

# Functions of public venture capital

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## 1. Purpose and background

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▼ Government VC scheme have been a key policy issue for governments to promote not only new technology based firms(NTBFs) but also economic development since 2000.

\*Governments have attempted to foster the creation of US- or Silicon Valley style venture capital(VC) market as a necessary preliminary step to support the generation of high-growth entrepreneurial firms.

\*Japanese government has established university spinoff funds totaling 100 billion Japanese Yen and promoted investment activities through funds of four universities.

\*In its Japan Revitalization Strategy 2016, it has set a challenging Key Performance Indicator to double nominal GDP as a percentage of venture capital investments in entrepreneurial firms by 2022 .

## 2. How to justify government Intervention

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### ▼ Positive spillover hypothesis

\*NTBFs generate positive externalities by commercializing their ideas and inventions, creating jobs and boosting economic development (Florida and Kenney, 1988; Audretsch 1995; Pfirrmann, Wupperfeld and Lerner, 1997; Lerner, 1997).

\*Government VCs are supposed to identify investments which will ultimately yield high private and/or social returns and provide value adding supports to the management of their portfolio firms.

## 2. How to justify government Intervention

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### ▼ Market failure hypothesis

\*NTBFs often cannot gain enough capital to start and expand their businesses.

\*Government intervention can be helpful for filling the NTBFs' equity capital gap.

\*- highlights :the risk of R&D externalities and agency problems surrounding NTBFs.

:their human resource constraints, insufficient collaterals and lack of management experience

\*Private VCs often do not get incentives to invest in NTBFs which have higher risks.

\*the 2008-2009 financial crisis has deteriorated the situation, because private VCs have become more risk adverse and have focused on later stage investments.

## 3. Criticisms of two hypotheses

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### ▼ Positive spillover hypothesis

\*It has been argued that government VCs could identify successful investments either financially or socially and give appropriate value added supports as coaches.

\*Government officials might lack proper incentives, knowledge and experience to invest in NTBFs (Lerner, 2002; Leleux and Surlemont, 2003).

- Due to the broader objectives : not only financially but also socially
- less accountable for their activities.

### ▼ Market failure hypothesis

\*Government VCs might have reduced private VCs' opportunities to invest in NTBFs (Armour and Cumming 2006).

\*They weaken the functions of private VCs to find and support their portfolio firms.

## 4. Methodology: a literature review

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### ▼ Major databases

ABI/INFORM, Business Source Premier and Science Direct, Web of Science and Google Scholar

### ▼ Keywords

“public venture capital,” “publicly backed venture capital,” “publicly supported venture capital,” “public sector venture capital,” “government venture capital,” “government backed venture capital,” “government-supported venture capital,” “university seed fund” and “seed funds.”

### ▼ More than 190 peer reviewed papers

### ▼ Extracting the relevant 51 papers from initial pool of 190

▼ To review micro level researches related to spillover hypothesis and macro level researches related to market failure hypothesis.



## 5. Spillover hypothesis: It was supported

Contributions	Description	Studies
More value adding	Australian Pre-Seed Funds have smaller portfolios (number of investees) per manager.	Cumming and Johan (2009) Cumming (2007)
Better performance	Government VC and R&D tax incentives seemed to produce positive effects on technology-based small firm's performance.	Revest and Sapio (2012)
More growth	SBIR program awardees grew significantly faster than matched firms over a decade and were more likely to attract venture financing.	Lerner (1999) Cumming and Johan (2014)
More employees	The high tech firms, which are funded by the SBIR program retained more employees after completion of the project.	Link and Scott (2012)
More exit	Australian Innovation Investment Funds had more exit success.	Cumming (2007)





## 5. Spillover hypothesis: It was supported

Contributions	Description	Studies
More Innovation and R&D	Australian Innovation Investment Funds have facilitated R&D, innovation, and economic growth.	Cumming and Johan (2014)
More Governance	Government VC-backed IPO firms have better board structures than non-government VC-backed IPO firms.	Chen, Liao and Lu (2012)
More R&D partnership	VC backing has a strong positive impact on NTBFs' participation in EU-funded R&D partnerships. The magnitude of the impact of VC backing considerably differs depending on the type of investor with bank and government VC exhibiting the strongest positive effects.	Colombo, D'Adda and Pirelli (2016)
More staging	Government VC funding increases the likelihood that firms will receive private VC.	Guerini and Quas (2015) Munari, Pasquini and Toschi (2015) Cumming (2007)
More syndication	University-oriented seed funds-backed firms perform better in staging and syndication.	Munari, Pasquini and Toschi (2015) Cumming (2007)



## 5. Spillover hypothesis: It was not supported

Contributions	Description	Studies
Less value-adding	Investment managers of captive funds were less involved in value-adding activities.	Knockaert, Lockett, Clarysse and Wright (2006)
Less performance	Labour-Sponsored Venture Capital Corporations have artificially low betas and returns that have significantly underperformed industry benchmarks.	Cumming and MacIntosh (2007)
Less exit	The dominant presence of Labour-Sponsored Venture Capital Corporations in Canada has given rise to a high proportion of less successful exits by means of buybacks and secondary sales.	Cumming and Johan (2008)  Munari, Pasquini and Toschi (2015) Cumming and Johan (2010) Munari, Pasquini and Toschi (2015)
More buybacks and secondary sales	The dominant presence of Labour-Sponsored Venture Capital Corporations in Canada has given rise to a high proportion of less successful exits by means of buybacks and secondary sales.	Cumming and Johan (2008)  Buzzacchi, Scellato and Ughetto (2013)



## 5. Spillover hypothesis: It was not supported

Contributions	Description	Studies
Less support of business idea and professionalization	The contributions of independent VC funds prove to be significantly higher than those of government VC funds in a number of areas, including the development of the business idea and professionalization.	Luukkonen, Deschryvere and Bertoni (2013)
Less productivity, efficiency	Government VC-backed firms display significant reductions in productivity and efficiency compared to their non-VC-backed peers.	Alperovych, Hübner and Lobet (2015)
Less staging and syndication	Australian Pre-Seed Funds do not stage and syndicate more frequently.	Cumming and Johan (2009)

## 5. Spillover hypothesis: Related micro level researches

### Characteristics of government VCs

Contributions	Description	Studies
Early stage investment	Government VCs invest more during the early stages.	Pintado, Pérez de Lema and Van Auken (2007) Cumming and Johan (2009)
Hi-tech	Australian Innovation Investment Funds take on risk by investing in early stage and high-tech investments	Cumming (2007)
Local investment	Australian Pre-Seed Funds are more likely to invest in firms resident in the same state.	Cumming and Johan (2009)
Longer duration of investment	A higher public share is associated with a longer duration of investment.	Buzzacchi, Scellato and Ughetto (2013)
Stable and different investment pattern	Government VCs appear to be the most distinct type of VC investor. The investment patterns of government VCs are stable over time and similar across several European countries.	Bertoni, Colombo and Quas (2015)

## 5. Spillover hypothesis: Related micro level researches

### Characteristics of government VCs

Contributions	Description	Studies
Different sensitivities to determinants	Government funded VC has different sensitivities to the determinants of VC compared to non-government funded VC.	Jeng and Wells (2000)
Not high-tech	Australian Pre-Seed Funds are less likely to invest in high-tech firms than other types of VC funds.	Cumming and Johan (2009)
Short period of duration to IPO (less risky investment)	Canadian VCs with the dominant presence of Labour-Sponsored Venture Capital Corporations have had scant success in achieving IPO exits and short period of investment duration to IPO.	Cumming and Johan (2010)
Volatile investment policy	Canadian Labour-Sponsored Venture Capital Corporations in Ontario reduced the number of investments in private firms and included public firms in their portfolios after the change in tax policy.	Johan, Schweizer and Zhan (2014)

## 5. Spillover hypothesis: Related micro level researches

### Syndication seems to be effective

Contributions	Description	Studies
More exit	There is also a positive association between mixed government VC and private VC funding and successful exits, as measured by initial public offerings and acquisitions, attributed largely to the additional investment.	Brander, Du and Hellmann (2014)  Cumming, Grilli and Murtinu (2014)
Better performance	Government VC-backed NTBFs underperform with respect to private VC-backed ones and do not grow more than non-VC-backed firms. The only notable exception suggesting a positive and statistically significant impact for government VCs is when government VC funds co-finance with private VC funds.	Grilli and Murtinu (2014b)
More sales growth	When led by independent VC investors, there is a positive and statistically significant impact of syndicated investments by both government and independent investors on firm's sales growth.	Grilli and Murtinu (2014a)

## 5. Spillover hypothesis: Related micro level researches

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### Syndication seems to be effective

Contributions	Description	Studies
More innovation	Government VCs boost the impact of independent VCs on both invention and innovation. They are an ineffective substitute but an effective complement of independent VCs.	Bertoni and Tykvová (2015)
More staging	Enterprises funded by both government VCs and private VCs obtain more investment than enterprises funded purely by private VCs and funded purely by government VCs.	Brander, Du and Hellmann (2014)



## 6. Market failure hypothesis: It was supported \*

Contributions	Description	Studies
Development of VC market	Spanish VC market has rapidly developed in the last 10 years and this development coincides with the establishment of public policies for encouraging technology entrepreneurship	del-Palacio, Zhang and Sole (2012)  Colombo, Cumming and Vismara (2016) Wonglimpiyarat (2016)
Development of VC market(partial)	Latvian venture capital programs could be seen as a partial success, because it has failed to address the demand side.	Avots, Strenga and Paalzow (2013)
Crowding-in effect	Markets with more government VC funding have more VC funding per enterprise and more VC-funded enterprises, suggesting that government VC finance largely augments rather than displaces private VC finance.	Brander, Du and Hellmann (2014)



## 6. Market failure hypotheses: It was not supported \*

Contributions	Description	Studies
Hindering the development of VC market	Government programs more often hinder than help the development of private equity.	Armour and Cumming (2006)
Crowding-out effect	Canadian Labour-Sponsored Venture Capital Corporations crowd out other types of VC funds.	Cumming and MacIntosh (2006)
Crowd-out other government VC	Australian Pre-Seed Funds program diminishes the incentives for a previously existing Australian government VC fund program to invest in seed stage ventures, and hence competing government initiatives appear to be crowding out one another.	Cumming and Johan (2009)

## 6. Market failure hypotheses: It was not supported \*

Contributions	Description	Studies
Not encouraged	The presence of inefficiencies in venture capital markets that are not alleviated by the existing Italian technology policy measures towards high-tech start-ups.	Colombo, Grilli, and Verga (2007)
Not discouraged	Government VC funds in Europe have not crowded out private VC investment.	Cumming (2014)
No effects	Large government participation is correlated with smaller VC industries. However, their analyses do not support the view that public venture capitalists are acting to seed the industry or that they crowd-out private funds.	Leleux and Surlemont (2003)

## 6. Market failure hypotheses: Related macro level researches

### The other factors matter

Contributions	Description	Studies
Regional characteristics	Regional characteristics matter for rigorous assessments of the effectiveness of government VC programs.	Munari and Toschi(2015)
Institutional differences	Institutional differences led to the later development of an active VC market in Sweden compared with the United States. In particular, a later development of financial markets and a heavier tax burden for entrepreneurs have played a key role.	Lerner and Tåg (2013)
Others factors	Government VC funds are indeed fuel for transformative entrepreneurship. But if only seed capital is provided, it flows straight to low-quality ventures.	Venkataraman(2004)
Dynamic process	Direct and indirect approaches recognize the importance of active stock markets but largely ignore the dynamic processes of markets, asserting that the provision of capital and institutional changes.	Callagher, Smith and Ruscoe (2015)
Long lead time	Long lead times associated with government VC initiatives are necessary like in US and Australia.	Lerner and Watson (2008)

# Market failure hypothesis: Related macro level researches\*

## The other factors matter

Contributions	Description	Studies
Partnership between government and private VC	Local governments in China usually play a dominant role in the VC market due to the innate strategic resources. Promoting the VC market by stimulating private investors' engagement is a crucial step to create the foundation of public/private partnerships from a local government perspective.	Wang, Wang, Ni and He (2013)
Fare policies	The Swedish government has been biased against supplying seed capital to firms in relatively mature industries (e.g. metalwork and machinery industries).	Link and Scott (2010)
Cost-effectiveness	While measures stimulate entrepreneurship, only cost-effective government services can improve welfare.	Carpentier, L'her and Suret (2010)
Balance of government and private VC	Public sector has been involved in more than three-quarters of the early stage investments made in the Midlands and North UK. It has been rising to more than 90% in some regions in 2008.	Mason and Pierrakis(2013)
No financial gap	There was no evidence of shortage of VC funds in Europe. Also, there was no evidence of increased public R&D spending on the innovation ratios.	Da Rin, Nicodano, and Sembenelli (2006)



## 7. Limitation and implications for future research

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### ▼ Summary

#### \*Spillover hypothesis

Controversial results

Government VCs have different characteristics

Syndication seems to be effective.

#### \*Market failure hypothesis

Controversial results

It seems to depend on other factors.

### ▼ Limitation

\*Academic literature review

\*Empirical research should be next step

Japan and Estonia (I will stay until next March)



## 7. Limitation and implications for future research

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### ▼ Future researches regarding positive spillover

\*To study extensively different government VCs' objectives

-financial return, social payoffs and local focus

\*To study different government VCs' experience

-skill, abilities to manage

\*To study different government VCs' financing schemes

-100% government funds, hybrid private-government funds

and funds-of-funds

\*To study various types of portfolio firms:

-industry, technology, human capital, relational capital, age

### ▼ Future researches regarding market failure

\*To study broader context.

-other legislative initiatives such as taxes

-other financial policies

-supporting measures for NTBFs