

The Effect of Policy Uncertainty on VC Investments Around The World

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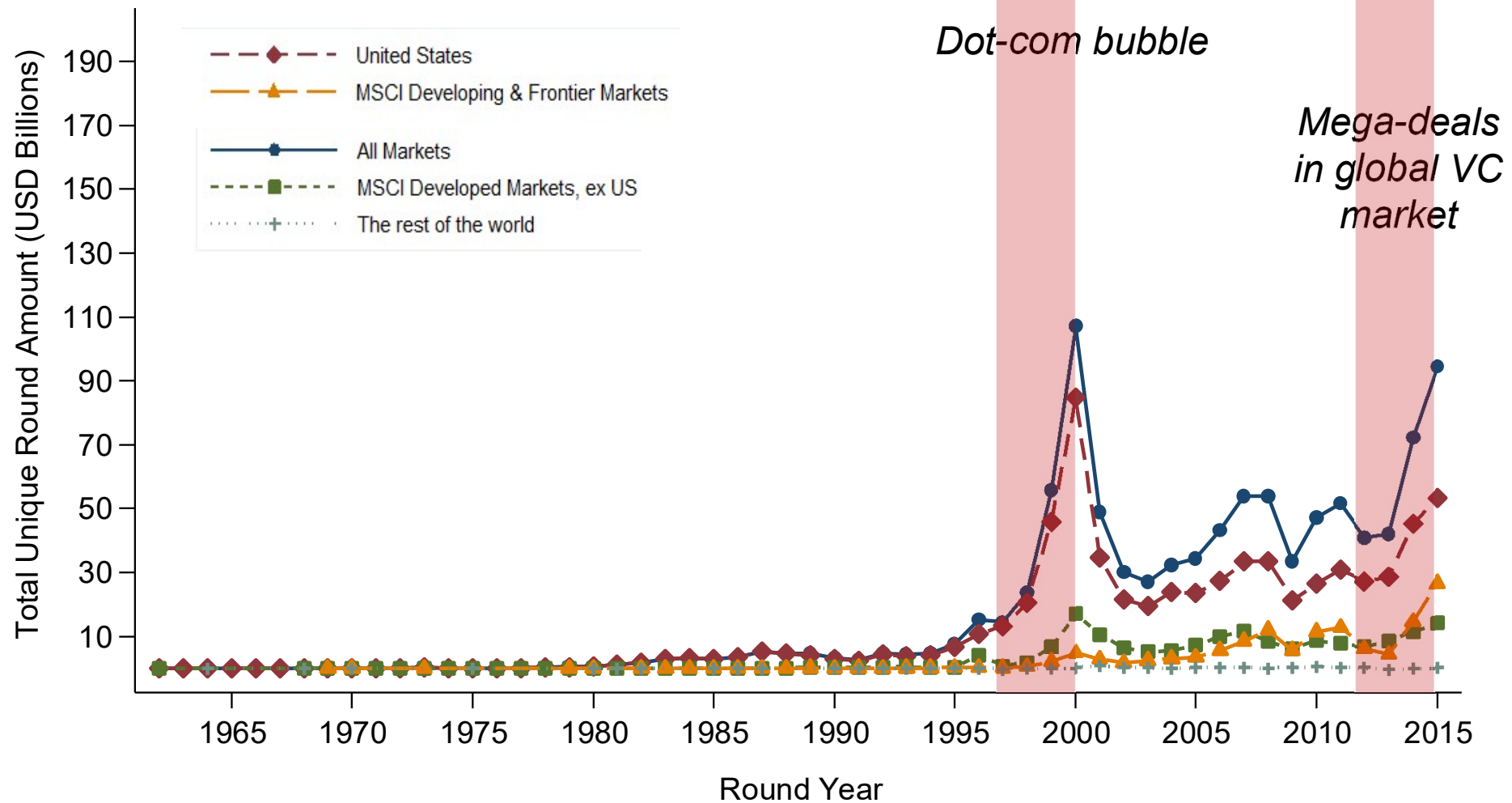
The Economics of VC Investments

- **VC investors provide staged financing to startup companies that tie each financial infusion to milestones**
- **Matching the amount of money raised in each round to the specific uncertainty that needs to be resolved with that round of funding**
 - This structured financing builds real options (Gompers 1995; Bergemann, Hege, and Peng 2008)
- **VC investors refer to “financing risk” to describe how otherwise sound projects may not obtain capital for the next experiment.**
 - Nanda and Rhodes-Kropf (2010, 2013) argue that hot markets—times when financing risk is low—allow projects with the highest real option values to be funded, because the continuation risk is lower for all projects in the economy.

Investment under uncertainty

- (-) **“Bad news principle”** (Bernanke, 1983; Dixit and Pindyck, 1994)
 - Without investment lags → delay investments amid uncertainty
 - For irreversible investment → the increased value of the option to wait hold back on investment in the face of uncertainty
- (+) **“Good news principle”** (Bar-Ilan and Strange, 1996)
 - With investment lags → the opportunity cost of waiting is also uncertain
 - Higher uncertainty → invest sooner
 - Invest when uncertainty is high → obtain an option to complete the project (future growth options)

The rise of VC investments outside the U.S.



U.S. Venture Capital vs Non-U.S. Venture Capital Investment

- **Characteristics of U.S. VC investments** (Megginson and Weiss, 1991; Black & Gilson 1998; Gompers & Lerner, 1999)
 - High use of convertible preferred stock
 - Investments in innovative sectors
 - Early stage financing
- **Characteristics of VC investments abroad** (Black & Gilson, 1998; Megginson, 2004)
 - High use of common stock (70%)
 - Lower-technology industries
 - Later-stage financing

Summary of the paper

Research Questions:

- Does policy uncertainty affect
 - VC investments in non-U.S. firms?
 - VC strategy & investment outcomes?
 - Cross-Border VC investments?
- Does the policy uncertainty effect varies cross-sectionally

Results:

- Policy uncertainty is negatively associated with VC investments
- Policy uncertainty increases VC investment staging, decrease VC investment skewness & VC likelihood of successful outcomes.
- The negative effect of policy uncertainty
 - Is more pronounced for high risk firms
 - Is less pronounced for firms in high-investment region and backed by captive lead VCs

Sample & Research Design

Methodology:

- Panel with fixed-effects
- Probit regression

Sample:

- 23,354 firm-year observations (VentureXperts)
- 22 countries
- 1987 – 2015
- Economic Policy Uncertainty Index (Baker, Bloom, Davis, 2016)
- IPO & Acquisition data (SDC)
- Control variables (Datastream & WDI)
- National Elections (DPI – IADB)

Summary Statistics

- On average,
 - Total annual VC investment per firm is \$ 7.5 million
 - Entrepreneurial firm age is 5.3 years
 - Lead VC age is 11 years
- VentureXperts data
 - Missing round amounts (Kaplan et al., 2002)
 - Overreporting (Tian, 2011)
 - Unbiased measures (Gompers and Lerner, 2004)

Units of observations

- **First part:** VC investment
 - Firm year
 - Industry-country year
- **Second part:** VC investment structure and outcome
 - Firm
- **Third part:** Cross-border VC investment
 - VC country - entrepreneurial country pair

Policy uncertainty *negatively* affect VC investments

$$Investment_{ikjt} = \alpha_{ijt} + \beta_1 Policy\ Uncertainty_{jt} + \beta_2 Controls_t + \varepsilon_{ijt} \quad (1)$$

	VC Inv.	VC Inv.	No. of VC	No. of VC	Inv. per VC	Inv. per VC
Policy uncertainty	-0.212***	-0.169***	-0.161***	-0.167***	-0.136***	-0.099**
	-0.054	-0.053	-0.055	-0.044	-0.042	-0.042
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Augmented Controls	No	Yes	No	Yes	No	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Stage fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Lead VC country fixed effects	No	Yes	No	Yes	No	Yes
Observations	21392	20760	21392	20760	21392	20760
Adjusted R-squared	0.218	0.255	0.111	0.122	0.293	0.331

A standard deviation **increase** in policy uncertainty is associated with

- **12.46% decrease** in VC investment amount,
- **9.4% decrease** in Number of VCs investing,
- **7.9% decrease** in Investment per VCs in the same year.

Controls used in regressions

- **Firm-level Controls:** Entrepreneurial firm age, Lead VC age
- **Industry-level Controls:**
 - Baseline: Tobin's Q, sales growth, cash flow, tangibility,
 - Augmented: competition.
- **Country-level Controls:**
 - Baseline: Stock market returns, Real GDP growth
 - Augmented: Country currency volatility, Patent applications, Trade openness, Financial openness, Inflation.
- **Clustering of standard errors:** Country-Industry Year

The adverse effect of policy uncertainty is not persistent

	VC Inv. t+1	VC Inv. t+2	No. VC t+1	No. VC t+2	Inv. Per VC t+1	Inv. Per VC t+1
Policy uncertainty	0.015	0.029	0.019	0.027	0.007	0.015
	-0.026	-0.037	-0.023	-0.023	-0.021	-0.03
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Stage fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21148	21147	21148	21147	21148	21147
Adjusted R-squared	0.024	0.021	0.013	0.015	0.028	0.026

- There is *no evidence of a subsequent uptick* in VCs investment in the following years

VC investments are lower during close election years

	Close Election I			Close Election II		
	VC Inv.	No. VC	Inv per VC	VC Inv.	No. VC	Inv per VC
Close election	-0.159**	-0.034	-0.143**	-0.147**	-0.051	-0.126**
	-0.066	-0.049	-0.053	-0.064	-0.05	-0.05
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Stage fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17755	17755	17755	17755	17755	17755
Adjusted R-squared	0.204	0.12	0.272	0.204	0.12	0.272

- Using two proxies **close national election** from 47 countries
 - Policy uncertainty ***negatively*** affect total VC investments & Investment per VCs
 - There is ***no significant*** change in the number of VCs investing

Other Robustness Checks

- The baseline result continues to hold
 - Using residual policy uncertainty
 - Using industry-level units of observation
 - Using randomized close election years
 - Using Congress Year of Chinese Communist Party for China sample
 - Using two subsamples based on ethnic fractionalization in a country

Cross-section Heterogeneity Tests

- By interacting Entrepreneurial firms & Lead VC investors characteristics with economic policy uncertainty, I show that:
- The effect of policy uncertainty is *more pronounced* for
 - Young and early-stage firms
- The effect of policy uncertainty is *less pronounced* for
 - Firms in cities with high global VC investments
 - Firm in country with more developed equity markets
 - Firm backed by Corporate Lead VCs

VC investment outcomes and strategy

	IPO exit	Acquisition exit	Successful exit
Policy uncertainty	-0.595*	-0.883***	-0.880***
	-0.32	-0.104	-0.111
Baseline Controls	yes	yes	yes
fixed effects	yes	yes	yes
Observations	14290	20911	21208
Pseudo R-squared	0.2149	0.2714	0.2405

	No. Rounds	Skewness
Policy uncertainty	1.043***	-0.213***
	-0.091	-0.024
Baseline Controls	yes	yes
Fixed effects	yes	yes
Observations	24585	15130
R-squared	0.2515	0.1982

- Policy uncertainty **negatively** affect VC investment outcomes
- Policy uncertainty **increase** staging and **reduce** skewness

Policy uncertainty *negatively* affect Cross-Border VC investments

	Cross-Border VC Inv.	Cross-Border VC Inv. t+1
Economic policy uncertainty	-0.286** (0.134)	-0.287* (0.152)
Baseline country pair controls	yes	Yes
Year Fixed Effects	Yes	Yes
Entrepreneurial Firm Country Fixed Effects	Yes	Yes
Observations	2170	2164
Adjusted R-squared	0.200	0.205

A one-standard-deviation increase in the policy uncertainty in a given entrepreneurial firm is associated with **a 15.2% decrease** in the amount of cross-border VC investment.

Conclusions

- I present robust evidence that policy uncertainty negatively influences Venture Capital investments across-countries.
- The economic magnitude of the effect is significant.
- This finding is particularly important since it shows that even moderate amount of policy uncertainty can act as a hefty tax on venture capital investment.