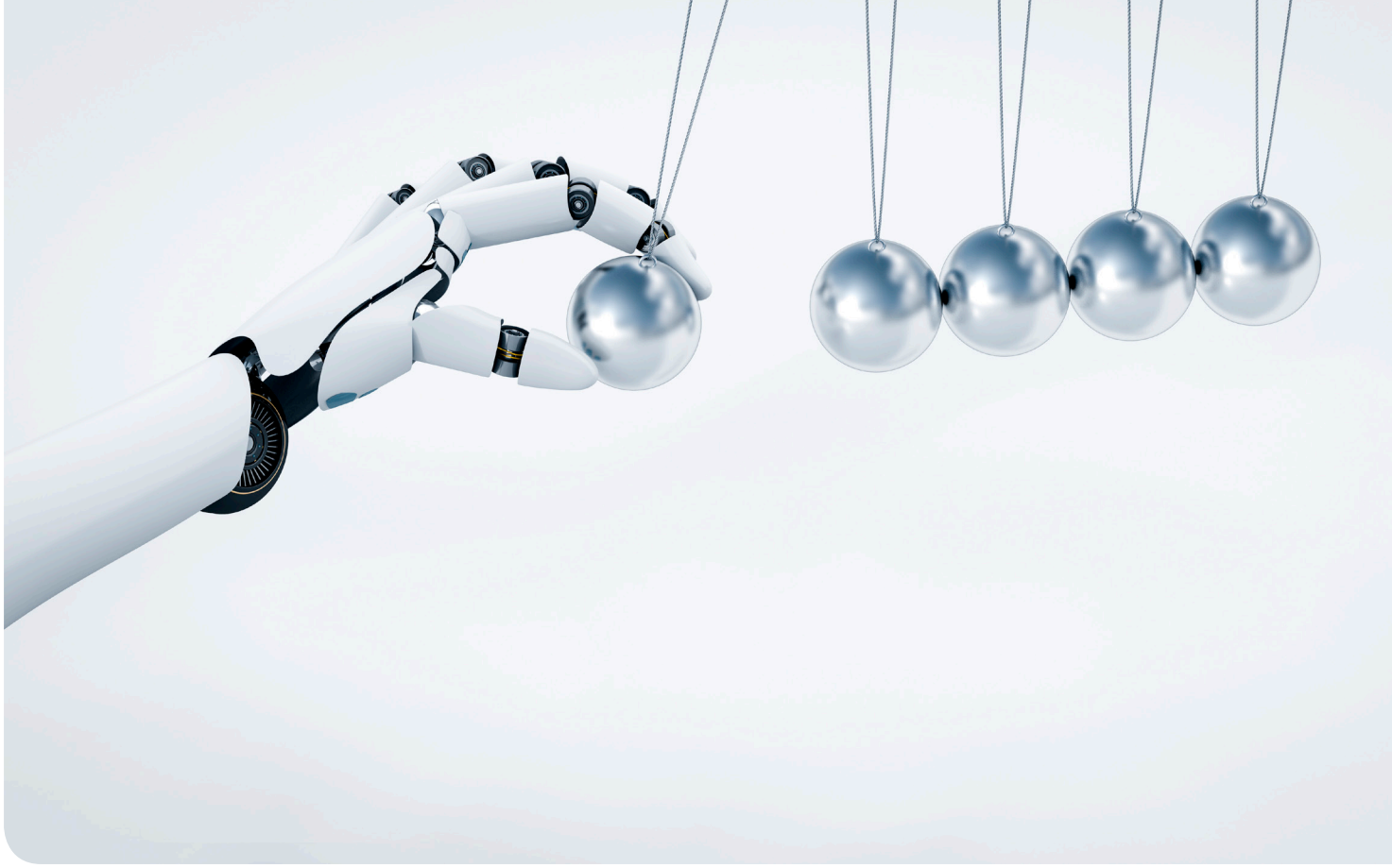

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VC market Germany: Ready for the next development stage

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VC market in Germany: Ready for the next development stage

Summary of key points

– **Venture capital investments have positive economic effects.** Market failure, however, leads to suboptimal VC investment levels. While the problem in Germany used to be acute in seed finance, it now affects later-stage and larger financing rounds. The growing importance of the digital economy has contributed to the shift because digital start-ups are under pressure to scale up fast, for which they require larger VC investment volumes. In the US, VC investors are prepared for the specific needs of digital start-ups. Germany has not yet reached this development step.

– **The German venture capital market was growing until the coronavirus crisis hit. Since 2014, annual VC investment had increased 2.8-fold to around 1.9 billion in 2019.** The overall market environment (fundraising, demand, exit) has also improved significantly in the past years. The coronavirus crisis then dealt a severe blow to VC business sentiment but has not yet had a visible effect on investment activity.

– **Despite the positive development of the German VC market, it lags behind other European countries.** Relative to the strength of their economies, VC markets in the United Kingdom and France were around 2.1 and 1.5 times larger on average in the past three years. This represents a gap of 700 to 1,700 million euros in investment volume annually. The lag is particularly pronounced in the area of biotech/healthcare.

– **With a view to unicorns, Germany is in mid-range in Europe.** Unicorns can be taken as a measure of the ability of VC markets to realise repeated large-volume financing rounds. At present, Germany has 12 such start-ups with evaluation in excess of USD 1 billion, fewer than the United Kingdom's 22 but more than France's five. Unicorns are common in large VC markets, which explains why most of the world's unicorns are found in the US and China. When large financing rounds are realised in Germany, foreign VC investors are on board in nine out of ten cases. That increases the risk of such start-ups leaving the country.

– **The data situation on venture capital is uncertain.** In addition to data from investor associations, data is available from information providers that capture published VC transactions. For 2018 and 2019, association reported institutional VC investments in Germany worth EUR 1.7 and 1.9 billion are mirrored by a total volume of EUR 2.3 to 6.2 billion in VC deals, depending on who provided the data. The wide range shows how difficult it is to ascertain the 'true' size of the VC market.

– **The German VC market is lagging behind, not just within Europe but internationally too.** This has been shown by analyses of transaction data that include VC deals in the broadest sense from diverse investors. Relative to economic strength, the gap to the United Kingdom has increased to a factor of 2.7 on average over the past three years. The VC markets of China and the US are clearly in the lead, being 5.2 and 4.1 times larger. In US dollars, these factors represent gaps in annual VC deal volume in excess of USD 7 billion, 13 billion and 18 billion.

– **Germany is lagging behind in digitalisation but also in other future areas.** Based on absolute figures, it is particularly the VC deals in China and the US in the field of mobile apps that stand out. Germany's VC market also lags behind in fields such as manufacturing and robotics, which actually build on Germany's traditional research strengths. In other technological areas, such as artificial intelligence and big data, but also clean technology and health technology, the gap in VC deal volumes is slightly narrower. Their relative share in the German VC market, however, remains comparatively low.

– **The interplay of domestic and foreign investors can give rise to a healthy and sustainable VC ecosystem.** Weaknesses in individual market phases can be ironed out by mobilising private capital. Crowding-in models and tax incentives have already proven their practicability in this respect.

Venture capital as fuel for creative destruction and future growth

Start-ups need suitable finance

Google and Facebook have shown the way: Grow rapidly with new technologies and an innovative business model and achieve a globally dominant market position as a relatively young enterprise, employ thousands of people and be among the world's most valuable companies. This impressive success story has helped put start-ups (i.e. innovative or growth-oriented young firms) on the economic-policy agenda of most industrial nations.

In order to be able to write such success stories, however, start-ups require suitable finance. That is because the more innovative and growth-driven they are, the less suitable traditional debt finance is for them. Loans fit neither the cash flow profile nor the risk profile of typical start-ups.[1] Venture capital (VC), on the other hand, fits very well. Investors participate in start-ups with venture capital. The high risk therefore can potentially offer opportunities for high returns if the value of the start-up increases when it is successful.

Because of the coronavirus crisis, start-ups have moved up on the economic policy agenda. Since buyers and investors became more reluctant to get involved, the crisis posed an existential threat for many start-ups.

'Software is eating the world' [2] or why VC is so important in the digital economy

However, Google and Facebook are not just examples of success stories. They also stand for the league of young enterprises with digital, highly scalable business models. Such enterprises can quickly expand their offerings to a large number of customers and meet their demand without their costs growing in the same proportion. The more the costs remain below growth, the more scalable the business model. Compared with the pioneering days of their predecessors, the conditions for digital start-ups have improved again significantly in the past ten years. There are hardly any business segments left that do not rely on software or web 2.0 apps. Mobile internet use has massively expanded through smartphones. That has generated enormous potential for the development of innovative digital business models. At the same time, market entry barriers for digital start-ups have fallen considerably owing to declining investment costs, for example through cloud computing. The growth trajectory of digital start-ups therefore differs from that of traditional technology start-ups.

If digital start-ups want to be globally competitive, after developing a functioning beta version they are often forced to scale up their business to a high level, in other words quickly attract many customers (market share) and get a head start in brand recognition. Such a strategy is particularly necessary in platform approaches because these are often winner-take-all markets as a result of network effects. In contrast to traditional technology start-ups, it is not the development and improvement of a technical product prototype that accounts for the bulk of their costs but the scaling – even if this is fundamentally done in a cost-efficient way. The higher and faster the scaling is to be, the more capital is needed.

VC has positive economic effects

Start-ups help make new technologies marketable and acceptable to society, create new markets or at least break up encrusted economic structures, thereby ultimately creating jobs of the future – very much in line with Schumpeter's 'creative destruction'. VC finance supports start-ups in this quest. The positive effect of VC on start-ups' successes in growing, innovating and commercialising their offerings is particularly well documented in the economic literature.[3] Thus, VC investments increase start-ups' turnover growth, employment growth, patent applications and product development / introduction ('time to market').[4]

'The VC impact for 90% of companies is substantial – receiving a VC investment allowed them to improve further and faster than their peers.' [5]

At industry and country level, VC investment is proven to generate higher innovative output than direct expenditure on research and development (R&D) does. Thus, the overall economic effect of a dollar of venture capital for patent applications is around three times as high as a dollar of R&D.[6] Since knowledge essentially has a public good characteristic, the benefit derived from it is not limited to the start-ups being financed. Other companies also benefit through spillover effects.[7] Because of these positive external effects, the availability of VC also plays an extremely important role for the economy as a whole.

Market failure results in VC investment levels that are economically inadequate

Germany's VC market is still relatively young, as it is in most European countries with bank-based financing systems. Only in the United Kingdom[8], where the capital market plays a much larger role for the economy, is the VC market older and more mature. Internationally, the US plays a pioneering role. In the 1950s the VC market began to develop there with massive state support in the form of military R&D and production orders.

In the mid-1990s the German VC market gathered steam for the first time but was hit hard by the dotcom crash. That led to a loss of confidence in the quality of start-ups overall (both in business models and in key figures and forecasts), with VC investors generally becoming more risk averse. Very young start-ups suffered most from this setback. The reason is that in early phases of a start-up, the founders are still much better informed about the business model, technology etc. than potential investors (information asymmetry). Confidence-building measures no longer bore fruit. Even promising start-ups hardly found VC investors anymore. It was not until the High-Tech Start-up Fund was launched that the situation eased and the market was revived.

Information asymmetries are not the only frequent reason that the market mechanism leads to economically suboptimal outcomes (market failure), creating the need for economic policy action. The positive external effects of VC on innovation also call for corresponding measures, as private VC investors do not take them into account in their investment decisions.

Given the information asymmetries and positive external effects, VC is probably in short supply in the economy as a whole. The High-Tech Start-up Fund created reliable access to VC for very young start-ups in Germany. On its own, however, the German VC market can only sporadically raise large volumes of growth finance. Thus, nine out of ten large deals there have foreign direct investors on board (Figure 1).

The high participation of foreign direct investors in growth finance is a sign that the German VC market has not yet matured. Given the increasing importance of digital business models, which require large volumes of follow-up finance for growth and market penetration relatively soon after their start-up finance, this is a problem for the future viability of the economy. The US venture capital scene has adapted to the specific needs of start-ups in the digital economy. Germany has not yet reached this development stage.

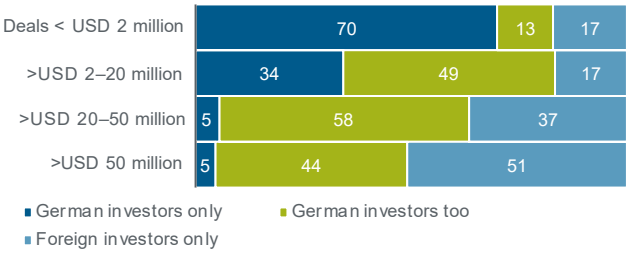
VC investors: diversity in motivation, focus and investment power

When start-ups need VC, the stage of their business growth and the financing purpose are relevant in choosing which investors should participate. Private equity investors, corporations ('corporate venturing'), family offices and business angels are some of the players active in the VC market.

Private equity investors are 'institutional investors' whose business purpose is to raise financial resources to be able to acquire a stake in a business and sell that stake again at a profit after the business has innovated or expanded successfully. Venture capital firms specialise in acquiring stakes in start-ups. Typically, they establish their own temporary vehicles (VC funds) to arrange the process (fundraising / investment / exit). They invest the funds in multiple start-ups so as to spread the high risk at least a little. Ideally, one or two very successful participations can thus secure an above-average return for the fund, irrespective of how the remaining participations evolve. VC funds invest sums starting at several hundred thousand euros depending on their size and focus.

Figure 1: Foreign direct investors are on board in nine out of ten major VC deals in Germany

Origin of investors in per cent of all deals* (∅ 2017–2019)



* All deals stating deal volume and origin of investors[23]

Source: own calculations with data from Preqin

In addition, there are informal investors such as business angels. These are usually wealthy private individuals (often former entrepreneurs) who invest in start-ups and support them with their entrepreneurial experience. They generally focus on the earliest stages of a business, invest lower amounts and have other motives beyond financial returns.[9] For many angel investors the joy and challenge of supporting, accompanying and developing new businesses plays a major role. Angel investors often work to develop new businesses to a level that makes them interesting for VC funds. Family offices are another type of informal VC investors. They often manage large, historically

grown family assets. They generally regard the preservation of capital as a high priority, so that VC only accounts for a small portion of their asset allocation. They typically act as fund investors but increasingly invest directly as well. Corporates typically invest using their own VC firms (CVCs), which then belong to the institutional market. Strategic goals are priorities for them, even before financial returns.[10] For example, they use VC investments to gain a window on technology or in order to familiarise themselves with new business models. But corporates also increasingly invest informally, that is, directly without an intermediary CVC company.

There are no official statistics on VC investments. Of course, changes in shareholdings of corporations must be published but there is no obligation to identify whether they specifically involve a VC investment. This is compounded by general difficulties in defining what constitutes a start-up. Information providers such as Preqin, Pitchbook, Dow Jones VentureSource and CB-Insights capture private equity transactions but evaluating them is fraught with particular challenges (see box on page 11). Given the difficult data situation, in the following we will mostly use data from Invest Europe, the European association of private capital providers, which collects investment-related information, primarily from its members.

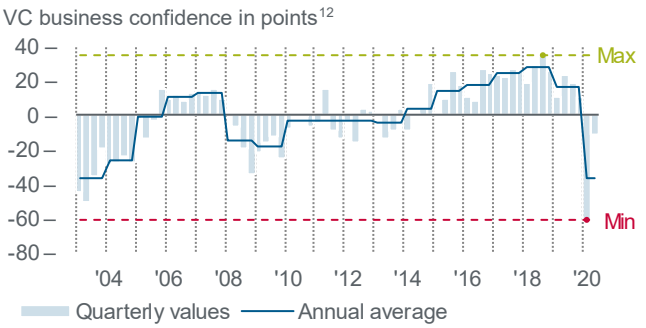
Coronavirus shock has unsettled the German VC market but investment activity remains steady

Coronavirus crisis has shocked VC investors

The coronavirus pandemic spread across the globe in the first quarter of 2020. Some countries temporarily introduced curbs on all public activity and ordered businesses to shut down in order to contain the pandemic. In Germany the measures have so far not been as restrictive. Contact and travel restrictions were imposed, large public events were banned and companies and professionals with close personal customer contacts were ordered to stop trading. These measures had a direct and severe impact on areas such as the events industry, tourism, catering and hospitality, retail and personal services. Many self-employed persons, businesses and start-ups in these sectors suffered heavy or complete turnover losses. But the crisis was not limited to directly impacted sectors. The measures adopted around the world to contain the pandemic weighed heavily on the entire global economy. This was also reflected on the stock exchanges. The Dow Jones Industrial Average index plunged 37 % from mid-February to mid-March as investors' preference for cash rose sharply. The sudden uncertainty that beset portfolio enterprises and fundraising deeply unsettled German VC investors.

According to the German Venture Capital Barometer, which KfW surveys on a quarterly basis in cooperation with the German Private Equity and Venture Capital Association (BVK), business confidence plummeted to an all-time low at the end of the first quarter of 2020 (Figure 2). Thus, only six quarters separated the all-time high and the all-time low. However, the initial shock passed again in the second quarter. Business sentiment recovered significantly from the new all-time low. The EUR 2 billion support package for start-ups jointly announced by the Federal Ministry for Economic Affairs and the Federal Ministry of Finance on 1 April 2020 most likely played a role in this.[11] KfW and KfW Capital performed key functions in the design, implementation and financing of this package.

Figure 2: Coronavirus crisis sends VC business confidence crashing through the floor



Source: German Venture Capital Barometer

Confidence has fallen across a broad front[13]

At the end of the first quarter of 2020, almost all sentiment indicators of the German VC market fell deep into the red (Figure 3). Sentiment regarding fundraising, exit opportunities, new investments and value adjustments dropped sharply. The only indicator to improve – one that, from experience, moves in opposite direction – was the assessment of entry valuations. Given the uncertainty over the further development of the coronavirus pandemic, the economic outlook became very bleak. Valuation benchmarks for portfolio enterprises also plummeted as a result of the global slump in share markets. So it was understandable that pressure on portfolio and entry valuations rose noticeably. Scepticism about new investments is also a well-known phenomenon. This crisis-induced state of shock was evident both after the end of the New Economy boom and in the financial crisis, when investors hesitated to invest again and temporarily limited themselves to supporting their portfolio companies. A similar shift in investment focus would therefore not be unusual in the coronavirus crisis either.[14] At any rate, demand for VC has not fallen. Although VC investors have a more negative view of

the level and quality of their deal flow and its innovative character, the decline is relatively moderate.

Figure 3: Coronavirus shock has driven sentiment indicators deep into the red – recovery after initial scare

Sentiment indicators in points[12]

Setiment indicator	Q4 / 2019		Q1 / 2020		Q2 / 2020
Fundraising	+39.1	↓	-35.3	↑	+0.8
Entry evaluations	-50.4	↑	+11.6	↑	+26.2
Exit opportunities	+15.4	↓	-73.4	↑	-23.8
New investment	+6.6	↓	-70.1	↑	-31.5
Dealflow strength	-1.8	↓	-10.7	↑	+5.0
Dealflow quality	-6.7	→	-6.4	→	-5.3
Funding	+13.8	↓	+1.9	↑	+37.8
Taxation framework	+21.4	↓	+12.2	↑	+29.0
Innovation	-5.2	↓	-14.7	↑	+19.7
Write-downs	+21.9	↓	-49.8	↑	-15.4

Source: German Venture Capital Barometer

VC investors are breathing a sigh of relief[15]

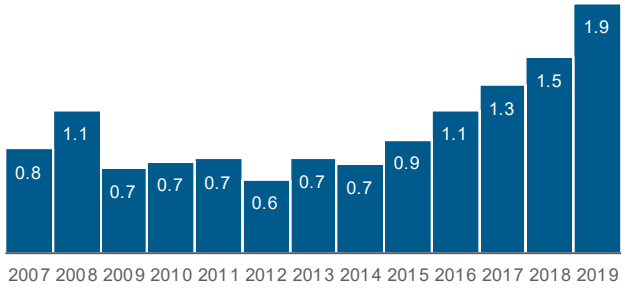
Just as the various sentiment indicators deteriorated almost consistently in the first quarter, they recovered again in the second quarter. The only exception was quality of deal flow, however, for which assessments remained steady, as they did in the previous quarter. VC investors are breathing a sigh of relief with respect to fundraising, exit opportunities, new investments and value adjustments. With the exception of the fundraising environment, the corresponding indicators continue in negative territory but the relief over progress made in containing the pandemic in Germany for now and apparently mastering the crisis better economically than other countries is palpable. Encouragingly, the assessment of entry valuations – an indicator that normally moves opposite to the others – continues to improve after rising significantly in the first quarter. As the first shockwave in the second quarter has passed and VC investors are now more eager to enter into new investments again, even if much less than before the coronavirus crisis, that – along with more favourable entry valuations – may create positive feedback effects for the market.

VC investment grew steadily from 2015 to 2019

A look at the development of Germany's VC market shows that the financial crisis of 2008 was a turning point. It took the market several years to recover from that shock. From 2009 to 2014, investment activity in Germany settled at a level of EUR 600 to 700 million per annum. In 2015 investment activity gathered steam again. In a period of just five years, VC investment in Germany increased 2.8-fold to around EUR 1.9 billion in the year 2019 (Figure 4).

Figure 4: Venture capital investment in Germany more than doubled within five years

Investment in German start-ups, EUR in billions



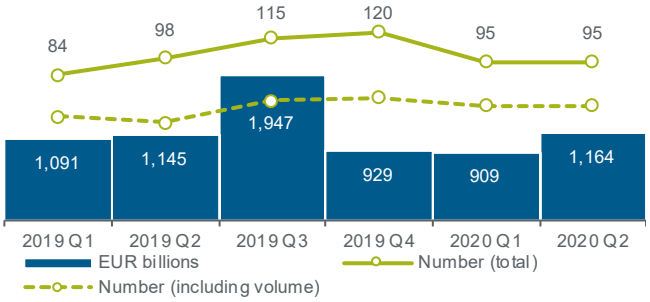
Source: Invest Europe / EDC

Investment restraint has not yet manifested itself

Current transaction data provides an idea of how the coronavirus crisis has affected actual investment activity. So far, the investment data does not reflect the feared investment reluctance. Thus, on the basis of Preqin data, which are not comparable to those of association data (see box on page 11), investment activity in the second quarter of 2020 remains on the level of the same quarter in the previous year (Figure 5). It is possible, however, that the declines will not become apparent until later in the year, when all deals initiated before the coronavirus crisis have been completed.

Figure 5: Coronavirus crisis has not yet impacted on investment activity

Volume and number of VC deals[23]



Source: own calculations with data from Preqin

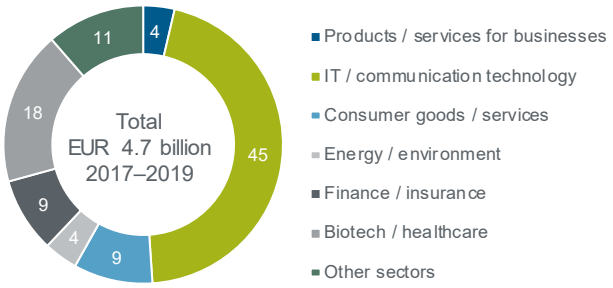
Other analyses have concluded that the investment volume in the first half of 2020 was much lower than in the same period last year because fewer very large deals were closed owing to the coronavirus crisis.[16] Given the unusual accumulation of very large deals in 2019, however, a coronavirus effect in the first half of 2020 is rather unlikely.

Around EUR 4.7 billion was invested in VC in Germany during 2017–2019. The lion's share of this went to information and communications technologies (45%, Figure 6). Biotechnology/healthcare (18%) as well as consumer goods/services and finance/insurance

(9% each) were also sought after. Four per cent of VC investments each went to the sectors business products/services and energy/environment.

Figure 6: Almost half of VC investment went to information and communications technologies

Sector shares in per cent (avg. for 2017–2019)



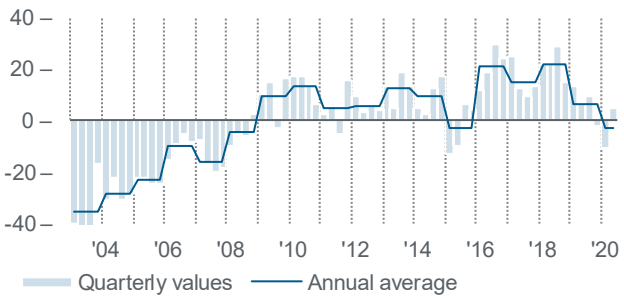
Source: own calculations on the basis of Invest Europe / EDC

Demand continues long-term upward trend despite current weakness

German institutional investors see a positive trend in the demand from start-ups for VC over the past 15 years (Figure 7). Demand for VC increased significantly from 2003 to 2009 and then remained relatively steady up to the year 2014. After a temporary drop in 2015, however, demand rose again to a higher level in the following years. This is also consistent with the development of the number of start-ups in Germany (Figure 8), which grew strongly in the years 2017 and 2018. In 2018 Germany had some 70,000 start-ups – innovation- or growth-driven young enterprises. In the coming years, around 9% of these intend to finance their further growth with venture capital, that is, through a participation by venture capital funds or business angels. At the moment, demand for venture capital is weaker. This is not an effect of the coronavirus crisis, as the weakness began already in 2019. However, there have always been phases of weakness. There are no signs of the long-term upward trend ending any time soon.

Figure 7: Positive development of VC demand

VC demand sentiment in points[12]

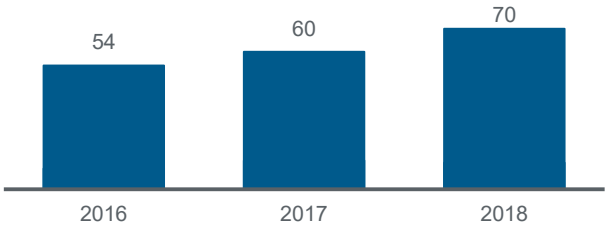


Source: German Venture Capital Barometer

It is not clear how developments in the VC market and the number of start-ups correlate. A causal relationship is possible in both directions. Thus, a positive development in the number of high-quality start-ups (where sufficiently available) will entail an increase in VC investment. On the other hand, it is possible that the number of start-ups that potentially need VC will not grow until they are confident that there will be a sufficient supply of venture capital. For Germany, for example, there is a statistically significant effect of the amount of VC investment in one year on the number of high-tech start-ups in the following year.[17] This supply effect on start-up activity has also been evidenced for the US.[18] When one of the two trends starts to pick up, it can trigger a process with positive feedback effects.

Figure 8: Number of start-ups in Germany is growing

In thousands



Source: KfW-Start-up-Report 2019

Start-ups make up only a small portion of annual entrepreneurial activity. On average over the past years, only around seven in 100 newly founded businesses in Germany exhibited the characteristics of start-ups.[19] Entrepreneurial activity overall has been on the decline for many years now, also because the drive towards self-employment has weakened considerably.[20] Young people are a bright spot in this regard, as they were slightly more inclined to start a business. It is possible that they helped start-up numbers to grow despite overall declining entrepreneurial activity. Should young people's entrepreneurial spirit continue to rise, it would presumably bolster VC demand as well.

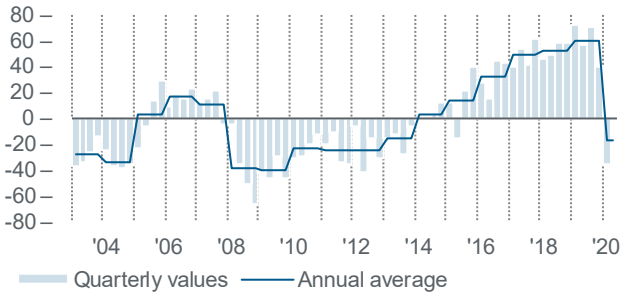
Fundraising climate rises to record level in low-interest environment – coronavirus crisis is creating uncertainty

In order for VC companies to be able to invest in start-ups, they must first raise the capital required for the respective funds. The supply of VC for start-ups thus essentially depends on how much capital investors are prepared to allocate to the VC asset class. The fundraising situation for German VC funds has improved significantly since the global financial crisis. Their sentiment about the fundraising situation had dropped to a low point in June 2009 (Figure 9). But the fundraising climate gradually improved in the following

ten years. Since 2016 it exceeded the pre-crisis level for the first time and has since regularly reached new highs. This development has been supported by the persistent low-interest environment in which more capital from interest-bearing products is being channelled into more high-return investments.

Figure 9: VC fundraising climate: 10 years from record low to record high and into the coronavirus crisis

Fundraising climate in points[12]



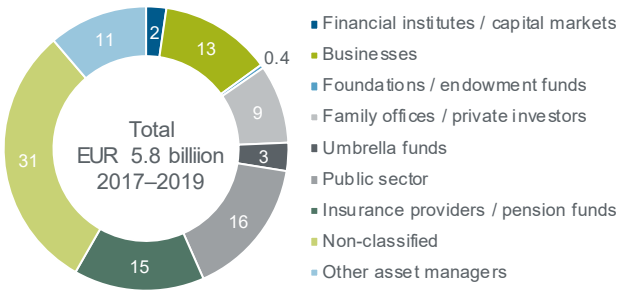
Source: German Venture Capital Barometer

The outbreak of the coronavirus crisis at the beginning of 2020 has massively unsettled businesses and investors. Their response was to work hard to secure liquidity. For example, investors retreated from existing investments, as illustrated by the collapse of international stock markets. The fundraising climate deteriorated accordingly.

In the 2017–2019 period, VC funds domiciled in Germany raised to some EUR 5.8 billion (Figure 10). The state was the most important source, accounting for a share of 16%. Insurers/pension funds and enterprises, the next largest sources, contributed 15 and 13%. For a major portion of the capital raised, however, the sources are unclear (31%). This probably leads to an underestimation of the amount of capital originating from private sources, as official sources tend to have greater transparency.

Figure 10: Large asset managers contribute only little to fundraising

Fundraising sources in per cent (avg. for 2017–2019)



Source: own calculations on the basis of Invest Europe / EDC

Exit opportunities improved in the past decade – trade sales are most important exit route

VC funds usually have a targeted term of around ten years and follow a traditional investment pattern: They invest their funds in promising start-ups for a period of three to five years. They subsequently monitor their portfolios and make follow-up investments in the most promising businesses. They exit from the start-ups in the last years of the term.

At that stage, however, many investments no longer exist because start-ups are typically high risk and therefore often fail. In order to achieve a positive return for the fund investors, such partial or total losses must be offset by a small number of very high-growth investments.

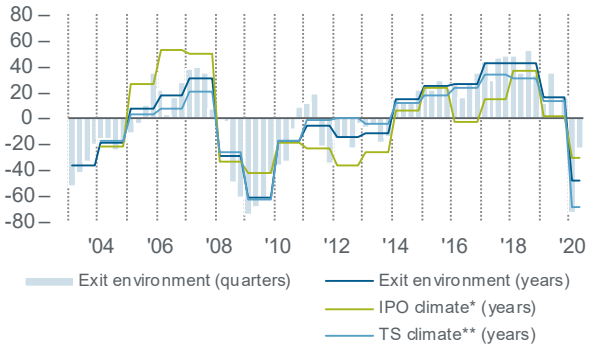
Typical ways in which VC funds divest from their participations are trade sales (selling their company shares to a strategic investor such as a large corporation that integrates the technology or service of the start-up into its business process), secondary sales (selling their company shares to another venture capital or private equity fund), buybacks (having their company shares bought back by the start-up or its participating management) and public offerings ((initial) listing of company shares on stock exchanges).

The exit environment, that is, the assessment of the situation and expectations of VC funds regarding the possibility of exiting from the investment, deteriorated significantly during the financial crisis, as did the fundraising climate, and has since recovered only gradually (Figure 11). It was not until 2017 and 2018 that the exit environment returned to record levels. In 2019, however, it grew bleaker again, as the coronavirus crisis gave it another considerable dampener.

The exit environment differs according to the relevant exit pathway. The environment for initial public offerings in particular is proving to be relatively volatile. It depends rather heavily on the development of the (international) stock markets because in positive market phases IPOs are more likely to meet the necessary demand and thus make them easier. In the year 2007 the IPO environment achieved the highest level ever measured but declined sharply in the wake of the financial crisis. After that, a wavelike growth trend began which culminated in a ten-year high in 2018. The environment for IPOs is currently less favourable than for other exit pathways. This is probably due primarily to the fact that some IPOs that were planned and realised in the US in the past quarters were not as successful as expected.

Figure 11: Coronavirus crisis narrowed exit opportunities for VC funds once again

Exit climate indicators in points[12]



* IPO: Initial Public Offerings ** TS: Trade Sales

Source: German Venture Capital Barometer

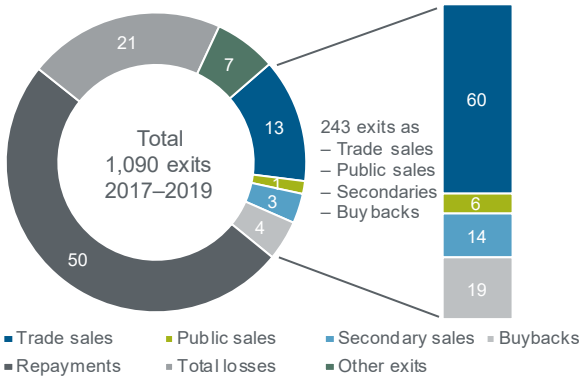
Trade sales are the exit pathway that appears to have been particularly hard hit by the coronavirus crisis. The environment for exiting by selling to strategic investors has deteriorated more than average. This may have to do with the fact that strategic investors themselves are suffering from the crisis and seek first and foremost to secure liquidity because of turnover losses. Strategic acquisitions are therefore on the backburner.

During the 2017–2019 period there were more than 1,000 exit transactions from start-ups in Germany. Here it must be taken into account that an exit can also take place gradually in several transactions. Furthermore, VC investors often provide their portfolio companies debt or mezzanine capital in addition to equity. Repaying this capital counts as an exit transaction. Half of the more than 1,000 exit transactions consisted of such repayments (Figure 12, left). A further one fifth were depreciations as a result of total losses, highlighting the high risk of VC investments.

Around one quarter of all exit transactions use the exit pathways mentioned with ownership transfer. This is where trade sales dominate, accounting for 60% of these transactions (Figure 12, right). Buybacks (19%) and secondary sales (14%) are also relatively common. Public sales (6%), on the other hand, are relatively rare. There is a reason for this. As a rule, public placements are only for a positive selection of 'listing ready' companies that are expected to gain high market capitalisation, for example. Usually, this applies only to start-ups which are already established in the market despite their young age and have grown strongly, meaning they have successfully completed several rounds of financing. However, it is also evident that the attractiveness of exit pathways is changing. While there used to be no alternative to IPOs in order for a company to earn exceptionally high returns, today trade sales offer companies the prospect of very good returns as well.

Figure 12: Trade sales dominate exit activity with ownership transfer

Exits in per cent (avg. for 2017–2019)



Source: own calculations on the basis of Invest Europe / EDC

Coronavirus crisis has both immediate and structural impacts

Stress and existential threat for start-ups

Even if business confidence in the meantime has clearly recovered from the new all-time low and the market might pick up again, market conditions are no longer what they used to be. In the supplementary coronavirus survey to the German Venture Capital Barometer of the second quarter 2020, VC investors almost unanimously reported that the start-ups in their portfolios were struggling with turnover losses as a result of the crisis (Figure 13). The majority also expect more start-up failures. But many only partly agree with this statement, presumably because they have their eyes on different sectors that have been affected by the coronavirus crisis in very different ways.

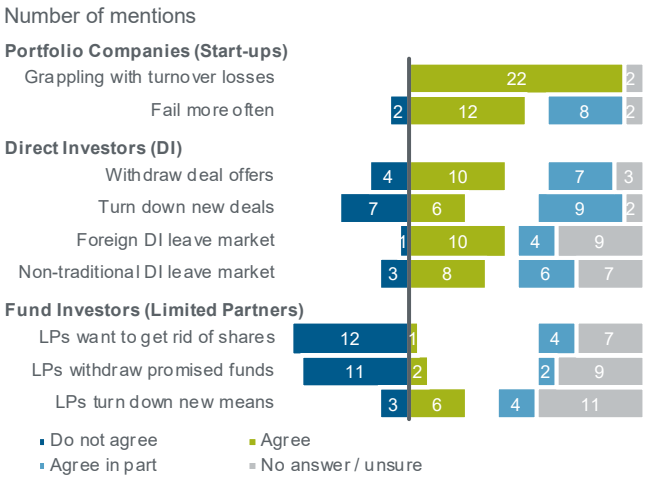
Investor landscape in upheaval

Start-ups are also feeling the crisis on the financing side. Thus, most VC investors reported that the coronavirus crisis ultimately prevented them from finalising approved deals. Here as well, many investors agree only in part. Apparently, deals were more often cancelled by investors who were heavily invested. That is because the lower the available reserves were, the more likely they were to support the existing portfolio. The same applies to the closing of new deals, although the picture here is much more balanced overall. In other words, there is still appetite for new investment. This is consistent with the improvement in the investment environment in the second quarter, after investor appetite dried up in the first quarter of 2020 (Figure 13). Evidently, the great uncertainty caused by the coronavirus shock in Q1 was the main reason approved deals

were not realised in the end. But the risk of further crisis-induced cancellations should now have passed.

The crisis is also likely to have indirectly affected start-ups' access to VC – through a change in the investor landscape. Thus, the majority of the surveyed investors have noted that foreign direct investors and non-traditional direct investors such as companies, endowment funds, hedge funds, sovereign wealth funds and investment banks have reduced their activities in the market. A retreat to the domestic market and core business would be a normal crisis response. The data of Preqin, however, shows that the share of foreign VC investors in the deals closed in the March-June 2020 period has hardly changed in comparison with the same months of previous years. Whether the perceived change in the investor landscape will come about and whether it may be a snapshot or long-term trend will depend on the further progression of the coronavirus crisis – as will investment activity.

Figure 13: Coronavirus crisis weighs on the VC market and is changing the investor landscape



Source: special survey conducted under the German Venture Capital Barometer Q2/2020[21]

Investors remain loyal to VC funds

The fear that the stock market sell-off could also spill over into VC fund investments did not materialise. It appears that fund investors have attempted to withdraw from VC funds only sporadically. Thus, few VC investors confirm that fund investors have attempted to exit from investments or have withdrawn commitments they had made to fund investments. Those who are in the process of raising funds, however, will have more difficulty securing commitments from fund investors.

German VC market in a benchmark comparison

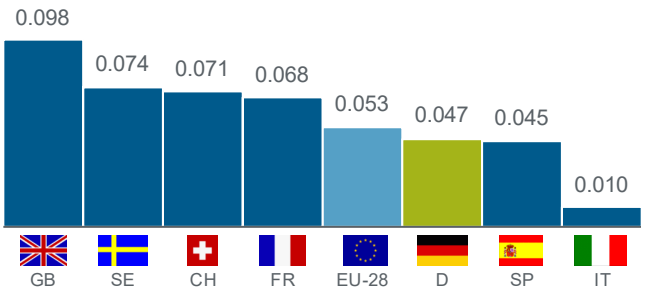
Germany is lagging behind in VC investments

The VC market in Germany has been growing in recent years and VC investments have increased. But that is also true of other countries. Even a European comparison is sobering. In relation to the strength of their economies, the VC markets in the United Kingdom and France have evolved much more positively, with the German market even lagging behind the development of the whole EU-28. On average for the 2017–2019 period, VC investments in Germany represented 0.047% of GDP (Figure 14).

For the EU-28 the rate is 0.053%. The rates for other major European economies such as the United Kingdom, Sweden and France are much higher still. In this comparison, the United Kingdom must be seen as the EU's VC lead market, both in relative and in absolute market size. On average for the 2017–2019 period, VC investments there represented 0.098% of GDP. This means that relative to the country's economic strength, more than twice as much VC was invested there each year as in Germany.

Figure 14: As a percentage of GDP, UK's VC market is twice as large as Germany's

VC-to-GDP ratio in per cent (avg. for 2017–2019)



Source: own calculations on the basis of Invest Europe / EDC

Expressed in euros, this means Germany is lagging behind in VC investment by some EUR 1,700 million. (Figure 15). That is the sum that would have to be invested additionally in Germany each year in order to achieve the relative market size of the UK in the 2017–2019 period. The gap to Sweden is a good EUR 900 million, to Switzerland a good EUR 800 million and to France a good EUR 700 million. As VC markets evolve dynamically, the difference to the benchmarks also varies. Thus, until a few years ago the VC markets in Germany and France were of the same size relative to their economic strength. It was not until 2013 that a gap opened up. The lag behind the UK also increased considerably after 2017.

Lag particularly in biotech / healthcare but ahead in energy / environment

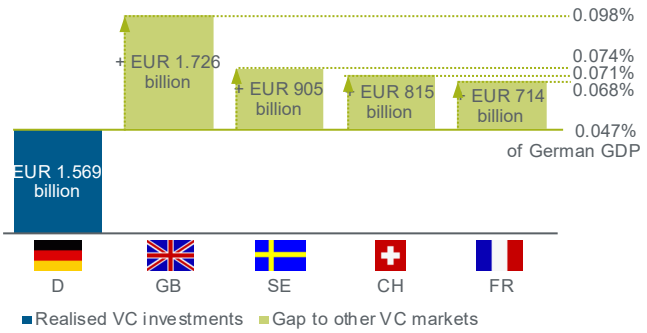
With regard to the target sectors of VC investments, Germany is hardly any different from the United Kingdom, France or the European average (Figure 16). In all regions, most of the capital invested in the 2017–2019 period went to the areas of information and communications technologies. Here, France stands out with a share of 57%, with the United Kingdom just behind.

A significant difference exists only in the field of biotechnology/healthcare. Germany's 18% share is relatively small. France's share was only slightly higher, at 21%. The United Kingdom, however, matched the European average, at 24%. Energy/environment is the only sector in which Germany trumps all other regions with a share of 4%. Even if the level is relatively low, that share is still twice as high as the European average and four times as high as in the United Kingdom.

Thus, the biotechnology/healthcare sector accounts for a disproportionately high share of the above lag of the German VC market. By contrast, Germany leads in VC investment in the energy/environment sector. In the 2017–2019 period, about one third of the capital invested here in EU-28 went to German start-ups, which is slightly more than the almost 30% invested in the previous period (2014 to 2016).

Figure 15: German VC market lags behind European benchmarks by approx. EUR 700 – 1,700 million

(Avg. for 2017–2019)

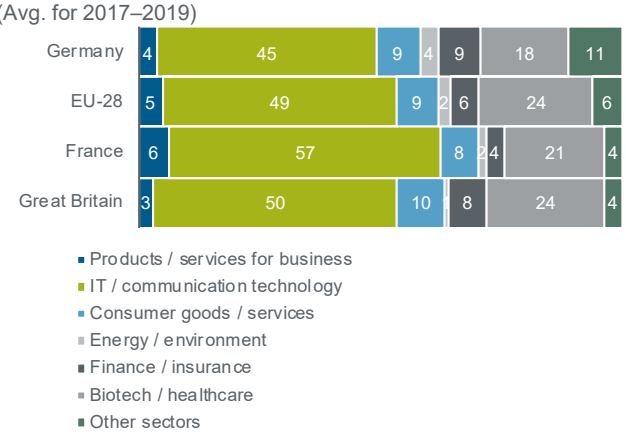


Lag: How much more venture capital would Germany have had to invest additionally each year to achieve the benchmarks' respective GDP ratio?

Source: own calculations on the basis of Invest Europe / EDC

Figure 16: Only minimal differences in target sectors of VC investments in Europe

(Avg. for 2017–2019)



Source: own calculations on the basis of Invest Europe / EDC

(☛ Page 14)

Box: The German VC market compared with China and the US

Data sources for the international comparison

The statistics of the European association of private capital providers ('Invest Europe') do not cover non-European VC markets such as China and the US. Other data sources must therefore be consulted for a comparison with these markets. These include transaction data of specialised information providers. Private equity transactions (deals) are captured by providers such as Bureau van Dijk, Dow Jones VentureSource, Majunke, Pitchbook, Preqin and Refinitiv, for example.

Challenges for data analysis

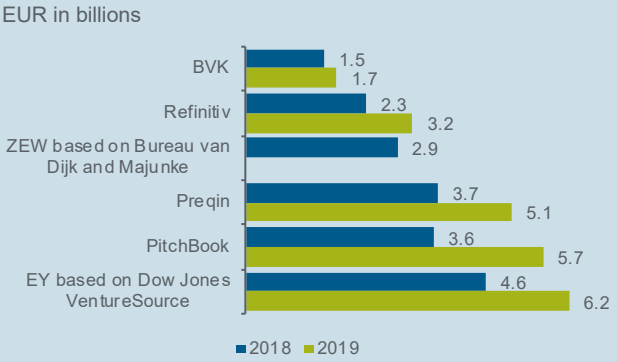
Comparisons should be made only with the data from the same provider because providers differ in their coverage and the definitions they use. Comparing data from different sources inevitably leads to different results. In particular, comparing transaction data with the statistics of the association Invest Europe is unreliable for three main reasons:

1. First, the statistics of Invest Europe primarily map investment activity of institutional equity providers domiciled in Europe. They only include the funds effectively disbursed. Transaction databases, on the other hand, capture deals that have become known and their volumes. These are based on press releases and reports in specialist magazines and newspapers, for example. They do not take into account when funds effectively flow and in what amounts (for example, upon disbursement in tranches tied to the achievement of milestones)[22]. Besides, many deals become known but their conditions do not. The deals are therefore often captured without volume data.[23]

2. Second, they also capture deals by non-institutional private equity investors such as business angels or private investors, as well as atypical VC investors. Atypical VC investors such as enterprises, endowment funds, hedge funds, sovereign wealth funds or investment banks are increasingly expanding their typical role of fund investors and entering into increasingly more (large-volume) direct shareholdings.[24]

3. Third, they also capture deals for which it is at least debatable whether they are actually VC investments.[25] While the association statistics rather tend to underestimate the market,[26] the deal volumes of the transaction data overstate the actual VC investments for the reasons mentioned. According to association data, in the year 2018 institutional VC investments totalled EUR 1.5 billion, while the volume of VC deals amounted to EUR 2.3–4.6 billion, depending on the source (Figure 17). In 2019 the divide was similar, when EUR 1.7 billion from institutional VC investors contrasted with VC deals totalling EUR 3.2–6.2 billion. The differences between VC investments and VC deal volume show how uncertain the data are and how difficult it is to determine the 'true' size of the VC market.

Figure 17: Investments and deal volume in German VC market by comparison



Sources: BVK, Refinitiv, ZEW, PitchBook, EY and own calculations based on data from Preqin.[27]

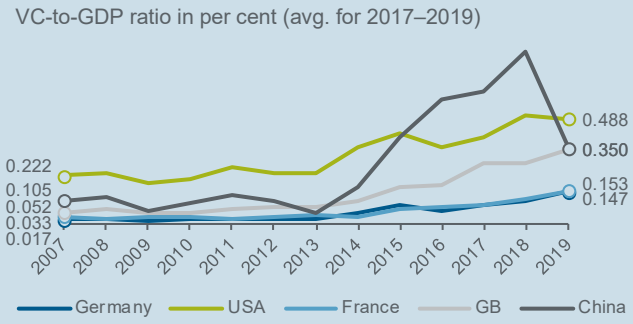
Analyses with transaction data require extensive data work

The Leibniz Centre for European Economic Research (ZEW) processed the transaction data of the Bureau van Dijk (Zephyr M&A database) and Majunke Consult in order to analyse the development of Germany's VC market.[26] To this effect, the data were adjusted for entries that were deemed with sufficiently high probability not to be VC deals, for example. Missing data on deal volume were also imputed with the aid of regression techniques. This ultimately results in a deal volume of EUR 2.9 billion for the German VC market in 2018, which is roughly halfway between the data supplied by the associations and the levels of the other published deal volumes.

International comparison on the basis of transaction data

Despite the limitations of transaction data, the following analyses are based on the Preqin deal database. Ultimately, a global comparison of VC markets can be made only on the basis of transaction data. Manual adjustments and processing steps are impossible given the tens of thousands of transactions contained in the database. The analyses take into account all transactions recorded in the database as VC deals along with their corresponding deal volumes. On that basis, the Preqin data also shows that the international VC markets are growing, as investments have been on the rise for years now (Figure 18). The Chinese, US and UK VC markets, however, have evolved much more dynamically than the German VC market, which is on a similar development pathway as the French one.

Figure 18: Development of VC markets internationally



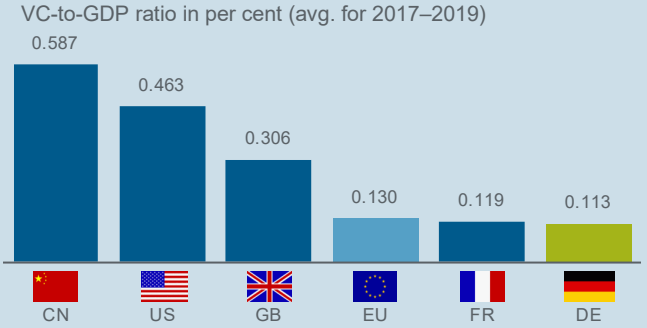
Source: own calculations with data from Preqin and IMF[23,28,29]

On average for the past three years (2017–2019), the VC deal volume in Germany was 0.127% of GDP (Figure 19). That is three times more than the level reported in the association statistics. However, the comparison of this data also shows that the level of the German VC market is below the EU average.

The comparison with France shows a deviation, with Germany almost on the same level. The French VC market therefore looks to have a slight lead, particularly in institutional VC investments (association statistics), but Germany draws level again with informal VC investments.

But when informal investments are included, the gap to the UK widens from 1.8 to 2.7 times. Even further ahead are China and the US, whose VC markets are 5.2 and 4.1 times larger in relation to their economic strength.

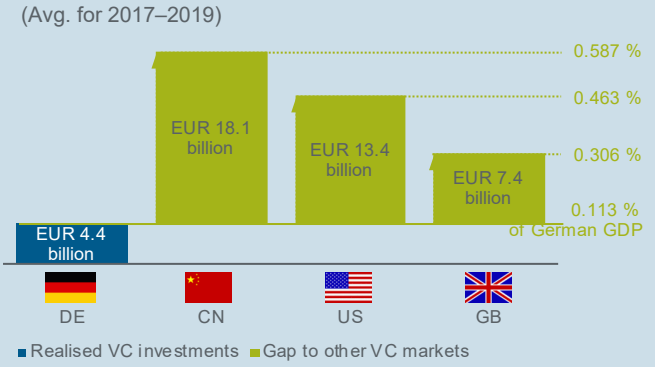
Figure 19: China and US VC market size clearly beats Germany's by factors of 5.2 and 4.1



Source: own calculations with data from Preqin and IMF[23,29]

On the basis of transaction data, Germany's gap to international VC markets in terms of annual deal volume appears enormous. Thus, additional VC deals totalling more than USD 7 billion, 13 billion and 18 billion would have had to be finalised in Germany annually in the past three years in order to match the relative market sizes of the UK, the US and China (Figure 20).

Figure 20: The relative gap of the German VC market to its international benchmarks is as much as EUR 20 billion per annum



Source: own calculations with data from Preqin and IMF[23,29]

Many technological trends are international – with different weightings

Transaction data provides the benefit that it can be broken down by individual categories. This allows technology or business fields (verticals)[30] to be identified that are deemed to be particularly promising and thus forward-looking from the perspective of VC investors.

Table 1: Mobile app start-ups received the most venture capital

VC deal volume by technology / business field
Share in total volume (2017–2019, includes multiple counting)

Technology / Business sectors		CN	US	DE	GB	FR
Mobile apps	USD bn	115.6	71.3	6.0	7.9	2.0
	per cent	50.3	25.0	45.7	31.5	20.7
E-commerce	USD bn	47.4	42.1	4.9	3.8	1.7
	per cent	20.6	14.7	37.7	15.0	17.7
FinTech	USD bn	25.7	22.9	2.4	6.9	0.7
	per cent	11.2	8.0	18.5	27.4	6.8
Artificial intelligence	USD bn	20.1	34.2	1.7	2.9	0.9
	per cent	8.7	12.0	12.8	11.7	8.9
Manufacturing	USD bn	16.2	18.3	0.3	0.9	0.3
	per cent	7.0	6.4	2.2	3.5	2.7
Cloud computing	USD bn	15.1	55.0	1.8	3.1	1.4
	per cent	6.5	19.3	13.6	12.5	14.4
Big data	USD bn	14.0	12.9	0.4	0.6	0.4
	per cent	6.1	4.5	3.1	2.5	4.6
Electric / hybrid vehicles	USD bn	13.3	7.2	0.3	0.1	0.0
	per cent	5.8	2.5	2.0	0.3	0.5
IoT	USD bn	12.7	6.4	0.3	0.3	0.2
	per cent	5.5	2.2	2.6	1.1	1.8
Clean technology	USD bn	12.2	7.7	0.3	0.4	0.2
	per cent	5.3	2.7	2.5	1.4	2.1
HealthTech	USD bn	8.7	31.7	1.1	1.6	0.8
	per cent	3.8	11.1	8.6	6.5	8.8
⋮		⋮	⋮	⋮	⋮	⋮
Blockchain	USD bn	3.8	7.1	0.3	0.5	0.2
	%	1.7	2.5	2.3	1.9	1.7
Robotics	USD bn	2.7	6.4	0.1	0.4	0.0
	%	1.2	2.2	1.1	1.6	0.2
InsureTech	USD bn	0.3	5.5	0.4	0.2	0.1
	%	0.1	1.9	3.4	0.7	1.2
Nanotechnology	USD bn	0.1	0.9	0.7	0.1	0.0
	%	0.0	0.3	5.4	0.5	0.4

Note: The shares of technology / business fields refer to the total volume effectively captured on the ground. As the fields shown may overlap, multiple allocations may occur and sums exceed 100% in some columns.

Source: own calculations with data from Preqin

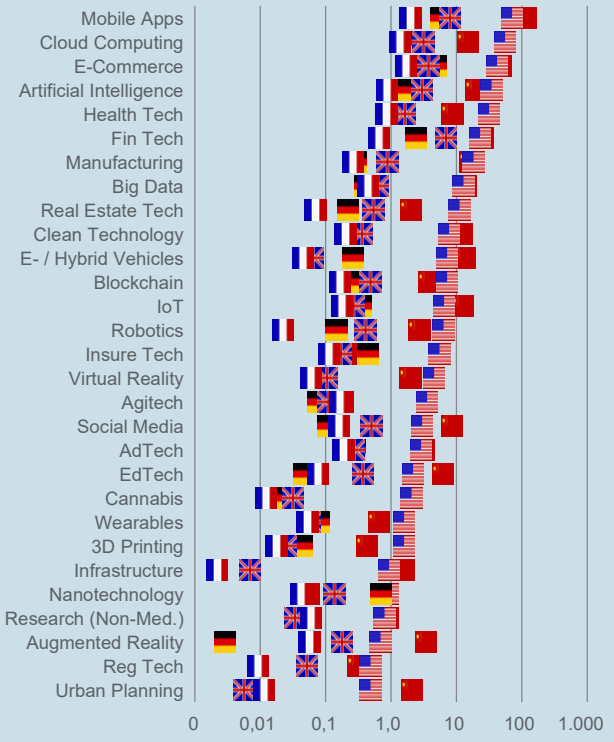
In the countries shown here, the field 'mobile apps' accounted for the largest deal volume in the sum of the past three years (Table 1 and Figure 21) – depending on the region, roughly one fifth to half the total volume. Mobile app start-ups currently appear to have an internationally promising business model. E-commerce start-ups were also sought after. They accounted for around 15-40% of total volumes. However, cloud computing was stronger than e-commerce in the US and FinTech was stronger in the UK.

Across the countries studied, however, FinTech start-ups performed very differently. The shares in total volumes range from just under 30% in the United Kingdom through almost 20% in Germany to 7-11% in the US, France and China. Artificial intelligence was also heavily favoured, accounting for roughly 9-13% of total volume. As in FinTechs, the shares of cloud computing also vary greatly. In China, however, cloud computing attracted relatively less VC than in the other countries, as was the case in healthtech. By contrast, China is the top performer in the field of electric / hybrid vehicles, both in relative and in absolute terms. The US, for its part, is the front-runner in areas such as blockchain, robotics and insuretech. Finally, nano-technology stands out as an area in which Germany is relatively stronger and can at least keep pace with the US in absolute terms.

Compared with China and the US, Germany has a relatively low deal volume particularly in the technology areas of big data, electric / hybrid vehicles and clean technology. These are therefore likely to be the areas in which the country lags farthest behind its international competitors. However, weaknesses are also evident in technological fields such as manufacturing and robotics, which are actually traditional German strengths.

Figure 21: VC deal volume by field

2017–2019 in USD billion (includes multiple counting)



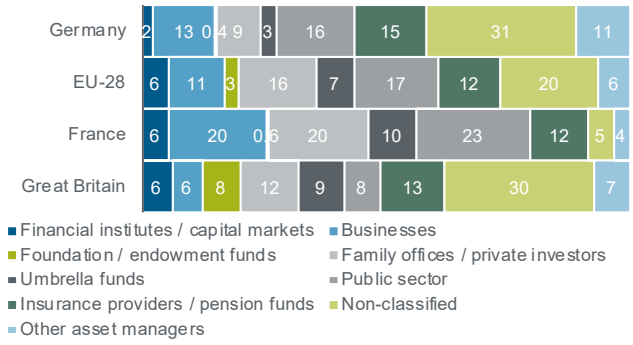
Source: own calculations with data from Preqin

Fundraising – high potential for mobilising private capital in Germany

Comparing the source of funds for VC investments in different countries can provide important indications as to which sources can be more strongly activated. The share of public money in financial resources attracted by VC funds in the 2017–2019 period averaged 16% in Germany (Figure 22). One in six euros came from public sources across Europe; however, only one in twelve euros in the United Kingdom. Among the private sources in Germany, businesses and insurers / pension funds appear to have contributed similar volumes to fundraising as public sources. Other investors such as family offices and private investors, by contrast, made a smaller contribution.

Figure 22: Sources of funds fraught with uncertainty

Sources of funds in capital raised in per cent
(avg. for 2017–2019)



Source: own calculations on the basis of Invest Europe / EDC

The data presented must be interpreted carefully for two reasons, however. First, there is no data on the origin of quite a high proportion of the funds. Across Europe, this represents 20% of the capital raised in 2017–2019 and in Germany and the UK it is as much as one third. Only France has a negligible proportion of funds of unknown origin (5%). Interpreting the comparison between countries is difficult because data is lacking to varying degrees. The share of public sources in fundraising, however, is more likely to accurately reflect their contribution than the shares of private sources, which are presumably higher. The reason for this assumption is that private sources are more likely to be unknown than public sources of funds, which tend to have greater transparency.[31] Second, the comparison with the United Kingdom in particular appears to show a relatively limited public contribution in that country. The British VC market has, in fact, received massive support in the form of tax relief since the mid-1990s, which we will comment on in greater detail further below.

Trade sales are more important than average in Germany – while public sales are weak

A comparison of typical exit pathways illustrates the high importance of trade sales in Germany. Nowhere else do trade sales represent 62% of corresponding exits (Figure 23). This could be related to Germany's strong SME sector, which also has many large businesses that make strategic acquisitions. Trade sales make up only one third of exit transactions in France. Public offerings, for their part, are by far the most widespread option there, and they are common in the United Kingdom as well. As public offerings can potentially achieve the highest returns, they provide major benefits for these two VC markets. Their stock exchanges appear to be more capable of absorbing the new placements. In the area of buybacks, Germany's share is slightly below average. The United Kingdom stands out here, making relatively little use of this exit pathway.

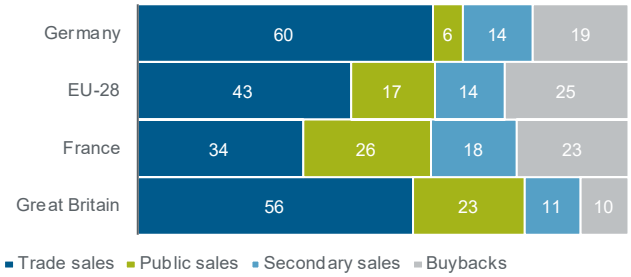
Valuations in the US are higher than in Germany and Europe

The monetary valuation of start-ups appears to be more cautious in Germany and Europe than in the US. There, start-ups on average receive more capital in the respective financing rounds (seed, series A, B, C etc.) – an indication that their shares are ascribed higher value. Presumably, investors there assume a higher likelihood of a worthwhile exit already at the time they invest. Thus, exits are made more often as IPOs in the US than in Europe and twice as often as in Germany.[32] US start-ups therefore have an advantage as they can grow more aggressively with the capital bonus. However, US start-ups are at an advantage not only in the respective financing rounds but also in their number, as US VC funds are larger and therefore can run more financing rounds.[33]

The higher availability of growth capital is specifically reflected in the number of 'unicorns' – unlisted start-ups valued at more than USD 1 billion. The more financing rounds a start-up goes through, the more likely it becomes a unicorn. This is determined by the post-money valuation subsequent to each financing round. The post-money valuation corresponds to the share price based on the last financing round multiplied by the arithmetic total of all shares existing thus far (including shares obtainable through conversion rights or options).

Figure 23: Germany leads the pack in exits via trade sales but no country has fewer public offerings

Exit pathways in per cent of all exit transactions (avg. for 2016–2019)



Without total losses, repayments and exits not otherwise specified

Source: own calculations on the basis of Invest Europe / EDC

Unicorns: Measure of ability of VC ecosystems to realise large financing rounds

The total number of unicorns created is often seen as a type of attractiveness indicator for the respective VC markets or VC ecosystems. Therefore, a large number of unicorns is not a value in itself. It should actually be an indicator of whether the respective VC ecosystems are capable of repeatedly realising financing rounds with large volumes.

This is easier to achieve in large VC markets, which is why the international incidence of unicorns follows the size of the VC markets. There were 438 unicorns around the world in 2020, the highest number of which by far were in the US (216), followed by China with roughly half as many (103, Table 2). In Europe the United Kingdom (22) is ahead of Germany (12), France and Switzerland (five each). President Emmanuel Macron of France recently set the target that France should have 25 unicorns by 2025.[34] The message is that the French VC market should have a sufficient supply of growth capital in future so that financing rounds with large volumes will no longer be a problem.

Table 2: Distribution of unicorns reflects market size

Number of unlisted start-ups valued at >USD 1 billion (unicorns)

Country	2010/13	`14	`15	`16	`17	`18	`19	2020	Sum
USA	7	15	22	12	29	57	72	2	216
China	2	4	15	10	19	37	16		103
UK			3	1	7	6	5		22
DE			2		1	4	5		12
FR			2			1	2		5
CH				1	1	1	2		5
RoW*	1	7	5	3	9	23	26	1	75
Sum	10	26	49	27	66	129	128	3	438

* Rest of world

Source: CB-Insights Global Unicorn Club, as at 15 July 2020

Fragmentation hampers European start-ups

The fragmentation of Europe's VC market, which is ultimately composed merely of the sum of the individual national VC markets, is another reason that there are fewer unicorns overall in Europe than in the competing economic regions US and China. The individual national VC markets in Europe do not have a uniform legal framework, which hampers both investment activity and fundraising across borders. Removing barriers to cross-border investment would be an important step towards more efficient capital allocation and, hence, improving VC return opportunities.[35]

Fragmented European markets are a fundamental problem for local start-ups. Despite the existence of the EU internal market for goods and services, the domestic market is much less homogeneous for them than for start-ups in the US or China – beginning with Europe's language diversity. It is easier to grow and use economies of scale in large, homogeneous markets. The valuations of start-ups ultimately reflect this as well. In order to make life easier for European start-ups with digital business models in particular, efforts should continue to further develop and improve the 'digital internal market'.

Coronavirus crisis increases correction pressure

What stands out is that most unicorns emerged in the years 2018/2019. One reason for this is that older unicorns are no longer listed here because they lost their status, for example as the result of an IPO. Another reason, however, is that more unicorns actually did emerge in recent years, particularly in the US and China. This is due to the increased availability of capital. However, around the world, just three more unicorns emerged in the first half of 2020 – the lowest number since 2013. That is an effect of the coronavirus crisis, which has put enormous pressure on the valuation of start-ups.

In previous years, potential unicorn start-ups raised the capital they needed for their next growth stage through an IPO. Thus, they conducted most IPOs before reaching unicorn status, which reduced the number of such unlisted 'billion' start-ups. For a successful IPO, however, they needed to first provide evidence of their ability to earn sustained profits with their business model. Now, however, with the increased availability of capital, VC investors can finance the previously IPO-based growth stage themselves and thereby secure a larger share of the expected gains from growth.

IPOs more difficult for unicorns but other exit pathways hardly viable on a mass scale

The downside of this is that 'successful' IPOs are becoming more difficult for unicorns. The increased activity of atypical VC investors (see box on page 11) has a double effect here. First, they inflate the valuations of companies through their direct investments (they are apparently willing to pay higher prices than traditional VC investors).[36] Second, they reduce the market liquidity necessary for IPOs because they are lost to the public market as IPO investors as a result of their VC deals.

Furthermore, the additional private financing rounds reduce the pressure of start-ups to demonstrate their ability to earn profits. Thus, the share of start-ups with negative operating results going public in the US has recently increased significantly and is now as high as it was 20 years ago. The outcome is that unicorns more often find themselves being pruned back in their IPO (Uber / Lyft) – if the listing materialises at all (WeWork).

The reason is that, while the number of unicorns is at least an indicator of access to growth capital in a VC ecosystem, the unicorn status says only little about the actual value of the start-up in question. This is due to the rough calculation methodology in which each share is given the value of the latest financing round. In reality, the shares sold in the respective financing rounds (seed, series A, B, ..., E, etc.) are endowed with completely different cash flow, liquidation, control and voting rights, so that they need to be ascribed very different values.

The shares sold in any last financing round are typically worth the most, so that a rough calculation based on their price greatly overestimates the actual value of the company. A current analysis illustrates this: If we take into account the conditions of all financing rounds that affect value (liquidation multiples, option pools, seniority, participation caps, IPO ratchets etc.), the latest post-money valuation of US unicorns overestimated their fair value by nearly 50%.[37] If the rumoured post-money valuation of unicorns is generally corrected to fair value at the IPO or the exit, that does not mean that investors go without a profit, especially not the investors who joined last. That is because in each financing round the investors are typically endowed with more or improved protective rights that secure a minimum return for them.[37]

Even if an IPO has become more difficult for unicorns of late, it is usually the only viable exit pathway for their VC investors. To be sure, large returns can now also be achieved with trade sales to large enterprises, (especially Big Tech), but such an exit is unlikely to be an option for most unicorns because first there have to be suitable buyers for acquisitions of this scale. Deals such as Facebook's takeover of WhatsApp for USD 19 billion in 2014 are not the rule. But this example shows that strategic takeovers sometimes involve the payment of high sums of money and the Big Tech companies in particular are willing to do this, thereby consolidating their market power.

Further impetus is necessary

Germany's VC market is growing but continues to lag behind its European and international benchmarks. An investment gap to other VC markets does not necessarily have to mean lack of available venture capital but in industrially and culturally similar economies it is an indication of it. The German VC market only began to fall behind France in the past few years. The French president has even announced further measures aimed at mobilising even more high-volume growth capital for the French market.

Germany is at risk of falling behind other countries in important technological fields that are being pushed forward especially by VC-financed start-ups. US and Chinese start-ups in particular have an enormous growth advantage through the large financing rounds that are available in their markets. As size and prominence are decisive factors for prevailing in the long term in many digital markets, competitors can hardly catch up with these enterprises' head start later on.

'Stand ready to write large cheques – fast' [38]

The German VC ecosystem must take the next development step and produce larger funds that are capable of accompanying start-ups through a number of large financing rounds. Large financing rounds are no longer uncommon in Germany's VC market but German investors are hardly capable of sustaining them on their own. Foreign direct investors are on board in nine out of ten cases. This is basically not a problem because the German VC ecosystem can benefit from investors from more professional markets.[39] Nor is it a new phenomenon. VC investors in other countries have always focused on later financing rounds because screening and due diligence in earlier rounds is more difficult as a result of the distance to the market. Information deficits are largely eliminated in later rounds.

However, it is very much a problem if the participation of foreign investors ultimately leads to a drain of businesses and know-how out of Germany. After all, it is economically inefficient to bear the risks but not reap

the rewards in the form of employment, technology diffusion and tax revenues. More recent studies indicate that the participation of foreign VC investors at least raises the risk of a foreign exit (i.e. a trade sale to a foreign corporate or IPO outside Germany).[40] The risk is likely to be higher for larger start-ups and unicorns in particular because the capacity of the German stock market to absorb their IPOs tends to be limited. If German VC investors were able to participate more often in larger financing rounds, that would presumably increase returns in the VC asset class as well. For one thing, investors of later financing rounds are typically privileged over earlier investors and for another the risk decreases with the number of financing rounds.

On the whole, foreign investors should be welcome in the domestic VC market because it benefits from them. At the same time, the domestic market should be strong enough in all market phases – in other words, it should be strengthened where weaknesses exist. The interplay of domestic and foreign investors enables the creation of a healthy and sustainable VC ecosystem.[41]

'Our core message to policymakers is, therefore, that they should work concurrently on transaction-level and ecosystem-level policies. By doing so, policies to strengthen a country's domestic base, as well as attract foreign investors, can work together to grow a healthy and sustainable VC ecosystem.'[41]

The growing activity of non-traditional VC investors can create the impression that the supply of VC for start-ups will be secure in the future because the new actors fill the gaps. But that may be deceptive. The reason is that these actors typically invest pro-cyclically. Their activity increases when the economic situation is good and capital is available. But they obviously withdraw again when the pendulum swings back.[42] This pro-cyclical behaviour appears to be showing in the coronavirus crisis as well (see page 8). Government intervention should therefore ensure a sustainable availability of VC.[43]

Mobilising private capital: Crowding-in models and tax incentives work

The state can help larger funds emerge. It can do so both by implementing measures that mobilise the provision of private VC and by improving the VC ecosystem. Private capital can be mobilised by making available public capital (crowding-in) or through tax incentives. Since the aim is to ultimately generate larger and hence more effective funds, incentives should primarily be set for institutional asset managers to allocate more capital to the VC asset class. In making available public capital (or guarantees), however, care must be taken not to overshoot the mark.

In any case, the private capital providers should share in the risk.[44] After all, empirical findings show that sharing risk between public and private funds can generate excess returns.[45] Good return prospects are generally very suitable for mobilising private capital. The problem is that information on venture capital returns becomes available only with a time lag or as an approximation. Thus, the final return of VC funds is not certain until the end of the term after its liquidation. Besides, VC fund companies can publish fund returns at their discretion.

Selection effects are likely to occur here. Fund investors can also be required to keep the returns secret. Partially published continuing returns of existing funds are crucially influenced by valuation effects. A pragmatic approach therefore consists in interpreting the market signals. They are likely to show that the VC asset class generally keeps its promise. That is because if long-term fund investors allocate funds repeatedly, it is a sign that they are satisfied with the returns they are achieving.[46]

In addition to providing public capital, most countries also rely on tax benefits for VC investments. The United Kingdom and France each have six different tax incentive models that improve the supply of private capital for VC markets.[47] Based on how their VC markets are developing, that seems to be working. So far, the United Kingdom has already paid GBP 3 billion into the 'Enterprise Investment Scheme'.[48]

VC availability necessary but insufficient: VC ecosystem needs to be strengthened

The continuous availability of capital in all financing stages is a necessary but not a sufficient condition for the emergence of a successful VC ecosystem. The other aspects of the ecosystem must also be nurtured.[49] For example, the absorptive capacity of the stock market should be strengthened. Germany's share culture is still in its infancy. The country has a very low rate of share investors in an international and EU-wide comparison.[50] The brief positive trend at the end of the 1990s was abruptly ended by the dotcom crash. If there are to be more unicorns in Germany in the future, the exit pathway via IPOs must be open to them.

France is also aware of this problem. A European solution would appear to be appropriate.

Work on further developing the VC ecosystem should also address the demand side, that is, by making improvements to growth conditions for start-ups. One disadvantage German start-ups face is, for example, that conditions for employee equity participation are less favourable, as it involves high bureaucratic hurdles and tax implications that make it unattractive for employees.[51]

Start-ups compete fiercely for talented workers, especially IT experts. But they cannot beat large enterprises where fixed salaries are concerned. The prospect of benefiting from an increased company value in the event of successful growth, however, should be an incentive for many skilled workers to begin or continue working for a start-up. Offering simpler solutions in this respect would make it easier for start-ups to thrive (and survive). A legal reform is currently under consideration,[52] an expert hearing[53] has taken place recently. It would be a measure that would strengthen the self-preservation capacity of the VC ecosystem. After all, profits from very successful exits often flow back into the market when the individuals participating in the start-up become active as VC investors themselves.

[1] Hall (2002), Start-ups and their financing in Europe, EU Monitor Global Financial Markets, Deutsche Bank Research.

[2] Marc Adreesen, Why Software is Eating the World, Essay in The Wall Street Journal, 20 August, 2011 (**link**).

[3] 'The literature research has identified the characteristics of venture capital financing, specifically there are evidences that venture capital funds trigger the growth of company, product development, inspire entrepreneurship and thus enhancing the competitiveness of start-ups', Savaneviciene et al. (2015), Venture Capital a Catalyst for Companies to Overcome the "Valley of Death": Lithuanian Case, 4th World Conference on Business, Economics and Management, WCBEM, Procedia Economics and Finance 26 (2015) 1052–1059 (**link**).

[4] Arqué-Castells (2012), How venture capitalists spur invention in Spain: Evidence from patent trajectories, Research Policy, 41: 897–912; Bernstein et al. (2015), The impact of venture capital monitoring, Journal of Finance, Volume 71, Issue 4, August 2016, p. 1591–1622 (**link**); Crisanti et al. (2019), The VC factor: Data driven insights about VC-backed start-ups in Europe, Joint EIF – Invest Europe study, 5 December 2019 (**link**); Da Rin et al. (2011), A survey of venture capital research, NBER working paper n°17523 (**link**); Kraemer-Eis et al. (2016), The European venture-capital landscape: an EIF perspective, Volume I: The impact of EIF on the VC ecosystem, EIF Research and Market Analysis, Working Paper 2016/34 (**link**); Savaneviciene et al. (2015), Venture Capital a Catalyst for Companies to Overcome the "Valley of Death": Lithuanian Case, 4th World Conference on Business, Economics and Management, WCBEM, Procedia Economics and Finance 26 (2015) 1052–1059 (**link**); Tykvová et al. (2012), Potential of Venture Capital in the European Union, Directorate General for Internal Policies; Policy Department A: Economic and Scientific Policy; Industry, Research and Energy; European Parliament (**link**).

[5] Crisanti et al. (2019), The VC factor: Data driven insights about VC-backed start-ups in Europe, Joint EIF – Invest Europe study, 5 December 2019 (**Link**).

[6] 'Averaging across our preferred regressions, we come up with an estimate for b (the impact on patenting of a dollar of venture capital relative to a dollar of R&D) of 3.1', Kortum and Lerner (2000), Assessing the contribution of venture capital to innovation, RAND Journal of Economics, Vol. 31, No. 4, Winter 2000, p. 674–692 (**link**); 'Our estimates of b (the impact of an euro of private equity finance relative to a euro of industrial R&D) are generally positive and significant, but they tend to vary depending on the specification used. Averaging across different estimations, we come up with an average estimate of b of 2.6.', Popov and Roosenboom (2009), Does private equity investment spur innovation? Evidence from Europe, ECB Working Paper No. 1063 (**link**).

[7] 'That knowledge has an important public good characteristic is generally recognized', Romer (1987), Increasing Returns and Long Run Growth, Journal of Political Economy 94, 1002–1037 (**link**).

[8] Here and in the following, the term United Kingdom refers to Great Britain and Northern Ireland.

[9] Fryges et al. (2007), Hightech-Gründungen und Business Angels (*High-tech Start-ups and Business Angels* – our title translation, in German only), Centre for European Economic Research (**link**).
Ullrich (2008), Der informelle Beteiligungskapitalmarkt in Deutschland (*The informal private equity market in Germany* – our title translation, in German only), WirtschaftsObserver online No. 41, KfW Economic Research.

[10] Metzger (2013), Minimum expected return of private equity companies: Claims become more modest, Papers and Proceedings, KfW Research (**link**).

[11] '2 Milliarden Euro-Maßnahmenpaket für Start-ups steht' (*EUR 2 billion relief package for start-ups is ready* – our title translation, in German only), joint press release by the Federal Ministry of Economic Affairs and the Federal Ministry of Finance dated 30 April 2020 (**link**).

[12] The confidence indicator is the median of the respective standardised indicators of situation and expectation assessments, which in turn are calculated as the balances of positive and negative reports. A positive value means that the assessment of the situation-expectation mix is above the long-term average.

[13] Metzger (2020), Coronavirus shock: VC sentiment crashes, German Venture Capital Barometer 1st Quarter 2020, KfW Research (**link**).

[14] Deutsche Börse Venture Network (2020), Investor sentiment on COVID-19 implications, April 2020 (**link**).

[15] Metzger (2020), VC business confidence returns after the coronavirus shock, German Venture Capital Barometer 2nd Quarter 2020, KfW Research (**link**).

[16] EY (2020), Startup Barometer Deutschland, July 2020 (**link**). 'Clearly there is a coronavirus effect on venture capital investment', said Thomas Prüver, Partner at EY, in Handelsblatt (14 July 2020), Schwaches erstes Halbjahr (Weak first half-year – our translations, in German only). EY's Startup Barometer Germany is based on data from Crunchbase since July 2020 and thus for the first half of 2020, previously using Dow Jones VentureSource. Unfortunately, whether the trend shown would also appear if the same data source were used for the comparison period remains unclear. Given the enormous differences between various data sources shown on page 11, this is at least questionable.

[17] Brutscher and Metzger (2012), Befördert Wagniskapital Hightech-Gründungen? *(Does venture capital promote high-tech start-ups?* – in German only) Akzente No. 60, KfW Research.

[18] Samila and Sorenson (2011), Venture Capital, Entrepreneurship, and Economic Growth, Review of Economics and Statistics, Volume 93 (1), p. 338–349 (**link**).

[19] Metzger (2020), KfW-Start-up-Report 2019, KfW Research (**link**).

[20] Metzger (2019), Wunsch nach beruflicher Selbständigkeit nimmt ab, Lichtblick durch Jüngere (The drive for self-employment is slowing, younger entrepreneurs are a silver lining – in German only), Focus on Economics No. 261, KfW Research.

[21] Metzger (2020), Coronavirus crisis has unsettled the VC market and changed the investor landscape, Economics in Brief No. 202, KfW Research (**link**).

[22] 'More often than not, venture capital investments are split in tranches and partly subject to the fulfillment of one or more milestones', Benvalor Venture Capital Blog, Milestones, the Mother of all Pittfalls in Venture Capital Term Sheets, 7 March 2017 (**link**).

[23] VC transactions are private investments and therefore generally rather non-transparent to outsiders. Many deals are disclosed but without their terms and conditions. Deals are often reported without stating volumes. The proportion of missing data varies relatively heavily across countries and over time. The Preqin transaction database provides volume data for 61% of VC transactions in Germany on average in the 2016–2018 period. For China, only 35% of deals provide volume data, while for France the figure is 95%. Data provided on deals in the United Kingdom and the US are also relatively comprehensive (85%). It can be assumed that the majority of transactions for which data are missing are smaller transactions. If we were to assume a mean deal volume of up to EUR 5 million for all transactions for which data are missing, the total volume reported for Germany in the year 2018 would increase from EUR 5.7 billion to EUR 6.1 billion. For Germany, the imputed total volume in the 2016–2018 period is almost 8% above the volume actually captured, for China it is also just under 8%, for France and the US a good 1% each and for the United Kingdom a good 3%. Taking into account these corrections, the comparison with the United Kingdom and the US would turn out slightly more favourable.

[24] 'Over the last decade, a healthy venture ecosystem has encouraged non-traditional VC investors to become increasingly involved. We use the term 'tourist investors' to address this audience – referring to essentially anyone outside of VC firms (including corporations, LPs, PE firms, sovereign wealth funds, hedge funds, investment banks, etc.). Despite historically making up a smaller proportion of VC, the number of new players is quickly growing – and they are injecting massive amounts of capital into the ecosystem', Pitchbook Blog, New participants in VC will continue to proliferate, 30 January 2019 (**link**).

[25] A prominent example of such a transaction is the US megadeal of the fourth quarter of 2018: The Altria Group Inc. (Marlboro) acquired a 35% minority interest in the e-cigarette start-up JUUL Labs Inc, which was founded in 2015, for USD 12.8 billion. This deal rather has the characteristics of a strategic acquisition but nevertheless it was captured as a VC investment in the Pitchbook-NVCA Venture Monitor 4Q 2018 (**link**). Further examples of captured deals that do not represent venture capital in the strict sense are the investment by United Internet in Rocket Internet and the IPO of Rocket Internet (**link**) in the year 2014, or the commitment by Victory Park Capital to become an institutional investor on the online platform Zencap and provide funds for lending (**link**).

[26] 'Ein Nachteil dieser Erfassungsmethode ist, dass die Marktstatistiken der Verbände, d. h. Zahlen die sich nach dem Sitz der Portfoliofirmen richten, zu Unterschätzung tendieren. Dies ist dann gegeben, wenn investierende Marktteilnehmer nicht bei den jeweiligen Verbänden als Mitglied erfasst sind' ('*One disadvantage of this recording method is that the market statistics of the associations, i.e. figures based on the domicile of the portfolio companies, tend to underestimate. That is the case when investing market participants are not recorded as members of the respective associations' – our translation*), Bersch et al (2020), Unternehmensdynamik in der Wissenswirtschaft in Deutschland 2018, Studien zum deutschen Innovationssystem Nr. 3-2020, Centre for European Economic Research, Eds.: Commission of Experts for Research and Innovation (**link**):

[27] BVK (2020), Der deutsche Beteiligungskapitalmarkt 2019, February 2020 (**link**), EY (2020), Start up Barometer Deutschland, January 2020 (**link**), PitchBook (2020), 2019 Annual European Venture Report, January 2020 (**link**), Refinitiv (2020), Europe Venture Capital Review, February 2020 (**link**).

[28] Preqin counts the following financing stages / occasions as venture capital transactions: Angel, Seed, Series A / Round 1, Series B / Round 2 etc. plus Unspecific Rounds, Growth / Expansion, Pre-IPO, Private Investment in Public Equity (PIPE). It does not count add-ons, grants, mergers, venture debt und secondary stock purchases.

[29] Preqin states the deal volumes of the transactions in US dollars. The calculations of the VC-to-GDP ratios were based on GDP data from the World Economic Outlook Database of the International Monetary Fund (IMF) in US dollars at the respective prices.

[30] In its industry & vertical definitions,Preqin refers to the following technology/business areas as 'verticals': 3D printing, AdTech, Agtech, artificial intelligence (esp. machine learning, autonomous vehicles, chat bots), augmented reality (AR), BIG DATA (esp. sensor data, web log data, point of sale data, financial data, gaming data, input data, click-stream data), blockchain (esp. cryptocurrency, smart contracts, identity management, file / cloud storage), cannabis/medical marijuana, clean technology, cloud computing (esp. DaaS, IaaS, PaaS, SaaS), e-commerce (esp. shared economy), EdTech, electric & hybrid vehicles, FinTech (esp. smart-pay / physical-digital interactions, robo-advisors, eWallets and money transfer, processing & payment infrastructure, wealth management, online banking, exchange / trading platforms, digital brokerage, lending), healthtech, infrastructure, insuretech, internet of things (IoT, esp. edge computing, smart home, smart city, smart grid, smart agriculture / farming, smart supply chain, smart retail), manufacturing, mobile apps, nanotechnology, real estate tech, RegTech, research (non-medical), robotics (esp. drones), social media, urban planning, virtual reality (VR), wearables & quantified self (**link**).

[31] In structural comparisons, missing data are often simply left out. The assumption is made that missing data are distributed in a similar manner as known data. But this assumption is permissible only if the share of missing data is low (that is, if their inclusion or exclusion does not matter in quantitative terms), or if it can be assumed that the groups being considered have a similar risk for missing data. The shares identified here are too high for the funds to be simply left out in the comparison. France is the only country where this likely would not matter. Moreover, the risk of missing data is also likely to differ from one source to another. Thus, private sources are more likely to be unknown than public sources of funds, which tend to have greater transparency. The share of public sources in fundraising is therefore more likely to accurately reflect their contribution than the shares of private sources, which are presumably higher. Analyses that leave out the missing data in comparing fundraising sources (see e.g. Brigl and Liechtenstein (2015), A Rise in Good Deals, but an Investor Drought, The Boston Consulting Group and IESE Business School, October 2015 (**Link**)), are therefore not meaningful.

[32] According to our own calculations for the 2010–2019 period on the basis of the transaction database of Preqin, the share of IPOs in all captured exits from German start-ups is around 5%, Europe-wide it is 8% and in US start-ups 10%.

[33] 'Larger funds can write bigger checks, do more follow-ons, and have their pick of the best startups due to their largesse and qualities', Graham (2019), State of the Venture Capital Industry in 2019, Topal (**Link**).

[34] Emmanuel Macron in a speech on the eve of France Digital Day 2019, Handelsblatt business daily (19 September 2019), Start-up campaign in French.

[35] Kelly, R. (2011), The Performance and Prospects of European Venture Capital, EIF Research and Market Analysis, Working Paper 2011/09.

[36] 'It has been shown that corporate VCs can be less price and time sensitive towards venture investing than their closed-ended fund counterparts [and] that valuations in companies with corporate backers were 2.5x higher than those without', Graham (2019), State of the Venture Capital Industry in 2019, Topal (**Link**).

[37] Gornall and Strebulaev (2020), Squaring Venture Capital Valuations with Reality, Journal of Financial Economics, Volume 135, Issue 1, pp. 120–143 (**link**).

[38] Brigl and Liechtenstein (2015), A Rise in Good Deals, but an Investor Drought, The Boston Consulting Group and IESE Business School, October 2015 (**link**).

[39] Brandley et al. (2019), Cross-Border Venture Capital Investments: What Is the Role of Public Policy? Journal of Risk and Financial Management, 12, 112, Special Issue Venture Capital and Private Equity (**link**), Devigne et al. (2016), Escalation of commitment in venture capital decision making: Differentiating between domestic and international investors, Journal of Business Venturing 31, 253–271.

[40] Braun et al. (2019), Foreign Venture Capital Supply in Europe: Consequences on Ventures' Exit Locations and Entrepreneurial Migration, i. E. (SSRN), 2019 (**link**).

[41] 'Our core message to policymakers is, therefore, that they should work concurrently on transaction-level and ecosystem-level policies. By doing so, policies to strengthen a country's domestic base, as well as attract foreign investors, can work together to grow a healthy and sustainable VC ecosystem', Brandley et al. (2019), Cross-Border Venture Capital Investments: What Is the Role of Public Policy? Journal of Risk and Financial Management, 12, 112, Special Issue Venture Capital and Private Equity (**link**).

[42] 'It also goes without saying that corporate investors, or those who are not investing money ring-fenced in closed-ended fund structures, could cause contagion risk to the VC market if there is a cash crunch in the wider economy. This could force such entities to try and fire sell assets and/or abruptly curtail investment cadence', Graham (2019), State of the Venture Capital Industry in 2019, Topal (**link**).

[43] 'Government intervention is therefore justified for stabilising investment over time', Ekeland et al. (2016), Strengthening French Venture Capital, Les notes du conseil d'analyse économique, no. 33, July 2016 (**link**).

[44] Ekeland et al. (2016), Strengthening French Venture Capital, Les notes du conseil d'analyse économique, no 33, July 2016 (**link**).

[45] Brander et al. (2015), The Effects of Government-Sponsored Venture Capital, International Evidence, Review of Finance 19, p. 571–618 (**link**).

[46] 'Despite the issue of accessing enough data, attitudes towards overcoming it should be pragmatic. A large weight of judgment on the success of the VC asset class should be viewed through the signaling properties of what's going on day-to-day. If more funds are being raised, more GPs are being lauded and more firms are hiring, then that's generally a sign that—outside of very perverse incentives—LPs in funds are happy with what they are seeing', Graham (2019), State of the Venture Capital Industry in 2019, Topal (**link**).

[47] PwC, CASE, IHS (2017), Effectiveness of tax incentives for venture capital and business angels to foster the investment of SMEs and start-ups, European Commission Taxation Papers, Working Paper No. 68 (**link**).

[48] Glencross (2019), The EIS has cost the government £3bn in tax relief, so why has it become more generous? Cityam.uk, 27 Feb. 2019 (**link**).

[49] Achleitner et al. (2019), Enhancing innovation in Germany by strengthening the growth finance ecosystem), acatech Study, 26 June 2019 (**link**).

[50] Bundschuh and Türk (2018), Deutsche Sparer: zu wenig Aktien! (*German savers: not enough shares!* – Our title translation, in German only) Blickpunkt: Aktienkultur in Deutschland, LBBW Research und Deutsches Aktieninstitut (**link**).

[51] High bureaucratic effort is required, for example, for genuine employee equity participation in limited liability companies because each change in a participation must be certified by a notary. The taxation of earnings is unfavourable under Germany's tax legislation. This leads to a dry income situation in which employees must pay taxes on the shares or options when they receive them, meaning they have to pay tax from their salary on something they cannot even dispose of yet. Deferred taxation would be helpful here, that is, levying tax on capital gains when shares are sold. Start-ups have established a workaround to bypass these problems: virtual stock options. Ultimately, these are individual promissory contracts between the start-up and employees in which bonus payments are tied to exit conditions. A better solution than such a workaround, however, would be a legislative reform that is in line with today's demands (see endnotes 52 and 53).

[52] '[Das] Spannungsfeld zwischen MKB-Förderung in der Breite und Sonderregelungen für Start-ups wird in einem laufenden Forschungsgutachten ausgelotet' ('*The trade-off between promoting broad employee equity participation and adopting special rules for start-ups is being explored in an ongoing research report'*), Federal Ministry for Economic Affairs and Energy (2019), Mitarbeiterkapitalbeteiligung, Ein Win-win-Instrument für Unternehmen und Beschäftigte, Schlaglichter der Wirtschaftspolitik, Monatsbericht 09-2019 (*Employee equity participation, a win-win tool for enterprises and employees, highlights of economic policy, monthly report September 2019* – our translations, in German only) (**link**).

[53] Deutscher Bundestag (2020), Experten weisen auf Tücken der Kapitalbeteiligung von Mitarbeitern hin (*Experts point to pitfalls of employee equity participation* – our title translation, in German only), text archive (**link**).