

ECONOMIC FOOTPRINT OF SWEDISH VENTURE CAPITAL

Swedish Private Equity & Venture Capital Association (SVCA)
May 2019

Overview of report



PART 1:

Unique value creation of Venture Capital (VC)

- What is venture capital (VC)?
- How VC firms are helping individual companies



PART 2:

National economic benefits

- How VC is helping individual companies bring about economic benefits to the rest of the society.
- What is the potential for more VC investments in Sweden?
- How could more VC investments in Sweden benefit economic growth going forward?



PART 3:

Stockholm: A natural international hub for venture capital

We turn our attention to VC firms administering the funds to:

- Compare the Swedish VC market to international peers in terms of performance and size.
- Analyse what is needed to boost Swedish VC
- Provide policy recommendations

An aerial photograph of a dense forest with a path leading through it. The path is a light-colored, sandy or dirt trail that winds through the trees. The trees are mostly evergreens, and the overall scene is in black and white.

1

UNIQUE VALUE CREATION OF VENTURE CAPITAL

How are venture capital firms helping companies to succeed?

The unique value creation of venture capital

1 A unique type of funding



Bringing funding to new risky growth companies, often built on brand new ideas.

2 Active ownership



Leading growth companies to succeed through strategic and operational support.

3 Picking future winners



Identifying high-growth opportunities at the right time in the right markets.

In the following, we go through each of the three channels. In the next chapter, we analyse how this value creation brings about national economic benefits.

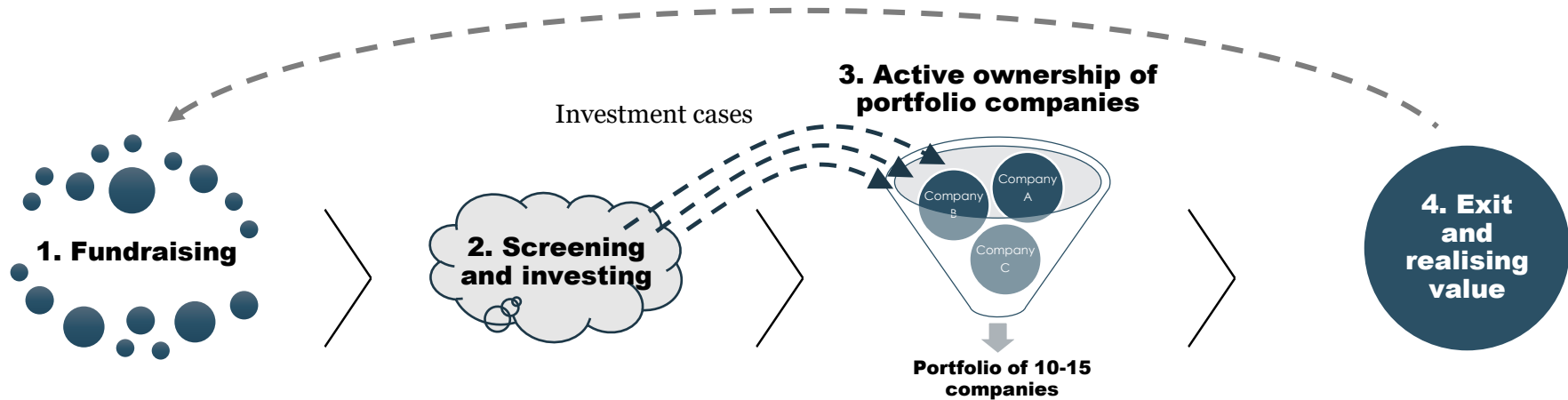
What characterises Venture Capital?

The Venture Capital (VC) model is about identifying high-growth – and high-risk – companies, bringing them to the market and developing scale. Mostly in knowledge-intensive sectors, such as ICT and life science, often as spin-outs from previous successful start-ups.

Due to the high-risk/high-return profile, these types of companies are unlikely to receive bank credit. They therefore crucially depend on venture capital.

Four tasks of venture capital firms

Successful exits often followed by new investments – success breeds more success.



As a first step, a new VC fund needs to find investors (limited partner, LPs). VC is risky and therefore the reputation and past performance of fund managers are important.

Over the next 2-4 years, the fund managers search through a large number of companies to identify investment cases. Focus is on companies with large growth potential.

VC funds carry out active ownership in the portfolio companies, using their highly specialised knowledge, network and syndication with other VC funds to increase the chance of success.

When the company has matured, the VC fund will start looking for potential buyers in other types of equity markets. The realised potential and experience are often canalised into new start-ups.

VC is a long-term high-risk investment with a strong upside

Most VC investments are unsuccessful

- 45% of all VC investments among major Nordic VC funds generate a loss. But the potential upside is high, for example: 4% has a return ten times the invested amount.
- This provides an average annual return (IRR) of some 23% over the past 10 years.

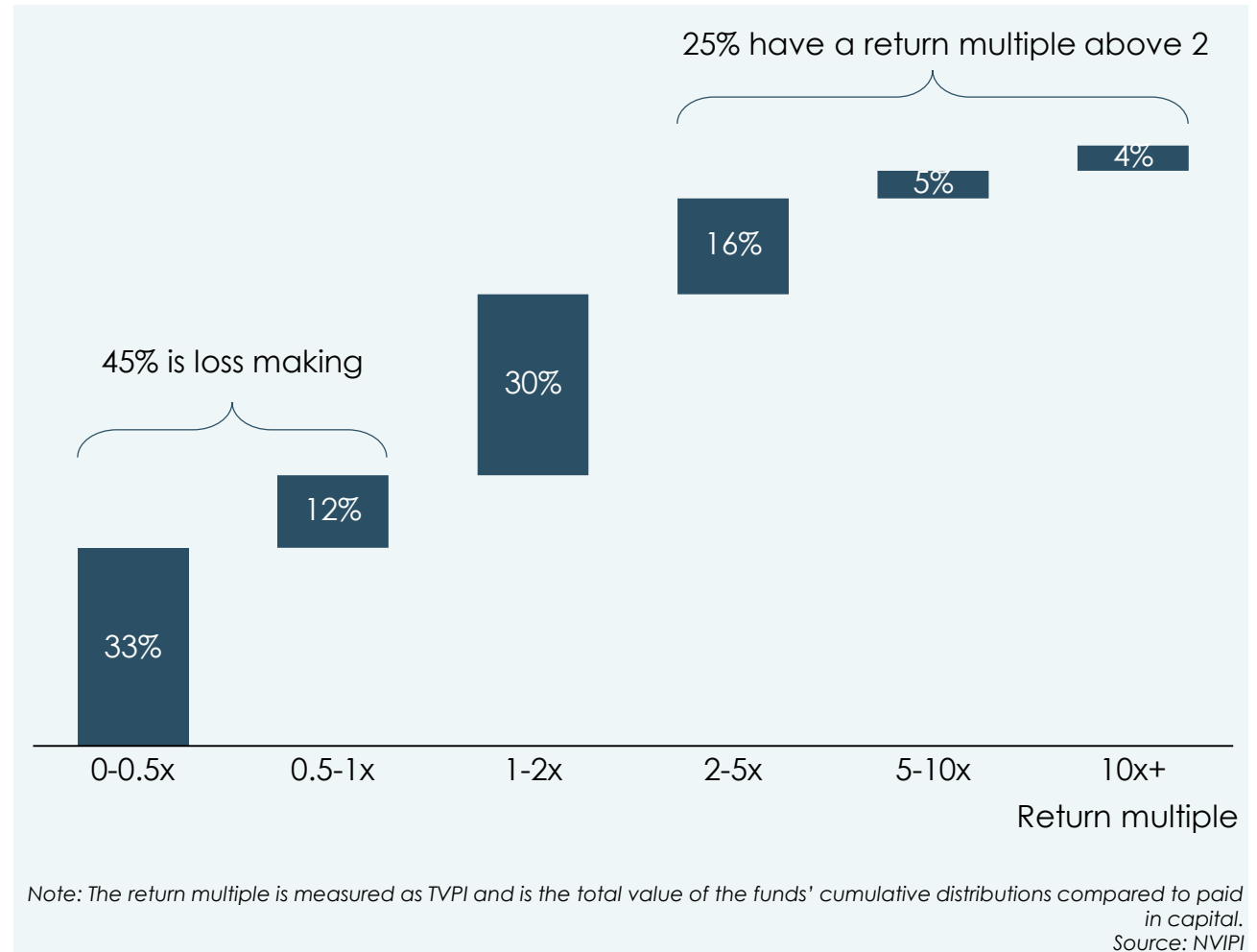
The high return discrepancy of the individual companies is mitigated through diversification

- A typical holding represents less than 15% of the total fund size.
- Consequently, only 20% of funds older than three years have a return multiple (TVPI) below one.

Source: NVPI

Distribution of return multiples (TVPI) of companies in major Nordic VC funds

Based on the Nordic Venture Capital Index (NVPI), which includes all the major Nordic VC firms

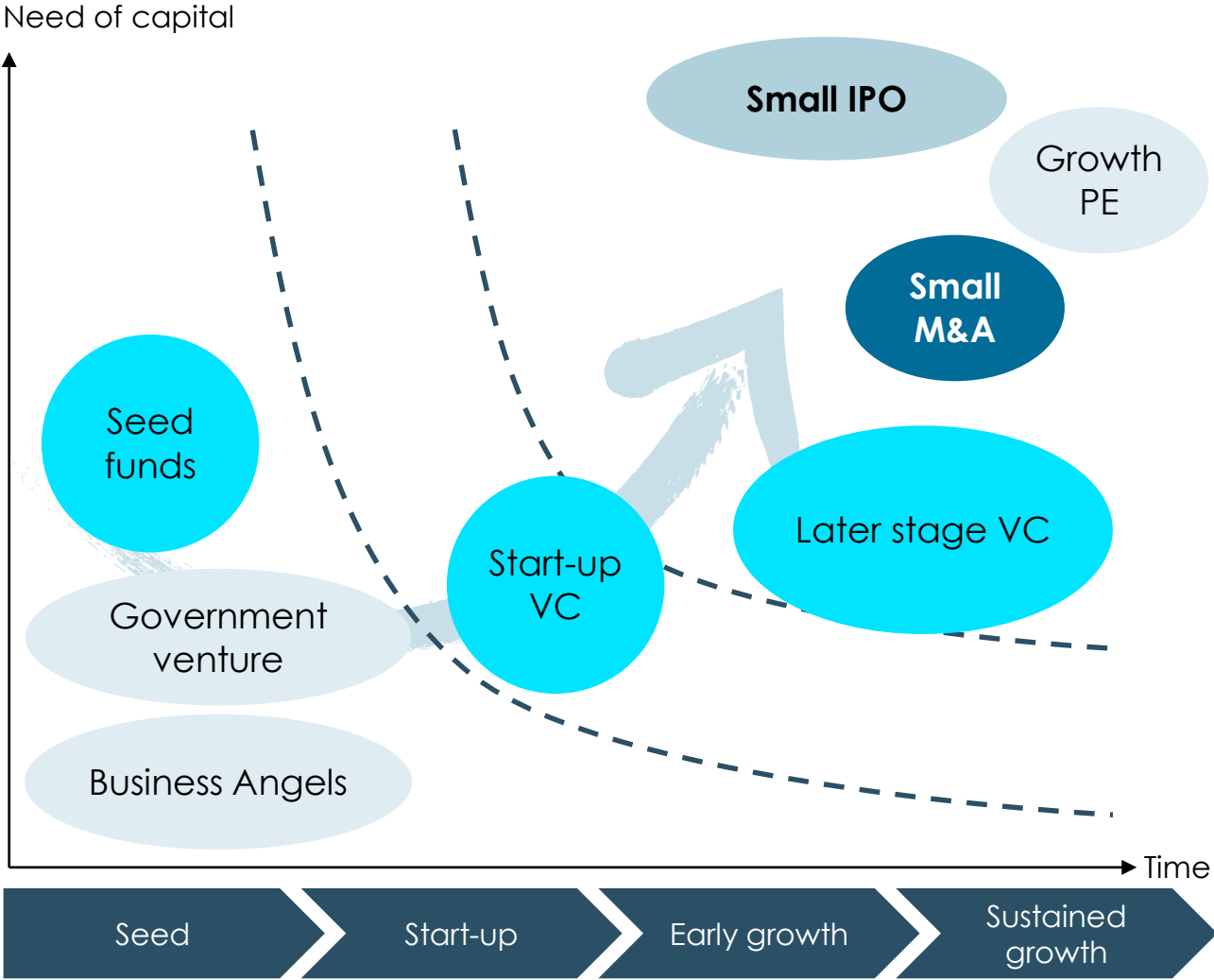


VC plays a crucial role in the capital food chain

VC is crucial in bringing small, innovative start-ups into proven business concepts

- The capital food chain is dependent on the effectiveness of early-stage funding.
- If there is no funding for seed and start-up companies, few companies make it to the later stage and gain scale.
- Later stage funding is crucial for companies to grow enough to finally obtain capital through small IPOs, M&A or growth Private Equity (PE).

Capital eco-system of innovative start-ups



Venture capital markets are international

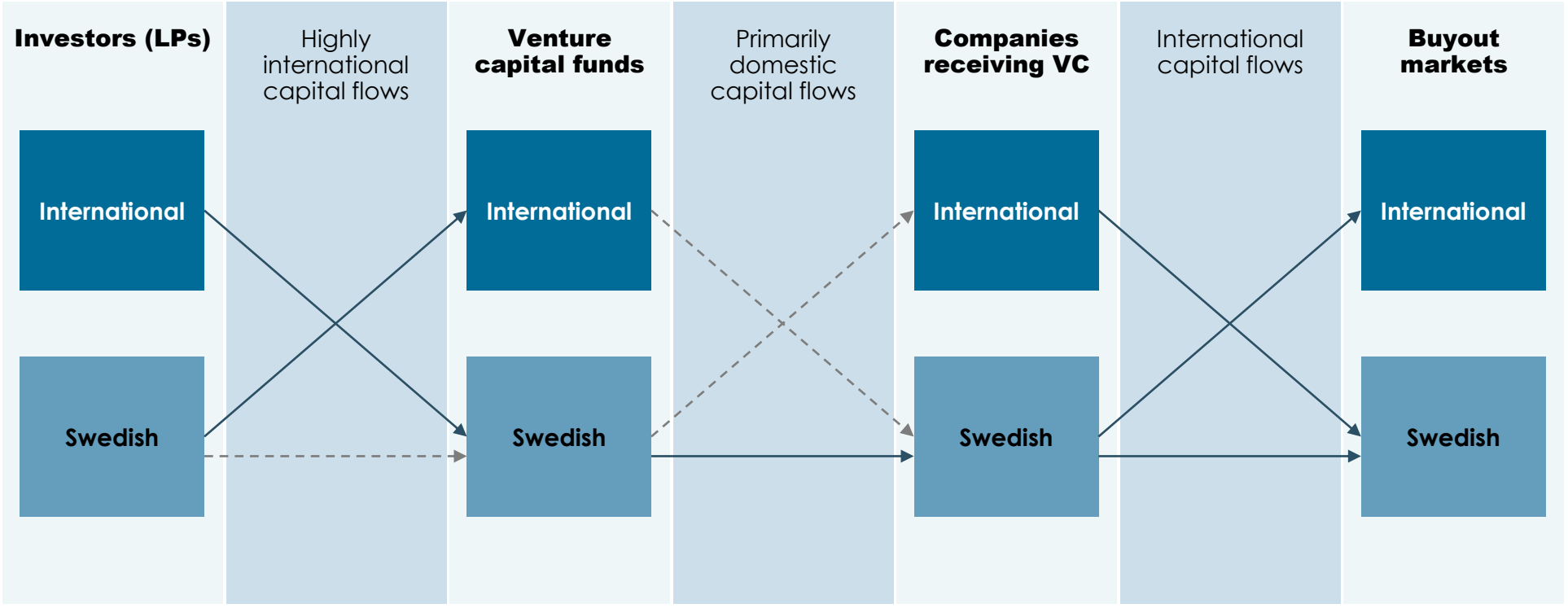
Four types of stakeholders in an international venture capital ecosystem:



VC investors (Limited Partners or LP) operate internationally, e.g. 70% of funds raised by Swedish VC firms are from foreign investors.¹ Similarly, Swedish investors often invest in foreign funds.

The norm is that companies receive capital from VCs in the same country, e.g. to avoid asymmetrical information biases. However, as companies increase in size, the information biases become smaller and companies increasingly receive funding from abroad.

The buy-out market is very international. Swedish start-ups can make use of a well-functioning Swedish IPO market and PE industry.

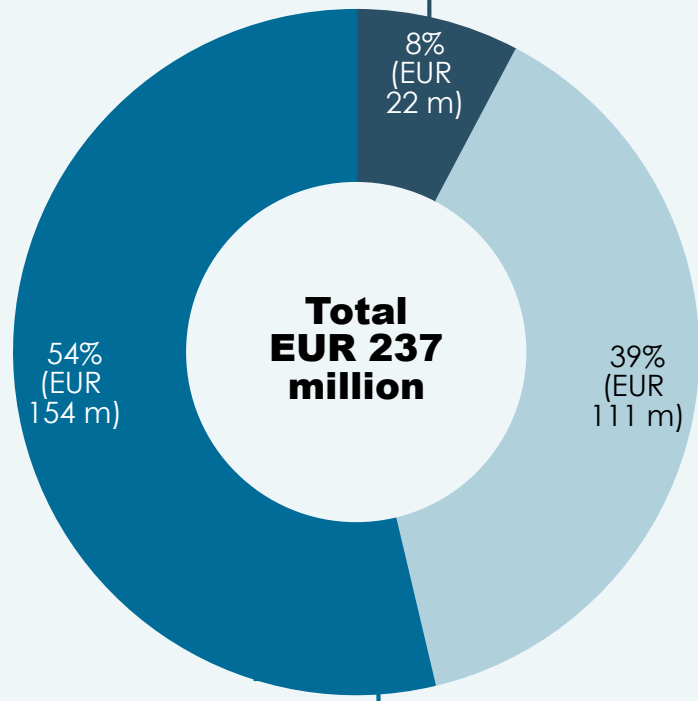


1) Source: Invest Europe

Swedish VC covers the three phases of bringing innovative companies to the market

VC investments in Sweden in 2017 – three types of funding

Share of total investments



Seed funds

– many investments with small ticket size

Early on, when the company is not yet established or is only an idea or prototype, the entrepreneurs mostly rely on private funds or business angel funding. Seed VC is often the only professional private investor, typically investing between EUR 100.000 € and 4 m.

Start-up VC

Next, once the company has a product to show and possibly some growth in the turnover, start-up VC funds become available, arranged in a number of rounds:

- Series A:** VC funds invest in the early start-ups, tickets of EUR 4-10 m.
- Series B:** As the company and product grow and develop, VC funds invest larger tickets, EUR 10-25 m.
- Series C:** Successful companies may make it to the largest round of start-up VC of EUR 25-100 m tickets.

Later stage VC

– few but large investments

For newly established companies with high growth during the first years and typically +100 employees, later stage VC become available (closely related to Growth PE capital), where the focus is on growing an already proven business concept (e.g. Spotify):

Series D/E: Tickets on +EUR 100 million.

Source: Invest Europe

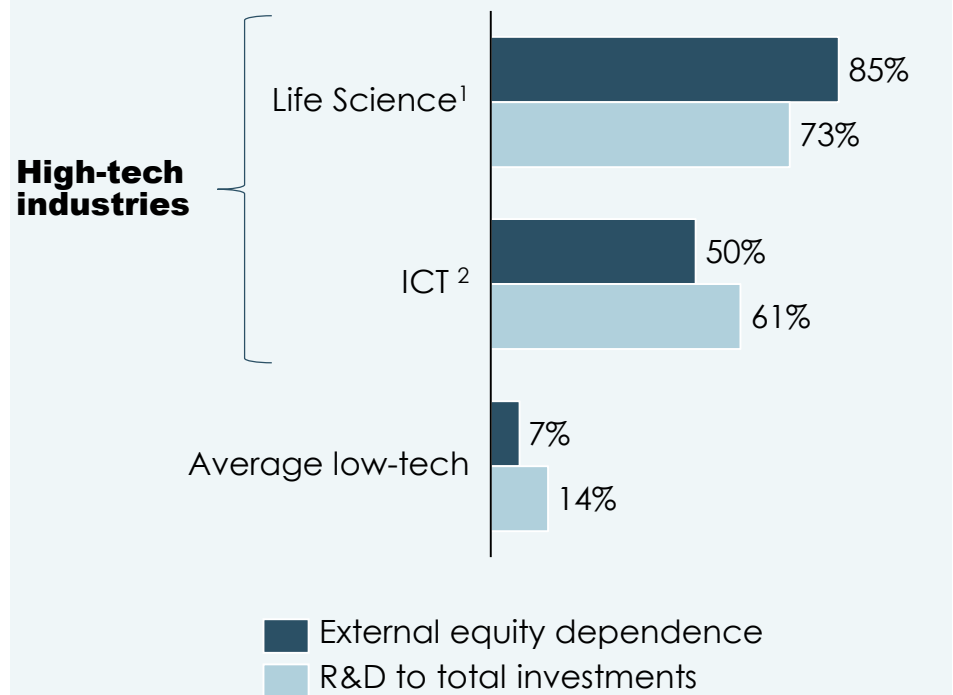
VC funding is crucial for high-tech industries

Innovative high-tech sectors depend on equity finance ...

... as a result, VC focuses on these sectors

Companies relying on the outcome of R&D efforts are too risky for standard credit finance and have a high external equity dependence compared to less risky firms

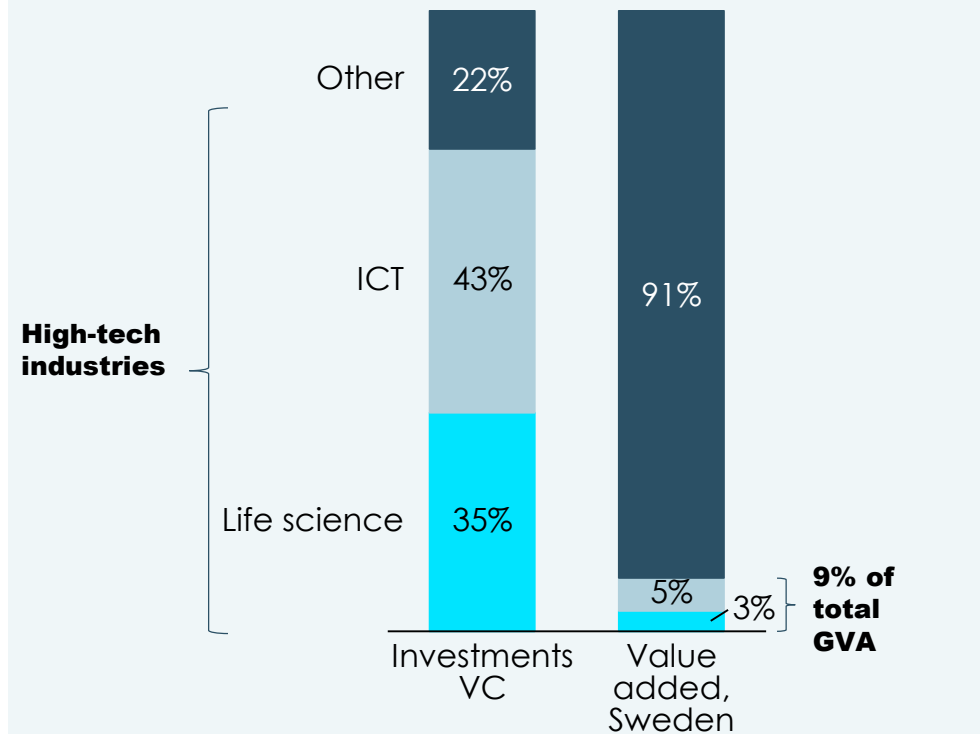
R&D and equity dependence for the median firm in US, 1980-2005



Source: Brown et al. (2016)

ICT and life science account for 78% of VC investments in Sweden, despite these sectors only accounting for some 9% of the total economy.

Investments by VCs and value added in Sweden, average 2012-2017



Source: Invest Europe and OECD

1) Includes all companies in sector code SIC 28: Chemicals And Allied Products. 2) A simple average of SIC 35, 36, 38., which Brown et al. (2016) denotes "ICT".

Active ownership: VC is “smart” capital

An important part of the societal contribution from VC firms is the knowledge and mentorship that comes along the capital.

Two factors enable VC firms to give their portfolio companies indispensable guidance in bringing them to success:

Previous experience in the field and in start-up

Investment professionals and staff working at VC firms are often previous successful entrepreneurs – this is crucial in transforming a good idea to a commercial success: One study finds that previous successful entrepreneurs have 67% higher sales compared to entrepreneurs without previous experience.¹

VC personnel has specialist knowledge:

Staff working in VC have very specialised knowledge – in life science often with links to academia. Also, tech investors are former entrepreneurs investing in business models or technology they have specialist knowledge in. This enables VC firms to provide concrete feedback on a product level.

“ Learning from earlier crises, we find it important to have a fully planned financial structure in place from the start, i.e. through all expected stages until we reach potentially break even, or reach a cash-flow positive. Nevertheless, the plans can and will often change along the way.

- Björn Odlander, managing partner of HealthCap

According to our sector interviews VC firms help their portfolio companies with:











- Finding the right strategy from the start, e.g. that the scientific strategy matches a sound financial plan.
- Minimising product risks and bringing the product to market, e.g. by providing access to global markets.
- Networking and bringing in the right talent, e.g. support in setting the right board, CEO etc.
- Getting access to other sources of finance.
- Helping with standard start-up compliance.
- Choosing the best exit strategy, e.g. M&A, IPO or private equity – and executing it.

1) Shaw (2017)

VC is important for the creation of the world's most valuable companies

The world's four most valuable companies are ICT-companies with VC-backing early on. While VC funds only invested in around 0.2% of new U.S. businesses, 43% of U.S. public listed companies founded between 1979 and 2013 were VC-backed.¹

The world's most valuable companies, measured by market cap in October 2018

1	Apple, est. 1976 (US)		VC backed	ICT
2	Amazon.com, est. 1994 (US)		VC backed	ICT
3	Microsoft, est. 1975 (US)		VC backed	ICT
4	Alphabet/Google, est. 1998 (US)		VC backed	ICT
5	Berkshire Hathaway, est. 1839 (US)			
6	Facebook, est. 2004 (US)		VC backed	ICT
7	Alibaba Group, est. 1999 (CN)			ICT
8	Tencent, est. 1998 (CN)			ICT
9	JPMorgan Chase, est. 2000 (US)			
10	Johnson & Johnson, est. 1886 (US)			

Source: Invest Europe and National Account

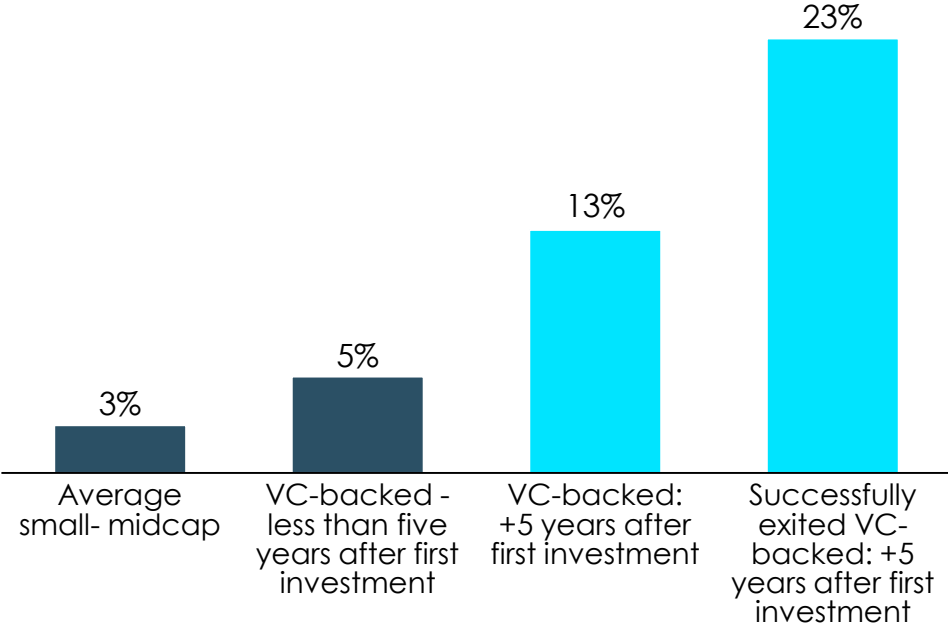
1) OECD (2018): A portrait of innovative startups across countries

Growth in VC-backed companies takes off five years after initial investment

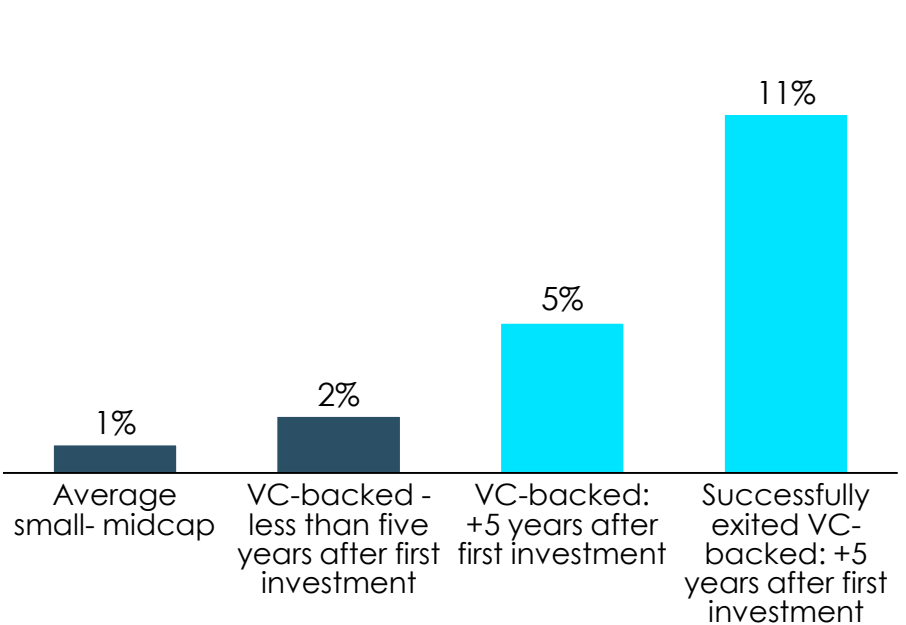
VC has little impact on revenue and employment growth in the first years after the initial VC investments – here the focus is on developing the concept. However, after five years, growth starts to take off and VC-backed companies significantly outperform average small and mid-cap companies.



Annual average growth in turnover for Swedish companies, 2006-2015



Annual average growth in employment for Swedish companies, 2006-2015



Note: See appendix for methodology. The estimates are based on 105,923 companies for "Average small-midcap", 358 companies for "VC-backed - less than five years after first investment", 248 companies for "VC-backed - more than five years after first investment" and 134 companies for "VC-backed - more than five years after first investment, successful companies" (not covering all years)
 Source: Amadeus and SVCA

2

NATIONAL ECONOMIC BENEFITS

In part 1, we showed that venture capital firms help companies to succeed:

- How does this benefit Swedish society as a whole?
- How can VC contribute to future economic growth in Sweden?

National economic benefits

1

VC supports highly productive sectors



VC investments go to highly productive sectors such as life science and ICT.

Thus, VC is crucial in future-proofing Swedish businesses and job market.

2

GDP contribution of Swedish VC



VC investments boost innovation, not only in the individual companies, but has wider spill-over effects given a boost to GDP.

3

Potential for more VC investments in Sweden



The very innovative and dynamic Swedish economy points towards a potential for more VC investments in Sweden.

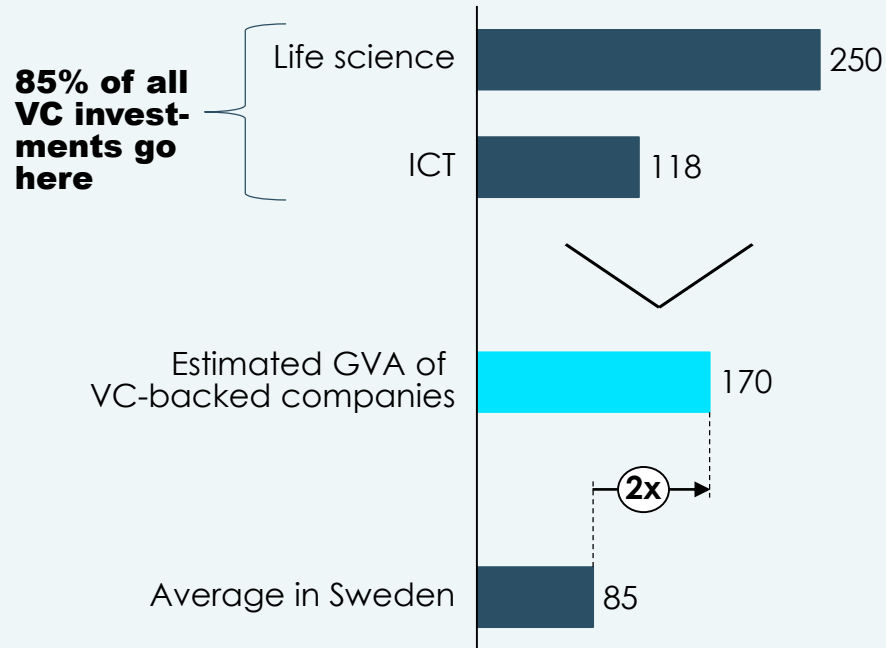
In the following, we go through each of the three topics

VC supports highly productive sectors

VC investments go to highly productive sectors such as life science and ICT. We estimate Gross Value Added (GVA) in VC-backed companies is around 2.5 times the Swedish average.

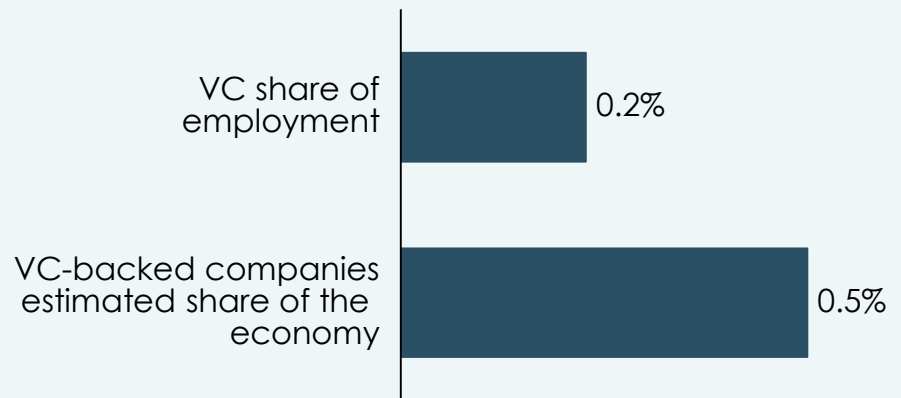
Consequently VC-backed companies take up a larger share of the economy than what its share of employment would entail

Gross value added per worker in Sweden in 2016, EUR 1,000



Source: Eurostat

VC-backed companies employ around 12,000 people in Sweden (in 2013)¹



Source: Eurostat

1) Source: SVCA: Private Equity Performance Study 2015

Digitisation is the number one growth driver going forward – here VC plays a crucial role

The fourth industrial revolution is upon us

Start-ups will play a leading role in this transition – consequently many incumbent firms are putting money in special purposes VC funds

“ Today, we are at the beginning of a fourth industrial revolution. Developments in genetics, artificial intelligence, robotics, nanotechnology, 3D printing and biotechnology, to name just a few, are all building on and amplifying one another. This will lay the foundation for a revolution more comprehensive and all-encompassing than anything we have ever seen.

- Klaus Schwab, Founder and Executive Chairman of World Economic Forum

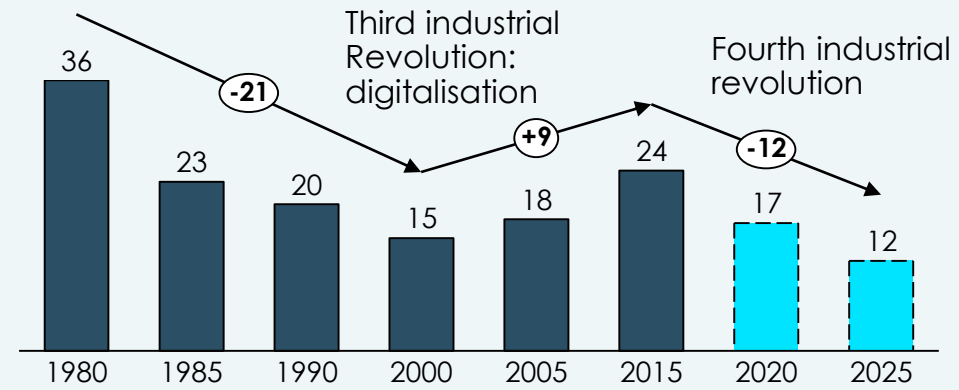
“ The digital economy is growing at seven times the rate of the rest of the economy

- European Parliament Research Service

Hard facts on the top ten most valuable companies in the world:

- 7 out of 10 are within tech
- 6 out of 10 are less than 25 years old
- Half of them are VC-backed

Average lifespan of a S&P500 company is expected to decline



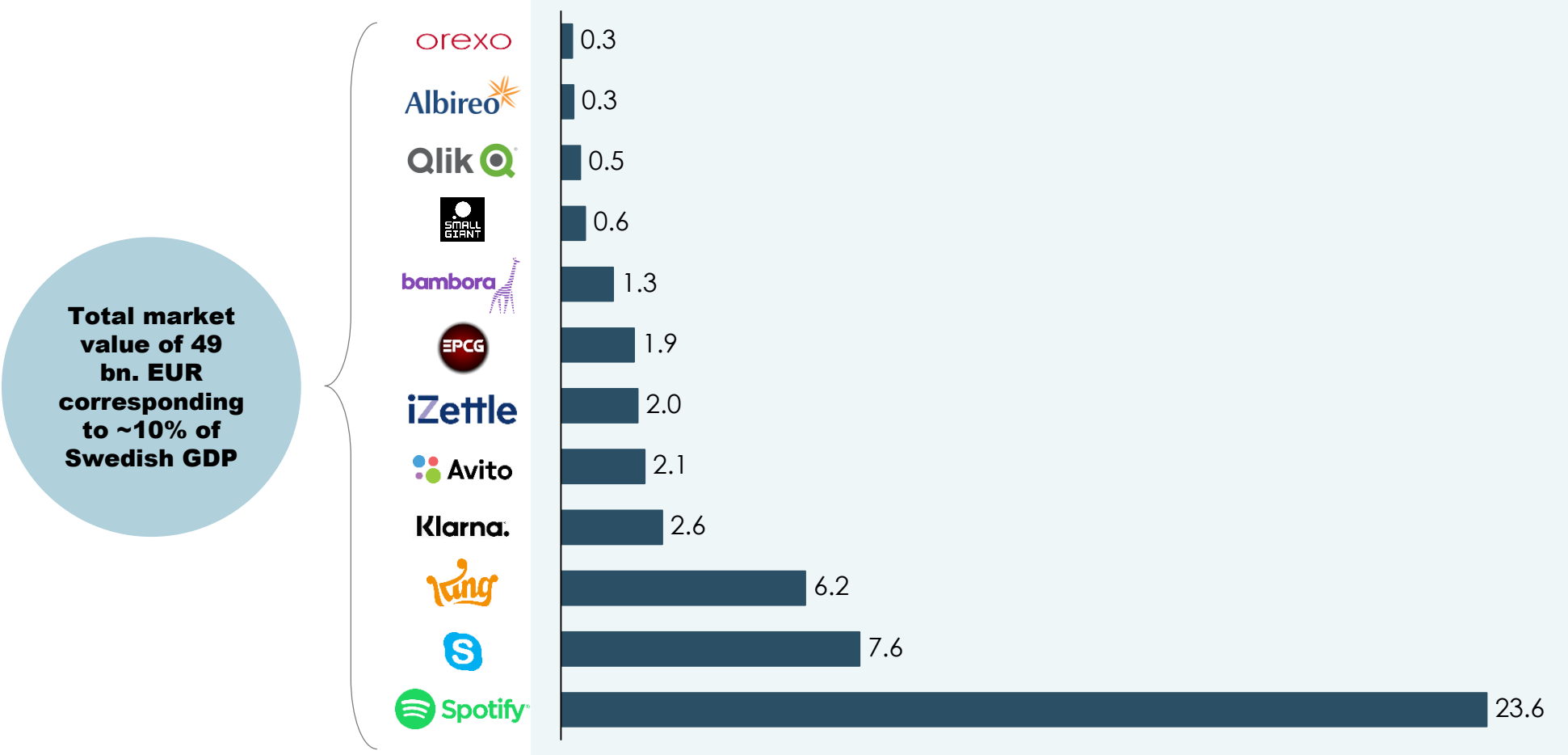
To reap the benefits of this transition and to future-proof Swedish jobs, venture capital will be imminent
 The nature of these tech-startups driving the innovation is high-risk, where the upside depends on the evolution of future trends. This makes them unsuitable for traditional financing but obvious candidates for venture capital finance.

Source: Credit Suisse

VC has been instrumental in creating Swedish unicorns

The 12 most valuable Nordic companies backed by Swedish VC (past 20 years)

Market value, bn. EUR



Note: The market value is based on market cap when available - when not, market value is estimated based on earnings (average PE for small cap Nasdaq stocks multiplied by earnings) or total accusation value. Venture capital deals are not always announced publicly, so the list is not exhaustive. Source: Annual reports, dealroom.com and crunchbase.com

The mechanism: Why VC benefits economic growth and innovation

VC benefits the wider economy through three channels:

1 Direct contribution: Allowing talented staff and entrepreneurs to fully utilise their potential

VC capital supports companies operating on the edge of the technology frontier, where the productivity is very high, making already talented staff and entrepreneurs utilise their expertise to the fullest.¹

Note that most employees working in VC-backed companies are already skilled staff – if they were not working in a VC-backed company, they would most likely be employed elsewhere – perhaps in an established company still providing value-added to the economy – but operating with a lower productivity.

2 Indirect effect: Knowledge spill-over to the rest of the society

The innovation and research taking place in VC-backed spills over to the rest of the economy through, e.g., information networks, job-changes and informal contacts. Thus research in VC companies provide an economy-wide lift in productivity.²

3 Indirect effect: Increased adoptability of new technologies from abroad

The increased level of knowledge and technology means that Swedish employees are in a better position to adopt and exploit new technologies from abroad, further increasing productivity in Sweden.³

Results from key literature on spill-over effects from VC and R&D:



- An increase in VC of EUR 1 results in an increase in output growth of EUR 3.33 as a result of economic spill-overs, based on an analysis of 16 OECD countries.
- The social return (impact on the entire economy) of R&D investments is about three times higher than the private return.
- The increase in patents of R&D investments is about 2-4 times larger in VC-backed companies than in regular companies.
- 8% of the innovation in US companies in the period 1983-1992 is a result of venture capital investments.

Source: See appendix

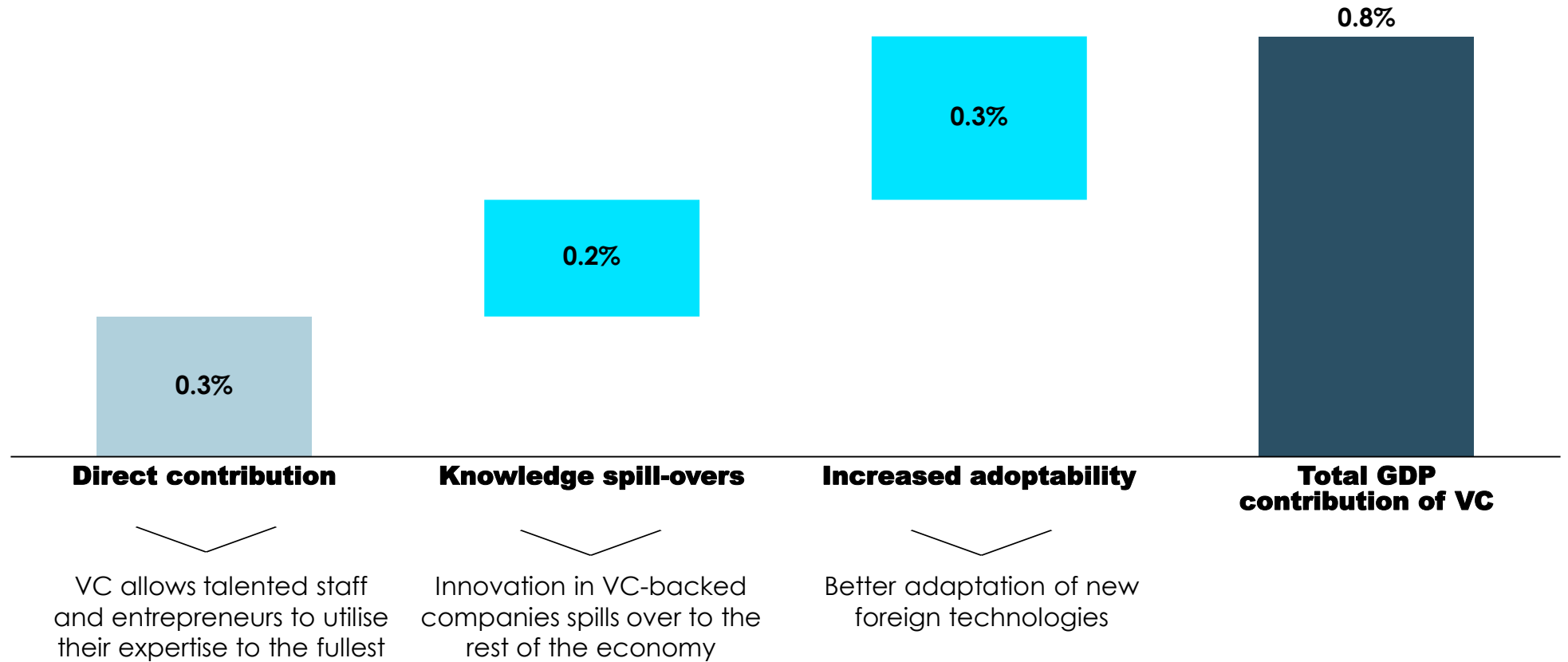
On the next page, we estimate how VC impacts the Swedish GDP through these three effects.



1) Schnitzer (2017) 2) Colino (2016) 3) Bye (2011)

GDP impact of Swedish VC

Estimated impact of Venture Capital on the Swedish GDP level



Thus, we estimate that because of venture capital, the level of Swedish GDP is 0.8% higher than it otherwise would have been. Technical details of the estimation are outlined in appendix.



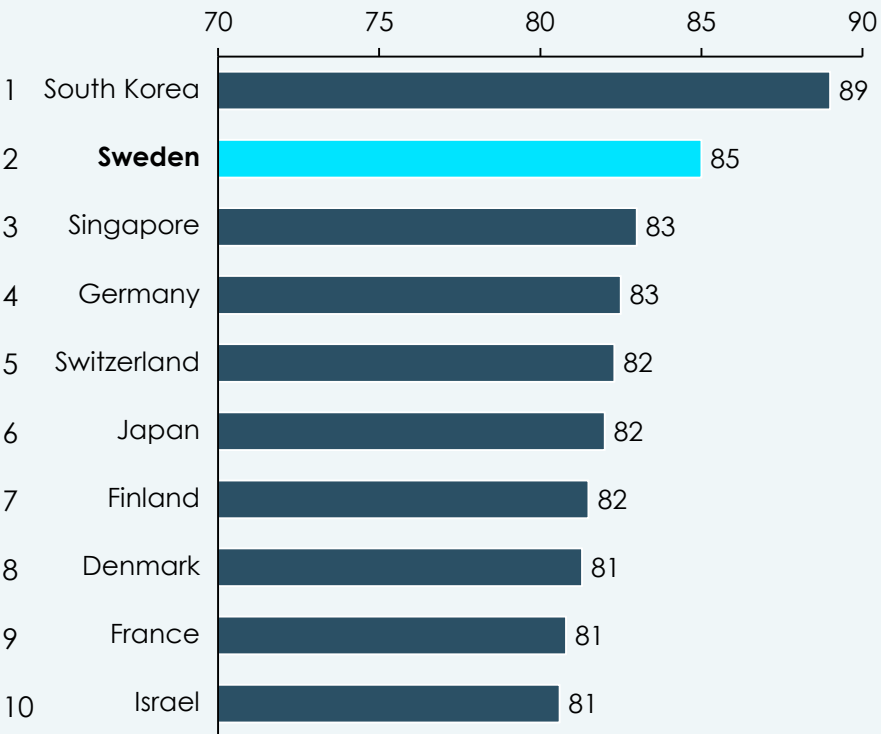
Many innovative start-ups in Sweden point towards further growth potential for Swedish VC

The Swedish economy is one of the most innovative in the world ...

... with a high-ranking start-up environment giving plenty of good business cases for VC funds. This points towards further growth for Swedish VC.

Top 10 most innovative countries in the world (ranking of Bloomberg)

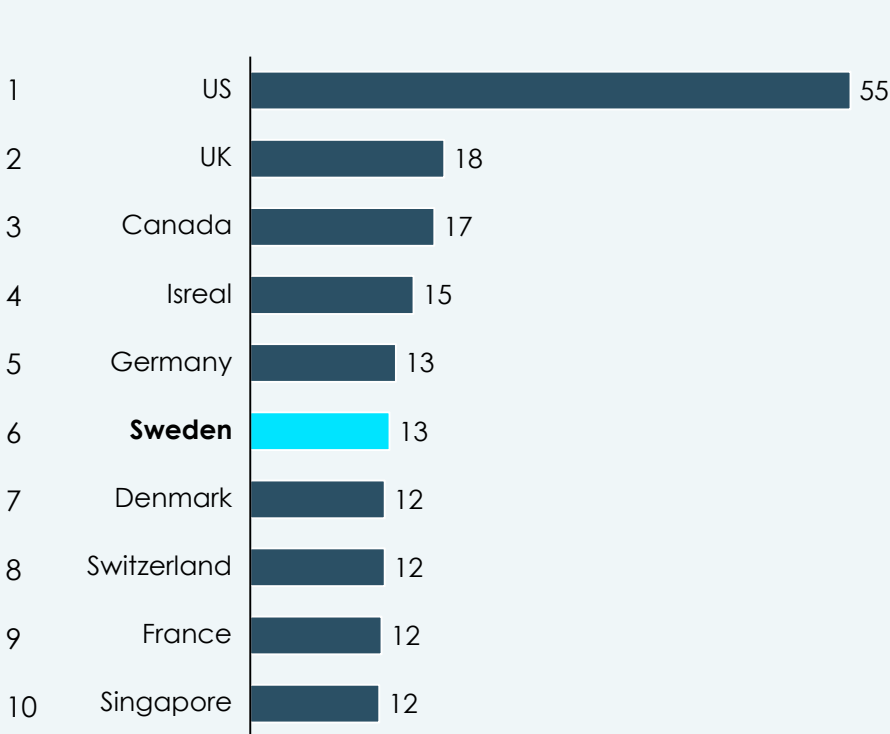
Index, 0-100



Source: Bloomberg

Top 10 best start-up ecosystems in the world (ranking by StartupBlink)

Score

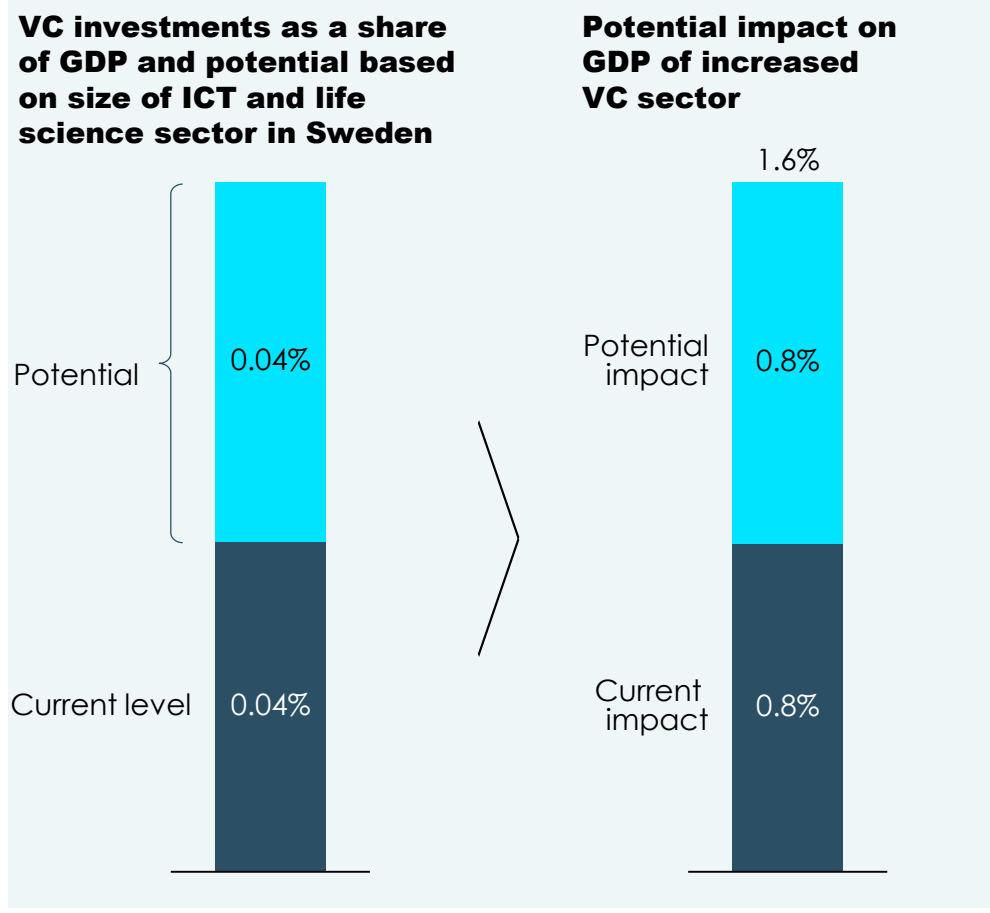
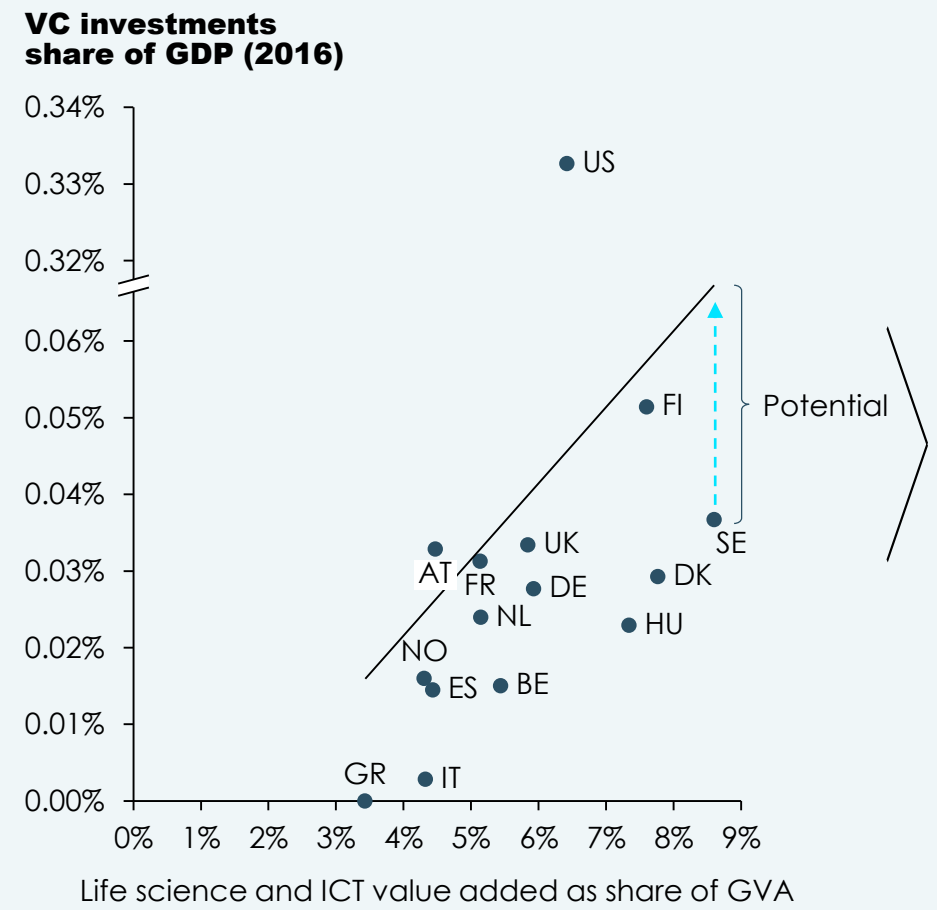


Source: StartupBlink

Swedish VC fully utilising the potential could boost GDP by 0.5%-1%

In general, countries with large ICT and life science sectors have strong VC markets – with the US being the important showcase, where VC is paramount in financing these two sectors...

... If Sweden fully utilised their industry potential within ICT and life science, the VC markets could double in size. This could increase GDP with a further 0.5%–1%.



Source: OECD

A winter scene featuring a snow-covered road that leads into the distance. The road is flanked by snow-covered trees and bushes. The sky is bright and overcast. The overall atmosphere is serene and quiet.

3

STOCKHOLM: A NATURAL INTERNATIONAL HUB FOR VENTURE CAPITAL

In part 1 and 2, we examined how VC helps companies and the economic benefits this entails. Now we turn our attention to the VC firms administering the funds:

- How does the Swedish VC market compare to international peers?
- What does it take for Stockholm to become an international hub for venture capital?

Stockholm: a natural international hub for venture capital

1

Benchmarking of Swedish VC



Swedish VC ranks above European and Nordic peers. Together with a strong ICT and life science sector, this points towards Stockholm as a VC hub.

2

How to boost Swedish VC



However, Swedish VC has potential to increase funding activity as stated on page 22. We provide recommendations for how to boost Swedish VC.

3

Policy recommendations

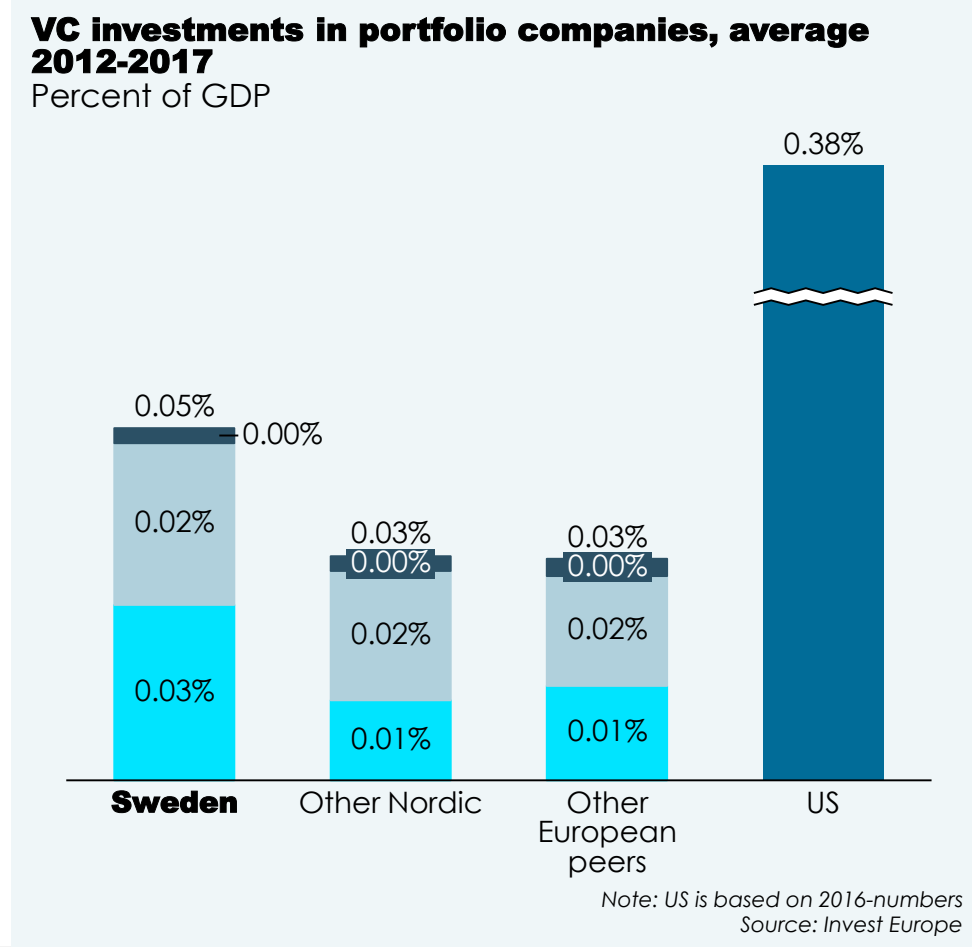
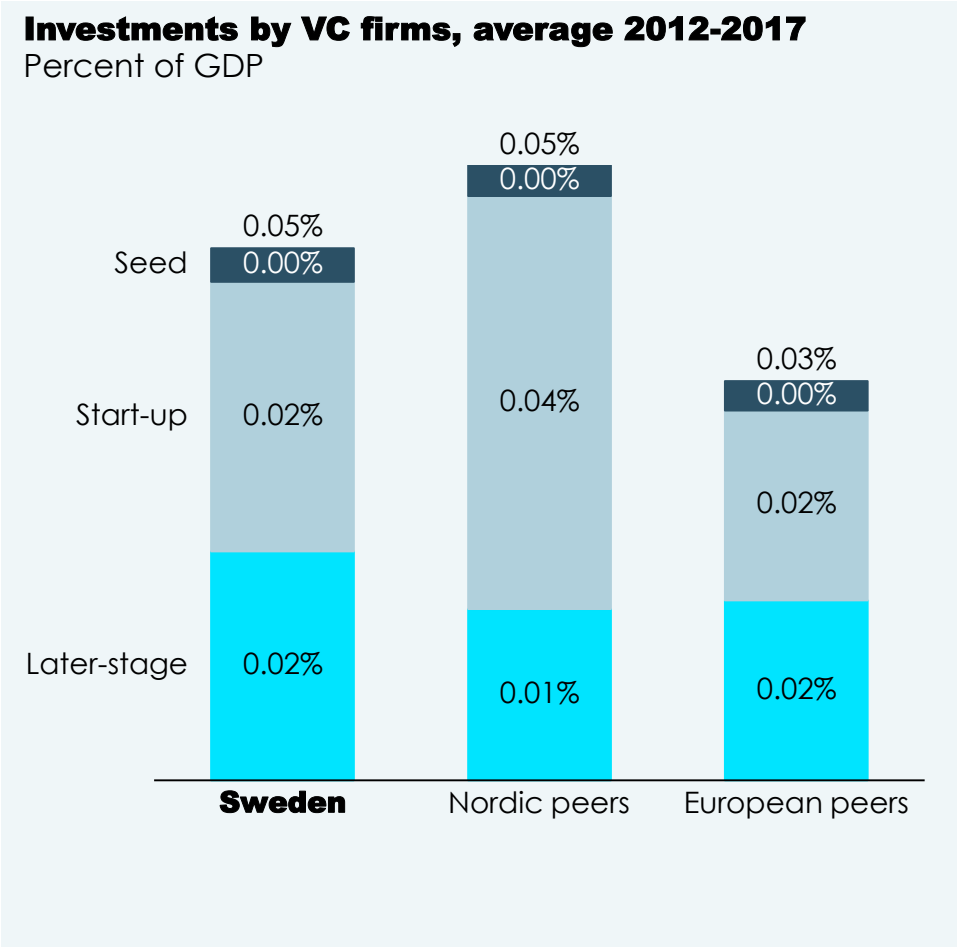


Finally, we point towards two concrete policy areas that could make Swedish VC reap the full benefits of its potential.

Swedish VC ranks above European peers

Compared to the economy, the VC industry in Sweden is larger than European peers, although slightly below Nordic peers (primarily due to one large Danish fund)

Also in terms of VC received by portfolio companies, Sweden ranks above EU peers. However, there is still a large gap to the more mature US markets, showing a great potential for improvement.

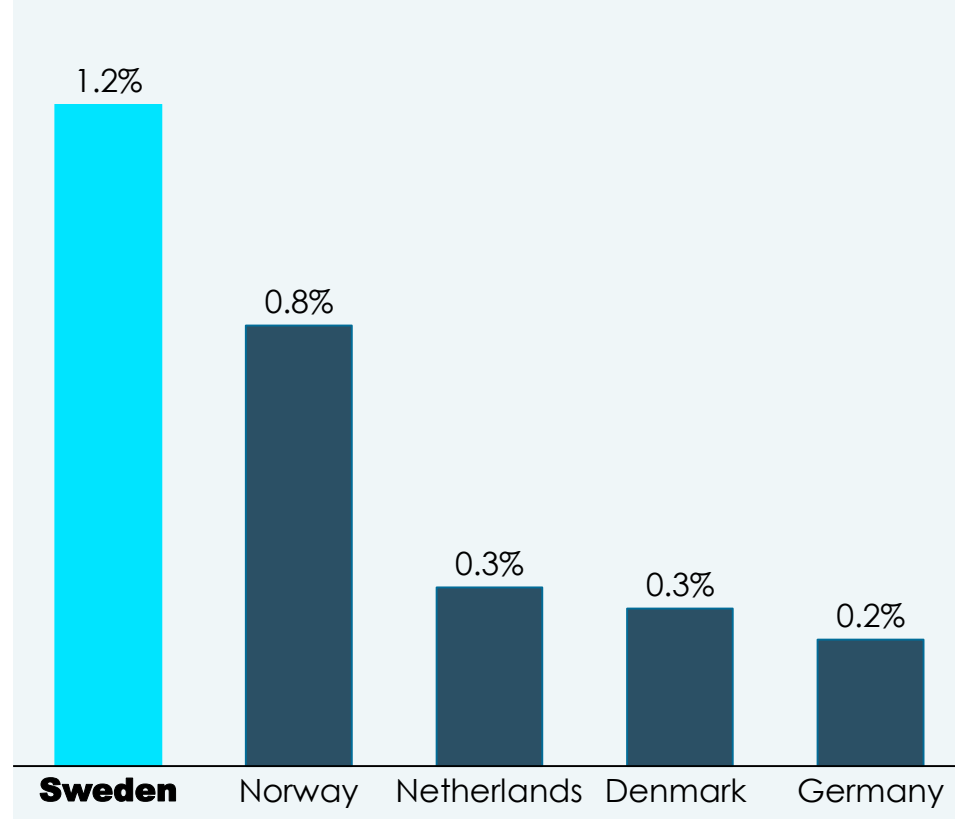


Great exit opportunities for VC-backed companies in Sweden

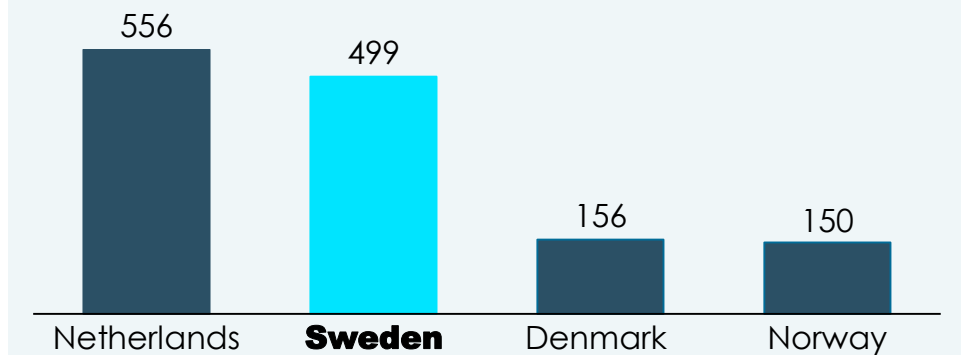
Examples of a high level of exit opportunities:

- Total value of IPOs compared to the size of the economy in Sweden is in the top among peers in Northern Europe
- The same applies to many IPO and M&A deals in Sweden compared to peers

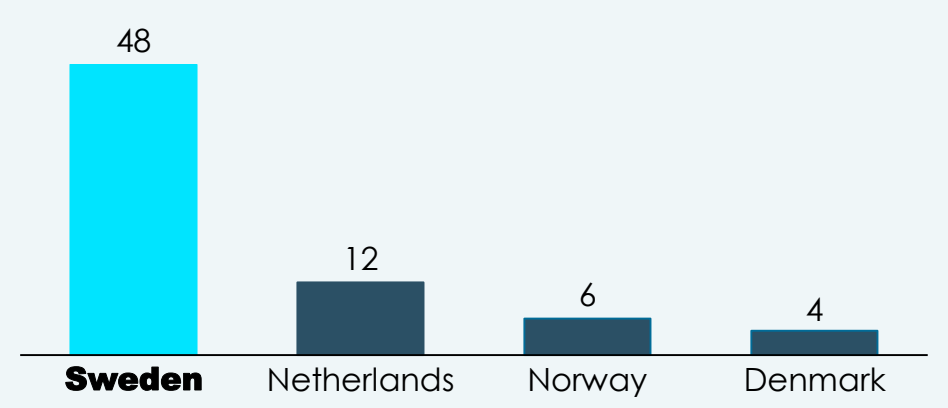
Total IPO value, average 2014-2016
Share of GDP



Number of M&A transactions, 2016



Number of IPOs, 2016

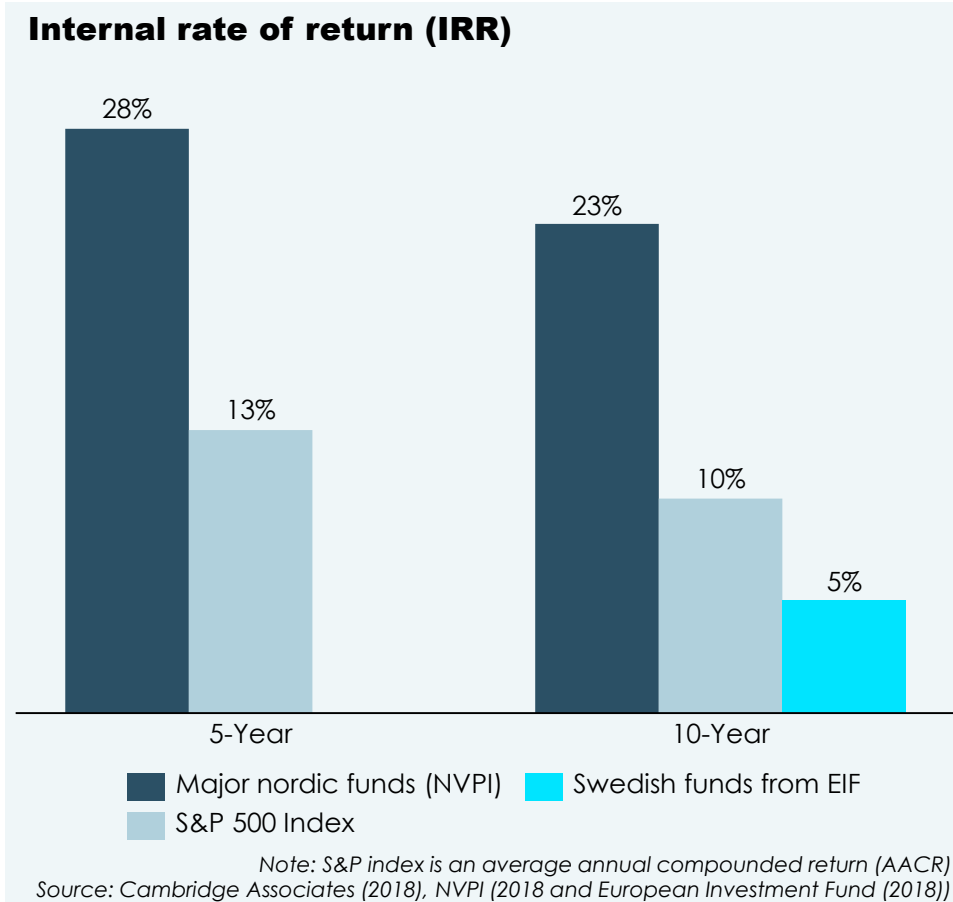
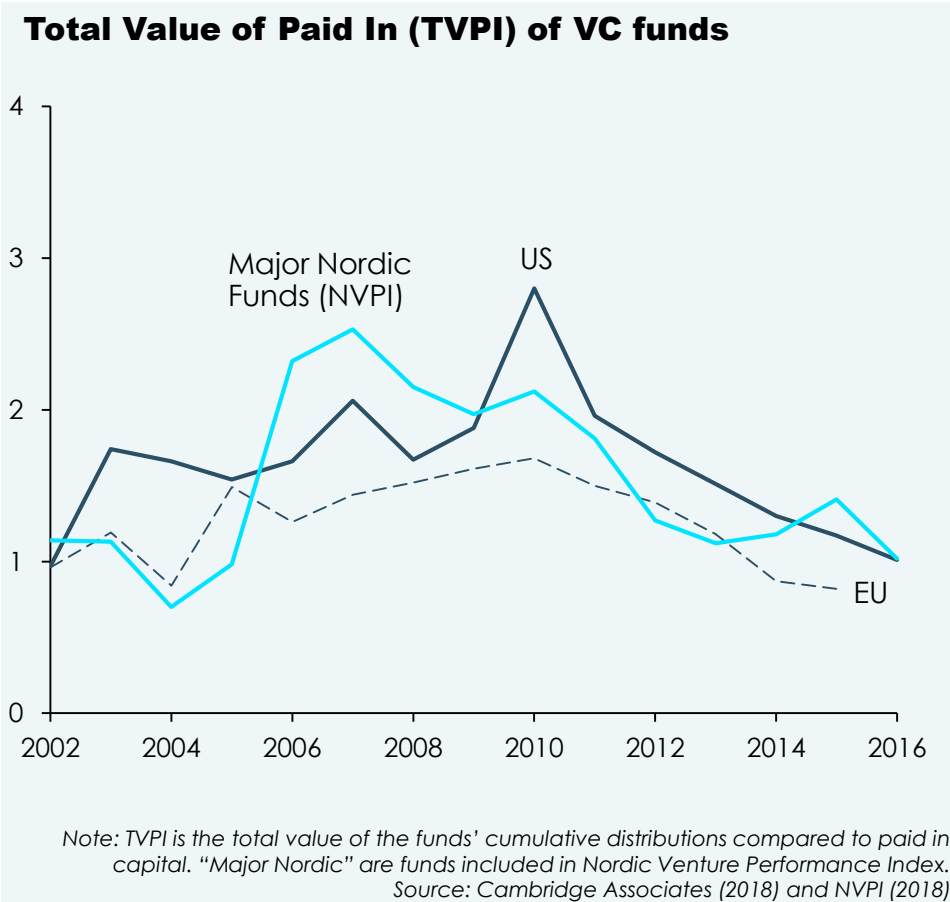


Source: BvD Zephyr

The large VC funds offer competitive returns for investors

Returns from the major Nordic VC funds can compete with average US returns. Average European VC is still below the more mature US market, linked to low and unstable returns in the lowest quartile.

Average returns from major Nordic funds outcompete returns from investments in blue chip companies. Still some way to go for smaller funds supported by the European Investment Fund (EIF).

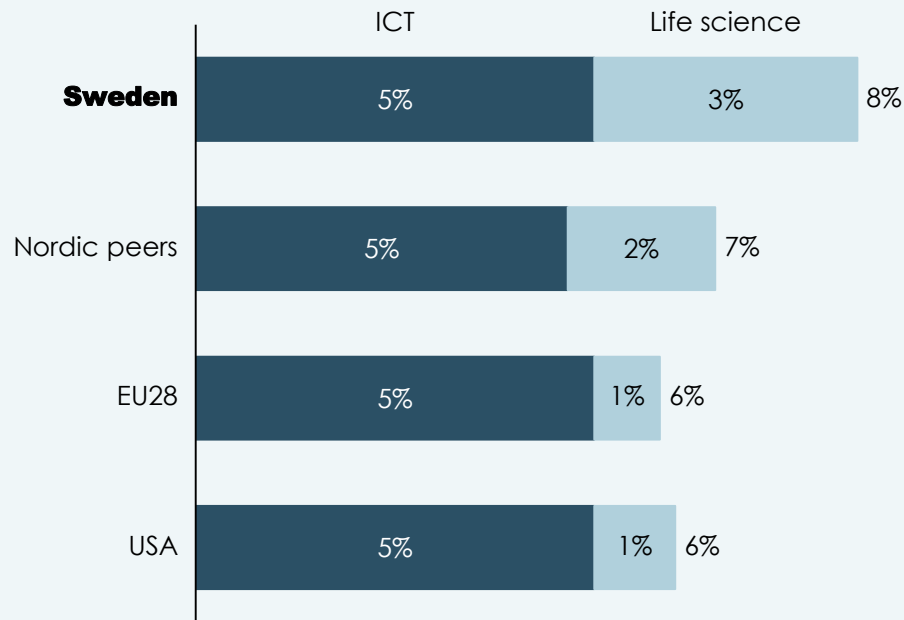


Strong ICT and life science sectors make Stockholm a natural VC hub

Large typical VC sectors in Sweden...

...make Stockholm a natural hub for Swedish VC

Value-added as a share of total GVA



Note: Life science is proxied by manufacture of basic pharmaceutical products and preparations. Sweden and Norway do not report life science separately and for Sweden it is estimated as the same share as in Denmark of total value added from manufacture of pharmaceuticals and chemicals products. Norway is calculated as the total sum of oil refining, manufacturing of chemical products and pharmaceutical products due to lack of data.

Source: OECD, Statistics Sweden and Statistics Norway

1. Sweden is in the lead in ICT and life science, with strong academic and research communities. And Sweden is among the most innovative countries in the world.
2. There are good exit opportunities with a well-developed IPO market and a large growth Private Equity sector. This ensures that Swedish VC can take companies through the entire capital food chain.
3. Sweden has the largest and most developed later-stage VC sector in the Nordics: Stockholm could become the Nordic later-stage VC hub – also for companies outside Sweden.

However: VC investments in Sweden have not recovered fully from the financial crisis as seen on next page. This should be seen in conjunction with the relatively benign economic environment in Sweden relative to, e.g., many European countries.

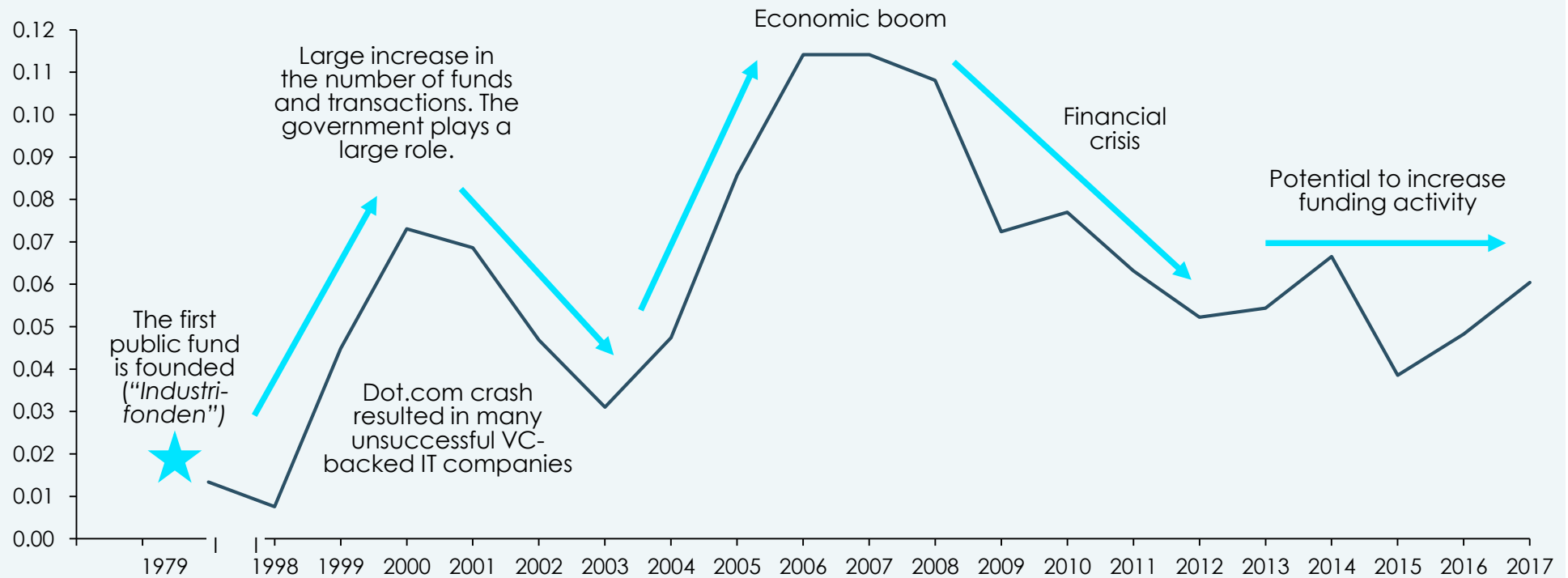
To sum it up: From a European and Nordic perspective, Swedish VC is doing well – but is not living up to its full potential.

On the following pages we provide initiatives that could boost Swedish VC.

Swedish VC investments has not recovered fully from the financial crisis – time for a kick-start?

VC investments in Sweden

Share of GDP



National government funding & investments play a large role



National private funding & Nordic investments



International investments and offices

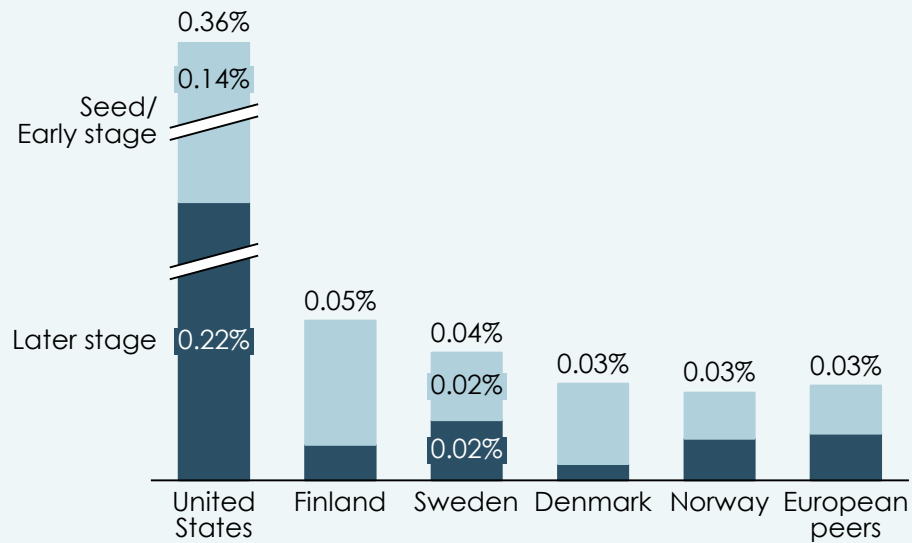
Source: Invest Europe

Too small investments size for later stage growth companies means they must find funding abroad

Later-stage VC investments are in general underrepresented in the Nordics, although higher in Sweden than in the other Nordic countries

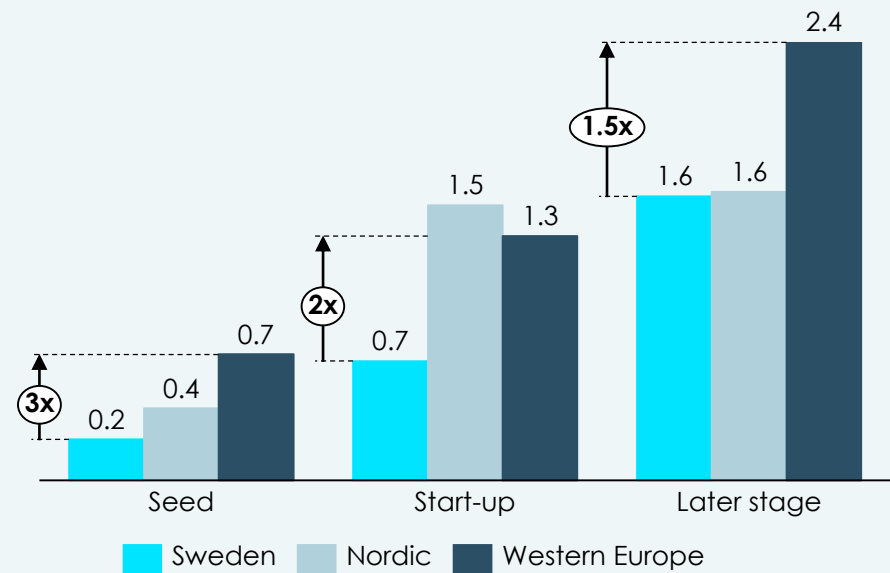
At the same time the average investment size is lower in Sweden compared to European peers

Venture capital investments as a percentage of GDP, 2016



Source: OECD

Average investments size in 2015-2017, EUR million



Source: Invest Europe

Implication

Many successful later-stage growth companies must find funding abroad, once they have reached a certain size – typically in relation to international expansion. This is a key factor in Swedish VC not utilising their full potential and also holds back average returns.

Stronger engagement of institutional investors could boost Swedish VC

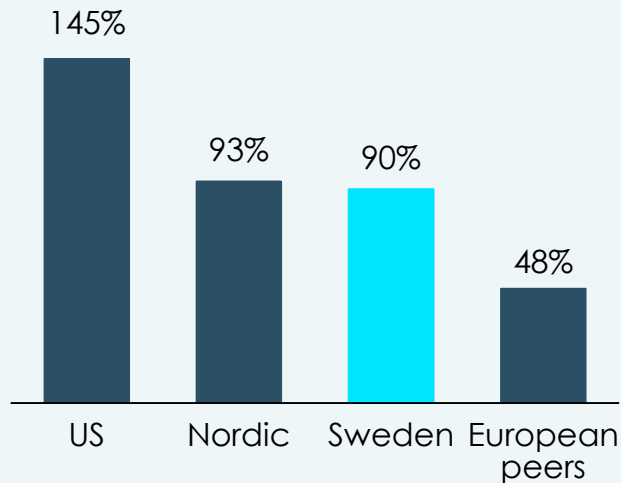
The many large Nordic institutional investors could be obvious investors in VC funds

- VC is a very long-term investment – so is the obligations of pension funds
- VC is risky, meaning commitments with several funds over several years to diversify risk is needed - pension funds have the capacity to do so.

However, institutional investors' engagement in VC is currently limited.

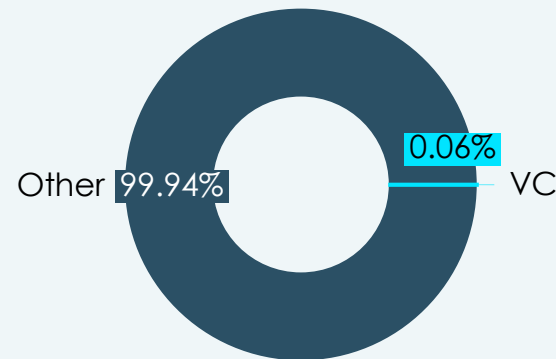
Pension funds in the Nordics in 2016

% of GDP



Source: OECD

Share invested in VC by Swedish pension funds



Note: VC share is calculated as total investment by pension funds from 2007-2017 divided by total assets from pension funds
Source: invest Europe

Institutional investors have to accept the high-risk nature of VC

” European LPs flocked into the VC asset class at the tail end of the 2000 internet bubble. Most of them subsequently burned their fingers ... The pendulum has [now] swung too much towards an obsession for risk-minimization.¹

- Christian Claussen, Partner Ventech

1) See <https://medium.com/ventech-insight-stories/are-european-vcs-too-risk-averse-34b866ed6ef2>

How to engage institutional investors

Two characteristics of the investment strategy of institutional investors must be considered:

1. Top-down approach in their investment decision focusing on correct distributing between different asset classes.
2. A strong focus on keeping costs down per invested SEK, meaning that they do not have the resources to carry out careful research, when investing in the quite limited ticket size of VC ... even when return performance can compensate for high investment costs.

Three recommendations could help further engage institutional investors:

Establish a Swedish SICAV equivalent¹



A SICAV is an open ended legal entity with variable capital. SICAVs and equivalent structures are widely used internationally and therefore well-known to international LPs.

Swedish based VC funds currently use limited companies (aktiebolag) as fund structures. For some LPs a Swedish equivalent to a SICAV structure would be more suitable and recognised. Therefore, it could attract more international LPs to invest in Swedish based funds, in particular if a suitable taxation system is put in place.²

Consolidated performance numbers



There is a lot of freedom for the individual funds in constructing their own performance numbers. This greatly increases the required due diligence effort required to invest in VC – time that institutional investors often do not have. And it makes the performance of the individual VCs less comparable both between funds and to other asset classes.

Sector index



VC's general performance can be difficult to assess looking across assets classes, as there is no consolidated sector index. EIF and NVPI are the best options, but none cover the majority of the Swedish VC funds. A sector-wide consolidated performance index could help brand Swedish VC in the top-down approach of institutional investors.

1) SICAV is an acronym for 'société d'investissement à capital variable', meaning 'investment company with variable capital'. 2) see *En hållbar, transparent och konkurrenskraftig fondmarknad* (2016) for a investigation on how to strengthen the competitiveness of the Swedish mutual fund industry and to modernize the Swedish fund rules.

Swedish portfolio companies need better access to highly skilled international staff

Access to highly skilled staff

To make a good idea grow into a proven business concept, not only capital is needed – also highly specialised staff.

This is not always available within Swedish borders – Swedish start-ups must be able to attract specialised foreign staff. However, this is often blocked by rigid and bureaucratic emigration laws.

Furthermore lack of stock option incentives makes it much harder to compete with other countries for attracting specialists (see next page).

Reform emigration laws – less restrictive to attract foreign experts:

Lower current thresholds for the required educational level and guaranteed income level as well as making the application process less bureaucratic.

Reform capital income taxation using revenue from lower government business subsidies

Insufficient incentives for new entrepreneurs

To compensate for the huge risk that starting up a company entails, the expected pay-off needs to be sufficient.¹

Successful start-ups are often created by very skilled people that give up high-earning positions at established companies.

Insufficient use of government subsidies

The Swedish government use nearly SEK 30 bn. a year in direct industry subsidies, corresponding to around 3% of the government budget. However, the research institute, Ratio, finds no clear benefits of the subsidies.² We argue that at least part of the money would be much better spent at improving the taxation structures as described below.



Create an attractive option taxation scheme

Staff in start-ups are often remunerated with equity options. Most of these options are taxed as personal income, making this kind of remuneration unattractive. A new scheme has been implemented with the intention that only sold shares should be taxed. However, given a strict interpretation of the Swedish Tax Agency, the scheme does not work in practice. We see it as important that a working scheme is put in place, preferably on a Nordic level with a harmonised stock option scheme.

Review taxation of closely held companies

Small actively owned firms are currently being penalised in terms of higher taxation compared to passively owned large corporates. We suggest to review the taxation of closely held companies to offset the disparity.

1) See also forthcoming report by Copenhagen Economics: "Undersøgelse af vækstiværksættere". 2) See Ratio (2018): "Innovationspolitik för tillväxt"

Obstacles to be addressed on an EU level: High compliance costs from AIFMD

Obstacle: High compliance costs from AIFMD

The sector reports high compliance costs and complexity linked to implementation of the Alternative Investment Fund Managers Directive (AIFMD),¹ through two main issues:

1 It treats VC funds in the same way as other leveraged types of alternative investment funds that have higher impact on systemic risk.

2 The rules are equal across size of funds, whereby it will be relatively more costly in terms of compliance etc. to run the typically smaller VC funds in Sweden.



Joint EU action by Nordic public and private stakeholders

Ensure that EU regulation, focused on economic and financial stability, does not inadvertently lead to compliance costs for the VC firms and related stakeholders that are out of proportion to the benefits. To do so, a collaboration among Nordic stakeholders with common interest is the obvious approach.

¹) Based on survey by Copenhagen Economics conducted in preparation of the report "The role of venture capital for economic growth in the Nordic region".

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APPENDIX

Impact on GDP of Swedish VC

How we estimated GDP contribution of VC



Method

Our main estimate is based on a paper describing a macroeconomic model (a so-called general equilibrium model) designed to analyse the impact of R&D on economic growth, cf. Bye et al. (2011):

- The model is calibrated to the Norwegian economy, which shares the same main features as the Swedish; a small open economy in Europe with a floating exchange rate and EU as the main trading partner.
- An experiment using the authors found that a increase in R&D capital of 6.9% provides an impact on GDP of 2.4%, i.e. a GDP multiplier of 0.35 from R&D investments (1/3 of this effects is direct impact).
- According to OECD, total R&D investment in Sweden in 2016 amounts to 2.26% of GDP. VC investments are 0.05% of GDP, i.e. VC investments contributes with a 2.2% increase in R&D investments.
- Using the derived multiplier, VC investments have a GDP impact of some 0.8% of GDP.



Assumptions

- Without the VC industry, the funds would not have been invested in Sweden, i.e. either invested abroad or consumed. If the funds instead were invested as a typical non-R&D investment, the impact of VC is lower.
- All VC investments can be classified as R&D, to the extent this is not the case, the impact will be lower.
- We assume that VC investments are as productive as all other R&D investments. One study found that VC investments are 2-4 times more productive – if this is the case, the GDP impact would be correspondingly higher.



Alternative method

- Swedish VC investments have a typical TVPI of 1.4. Using the average return profile of VC investments from the European investment fund, we found TVPI of 1.4 corresponds to an IRR of 15%.
- Research shows that the social return of a VC investment is about three times the private return – this means that the total social return of VC investments is 45%.
- In Sweden, annual VC investments are some 0.05% of GDP. This means, every year, VC investments bring about a total social return from VC investments of $45\% \times 0.05\% = 0.023\%$ of GDP.
- Using a risk-free interest rate of 3%, this corresponds to a total annual economic impact of VC investments of $0.023\% / 3\% = 0.75\%$ of GDP.



Methodology for calculating revenue and employment growth for Swedish VC-backed companies

Revenue and employment growth for Swedish VC-backed companies are calculated based on two data-sources:

- 1 The Amadeus database,¹ which consist of financial accounting data for more than 21 million companies in Europe with around 600,000 Swedish companies from 2006-2015.
- 2 A list of Swedish companies that have received venture capital, provided by SVCA

Financial accounting data for each Swedish VC-backed company was identified in the Amadeus database. As the Amadeus database does not provide a unique company ID, the two data sources were matched by company names. However, company names may differ slightly between the two databases, resulting in very few exact matches (ex. “Applied Nano Surfaces” and “Applied Nano Surfaces Sweden”). Fuzzy matching was therefore used to find the best non-exact match. A total of 764 matches was found.

To compare the performance of VC-backed companies with other Swedish companies from the Amadeus database, we removed all companies receiving below EUR 10,000 and assets above EUR 1,000,000,000.

The financial performance was calculated for each group

The category “VC-backed - successful companies” contains VC companies where the VC has a divestment

1) <https://www.bvdinfo.com/en-us/our-products/data/international/amadeus/>

Innovation created by VC-backed companies creates large spill-overs to the wider economy

Literature on the socioeconomic return on VC investments

Spill-over effects from VC are hard to estimate, but the literature agrees on a multiplicative effect of approximately three

Effect	Paper	Description
The article examines the social return of business R & D, public R & D and VC. They found that an increase in VC of EUR 1 results in an increase in output growth of EUR 3.33 . This increase is described in the article as the social return.	Astrid Romain and Bruno van Pottelsberghe (2004) "The Economic Impact of Venture Capital"	The article examines the difference between investments made by VC and R&D for 16 OECD countries.
The article finds that the social return on R&D is about three times greater than the private return . The article also finds that the effects of R&D and patenting are greater for complex industries and established companies.	David Colino (2016) "Cumulative Innovation and Dynamic R&D Spillovers"	Estimates the effect of dynamic spill-overs on R&D investments. The article examines both the impact of established businesses and VC-backed start-ups.
The article finds significant spill-over effects on VC funding. They find that the VC-funded start-ups have more patents per dollar and that these patents are of a higher quality . The article shows that an increase in VC of USD 1 million increases the number of patents in other companies by between 1.89 and 13.11. This figure is between 2.07 and 3.41 times greater than the spill-over effects of R&D investments.	Monika Schnitzer and Martin Watzinger (2017) "Measuring the Spillovers of Venture Capital"	The article tries to estimate spill-overs from VC-funded companies in the form of an increase in the number of patents sought in other companies. Examines VC-funded start-ups.
The article estimates that 8 percent of the innovations in American companies in the period 1983-1992 is due to venture capital. Schnitzer and Watzinger (2017) report that this article finds that an increase in VC of USD 1 at industry level is associated with three times as many patents as USD 1 corporate R&D .	Samuel Kortum and Josh Lerner (2000) "Assesing the Contribution of Venture Capital to Innovation"	The article examines whether venture capital financing has boosted innovation in US companies.

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