The Effect of Policy Uncertainty on VC Investments Around The World

Romora Edward Sitorus

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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.

The chart shows the total unique round amount in USD billions from 1965 to 2015 across different markets:
- United States
- MSCI Developing & Frontier Markets
- All Markets
- MSCI Developed Markets, ex US
- The rest of the world

Key events highlighted:
- Dot-com bubble
- Mega-deals in global VC market
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
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)
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

\[ Investment_{ikjt} = \alpha_{ijt} + \beta_1 Policy\ Uncertainty_{jt} + \beta_2 Controls_t + \epsilon_{ijt} \]  

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

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

- **Clustering of standard errors:** Country-Industry Year
The adverse effect of policy uncertainty is not persistent

<table>
<thead>
<tr>
<th></th>
<th>VC Inv. t+1</th>
<th>VC Inv. t+2</th>
<th>No. VC t+1</th>
<th>No. VC t+2</th>
<th>Inv. Per VC t+1</th>
<th>Inv. Per VC t+1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy uncertainty</td>
<td>0.015</td>
<td>0.029</td>
<td>0.019</td>
<td>0.027</td>
<td>0.007</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>-0.026</td>
<td>-0.037</td>
<td>-0.023</td>
<td>-0.023</td>
<td>-0.021</td>
<td>-0.030</td>
</tr>
<tr>
<td>Baseline Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Industry fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Stage fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Firm country fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
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<td>21147</td>
<td>21148</td>
<td>21147</td>
<td>21148</td>
<td>21147</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.024</td>
<td>0.021</td>
<td>0.013</td>
<td>0.015</td>
<td>0.028</td>
<td>0.026</td>
</tr>
</tbody>
</table>

- There is **no evidence of a subsequent uptick** in VCs investment in the following years.
VC investments are lower during close election years

<table>
<thead>
<tr>
<th>Close Election I</th>
<th>Close Election II</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC Inv.</td>
<td>No. VC</td>
</tr>
<tr>
<td>Close election</td>
<td>-0.159**</td>
</tr>
<tr>
<td></td>
<td>-0.066</td>
</tr>
<tr>
<td>Baseline controls</td>
<td>Yes</td>
</tr>
<tr>
<td>Industry fixed effects</td>
<td>Yes</td>
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<tr>
<td>Year fixed effects</td>
<td>Yes</td>
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<tr>
<td>Stage fixed effects</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm Country fixed effects</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>17755</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.204</td>
</tr>
</tbody>
</table>

- 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
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

<table>
<thead>
<tr>
<th>Policy uncertainty</th>
<th>IPO exit</th>
<th>Acquisition exit</th>
<th>Successful exit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.595*</td>
<td>-0.883***</td>
<td>-0.880***</td>
</tr>
<tr>
<td></td>
<td>-0.32</td>
<td>-0.104</td>
<td>-0.111</td>
</tr>
</tbody>
</table>

Baseline Controls: yes, yes, yes
Fixed effects: yes, yes, yes
Observations: 14290, 20911, 21208
Pseudo R-squared: 0.2149, 0.2714, 0.2405

- Policy uncertainty **negatively** affect VC investment outcomes
- Policy uncertainty **increase** staging and **reduce** skewness
Policy uncertainty *negatively* affect Cross-Border VC investments.

<table>
<thead>
<tr>
<th>Economic policy uncertainty</th>
<th>Cross-Border VC Inv.</th>
<th>Cross-Border VC Inv. ( t+1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.286** (0.134)</td>
<td>-0.287* (0.152)</td>
</tr>
</tbody>
</table>

- 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.