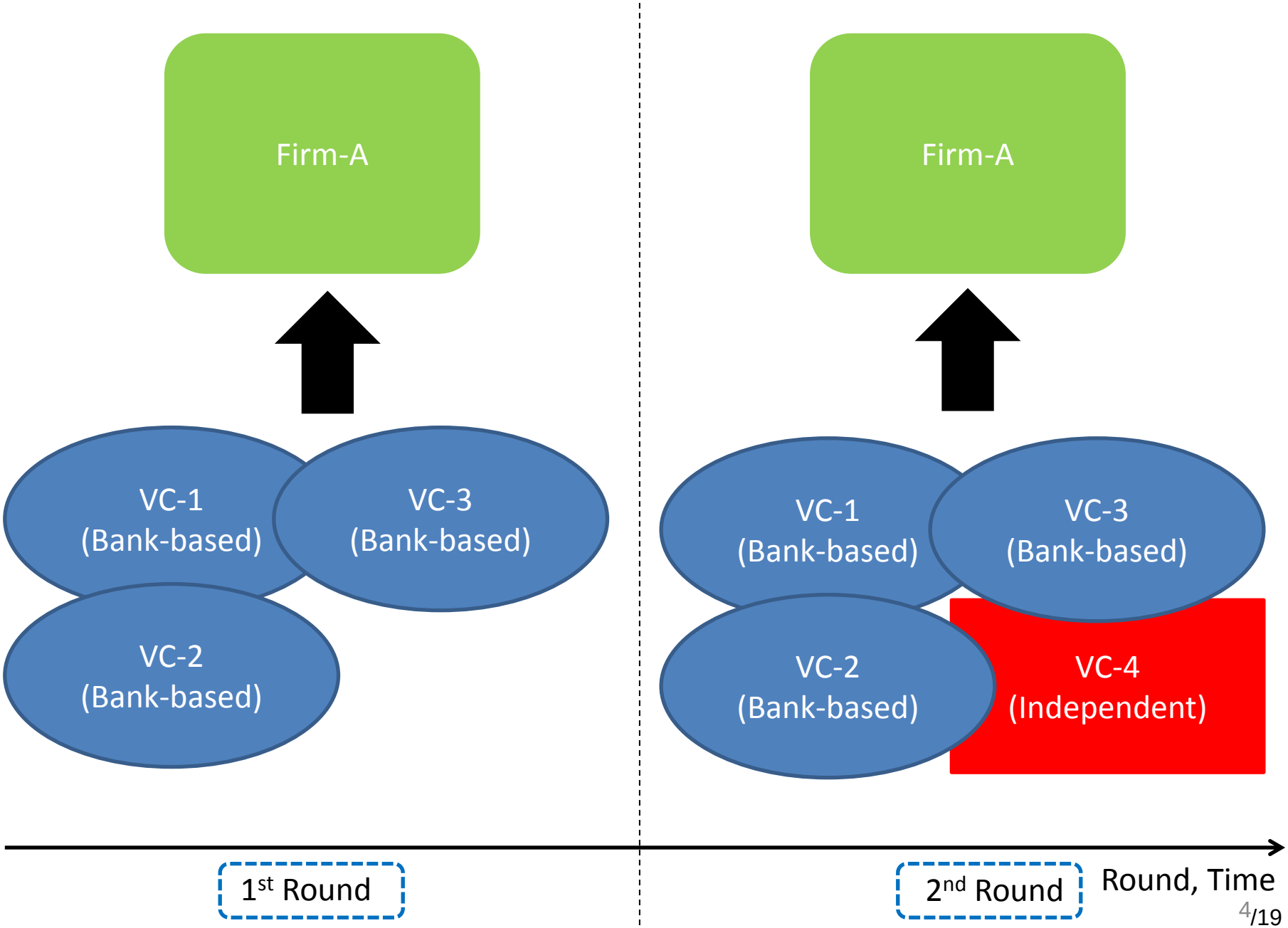
No screening but Coaching

- ✓ Use the results to discuss the contribution of **screening** and **coaching**
- ✓ Use a unique **venture firm-level data** augmented by the **VCs information**
- ✓ The data especially contains the **dynamics of the composition** of VC syndicate over investment rounds

<Illustration-1: **Small #(VCs) & large #(TYPES)** ⇒ Increase #(VCs) with keeping #(TYPES)>



<Illustration-2: **Large #(VCs) & small #(TYPES)** ⇒ Increase #(VCs) & #(TYPES) >



2. Key Findings

- IPO is more likely to be accomplished when **first-stage** investment includes
  - (i) Smaller number of VCs
    - Coaching effect through larger number of VCs seem not to work
  - (ii) Larger number of VC types (e.g., independent, bank-dependent, university etc.)
    - Larger Screening & Coaching effects through the inclusion of more VC types
- IPO is more likely to be accomplished when **follow-up investments** include
  - (i) Larger number of additional VCs
    - (Coaching) & diversification
  - (ii) Smaller number of additional VC types
    - Coaching by larger number of additional VC types seems not to work

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- First-round investments tend to be done by larger number of VCs and larger number of VC types when
  - Interpretation???
  - Experienced VC
  - (i) The ages of venture firms are older and/or lead VC are younger
  - (ii) The investment amount at the first-stage is larger
    - Diversification

3. Literature & Hypothesis Formulation (1)

- **Role of syndicated VC:**
  - ✓ Better screening and coaching (Sahlman 1990 JFE)
  - ✓ Portfolio diversification (Wilson 1968 Ecmt)
  - ✓ Deal-flow (Manigart et al. 2002 JBV)
- **Measuring the sources of screening & coaching:**
  - ✓ Size of VC syndicate (Megginson & Weiss 1991 JF; Lerner 1994 FM; Brander et al. 2002 JEMS)
  - ✓ Experience of VCs in a syndicate (Giot & Schwienbacher 2006 JBF)
  - ✓ Type heterogeneity among member VCs included in syndicates (Miyakawa & Takizawa 2012 WP)
  - ✓ Geographical proximity among VCs (Hochberg et al. 2007 JF)

3. Literature & Hypothesis Formulation (2)

- **Screening vs. Coaching**: Additional VC is…
  - ✓ Just a second-opinion (Lerner 1994 FM)
  - ✓ Making some value (Gompers and Lerner 2001 JEP)
  - ✓ Contributing to some kind of value-added activities (Brander et al. 2002 JEMS)

  ⇒ **Still an important open question!**

  Through a horse-race between the two hypotheses

- **Measure of performance:**
  - ✓ Return (Brander et al. 2002 JEMS)
  - ✓ Post-IPO performance (Krishnan et al. 2011 JFQA)
  - ✓ Time to IPO (Giot & Schwienbacher 2006 JBF)

3. Literature & Hypothesis Formulation (3)

***Hypothesis 1* (screening and coaching of first-round VC syndication)**

(a) It is more likely for venture firms to accomplish IPO when VC syndication at the first-round investment contains more types of VCs

(b) It is more likely for venture firms to accomplish IPO when VC syndication at first-round investment contains more VCs

***Hypothesis 2* (coaching of additional VCs)**

Additional VCs could not contribute to screening!

(a) It is more likely for venture firms to accomplish IPO when VC syndication contains more types of VCs in the follow-up rounds

(b) It is more likely for venture firms to accomplish IPO when VC syndication contains more VCs in the follow-up rounds

Might be mixed up with diversification motive

***Hypothesis 3* (diversification)**

It is more likely to have a larger number of VCs in the first round when the investment amounts in the first-round investment is larger.

4. Data (1): Data Sources

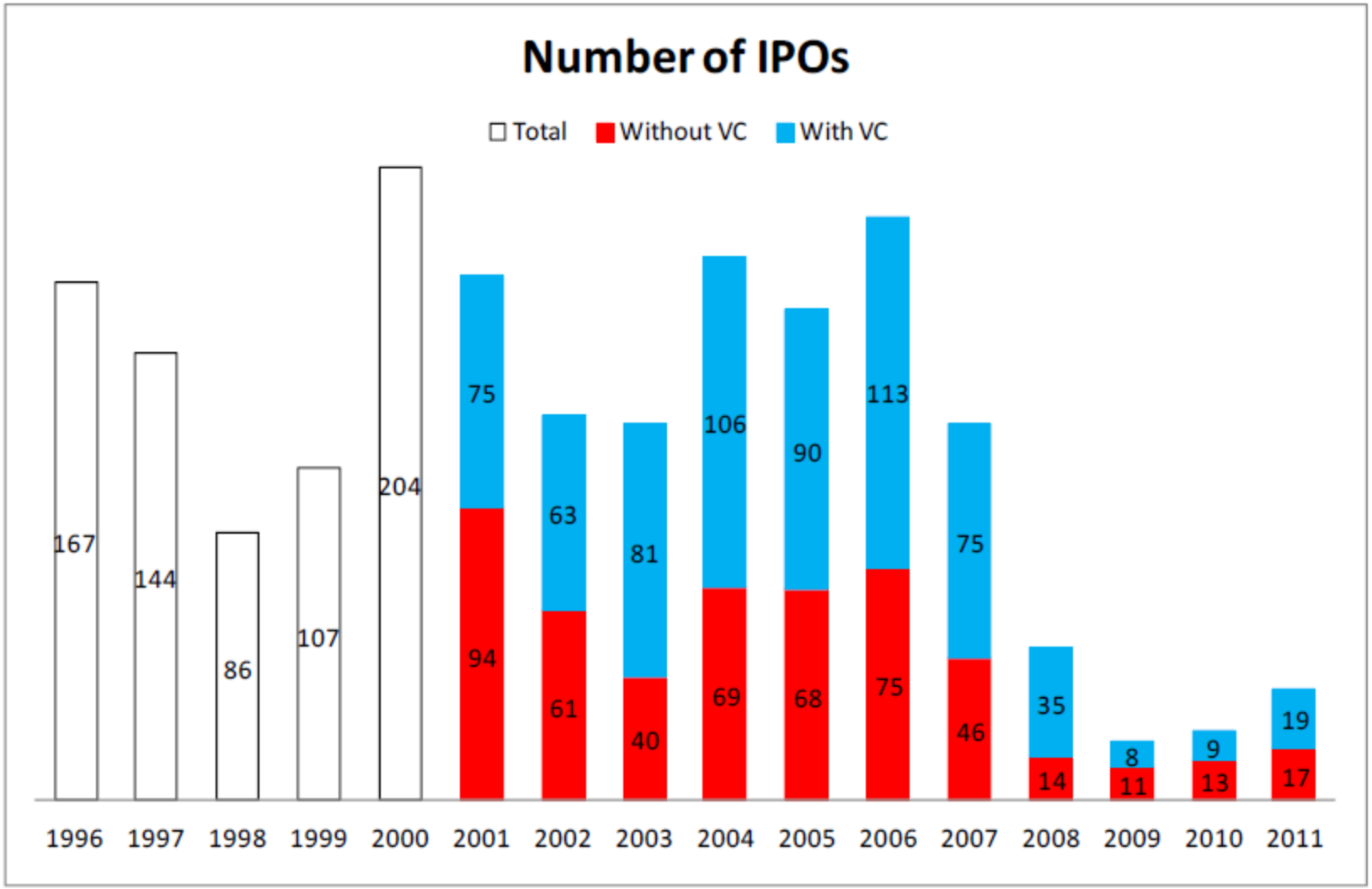
– Japan Venture Research (JVR) data

(Firm × VC × Round) level data

- ✓ All the IPO records of VC-backed Japanese firms since 1980s
- ✓ Firm identification, IPO date, the market where the firms are listed
- ✓ List of VCs and the investment amount from each VC in each round
- ✓ Characteristics of each VC (e.g., type, age, size etc.)
- ✓ Entrepreneurial firms (3-digit industry code and their location)

- ✓ **6,800** "firm-round" observations for **615** VC-backed firms
- ✓ **686** VCs in the data
- ✓ IPO dates from 2001 to 2011
- ✓ Investment rounds happen to be from Dec. 1983 to Oct. 2011
- ✓ Stock return (Nikkei average stock index)

⇒Construct a monthly-frequency panel data



Note: The above figure shows the number of IPO in each year in Japan. From 2001, the number of firms establishing IPO and having relation with venture capital(s) prior to IPO and without having the relation.

4. Data (2): Variables (Table-1 & -2, Figure-4)

– VC type:

82 Bank-dependent, **35** Security firm-dependent,

12 Insurance company-dependent, **18** Trade company-based ("Shosha")

98 Corporate, **19** Mixed origination, **196** Independent,
19 Foreign owned, **151** Foreign located, **5** University-based,
16 Government-based, **35** Others (restructuring, buy-out, other financial)

– Variables:

Time-invariant

VCNUM_TYPE (first round), VCNUM_TOTAL (first round),
VFGE (first round), LEADVCAGE (first round), INVEST (first round)

NKY_RETURN, VCNUM_TYPE, VCNUM_TOTAL, AMOUNT_INVEST_ACC,
TIME from First round, TIME from First round (Squared)

Time-variant

$VF\_IND\_DUMMY_i$, $VC\_TYPE\_DUMMY_i$

Dummy variables

Variable	Definition	Obs.	Mean	Std. Dev.	Min.	Max.
LN_NKY_AVR	Log of the monthly average of Nikkey Stock Price Average Index at t	25674	9.44	0.25	8.95	10.55
NKY_RETURN	The growth rate of Nikkey Stock Price Average Index from t-1 to t	25674	0.00	0.05	-0.25	0.25
VCNUM_TOTAL	Total number of VCs in the syndication	25674	7.33	9.08	1	116
VCNUM_TYPE	Total number of VC types in the syndication	25674	2.68	1.87	1	11
AMOUNT_INVEST_ACC	Accumulated investment amount for each firm at each time (unit: billion yen)	25674	0.43	1.67	0	43
VCNUM_BANK	Total number of bank-dependent VCs	25674	1.96	2.59	0	24
VCNUM_SEC	Total number of security firm-dependent VCs	25674	1.61	3.25	0	28
VCNUM_INSURANCE	Total number of unsurance company-dependent VCs	25674	0.51	1.16	0	9
VCNUM_TRADE	Total number of VCs backed by trade company ("Shosha")	25674	0.10	0.51	0	8
VCNUM_MIXED	Total number of VCs backed by multiple origins	25674	0.52	1.20	0	16
VCNUM_INDEP	Total number of independent VCs	25674	1.00	2.13	0	26
VCNUM_CORP	Total number of corporate VCs	25674	0.35	1.00	0	10
VCNUM_GOV	Total number of VCs backed by government	25674	0.28	0.84	0	12
VCNUM_UNIV	Total number of VCs backed by university	25674	0.06	0.43	0	8
VCNUM_OVERSEAS	Total number of VCs located in foreign countries	25674	0.27	1.26	0	23
VCNUM_FOREIGN	Total number of VCs owned by foreing investors	25674	0.08	0.56	0	9
VFAGE_FIRST	Age of venture firm at the first round	21734	12.04	13.11	0	71
VCAGE_FIRST	Age of venture capital at the first round	21734	25.18	11.91	1	59

Note: The numbers are computed from all the round-VC samples with at least one VC.

Number of VC
&
Number of VC-type

Average number of each type

VF ages
&
VC age
at first-round

5. Empirical Model (1)

– Random-effect panel estimation for a linear probability model

$$\mathbf{1}_{it}(\text{IPO}) = \alpha + \gamma \times Y_{it-1} + \beta \times X_{1,it-1} + \eta_i + \delta_1 \times VF\_IND\_DUMMY_i + \delta_2 \times VC\_TYPE\_DUMMY_i + \varepsilon \quad (1)$$

where

$\mathbf{1}_{it}$ (IPO): Dummy variable for IPO

Y_{it-1}: Endogenous variables

VCNUM_TYPE (first round), VCNUM_TOTAL (first round)

$X_{1,it-1}$: Exogenous variables

NKY_RETURN, VCNUM_TYPE, VCNUM_TOTAL, AMOUNT_INVEST_ACC, TIME from First round, TIME from First round (Squared)

η_i : Individual effect (random-effect)

$VF\_IND\_DUMMY_i$: Dummy variable for venture firm's industry

$VC\_TYPE\_DUMMY_i$: Dummy variable for lead VC's type

5. Empirical Model (2)

– Instrument variables $X_{2,it-1}$ for Y_{it-1} (*VCNUM_TYPE (first round)*, *VCNUM_TOTAL (first round)*)?

	"Relevance"	"Exclusion from 2nd stage"
VFAGE (first round) Age of venture firm at the first-round investment	◎ Opaqueness	○ No particular mechanism
LEADVCAGE (first round) Age of lead VC at the first-round investment	◎ Experience	△ Might matter in the 2nd stage
INVEST (first round) Total investment amounts at the first-round investment	◎ Diversification	○ No particular mechanism

Try an alternative model not using this as an IV

6. Empirical Analysis (1): Baseline Estimation

	First stage	First stage	Second stage
	VCNUM_TYPE (first round)	VCNUM_TOTAL (first round)	IPO dummy
Dummy for IPO	Coef.	Coef.	Coef,
NKY_RETURN	-0.0693	-0.2661	0.0447 **
	(0.0918)	(0.2809)	(0.0181)
VCNUM_TYPE	0.3408 ***	0.2888 ***	-0.0158 **
	(0.0149)	(0.0457)	(0.0080)
VCNUM_TOTAL	-0.0080 ***	0.1203 ***	0.0034 ***
	(0.0012)	(0.0036)	(0.0012)
AMOUNT_INVEST_ACC	-0.1220 ***	-0.4948 ***	0.0018 **
	(0.0068)	(0.0208)	(0.0007)
IV: VFAGE (first round)	0.0070 ***	0.0126 ***	
	(0.0006)	(0.0018)	
IV: LEADVCAGE (first round)	-0.0024 ***	-0.0076 ***	
	(0.0003)	(0.0008)	
IV: INVEST (first round)	2.0600E-07 ***	8.6100E-07 ***	
	(0.0000)	(0.0000)	
CONSTANT	0.9241 ***	1.5366 ***	-0.0273
	(0.0328)	(0.1002)	(0.0184)
VCNUM_TYPE (first round)			0.0651 **
			(0.0289)
VCNUM_TOTAL (first round)			-0.0167 **
			(0.0076)
# Obs		25,674	
# Groups		615	
Obs per group min		4	
avg		42	
max		271	
VC type dummy	yes	yes	yes
VF industry dummy	yes	yes	yes

MKT matters

H2 (a) rejected

H2 (b) supported

Experienced Lead VC & Younger VF
⇒ Less #(Type) and #(VCs)

H3 supported

H1 (a) supported

H1 (b) rejected

6. Empirical Analysis (2): Ignoring H2

	First stage	First stage	Second stage
	VCNUM_TYPE (first round)	VCNUM_TOTAL (first round)	IPO dummy
Extensive Margin	Coef.	Coef.	Coef,
NKY_RETURN	-0.0564	-0.2893	0.0411 **
	(0.0943)	(0.2925)	(0.0184)
VCNUM_TYPE			
VCNUM_TOTAL			
AMOUNT_INVEST_ACC	-0.1280 ***	-0.2855 ***	0.0047 ***
	(0.0066)	(0.0205)	(0.0012)
IV: VFAGE (first round)	0.0059 ***	0.0069 ***	
	(0.0006)	(0.0018)	
IV: LEADVCAGE (first round)	-0.0023 ***	-0.0096 ***	
	(0.0003)	(0.0008)	
IV: INVEST (first round)	2.1100E-07 ***	6.5500E-07 ***	
	(0.0000)	(0.0000)	
CONSTANT	0.9478 ***	1.3591 ***	-0.0306
	(0.0330)	(0.1024)	(0.0187)
VCNUM_TYPE (first round)			0.0694 **
			(0.0283)
VCNUM_TOTAL (first round)			-0.0247 ***
			(0.0093)
# Obs	25,674		
# Groups	615		
Obs per group min	4		
avg	42		
max	271		
VC type dummy	yes	yes	yes
VF industry dummy	yes	yes	yes

H3 supported

H1 (a) supported

H1 (b) rejected

6. Empirical Analysis (3): Not Using LEADVCAGE as IV

	First stage	First stage	Second stage
	VCNUM_TYPE (first round)	VCNUM_TOTAL (first round)	IPO dummy
Extensive Margin	Coef.	Coef.	Coef.
LEADVCAGE (first round)	-0.0024 ***	-0.0075 ***	0.0001 **
	(0.0003)	(0.0008)	(0.0001)
NKY_RETURN	-0.0675	-0.2651	0.0449 **
	(0.0946)	(0.2898)	(0.0183)
VCNUM_TYPE	0.3525 ***	0.3122 ***	-0.0193 **
	(0.0151)	(0.0461)	(0.0081)
VCNUM_TOTAL	-0.0082 ***	0.1244 ***	0.0038 ***
	(0.0012)	(0.0037)	(0.0012)
AMOUNT_INVEST_ACC	-0.1269 ***	-0.5165 ***	0.0016 **
	(0.0069)	(0.0212)	(0.0007)
IV: VFAGE (first round)	0.0073 ***	0.0133 ***	
	(0.0006)	(0.0018)	
IV: INVEST (first round)	2.1300E-07 ***	8.9400E-07 ***	
	(0.0000)	(0.0000)	
CONSTANT	0.9002 ***	1.4931 ***	-0.0374 **
	(0.0327)	(0.1002)	(0.0186)
VCNUM_TYPE (first round)			0.0760 ***
			(0.0285)
VCNUM_TOTAL (first round)			-0.0185 **
			(0.0074)
# Obs		25,674	
# Groups		615	
Obs per group min		4	
avg		42	
max		271	
VC type dummy	yes	yes	yes
VF industry dummy	yes	yes	yes

Experienced Lead VC
①leads to smaller and less heterogeneous Syndication

Experienced Lead VC
②reaches IPO more quickly

6. Empirical Analysis (4): Duration from 1st round

	First stage	First stage	Second stage
	VCNUM_TYPE (first round)	VCNUM_TOTAL (first round)	IPO dummy
Extensive Margin	Coef.	Coef.	Coef,
TIME from First round	-0.0092 ***	-0.0272 ***	0.0013 ***
	(0.0004)	(0.0012)	(0.0001)
TIME from First round (Squared)	2.1500E-05 ***	7.6500E-05 ***	-4.2200E-06 ***
	(0.0000)	(0.0000)	(0.0000)
LEADVCAGE (first round)	-0.0022 ***	-0.0070 ***	0.0001 **
	(0.0002)	(0.0008)	(0.0001)
NKY_RETURN	0.0768	0.1144	0.0288
	(0.0913)	(0.2818)	(0.0184)
VCNUM_TYPE	0.4135 ***	0.4539 ***	-0.0182 **
	(0.0147)	(0.0453)	(0.0080)
VCNUM_TOTAL	-0.0047 ***	0.1359 ***	0.0018 *
	(0.0012)	(0.0037)	(0.0010)
AMOUNT_INVEST_ACC	-0.1129 ***	-0.4775 ***	0.0016 **
	(0.0067)	(0.0206)	(0.0008)
IV: VFAGE (first round)	0.0084 ***	0.0160 ***	
	(0.0006)	(0.0018)	
IV: INVEST (first round)	1.9300E-07 ***	8.4300E-07 ***	
	(0.0000)	(0.0000)	
CONSTANT	0.9107 ***	1.6129 ***	-0.0417 **
	(0.0328)	(0.1012)	(0.0169)
VCNUM_TYPE (first round)			0.0498 **
			(0.0254)
VCNUM_TOTAL (first round)			-0.0089
			(0.0067)
# Obs	25,092		
# Groups	615		
Obs per group min	3		
avg	41		
max	270		
VC type dummy	yes	yes	yes
VF industry dummy	yes	yes	yes

Hump-shape as in Miyakawa & Takizawa (2012)

"Weaker" ⇒Time variables Seem to be partly sucking this

"Insignificant" ⇒Time variables Seem to be partly sucking this

7. Conclusions & Some more

- ***Good to have a variety of (but limited # of) VCs at first-round investment***
- ***Coaching from additional types of VCs seem not to work***
- ***Additional VCs seem to be beneficial (coaching and/or diversification)***

- ✓ Any good examples/cases?
- ✓ Dynamics of VC composition ⇒ Who would be more likely to be added?
- ✓ What combinations among various types of VCs are useful?
- ✓ Endogeneity issue: Other remedies (exogenous change in *VCNUM_TYPE* & *VCNUM_TOTAL*?)

- **Other future projects**
  - ✓ Post-IPO performance in terms of TFP and return from the investment [next project-1]
  - ✓ Measuring quality of individual VCs and VC syndication [next project-2]
  - ✓ Bank-dependent VC and Post-IPO bank relation (Hellman et al. 2008 RFS) ⇒ [next project-3]

Thank you and comments are welcome!

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