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Abstract

A well-functioning and efficient Venture Capital (VC) market is one of the key pillars to enhance European medium- and long-term economic growth, through the creation of new businesses and sustainable employment, the improvement of managerial practices and increased capital investments, which boost innovation, productivity and competitiveness. These conditions are enhanced in the presence of an integrated VC market, which improves capital allocation, generates economies of scale and spurs competition and diversification of financing sources.

This paper analyses cross-border VC flows in Europe in the 2007-2020 period, highlighting the deep fragmentation of the European market, with each country featuring its own peculiarities and evident disparities, and Northern European countries, the UK, and Ireland witnessing significantly higher cross-border volumes than Eastern-European and Mediterranean countries. Overall, the analysis of cross-border investments in the industry confirms that they are still rather infrequent, mainly due to local bias, with the domestic component accounting on average for 64.0% of the total VC activity and cross-border investments within Europe accounting on average for only 23.1%. Using a Grubel-Lloyd index, we find that the highest values of two-way flows of venture capital are concentrated in the major financial centres, with a prominent role of the United Kingdom. Furthermore, theory-grounded gravity equations investigate the determinants of cross-border VC flows, exploring, inter alia, the role of different financial structures across countries. Besides GDP (or market capitalisation) and distance, the quality of institutions and especially the degree of global financial integration do play a role in shaping cross-border VC flows. The uneven development of the financial market within Europe – with a market-based country cluster distinct from a bank-based country cluster – appears to matter little for cross-border VC flows.

JEL Classification: C58, F36, G24.

Keywords: Venture Capital; Financial Integration; Gravity Equation.

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1. INTRODUCTION

In the context of an overall growth of the financial market in Europe, in the latest decades the venture capital (VC) segment experienced a sustained development. However, its optimal development and smooth functioning has been marred by several issues, ranging from overall scarce volumes to low profitability, to persistent market failures in certain firm development stages, to paucity of exit options (Asdrubali, 2023). A problem which lays at the centre of the attention of EU policy makers is the scarcity of cross-border venture capital flows within Europe (cross-border investments within Europe account for only 23.1% on average during the period 2007-2020). Indeed, an integrated VC market would benefit both private and public stakeholders, because of a better capital allocation, economies of scale, ampler external financing options (and thus diversification possibilities), as well as greater competition among financial intermediaries, better financing conditions and lower fragmentation along country borders.

In this regard, we explore the view that cross-border VC financing depends on the financial structure of the country in which the agents operate (see, e.g., Black and Gilson 1998). In a bank-based system, financial intermediaries are the crucial players in channelling funds from investors to non-financial corporations. They pool resources of dispersed capital providers and play an important role as delegated monitors of the firms they lend to, on behalf of deposit holders. In the market-based paradigm, it is predominantly through markets that firms interact with those providing the capital. Here firms can more easily find funding by participating in markets for tradable securities, such as stocks or corporate bonds.[1]

On average the European system can be characterised as bank based,[2] a feature that has been a limiting factor for the financing of smaller innovative companies, in contrast with the more dynamic US financial system. However, Bijlsma and Zwart (2013) observe that the bank-based feature is not evenly distributed across EU countries.[3] Using 23 indicators on countries' financial characteristics, they identify two clusters with homogenous financial market structures within the EU:

- market-based EU (such as the UK, Netherlands, France and Sweden); and
- bank-based EU, which is further divided into two sub-clusters:
  - o developed bank-based EU countries (such as Germany, Portugal, Spain, and Italy); and
  - o less developed bank-based EU countries (which include Central and Eastern European countries, such as Bulgaria, Poland and Romania).

Less developed bank-based EU countries have joined the EU only recently, and generally feature smaller financial systems than the ones of the older Member States. In both types of countries, firms tend to rely more on banking channels to meet their financial needs. Nonetheless, bank-based countries are moving towards a more market-oriented financial system. They are developing equity and corporate bonds markets, in particular since the introduction of the euro.

On the other hand, market-based EU countries have better developed markets for equity finance, including VC. Although the banking sector of this cluster is still larger than the US as a proportion of investments in non-financial corporations, these countries feature a much more sizeable stock of cross-border assets and liabilities (and transactions) compared to the rest of the EU.

[1] Bijlsma and Zwart (2013).

[2] See e.g. Véron (2012) or European Commission (2017).

[3] In Bijlsma and Zwart (2013), as well as in our paper (which covers up to 2020), EU countries include the United Kingdom.

This corporate financing structure inevitably shapes the European financial structure, and the pattern of financial flows, bringing about financial fragmentation. This entails that some EU countries developed strong venture capital (VC) and private equity (PE) markets, so that they are able to attract and invest funds, while others remain left behind. Then capital circulates in the Union but not uniformly, creating disparities among Member States, accumulation of capital in some regions, and scarcity of investments in others. This fragmentation along national or regional borders characterises not only the stock and bond markets, but all components of capital markets as well as the banking sector in Europe, including the PE and VC markets. To be sure, fostering access to market-based finance especially for smaller innovative companies is a priority for the EU under the Capital Markets Union. In the area of venture capital, the EU has established a special label to promote cross-border investment through the European Venture Capital Funds (EuVECA) regulation, together with a similar regulation focused on European Social Entrepreneurship Funds (EuSEF). The review of both legislations in 2016 sought to open up the EuVECA and EuSEF fund labels to fund managers of all sizes, and to expand the range of companies that can be invested in in order to boost financing available for small and medium-sized innovative companies. This has been complemented by further Commission initiatives, notably the EU Listing act proposed in 2022, which is expected to enhance growth capital and make it easier for VCs to place their investments in SME growth markets.[4]

Against this backdrop, this paper tries to geographically characterise – both at European and at country level – cross-border VC flows, from fundraising to VC funds and from VC funds to investee companies, taking the perspective of both the funds and the investees. Moreover, it explores how much mileage we can gain in the explanation of such flows by using a theoretically sound gravity model, which, *inter alia*, distinguishes flows depending on the bank-based or capital-based nature of the countries involved. This approach will be applied to a dataset of PE/VC flows which is, to our knowledge, one of the most complete and accurate currently available[5] – the Invest Europe dataset.[6] More specifically, for each European country, we consider the following indicators over the 2007-2020 period:

1. The amount of money raised in the country by all VC funds and other PE funds for (mature) PE projects and for VC projects;
2. The geographical origin of the domestic VC fundraising;
3. The investments made with the money raised in the country, differentiating between those in (mature) PE projects and VC projects;
4. The geographical destination of the domestic VC fund investment, with the top five cross-border investee countries (this statistic looks at the country of incorporation of foreign investee firms);
5. The investment made in the country by foreign VC and other PE funds;
6. The geographical origin of the VC funds investing in the country, with the top five cross-border investor countries (this statistic looks at the country of incorporation of foreign PE funds);
7. The gross investment and divestment in the PE market of each country.

In addition, for all countries in Europe and considering average amounts for the period 2007-2020, we derive:

[4] For reference, see: https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/capital-markets-union/capital-markets-union-2020-action-plan/action-2-supporting-access-public-markets_en

[5] See also Pavlova and Signore (2021).

[6] The Invest Europe dataset is proprietary, and we thank Invest Europe for permission to use it in our elaborations.

1. The amount of investment in foreign firms by local private equity funds as a percentage of those funds' total investments. This measure gives an idea of the degree of internationalisation of a country's PE industry;
2. The amount of investment in the country's firms by foreign PE funds as a percentage of the total PE investments made in the country. This measure could be approximately interpreted as an index of attractiveness of a country's businesses on the international stage;
3. The difference between investments in local firms by foreign PE funds and investments in foreign firms by local PE funds, as a percentage of the total investments made in the country. This measure is akin to net imports relative to GDP. In fact, investments in local firms by foreign PE funds can be seen as imports of capital; similarly, investments in foreign firms by local PE funds amount to exports of capital;
4. European VC fundraising and investment flows, broken down geographically;
5. VC investments by country as a percentage of GDP.

We draw conclusions on the patterns of VC flows both in the aggregate and at country level, and reinforce our observations with the support of the Grubel-Lloyd index, which measures the extent and balance of two-way flows between European countries.

Finally, we explore several determinants of cross-border VC flows indicated in the literature – both theoretically and empirically – through various specifications of a gravity model – both at the European and national level. Our results suggest that the economic size of the destination countries plays an especially important role. An equally significant effect is exerted by distance between countries (under various dimensions) although the different directions of the effects suggest a trade-off between the diversification objective and the proximity preference. A relevant role is also played by global financial integration and the quality of institutions (especially in the destination country), whereas the bank-based financial structure has little bearing on cross-border VC flows, but only after controlling for financial market development and sophistication.

The analysis of this paper is structured into three sections. First, an outline of PE/VC markets is presented; in the next section the focus is narrowed to the role and the determinants of cross-border venture capital investments. Next, an analysis of the European cross-border venture capital investments is performed, taking into account both the theoretical literature and the empirical evidence. Finally, the last section draws the main conclusions.

2. PRIVATE EQUITY AND VENTURE CAPITAL MARKETS

The PE and VC markets constitute a segment of the financial market which provides capital and management expertise to companies that are not publicly traded. Typically, a fund manager (so called General Partner) plays the role of financial intermediary, raising funds from financiers (Limited Partners) and gathering them in a fund, which will then invest in companies' equity.

Traditionally, the difference between PE and VC is not clear-cut: in general terms, while PE finances changes of ownership in established businesses, often supported by debt finance, VC backs young start-ups in markets with high growth potential (Groh et al., 2010). For our interests, we will adopt the following definitions provided by Invest Europe.

The PE sector consists of three main components: Growth, Buyout, and VC.

- Growth is defined *as a type of private equity investment – most often a minority investment but not necessarily – in relatively mature companies that are looking for capital to expand operations, restructure operations or enter new markets.*
- For Buyout operations, *funds are provided to acquire a company. It may use a significant amount of borrowed money to meet the cost of acquisition.*

- VC can be found in different forms. In seed VC *funds are provided to research, assess and develop an initial concept before a business has reached the start-up phase*. In start-up VC *financing is provided to companies for product development and initial marketing. Companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially*. Finally, in later-stage VC, *funds are provided for the expansion of an operating company, which may or may not be breaking even or trading profitably. Later-stage venture tends to finance companies already backed by venture capital firms.*

These three PE segments typically operate through "funds". In particular, a venture capital fund is a pool of dedicated financial capital provided by investors to start-up firms and small businesses with perceived long-term growth potential which can be found in the three main above-mentioned forms, namely seed, start-up and later stage VC.

VC can play a fundamental role in the economic growth of Europe, as it features a number of positive characteristics, such as the creation of new businesses and sustainable employment, the improvement of managerial practices and increased capital investments, which ultimately affect as a whole the economic performance of each country via greater innovation, increased productivity and enhanced competitiveness (Flachenecker et al., 2020). The VC role, particularly concerning the job market, has become especially crucial after COVID-19 disrupted the initial phase of new enterprises or start-ups, causing a significant negative employment effect also in the long run.[7]

3. THE DETERMINANTS OF (CROSS-BORDER) VENTURE CAPITAL INVESTMENTS

From the analysis of the literature on the determinants of VC investments, a number of interrelated factors can be identified.

The theory according to which general partners of VC and PE funds prefer spatial proximity to their investments to facilitate the transaction processes of monitoring and oversight is widely accepted. This preference is illustrated by institutional investors' international allocation approaches, which lead to limited partners making a geographical selection of promising investment venues (Groh et al., 2010).

More generally, Black and Gilson (1998), Lee and Peterson (2000), and Baughn and Neupert (2003) suggest that national culture shapes both individual orientation and environmental conditions, leading to different levels of entrepreneurial activity in particular countries.

Additionally, Black and Gilson (1998) focus on the differences between bank-centric and stock market-centric capital markets, arguing that the existence of a well-developed stock market enabling venture capitalists to liquidate their investments through an IPO is crucial for the existence of a dynamic VC market. In this respect, bank-centric capital markets are less able to produce an efficient VC market infrastructure. This is due to banks' conservative approach to lending and investing, and to the weaker social and financial incentives that reward entrepreneurs. However, Green (1998) demonstrates that low availability of debt financing is an obstacle for start-ups in many countries. The same idea is supported by Cetorelli and Gambera (2001), who show how bank concentration promotes the growth of those industrial sectors that have a higher need for external financing by facilitating credit access to younger companies.

[7] Benedetti Fasil et al. (2021).

The country's legal tradition and economic development are also important determinants of its VC market development. In this regard, Beck et al. (2005) observe that firms in civil law countries face significantly higher obstacles in accessing external finance than firms in common law countries. This difference can be explained by the "legal origins theory", which traces many aspects of a country's economic state of development back to its legal system. The reasoning is that the common law is more market-oriented, leading to a higher degree of development. Two inter-related channels explain how the legal origin influences finance: the 'political' channel, connected to the degree of private property rights' protection versus the rights of the State (La Porta et al., 1999); and the 'adaptability' channel, which instead focuses on the flexibility of a legal system in adapting to changing environments (Hayek, 1960). These two channels are not mutually exclusive and sometimes lead to conflicting predictions with respect to a country's financial development.

In addition, the state of a country's economy directly affects VC activity. Gompers and Lerner (1998), focusing on the VC segment, show that there are more attractive opportunities for entrepreneurs if the economy is growing quickly. Similarly, Wilken (1979) argues that economic prosperity and development facilitate entrepreneurship, providing greater capital accumulation for investments. Likewise, Romain and van Pottelsberghe de la Potterie (2004) find that VC activity is cyclical and significantly related to GDP growth. Linking the different lines of thought, Pukthuanthong et al. (2007) suggest that larger economies, characterised by developed stock exchanges and contract enforcement, tend to have more developed VC markets than smaller economies. Moreover, consistently with the line of argument in the political and adaptability channels, they observe that an independent judiciary system and a flexible legal system are significant contributors to a flourishing VC market.

One of the main reasons for the lack of success in encouraging cross-border VC investment is local bias (Cumming and Dai, 2010). VC investments are characterised by high uncertainty, poor quantitative information and asymmetric information between the investor and the entrepreneur. Even more than in other financial investments, proximity and local expertise are needed to mitigate the financial risk.

Indeed, general macroeconomic conditions of a country have limited explanatory power in clarifying the triggers of cross-border VC flows. Analysing worldwide VC flows from 2000 to 2012, Hain, Johan, and Wang (2014) identify geographical, cultural, and institutional proximity as well as institutional and relational trust as explanatory variables for VC flows. Firstly, they compare cross-border investments made only by foreign VC funds with investments made by both foreign and local VC funds in a syndicate. The results of their random effect regression validate the hypotheses that VC investments are negatively affected by geographical and cultural distance and that the negative effect of distance is less pronounced in cross-border investments syndicated with domestic VC funds. Institutional trust positively affects cross-border VC inflows, but its effect loses significance when looking for deals syndicated with domestic VC funds. The authors further analyse cross-border VC investments comparing developed and emerging economies. The results demonstrate that relational trust via the syndication with domestic VC funds helps overcome the entry barriers and transaction costs associated with cross-border investments in a geographically, culturally or institutionally distant country. In fact, Tykvová and Schertler (2011) show that ties among local VC investors are related to the size and style of cross-border VC flows.

4. EUROPEAN VENTURE CAPITAL FLOWS: A CROSS-BORDER ANALYSIS

To carry out the analysis of the EU PE/VC cross-border investments, the 2020 Yearbook of Invest Europe is used. Moreover, upon request, Invest Europe provided the geographical breakdown of VC flows by source and destination. Therefore, we both analyse the PE/VC market at large and present

evidence on the determinants of cross-border VC flows through a set of empirical estimations based on the gravity model.[8]

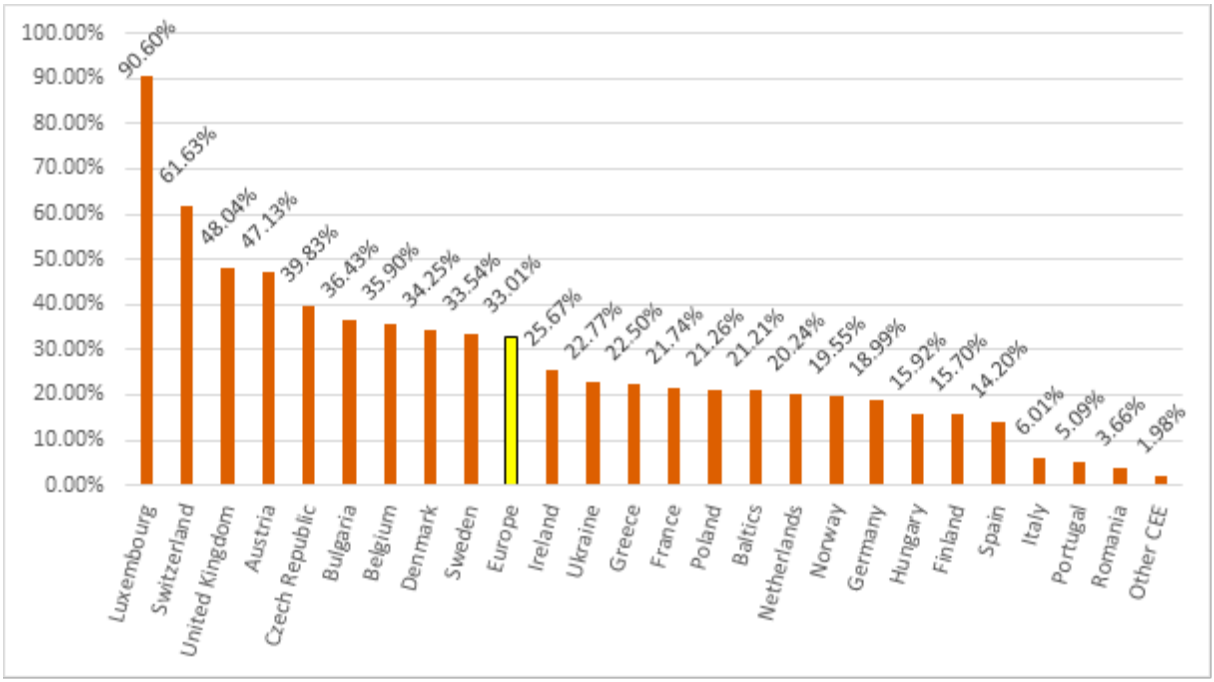
4.1 THE EUROPEAN PERSPECTIVE

4.1.1 Descriptive analysis

Starting from the private equity market, we analyse three indicators for all countries in Europe and consider average amounts for the period 2007-2020. We derive:

1. The amount of investment in foreign firms by local PE funds as a percentage of those funds' total investments. This measure gives an idea of the degree of internationalisation of a country's PE industry (*Graph 1*);

Graph 1: **Foreign investments of domestic PE funds as a percentage of their total PE investments** (2007-2020 average)

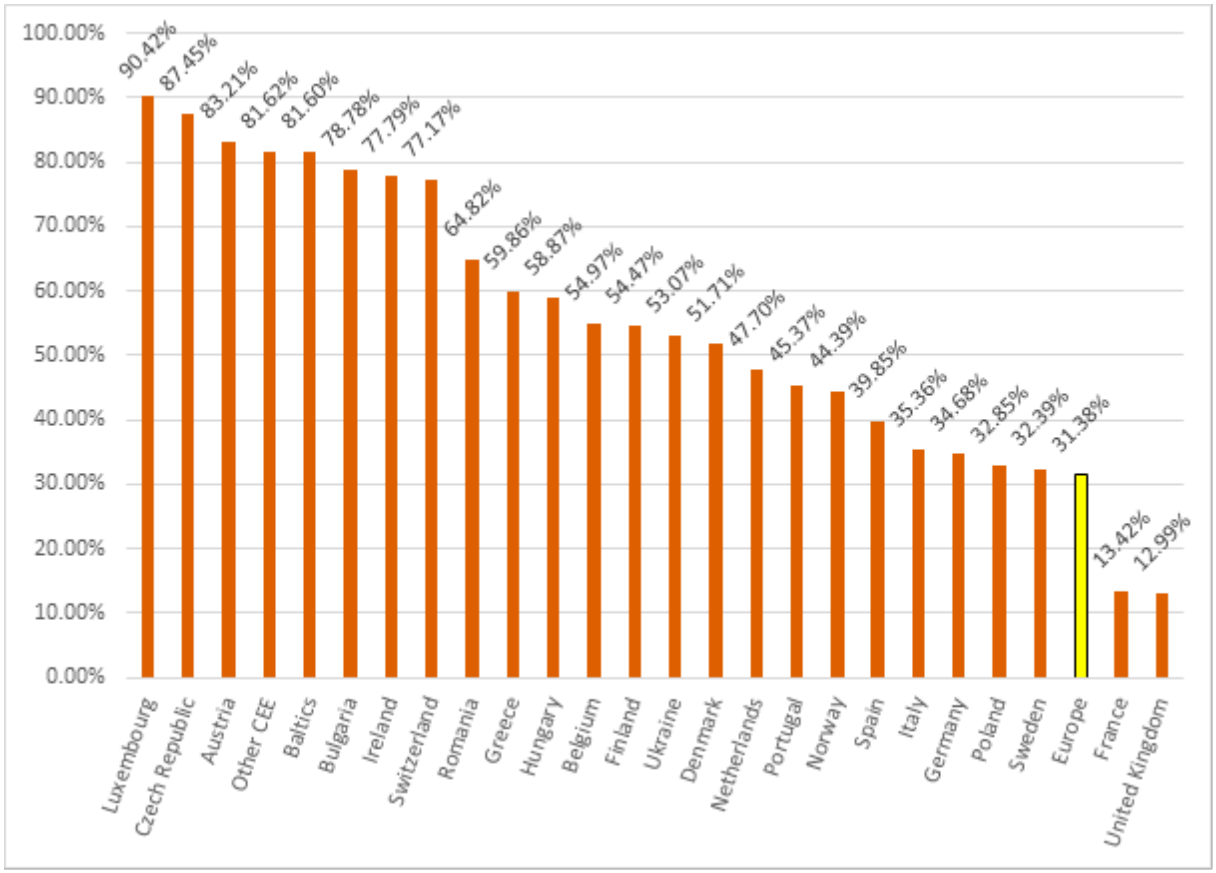


Source: data elaborated from Invest Europe Yearbook 2020.

2. The amount of investment in the country's firms by foreign PE funds as a percentage of the total PE investments made in the country (*Graph 2*). This measure could be approximately interpreted as an index of attractiveness of a country's businesses on the international stage;

[8] Our sample comprises 40 countries, including the European Union, the United Kingdom, Norway, Switzerland, Bosnia-Herzegovina, North Macedonia, Moldova, Montenegro, Serbia, Iceland, Liechtenstein, San Marino, Ukraine and Vatican City.

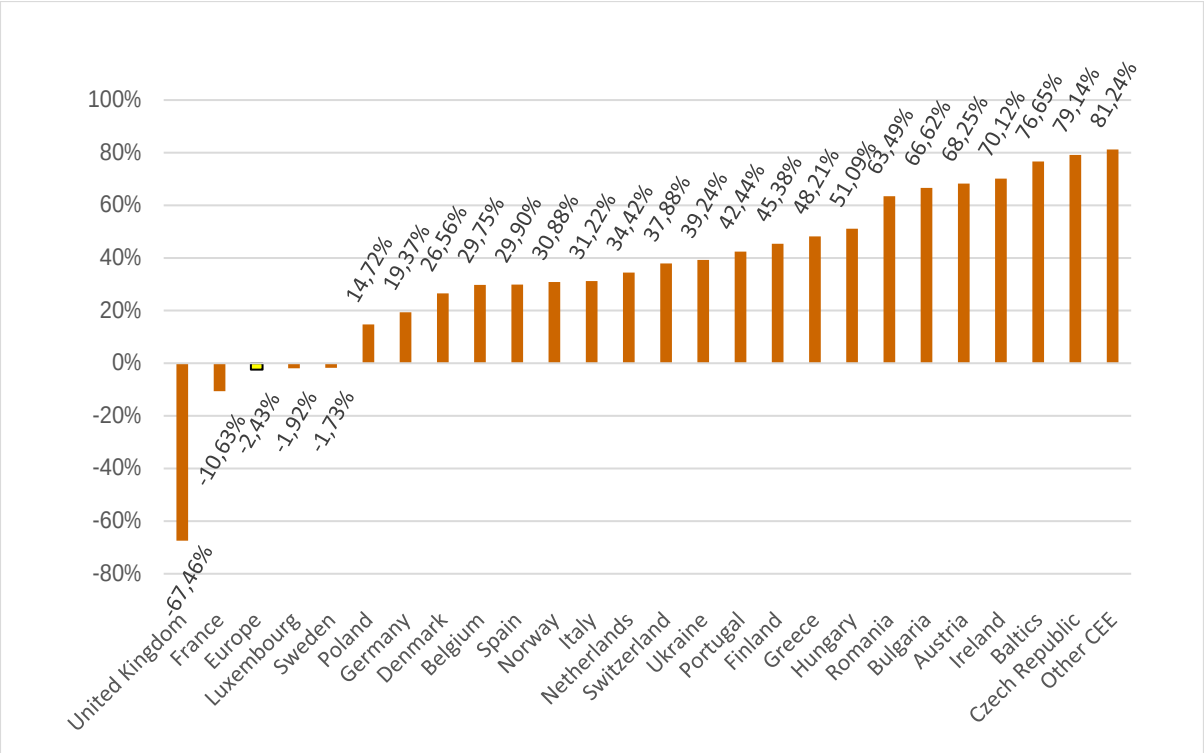
Graph 2: **Domestic investments by foreign PE funds as a percentage of total domestic PE investments** (2007-2020 average)



Source: data elaborated from Invest Europe Yearbook 2020.

3. The difference between investments in local firms by foreign PE funds and investments in foreign firms by local PE funds, as a percentage of the total investments made in the country (*Graph 3*). This measure is akin to net imports relative to GDP. In fact, investments in local firms by foreign PE funds can be seen as imports of capital; similarly, investments in foreign firms by local PE funds amount to exports of capital.

Graph 3: **Domestic investments by foreign PE funds minus foreign investments by domestic PE funds, as a % of total domestic PE investments** (2007-2020 average)



Source: data elaborated from Invest Europe Yearbook 2020.

If Europe were a financially developed and integrated market, we would expect much higher results in terms of the count and value of cross-border investments than the ones emerging from the data. The US is a natural benchmark on this specific point. Indeed, comparisons between Europe and the US drawn in the academic literature display a relatively underdeveloped PE market in Europe, despite the two economies being comparable in terms of GDP.

The results of the geographic analysis are very interesting and at times striking. On aggregate, exports of capital from European countries overcome imports. This is mainly due to the United Kingdom being a massive net exporter for PE flows. France, Sweden, and Luxembourg are the only other net exporters, though to a far lesser degree. Yet, for the EU as a whole, in 2020 the outflows from EU PE firms to extra-EU portfolio companies amounted to EUR 894 m, while inflows from non-EU PE firms to EU portfolio companies were at EUR 1,133 million (hence, a net inflow of EUR 239 million).

As regards the previous graphs, there are several features worth of an accurate analysis. Considering *Graph 1*, Luxembourg and Switzerland are the outliers at the top of the distribution and show very high levels of foreign PE investments (also in proportion to their GDP). However, for all the other countries, the metric lies below 50% and the majority scores below 26%. Thus, we can conclude that most of the investments of European private equity intermediaries remain within national borders.

There does not seem to be a simple relationship between this metric and the GDP of the countries: among those displaying higher values than the average, there are Bulgaria and Czechia – two middle-low income nations – as well as high income countries. Hence, the degree of development of the national economy and the exporting of capital by domestic private equity funds do not seem to be strictly related.

In fact, it is widely acknowledged that general partners of private equity funds prefer spatial proximity to their investments to facilitate the transaction processes of monitoring and oversight (Groh et al, 2010). Hence, when PE managers plan the allocation of their investments, a foreign investment will be

optimal – *ceteris paribus* – only if these information inefficiencies are outweighed by a greater risk/reward profile. Or, conversely, for a given foreign investment, technologic instruments in the monitoring processes and 'trust' networks in the foreign market will be crucial factors in explaining why some PE firms can afford it and some others cannot.[9] A joint consideration of the first and the second scenarios prompts other interesting perspectives. A cluster of countries can be identified, which includes Luxembourg, Czechia, Switzerland, Austria, and Bulgaria, exhibiting a relatively high level of both export of national private equity investments – as a ratio of total investments underwritten by domestic private equity firms – and import of foreign private equity capital, as a ratio of total private equity capital invested within the domestic borders. These countries appear to behave contrary to the common predictions mentioned above. However, it should be taken into account that geography may be misleading: a PE intermediary located, say, in Luxembourg might be funded and, directly or indirectly, managed by another financial company located in a different European country.

Within the countries that exhibit low values of foreign investments by local private equity firms, there are countries – such as Germany, France, Italy, and the Nordic nations – characterised by a relatively low value of local investments by foreign private equity firms; while a second group of countries – such as Romania, Greece, Hungary and other Eastern European countries – where a massive import of private equity capital occurs in relative terms. From this evidence, it seems reasonable to argue that, once accounted for the relative size of a PE industry, the degree of financial development of a country might be relevant in order to explain the size of its PE inflows.

The fact that the Baltics receive relatively more capital inflows through the PE channel than Germany does not mean that the former's firms are necessarily deemed more attractive by foreign investors. Rather, it should be seen as a hint that Baltic PE funds, although allocating nearly 90% of their total investments within national borders, might not be able to address their home market's commercial needs entirely. Examples from Germany, France and the Northern European nations are consistent with the geographical proximity theory.

Another metric explored in the geographic analysis is the difference between investments in local firms by foreign PE funds and investments in foreign firms by local PE funds, as a percentage of the total investments made in a country (*Graph 3*). This measure is akin to net imports relative to GDP. Although this measure is interesting, it suffers from two major drawbacks. First, it is biased upward towards countries that constitute financial hubs. The United Kingdom confirms to be a massive exporter of capital, yet this is not surprising, given the country's role as a financial centre in Europe. Second, since it is a relative measure, any two countries may be equal importers or exporters of capital and yet be fundamentally different. Ukraine and Switzerland are equal exporters of capital, in relative terms. However, there is much more PE activity in Switzerland than in Ukraine, both incoming and outgoing, not to mention that Switzerland's legal environment is more welcoming to the PE industry than Ukraine's.

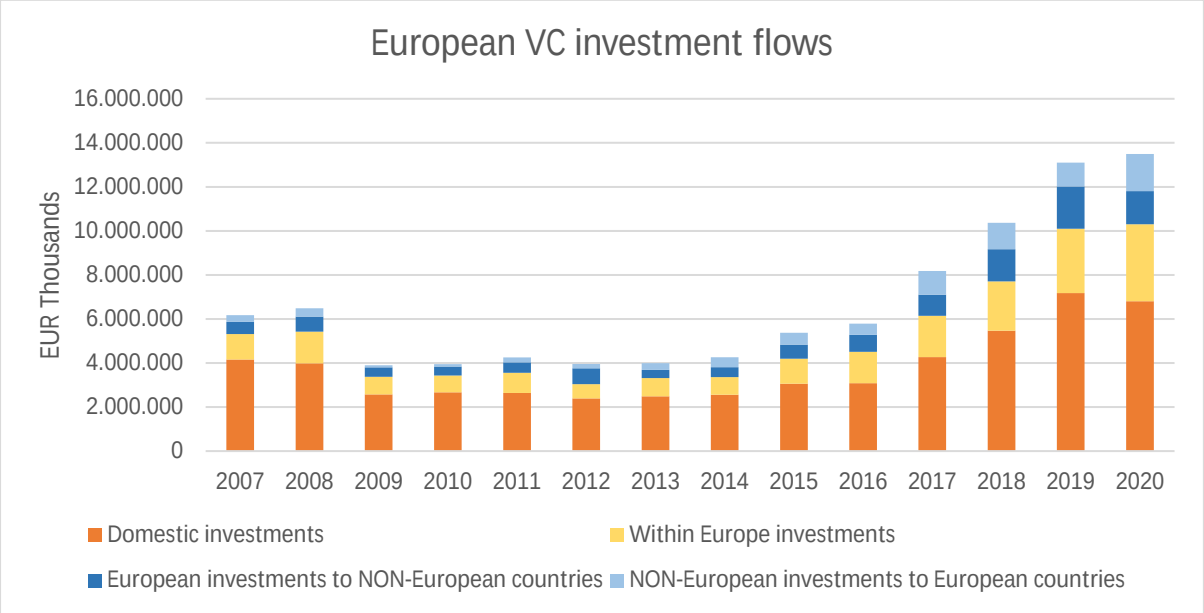
Narrowing down the focus on the venture capital segment, we describe in the following graphs the distribution of VC investments and fundraising during the years 2007-2020. In line with the general trend of European financial markets (as documented by Forster, Vasardani and Ca' Zorzi 2011), venture capital integration, after a steady increase up to 2008, suffered a setback with the financial crisis, to then rebound since 2015. Domestic investments increased consistently from 2009 to 2020, peaking in 2019. Cross-border investments within Europe and with extra-European countries also grew in more recent years. Overall, the magnitude of investments in the VC market has seen the domestic component accounting on average for 64.0% of the total VC activity and cross-border investments within Europe accounting on average for only 23.1% during the period 2007-2020. Cross-border investments with the rest of the world accounted for the rest (12.9%).

[9] For Luxembourg, Switzerland and the UK, it may also be the case that the regulatory landscape for foreign-oriented funds is more attractive.

Likewise, on the fundraising side, the majority of the funds came from domestic sources, and overall flows rebounded from 2009 onwards. In recent years, funds among European sources and from outside Europe sources increased.

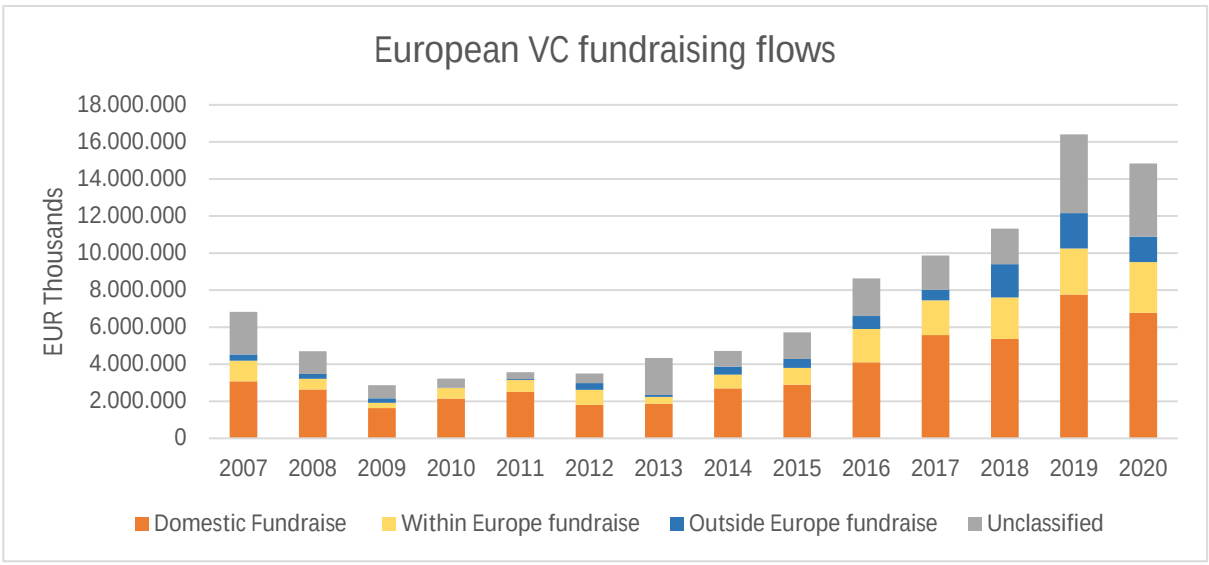
The main components in both cases are domestic and within-Europe investments/fundraising, denoting a scarce internationalisation of the European VC market.

Graph 4: **European VC investment flows (thousand euros)**



Source: data elaborated from Invest Europe Yearbook 2020.

Graph 5: **European VC fundraising flows**

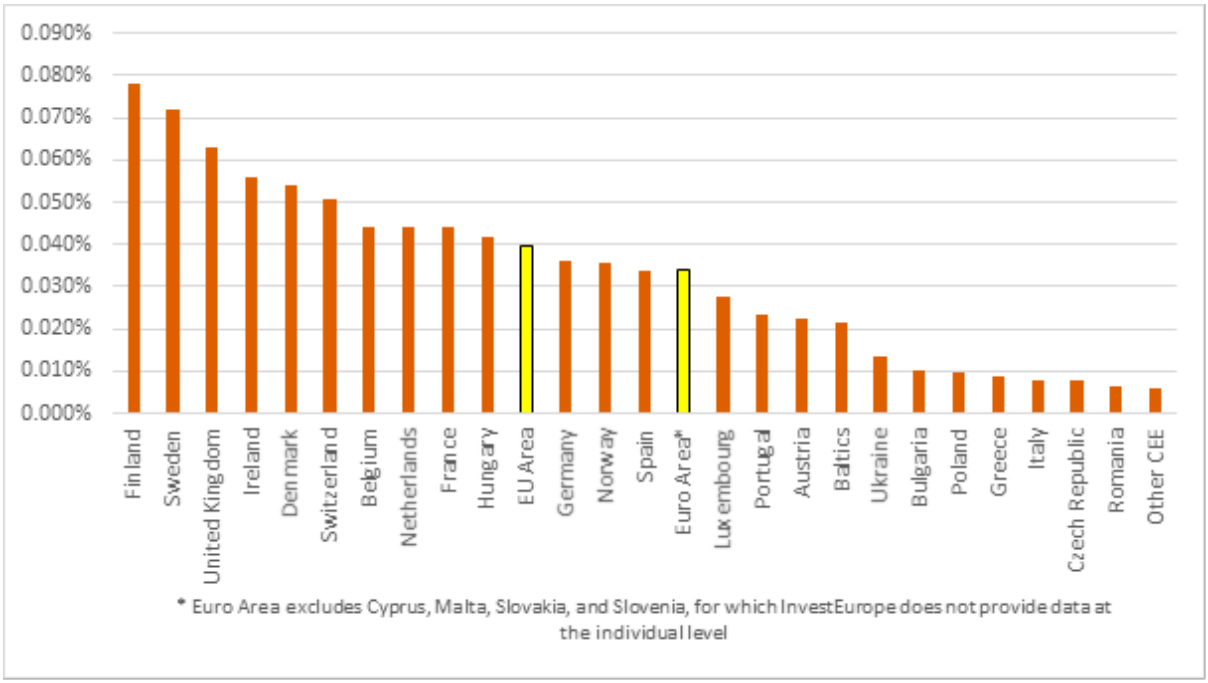


Source: data elaborated from Invest Europe Yearbook 2020.

The VC market in Europe is highly fragmented, with each country featuring its own peculiarities. Disparities among European countries are evident. An analysis of the amount of VC investments in each country, in proportion to their GDP, clearly shows that Finland, Sweden, the UK, Ireland,

Denmark, and Switzerland feature larger investment volumes than Eastern-European and Southern European countries (*Graph 6*).

Graph 6: **VC investments as a percentage of GDP (2007-2020 average)**



Source: data elaborated from Invest Europe Yearbook 2020.

In order to examine the interplay between cross-country investment volumes, we employ the Grubel-Lloyd index (see Box 4.1).

Box 4.1. **GRUBEL-LLOYD MODEL**

The Grubel-Lloyd index is an indicator that represents the intensity of the two-way investment flows for each country pair, showing whether the flows are balanced or not. This index can be considered as an alternative way to evaluate the nature of the linkages between countries, without accounting for the geographic distance between them. While the gravity model explored in the next section refers to distances and other flow determinants, this index focuses on the cross-border flows characteristics.

We take 40 European countries (and country groups) under analysis, using the data gathered from Invest Europe, and then consider the total value of their bilateral venture capital investments for the period 2007-2020. We adapt the Grubel-Lloyd Index, which traditionally measures the extent of intra-industry trade between countries, to two-way flows of securities, to measure the reciprocity of investments between the above countries.[10] On these lines, we use the cumulative data, instead of the annual ones, in order to have a more solid basis upon which to build our model. Indeed, VC investments exhibit a high degree of variability from year to year.

The Grubel-Lloyd index for trade between countries *i* and *j* is:

$$GL_{ij} = 1 - \frac{[x_{ij} - x_{ji}]}{x_{ij} + x_{ji}}$$

where x_{ij} represents the value of total gross VC investments from country *i* to *j*, while x_{ji} represents the opposite flow from country *j* to *i*.

It is worth noting that the value for GL is zero if either x_{ij} or x_{ji} is zero, which means there are no two-way flows of equity. The value for GL is one if x_{ij} equals x_{ji}, that is, if the value of country *i*'s purchases of assets (i.e. the equity of VC-financed companies) issued in country *j* is exactly the same as the value of country *j*'s purchases of assets issued in country *i*. Finally, the value for GL is "N/A" when there are no asset flows between country *i* and country *j*.

The table at the end of this box shows the adapted Grubel-Lloyd model for the period 2007-2020. It is interesting to note that the highest values of reciprocity of two-way flows of assets are concentrated in the major European financial centres; in particular, it is clear the prominent role of the United Kingdom, which exhibits a ratio of virtually 1 with Switzerland, 0.89 with Belgium, 0.88 with Denmark and 0.80 with France. Fundamental is also the role of Sweden, Germany, and Ireland, which report an average Grubel-Lloyd index above (or around) 0.5.

At the other end of the spectrum, ratios below 0.2 show highly unbalanced two-way investments – typically involving the European periphery (in particular, Greece and Portugal report the smallest average index) – and one-way investments, concentrated not only in the same biggest economies (e.g. UK or Germany), but also in those small but financially active countries of Central Europe[11] (e.g. Switzerland, Netherlands, Luxembourg) and Northern Europe (e.g. Swedenor Norway).

Some States diversify their cross-border flows a lot more than others in terms of number of countries they invest in, or number of countries they attract investments from. In this sense, the UK and Austria are the only two countries with no N/A, indicating that they exhibit two-way flows with all the other countries, although not always significant in terms of size. At the other end of the spectrum lie Eastern European countries like Romania and Ukraine with, respectively 16 and 14 N/A, followed by Mediterranean countries like Portugal and Greece, with respectively 14 and 12 N/A, indicating that these countries do not have VC flows with around half of the states considered in the analysis, therefore showing difficulties in investing or in attracting investments from abroad.

[10] See Lee (2010).

[11] As defined by the Meyers Encyclopaedias.

The heterogeneous level of this index highlights even more the low integration of the European VC market. Except for some important financial centres, the rest of the countries present unbalanced and scarcely diversified flows. The periphery of Europe, the Mediterranean area and the Central and Eastern Europe are indeed isolated actors in the VC market, featuring scarce mutual investment with other countries.

Table 1: Bilateral Grubel-Lloyd indices

Grubel-Lloyd indices	Austria	Baltics	Belgium	Bulgaria	Czech Republic	Denmark	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Luxembourg	Netherlands	Norway	Other CEE	Other Europe	Poland	Portugal	Romania	Spain	Sweden	Switzerland	Ukraine	United Kingdom
Austria		0,000	0,944	0,000	0,790	0,092	0,719	0,272	0,394	0,470	0,000	0,148	0,000	0,000	0,143	0,000	0,032	0,520	0,628	0,000	0,000	0,472	0,885	0,355	0,000	0,442
Baltics	0,000		0,000	N/A	0,000	N/A	0,475	0,048	0,321	N/A	N/A	N/A	N/A	0,000	0,614	0,000	N/A	0,000	0,887	N/A	N/A	0,051	0,739	0,000	0,868	0,937
Belgium	0,944	0,000		N/A	N/A	0,807	0,000	0,887	0,995	0,000	0,000	0,409	0,000	0,082	0,971	0,000	N/A	0,000	0,000	N/A	N/A	0,478	0,214	0,516	N/A	0,887
Bulgaria	0,000	N/A	N/A		0,000	0,000	N/A	N/A	0,080	0,049	0,000	N/A	0,000	N/A	0,000	N/A	0,000	0,000	0,000	N/A	0,975	0,000	N/A	0,000	N/A	0,522
Czech Republic	0,790	0,000	N/A	0,000		0,000	0,000	0,345	0,532	N/A	0,868	N/A	N/A	0,000	0,000	N/A	0,000	N/A	0,699	N/A	0,000	0,000	0,000	0,000	N/A	0,114
Denmark	0,092	N/A	0,807	0,000	0,000		0,726	0,575	0,770	N/A	0,000	0,846	N/A	0,000	0,672	0,343	0,000	0,000	0,000	0,000	N/A	0,752	0,893	0,608	N/A	0,880
Finland	0,719	0,475	0,000	N/A	0,000	0,726		0,884	0,455	N/A	0,000	0,000	0,000	0,615	0,090	0,712	0,000	0,663	0,705	0,000	0,000	0,330	0,650	0,149	0,000	0,359
France	0,272	0,048	0,887	0,000	0,345	0,575	0,884		0,588	0,000	0,000	0,522	0,217	0,660	0,866	0,768	0,000	0,000	0,435	0,271	N/A	0,313	0,726	0,598	0,000	0,799
Germany	0,394	0,620	0,995	0,080	0,532	0,770	0,455	0,588		N/A	0,470	0,511	0,626	0,129	0,979	0,477	0,000	0,326	0,694	0,128	0,000	0,547	0,937	0,602	0,338	0,564
Greece	0,000	N/A	0,000	0,049	N/A	N/A	N/A	0,000	N/A		N/A	N/A	N/A	0,000	0,000	N/A	N/A	0,000	0,000	N/A	N/A	0,000	0,000	N/A	N/A	0,620
Hungary	0,000	N/A	0,000	0,000	0,868	0,000	0,000	0,000	0,470	N/A		N/A	0,000	0,000	0,000	N/A	0,073	0,000	0,000	N/A	0,000	0,000	0,537	N/A	N/A	0,113
Ireland	0,148	N/A	0,409	N/A	N/A	0,846	0,000	0,522	0,511	N/A	N/A		0,671	0,000	0,232	0,000	N/A	N/A	N/A	N/A	N/A	0,611	0,770	0,424	N/A	0,619
Italy	0,000	N/A	0,000	0,000	N/A	N/A	0,000	0,217	0,626	N/A	0,000	0,671		N/A	0,223	0,000	0,000	0,000	0,000	0,000	N/A	0,098	0,000	0,290	N/A	0,830
Luxembourg	0,000	0,000	0,082	N/A	0,000	0,000	0,615	0,660	0,129	0,000	0,000	0,000	N/A		0,044	N/A	N/A	0,000	0,000	0,471	N/A	0,003	0,829	0,079	N/A	0,117
Netherlands	0,143	0,614	0,971	0,054	0,000	0,672	0,090	0,866	0,979	0,000	0,000	0,232	0,945	0,044		0,000	0,000	0,415	0,168	N/A	0,000	0,389	0,935	0,815	0,000	0,897
Norway	0,000	0,000	0,000	N/A	N/A	0,343	0,712	0,768	0,477	N/A	N/A	0,000	0,000	N/A	0,000		N/A	N/A	N/A	N/A	N/A	0,657	0,976	0,555	N/A	0,568
Other CEE	0,032	N/A	N/A	0,000	0,000	0,000	0,000	0,000	0,000	N/A	0,073	N/A	0,000	N/A	0,000	N/A		N/A	0,355	0,000	N/A	N/A	0,000	N/A	N/A	0,709
Other Europe	0,520	0,000	0,000	0,000	N/A	0,000	0,663	0,000	0,366	0,000	0,000	N/A	0,000	0,000	0,000	N/A	N/A		0,000	N/A	N/A	0,000	0,628	0,045	N/A	0,708
Poland	0,628	0,887	0,000	0,000	0,699	0,000	0,705	0,435	0,694	0,000	0,000	N/A	0,000	0,000	0,168	N/A	0,355	0,000		0,000	0,000	0,000	0,991	0,000	0,000	0,234
Portugal	0,000	N/A	N/A	N/A	N/A	0,000	0,000	0,271	0,128	N/A	N/A	N/A	0,000	0,471	N/A	N/A	0,000	N/A	0,000		N/A	0,544	0,000	0,000	N/A	0,627
Romania	0,000	N/A	N/A	0,975	0,000	N/A	0,000	N/A	0,000	N/A	0,000	N/A	N/A	N/A	0,000	N/A	N/A	N/A	0,000	N/A		N/A	N/A	N/A	N/A	0,000
Spain	0,472	0,051	0,478	0,000	0,000	0,752	0,330	0,313	0,547	0,000	0,000	0,611	0,098	0,003	0,389	0,657	N/A	0,000	0,000	0,544	0,000		0,765	0,621	0,433	0,297
Sweden	0,885	0,739	0,214	N/A	0,000	0,893	0,650	0,726	0,937	0,000	0,537	0,770	0,000	0,829	0,935	0,976	0,000	0,628	0,991	0,000	N/A	0,765		0,499	0,000	0,411
Switzerland	0,355	N/A	0,516	0,000	0,000	0,608	0,149	0,748	0,602	0,000	N/A	0,424	0,290	0,117	0,815	0,555	N/A	0,045	0,000	0,000	N/A	0,621	0,499		0,000	1,000
Ukraine	0,000	0,868	N/A	N/A	N/A	N/A	0,000	0,000	0,338	N/A	N/A	N/A	N/A	N/A	0,000	N/A	N/A	N/A	0,000	N/A	N/A	0,433	0,000	0,000		0,064
United Kingdom	0,442	0,937	0,887	0,522	0,114	0,880	0,359	0,799	0,564	0,620	0,113	0,619	0,830	0,117	0,897	0,568	0,709	0,708	0,234	0,627	0,000	0,297	0,411	1,000	0,064	

Source: data elaborated from Invest Europe Yearbook 2020.

4.1.2 The determinants of cross-border flows: a gravity analysis

Drawing from the evidence presented above and from the perusal of the literature, we investigate the determinants of cross-border VC flows using appropriate specifications of the gravity equation, ensuring at the same time their consistency with economic theory.

Conceptual framework

The gravity model has long been one of the most successful empirical models in economics, as it largely explains cross-country trade and factor movements. The traditional gravity model draws on the analogy with Newton's Law of Gravitation: a mass of factors of production supplied at country *i* is attracted to a mass of demand for factors of production at country *j*, but the cross-border flow might be reduced by the distance between the two countries, d_{ij}. The most basic form of the gravity equation is:

$$EXP_{ij} = \frac{GDP_i \cdot GDP_j}{d_{ij}}$$

Ravenstein (1889) and Tinbergen (1962) first used the gravity equation to explain migration patterns and trade flows, respectively. During the last decades, the gravity model has been extended to explain the international co-movements of portfolio investment (e.g., Portes and Rey 1998). The first financial gravity model has been that of Martin and Rey (2004), then applied in Portes and Rey (2005) and modified by Coeurdacier and Martin (2006). Further theoretical grounds for the financial gravity model have been developed by Okawa and van Wincoop (2012). In general, within the financial gravity equation, GDP is either substituted or complemented by the use of market capitalisation as regressor. Market capitalisation indeed might have higher explanatory power in predicting the financial cross-border flows.

Nonetheless, other elements are relevant for an individual investing in a foreign financial market. The information required to evaluate financial products is characterised by asymmetry and complexity. Moreover, financial information also involves knowledge of accounting practices, financial and banking regulation, political events, and the structure of national financial markets. Information is even more crucial for the venture capital market, where funds invest into small firms (e.g. start-ups) which are not required to comply with international accounting standards or with disclosure requirements, on top of being systematically affected by high risk. Language barriers as well as regulatory and institutional dissimilarities further exacerbate information asymmetry. For this reason, we couch our empirical analysis on theoretical models which generate gravity equations but focus on information asymmetries and institutional quality differences. These frameworks are flexible enough to also allow for transaction costs, which we interpret in terms of degree of capital market development (as opposed to bank credit).

Our analysis builds on papers that have provided a microfounded, general equilibrium theoretical underpinning for the financial gravity equation, such as Portes and Rey (2005), Aviat and Coeurdacier (2007), and Coeurdacier and Martin (2006). Specifically, we draw a testable financial gravity equation from the model of Martin and Rey (2004) as augmented by Cavallaro and Cutrini (2019). We then use the model to derive a testable equation for bilateral trade in VC flows along the lines of the relevant literature mentioned above.

Martin and Rey (2004) build a general equilibrium model with fully optimising agents and endogenous market capitalisation, where asset holdings of risk-averse agents result from the optimal intertemporal consumption choice, and distance arising from international transaction costs and imperfectly competitive financial markets determines size effects and portfolio home bias.[12] The three key elements that are required to generate a gravity equation are: (i) that assets are imperfect

[12] See Cavallaro and Cutrini (2019).

substitutes because they insure against different risks; (ii) that cross-border asset trade entails some transaction and/or information costs; (iii) that the supply of assets is endogenous. Hence, a fundamental determinant of equity flows are transaction costs, arising from information problems, as the source of distance, market segmentation and home bias. On the other hand, risk aversion and the imperfect substitutability of assets generate an incentive for diversification.

The value of the bilateral equity trade flows (by country *i* agents for assets issued in country *j*) is the value of the demands by the n_i agents for the shares s_{ij} of the $n_j p_j z_j$ projects of country *j* (inclusive of transaction costs τ), that is:

$$Equity_{ij} = n_i s_{ij}(1 + \tau)\, n_j p_j z_j \qquad (1)$$

Similarly, the value of the aggregate demand by country *j* agents for assets issued in country *i* is:

$$Equity_{ji} = n_j s_{ji}\,(1 + \tau) n_i p_i z_i \qquad (2)$$

which is the exact counterpart of Equation (1).

Taking the logarithm of (1) and using the equation for the individual demand of country *j*'s shares by a country *i* agent, Cavallaro and Cutrini (2019) arrive at a testable implication of the model along the lines of a gravity equation:

$$\log\,(Equity_{ij}) = \log\,(n_j p_j z_j\,) + \log(n_i c_{1i} n) + \varphi + \sigma \log(R_j) + \log\,(k)$$

where:

$n_j p_j z_j$ = country *j*'s financial wealth

$n_i c_{1i}$ = country *i*'s real income

φ = a transformation of transaction costs

R_j = return on assets/yield of market *j*

k = a constant.

A corresponding equation is derived from (2).

Econometric specifications and data

While equation (3) is cast in logs, we use fixed-effect Poisson regressions to analyse our panel dataset. One reason for this choice is that international financial flows share the same characteristics as international trade data which impair the use of linear panel models. As Santos Silva and Tenreyro (2006) argue, trade flows are affected by issues of zero values and heteroskedastic errors. The former hampers the use of log-linear models in that true zeroes in the dependent variable are discarded during the estimation procedure, causing inconsistency. Also the latter, however, is likely to be a source of inconsistency for OLS estimates, unless the error term satisfies restrictive assumptions on its form (see p. 644, *ibid*.). These two issues are solved together by the Poisson pseudo-maximum likelihood estimation technique; a further upside of this method is that the data are not required to be Poisson distributed nor the dependent variable needs to have integer values for the estimates to be consistent (p. 645, *ibid*.). In addition, coefficients can be interpreted as in OLS regressions: when attached to

independent variables in levels they are semi-elasticities; when attached to independent variables in logs, they are simple elasticities.[13]

Specification 1

Below we report the functional form of our first specification and detail the list of variables employed:

$$VC_{ijt} = \exp(\beta_0 + \beta_1 MktCap_{it} + \beta_2 MktCap_{jt} + \beta_3 Distance_{ij} + \beta_4 Costofcapital_{jt} + \beta_5 VC\ non\ Europe_{it} + \beta_6 VC\ non\ Europe_{jt} + \beta_7 EconomicFreedom_{jt} + \beta_8 BankBased_{jt} + \beta_9 Easeofdoingbusiness_{jt} + \beta_{10} IPO_{jt}) + \lambda_t + u_{ijt}$$

VC_{ijt} represents the amount (in billion euro) invested by venture capital funds in country *i* into enterprises in country *j* at time *t*.

$MktCap_t$ is the national market capitalisation, in trillion euro, a widely used measure of size in the empirical literature on equity flows. In our model, a large capital market in the destination country – representing the financial wealth term in equations (1)-(3) – attracts capital inflows due to the diversification motive. Similarly, a large capital market in the origin country – representing the real income term in equations (1)-(3) – generates capital outflows through demand for diversification.

$Distance_{ij}$ is an indicator which measures the bilateral distance (in kilometers) between country *i* and country *j*. It partly captures transaction costs.

$Costofcapital_j$ is an index (ranging from 0 to 1) which indicates to what extent the cost of capital in country *j* encourages business development in that country. Hence, this is not a "return-chasing" variable, but rather a measure of financial market effectiveness and transaction costs. As for the return on assets/yield of the destination market, we follow a substantial literature, and especially Portes and Rey (2005) and Okawa and van Wincoop (2012), where the return variable appears neither in the theoretical model nor in the main empirical specifications.[14] When trying the introduction of a "return-chasing" variable, Portes and Rey (2005), like much of the literature, find scarce effects on equity flows. Indeed, if equity returns are endogenous to such variables as the risk premium or exchange rate expectations, changes in country *j*'s equity returns should have little effect on bilateral equity flows; hence its introduction as a regressor would be useless at best.

$VC\ non\ Europe_t$ represents the two-way cross-border flows (in billion euro) between the origin (or destination) country and non-European countries. This variable represents the degree of financial globalisation in the international VC market and plays a role similar to the "multilateral resistance term" – advocated by Okawa and van Wincoop (2012) -- by controlling for third-country influence on both *i* and *j*.

The model also includes controls regarding both the economic system of country *j* and characteristics of its financial market. Among these covariates, $Economic\ Freedom_{jt}$ is an index, created by the Fraser Institute, which measures the degree of economic freedom for country *j*. The index (from 0 to 1) summarises five sub-indices: (i) Size of Government; (ii) Legal System and Security of Property

[13] While it is common to estimate Poisson gravity equations with the main explanatory variables in logs, we use them in levels, so as to interpret all coefficients as semi-elasticities and avoid taking logs of zero-inflated explanatory variables (see also Prehn, Brümmer and Glauben 2016).

[14] Portes and Rey (2005) include asset return covariances in other specifications; this variable, however, would be absorbed by the distance effects in our specifications.

Rights; (iii) Sound Money; (iv) Freedom to Trade Internationally; (v) Regulation. $Ease\ of\ Business_{jt}$ is an indicator that tracks the ease of doing business in country *j*. Both covariates capture the institutional quality indexes suggested by Cavallaro and Cutrini (2019) as essential pull factors for equity flows. IPO_{jt} is the value (in billion euro) of capital raised via initial public offerings in country *j* and year *t*, smoothed with a three-year moving average. It is an index of sophistication of financial markets, aimed at capturing – together with the market capitalisation, the cost of capital, distance and the bank-based index – the transaction costs represented by φ in equations (1)-(3). The source of the aforementioned regressors – all ranging from 0 to 1 – is the IMD Competitiveness Database.

$BankBased_{jt}$ is an index (ranging from 0 to 1) which indicates to what extent the economy of country *j* relies on banks. Following Ryan et al. (2014), our index is the ratio of bank credit (that is, the credit extended to the private sector by banks) over the sum of bank credit and market capitalisation. This index can be interpreted as a transaction cost, as described in section 3 above.

The fixed effects λ_t account for unobservable time-varying heterogeneity. We do not introduce country-pair fixed effects directly because, from preliminary tests, they are strongly collinear with the distance variable, which is a major determinant of the cross-border flows.

Specification 2

Our second specification aims to ascertain which regressors continue being significant when we invert the direction of trade, namely when we look at capital imports of country *i* from country *j*. On theory grounds this is justified by the endogeneity of asset supply – which makes equity import flows dependent, at least partially, on the same factors affecting equity demand; on empirical grounds, this specification can highlight the true differences arising between the demand and supply sides, and evaluate to what extent equity trade flows follow the intra-industry pattern implied by the monopolistic competition structure of the Martin and Rey (2004)'s model.[15]

$$VC_{jit} = \exp(\gamma_0 + \gamma_1 MktCap_{it} + \gamma_2 MktCap_{jt} + \gamma_3 Distance_{ij} + \gamma_4 Costofcapital_{it} + \gamma_5 VC\ non\ Europe_{it} + \gamma_6 VC\ non\ Europe_{jt} + \gamma_7 EconomicFreedom_{it} + \gamma_8 BankBased_{it} + \gamma_9 Easeofdoingbusiness_{it} + \gamma_{10} IPO_{it}) + \mu_t + e_{ijt}$$

Here, VC_{jit} represents the investments by venture capital funds in country *j* into companies in country *i*.

Specification 3

Our third specification follows:

$$VC_{ijt} + VC_{jit} = \exp(\delta_0 + \delta_1 MktCap_{it} + \delta_2 MktCap_{jt} + \delta_3 Distance_{ij} + \delta_4 Costofcapital_{jt} + \delta_5 VC\ non\ Europe_{it} + \delta_6 VC\ non\ Europe_{jt} + \delta_7 EconomicFreedom_{jt} + \delta_8 BankBased_{jt} + \delta_9 Easeofdoingbusiness_{jt} + \delta_{10} IPO_{jt}) + \nu_t + v_{ijt}$$

The two-way equity flows constituting the regressand represent a measure of financial integration of European VC markets. Here it is of great interest to assess the role of the global financial integration variables $VC\ non\ Europe_{it}$ and $VC\ non\ Europe_{jt}$: a sizeable effect of each of these two regressors would point towards an influence of financial globalisation on European financial integration patterns.

Note that we have an additional reason to omit the returns on assets/yield of the destination markets, as our dependent variable is the "sum" of the bilateral equity flows. That is, if R_i becomes larger, then

[15] See also Gu and Lu (2011) and Sun and Liang (2014) on the correlation between inward investment and outward investment in venture capital.

agents in both countries will prefer more of the assets produced in country *i* and prefer less of the assets produced in country *j*, and hence the total sum might not change.

Aggregate results

Table 4 illustrates the results of the 3 specifications above, applied to our sample of 40 European countries (some of which grouped by area). They show that market capitalisation has statistical significance when referred to both the importing and to the exporting country, in all three specifications (considering both one-way and two-way flows). We interpret this result as supporting the relevance of the diversification motive both as a pull and a push factor of a financially developed country.

A significant covariate is the measure of two-way VC flows between the exporting (importing) country and non-Europe (i.e., our "Rest of the World"). The capital flows between country *i* (*j*) and non-Europe is significant at the 1% level across all three specifications. This pattern (which is confirmed in the results for the gravity model with GDP) establishes a correlation between European financial integration (measured by intra-European VC flows, especially in the third specification) and global financial integration (measured by extra-European VC flows). It is worth noting that this link remains significant even in the presence of measures of economic activity in both countries (the GDP/Market capitalisation terms) as regressors; this points to a synchronisation of the European financial dynamics with that of the rest of the world, which is not driven by activity variables, but presumably by global financial factors.

Distance is, as expected, significant and negative across all the specifications, thus having a negative effect on both inflows, outflows and two-way flows. The cost of capital of the destination country represents a measure of financial market effectiveness (and transaction costs) and on average has a positive and significant effect in both the first and third specification.

The covariates proxying for the quality of institutions do not exhibit clear effects. *Economic freedom* is significant in none of three specifications. The *Ease of doing business* impact is significantly negative in the first, significantly positive in the second and no significance in the third specification, perhaps due to its correlation with other RHS variables. These ambiguous effects are confirmed by country-level regressions.

Finally, it is worth noting that VC flows seem in general unaffected by the financial structure of the destination country as measured by the bank-based index. The scarce significance of this index is however conditional on financial market development, as proxied by market capitalisation, cost of capital and number of IPOs.

Table 4. **Gravity model with market capitalisation**

	(1) **Flows from *i* to *j***	(2) **Flows from *j* to *i***	(3) **Two-way flows between *i* and *j***
Market Capitalisation i (EUR tn)	.985***	.814***	.897***
	(.086)	(.083)	(.069)
Market Capitalisation j (EUR tn)	.697***	1.146***	.901***
	(.149)	(.12)	(.118)
Gross flows between non-	1.586***	1.23***	1.445***

Europe and country i (EUR bn)	(.306)	(.338)	(.259)
Gross flows between non-Europe and country j (EUR bn)	.879*** (.293)	1.483*** (.329)	1.233*** (.233)
Economic Freedom	3.166 (3.715)	-.428 (2.556)	1.714 (2.555)
Bank-based economy	0 (.001)	0 (.001)	0 (.001)
Ease of doing business	-1.506* (.893)	1.928*** (.712)	.056 (.629)
Three-year average of funds raised in IPOs (EUR bn)	.021 (.022)	-.055*** (.021)	-.015 (.019)
$Distance_{ij}$	-.001*** (0)	-.001*** (0)	-.001*** (0)
Cost of capital	3.425*** (.824)	.96 (.762)	2.188*** (.577)
constant	-10.209*** (2.529)	-7.771*** (1.879)	-8.459*** (1.809)
Observations	5625	5625	5625
Pseudo R^2	.217	.215	.237

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Following the gravity tradition, we also used GDP (in trillion euro) as a regressor instead of market capitalisation to assess the robustness of results. The results are quite similar and are not reported here.[16]

4.2 THE COUNTRY PERSPECTIVE

As outlined above, the VC market in Europe is highly fragmented, with large disparities among countries. Therefore, we carry out our two-stage analysis also at country level. The descriptive analysis is again sourced from the Yearbook of *Invest Europe*, which collects data from associated PE and VC funds, aggregated by country. The 2020 edition covers the period from 2007 to 2020. Moreover, upon request, Invest Europe provides the geographical breakdown of VC flows by source and destination. For our research purposes, we construct nine key indicators. For each European country (or country group) and year, we consider:

1. The amount of money raised in the country by any PE/VC fund for (mature) PE projects and for VC projects;

[16] However, in the country regressions below we use GDPs as measures of country size.

2. The geographical breakdown of the amount of money raised by VC funds in the country;

3. The investments made with the money raised in the country, again differentiating between those in (mature) PE projects and VC projects;

4. The top five cross-border VC investee countries (this statistic looks at the country of incorporation of foreign investee firms);

5. The geographical breakdown of the investments by VC funds incorporated in the country;

6. The investments made in the country by PE/VC funds;

7. The top five cross-border VC investor countries (this statistic looks at the country of incorporation of foreign VC funds invested in the country);

8. The geographical breakdown of the VC funds invested in the country's portfolio companies;

9. The investments and divestments of PE funds incorporated in the country.

To deepen the analysis on the European venture capital market, a gravity model to study the determinants of cross-border VC flows is applied to each of our 26 countries/country groups. Three dependent variables are considered: outflows, inflows and two-way flows. For each dependent variable, two specifications are proposed: one with controls on the partner country, the other with controls on the reporting country. The potential explanatory variables included are: *GDP* of each country, *Two-way VC flows* between each country and non-European countries, and indicators controlling for the characteristics of the partner country's economic system, such as *Economic Freedom*, *Bank-based economy*, *Ease of business*, *IPOs*, as well as standard "distance" variables present in a gravity equation, such as *distance*, *common border* and *common language* (see sub-section above on the aggregate model specifications for an in-depth description of the regressors).

Importantly, the estimation method employed in this analysis is again the Poisson pseudo-maximum likelihood estimator, as proposed by Santos Silva and Tenreyro (2006). This goes against the traditional procedure when approaching a model in multiplicative form, that is to take logs to transform it into a linear specification and then apply the OLS estimation. The problem with this procedure, as underlined by Santos Silva and Tenreyro (2006), is twofold: on the one hand, there is the issue of zeroes in the dependent variable, i.e. a log-transformation on a variable which shows zero in some observations is clearly impossible;[17] on the other hand, and perhaps more importantly, under heteroscedasticity, OLS estimates are biased and inconsistent with a log-linearised model. In particular, if the regressors are not independent of the error term, then the OLS estimates will not be consistent. To overcome these limitations, a Poisson pseudo-maximum likelihood estimation is used (in particular, the STATA command PPML, elaborated by Santos Silva and Tenreyro, is employed). Of course, a Poisson regression allows to avoid log-transforming the model, and therefore it overcomes the problem of zeroes. As regards the consistency problem, several papers (Santos Silva and Tenreyro (2006), Silirvestovs and Schumacher (2009), Santos Silva, Tenreyro and Windmeijer (2015)) suggest that the new estimates will indeed be consistent.

Six regressions are explored: (i) outflows with controls on the country of destination; (ii) inflows with controls on the country of origin; (iii) two-way flows with controls on all countries except the country

[17] This problem is all the more serious the smaller the market segment analysed. Bilateral venture capital flows at country level inevitably feature several "true" zeros.

of interest; (iv) outflows with controls on the country of interest; (v) inflows with controls on the country of interest; (vi) two-way flows with controls on the country of interest. This division in six regressions weighs differently the country of origin and country of destination in all the three measures of flows. They allow us to investigate whether the investor's economy characteristics weigh more than the investee's or vice versa.

In order to extract as much information as possible from our data, we do not replicate exactly at country level the specifications explored at the aggregate level in the previous section. Besides using GDP instead of market capitalisation as a measure of country economic size, we use three covariates capturing different dimensions of "distance":

- *Distance* (in thousand km)
- *Common language*
- *Common border*

On the other hand, we do not use the cost of capital variable.

Since the purpose of the econometric exercise is to investigate how much mileage we can gain in explaining the determinants of cross-border VC flows through a standard gravity equation,[18] some specifications do not perfectly identify the effects under study. The issue is particularly noticeable in countries with few counterparts, and hence with few observations and many zeros; in these cases, some coefficients may not be precisely identified, and some covariates may be dropped altogether to ensure converge of the maximum-likelihood algorithm. As the problem is structural, it does not help much using traditional specifications in logs.

4.2.1 Southern Europe[19]

Southern European countries have a well-developed bank-based system but exhibit unbalanced two-way investments. Among them, Greece has the smallest average Grubel-Lloyd index and reports lower levels of foreign investments by local private equity firms compared to the European average, with Portugal having the lowest at 5% of its total PE investment (see *Graph 1*). Greece, on the other hand, shows a significant import of foreign private equity investments, comprising 60% of total PE investments, while Portugal, Spain, and Italy are all below 50% (see *Graph 2*). However, when considering absolute values of PE investments, every year Italy has consistently recorded investments in Italian portfolio companies from both PE and VC funds, while Greece experienced significant internal investments discontinuously in 2008 and 2015. In 2008, Greek funds made their biggest investment, reaching almost EUR 250 million, while the largest investment for Portuguese funds was in 2011, and for Spain it was in 2019. Only Italian funds have increased their investments in recent years, after a depression in the early 2010s, investing over EUR 5 billion in 2018.

As the gravity model also suggests, venture capital flows mainly originate from countries within the same group, and Southern European countries also tend to invest among themselves, except for Greece, which has seen France and Benelux as its main partners in recent years. In general, in bank-based systems, the private equity market is less developed compared to market-based systems. As shown in *Graph 6*, venture capital investments relative to GDP are low in all countries, except for Spain, which exceeds the European area average. Italy and Greece in particular invest less than 0.010% of their GDP, with Italy also attracting a low average level of fundraising, totalling EUR 2 billion between 2007 and 2020.

[18] Single-country gravity equations are commonly used (see, for example, Chiţu, Eichengreen, and Mehl, 2014).
[19] See descriptive country tables in Annex 7.1.

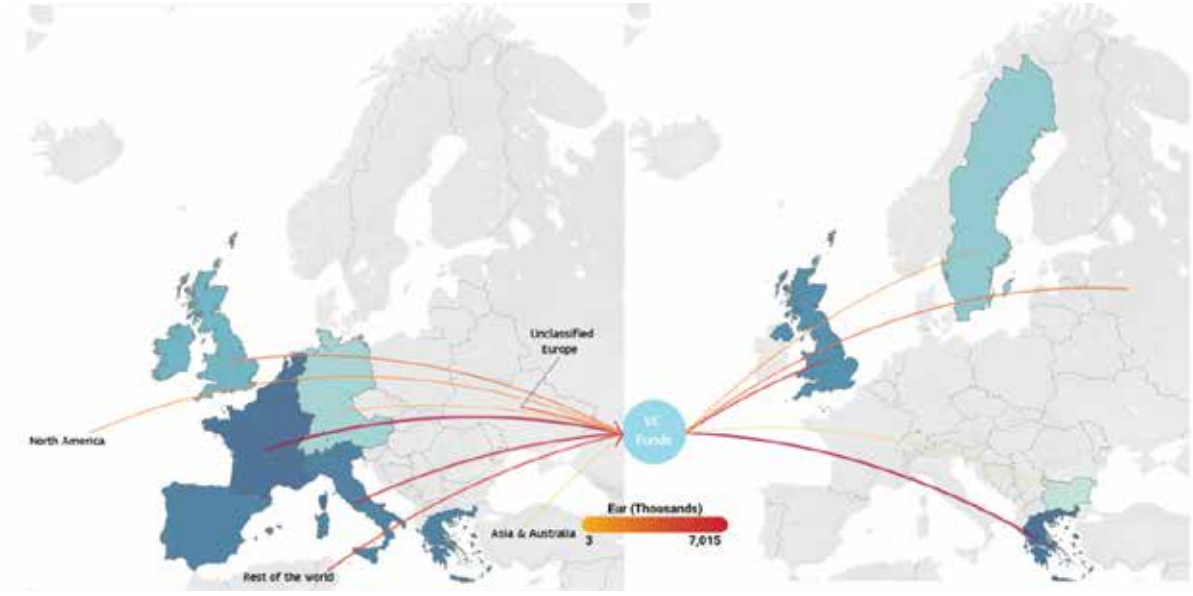
Looking at the evolution of venture capital fundraising, fund sizes increased in all countries in 2020 compared to previous years, except for Portugal, which had a larger VC fundraising in relative terms than PE, but a lower absolute value compared to 2019. Overall, the Portuguese market exhibited the lowest level of attracted resources.

The PE market in Portugal and Greece experienced significant divestment in 2013 due to the sovereign bond crisis, but both countries returned to positive net investment values in the following year, with Greece recovering thanks to EUR 300 million of private equity investment. Spain, on the other hand, had more divestments than investments from 2008 to 2016 and still a lower value of net investments compared to other countries.

The results of the gravity equations for Southern European countries support the theory that larger VC flows occur between countries with higher GDPs. A higher degree of financial globalisation in the international VC market also seems to have a positive effect on the financial integration of Southern European countries in Europe. As already noted in the aggregate equation, VC flows seem to be unaffected by the financial structure of both the origin and the destination country. Institutional quality seems to have a positive impact on VC flows, although this result is not very robust as institutional quality is estimated to have a negative impact in some specifications. There are no clear conclusions for geographic distance, which is measured by distance in km or the presence of a common border, as distance has both negative and positive effects on VC flows depending on the model specification. This suggests a trade-off between diversification – which pushes towards investment in different countries – and transaction costs/information asymmetries in investment decisions, which push towards investment in similar and neighbouring countries.[20]

Greece

Flows from European fundraising to Greek VC funds vs *Flows from Greek VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

[20] To the extent that VC flows mirror foreign direct investments, rather than portfolio investments, proximity becomes relatively more important, due to the relevance of the industrial organisation dimension.

Gravity model: Greece (GRC)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on *j*	(4) Inflow, controls on GRC	(5) Outflow, controls on GRC	(6) Two-way flow, controls on GRC
GDP i (EUR tn)	-141	63.63	51.14	-1.7	-.25	-1.22
	(128.09)	(46.16)	(36.48)	(0)	(.29)	(0)
GDP j (EUR tn)	.07	.27	.4	-285.33	372.24***	-291.43
	(.88)	(.71)	(.63)	(0)	(4.11)	(0)
Two-way flows between non-Europe and country i (EUR bn)	697.76	927.36***	771.29***	14.05	157.38***	12.26
	(441.08)	(351.36)	(233.8)	(0)	(2.37)	(0)
Two-way flows between non-Europe and country j (EUR bn)	3.69***	1.71***	1.65***	226892.05	-271837.7***	214264.45
	(.71)	(.57)	(.55)	(0)	(8676.73)	(0)
Economic Freedom	-49.44**	50.51***	38.65***	4739.12	-4344.43***	5078.43
	(20.33)	(14.1)	(11.04)	(0)	(63.27)	(0)
Bank-based economy	-.04	-.02***	-.02***	-.91	.71***	-.95
	(.03)	(.01)	(0)	(0)	(.01)	(0)
Ease of business	-5.48	-22.22***	-16.49***	-430.71	42.85***	-475.23
	(17.14)	(6.57)	(4.98)	(0)	(5.45)	(0)
Three-year average of funds raised in IPOs (EUR bn)	.43***	.49***	.4***			
	(.09)	(.17)	(.12)			
Distance (in thousand km)	2.22	2.5**	2.38***	-.92	-10***	-.89
	(2.31)	(1.13)	(.84)	(0)	(.31)	(0)
Common border	9***		2.6	-3.91	16.16***	-3.51
	(3.03)		(3.19)	(0)	(.62)	(0)
Constant	49.64***	-58.61***	-48.65***	-2981.98	2799.78***	-3198.59
	(18.63)	(17.19)	(13.67)	(0)	(41.07)	(0)
Observations	219	211	219	150	150	150
R-squared	.9	.82	.88	.17	1	.13

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

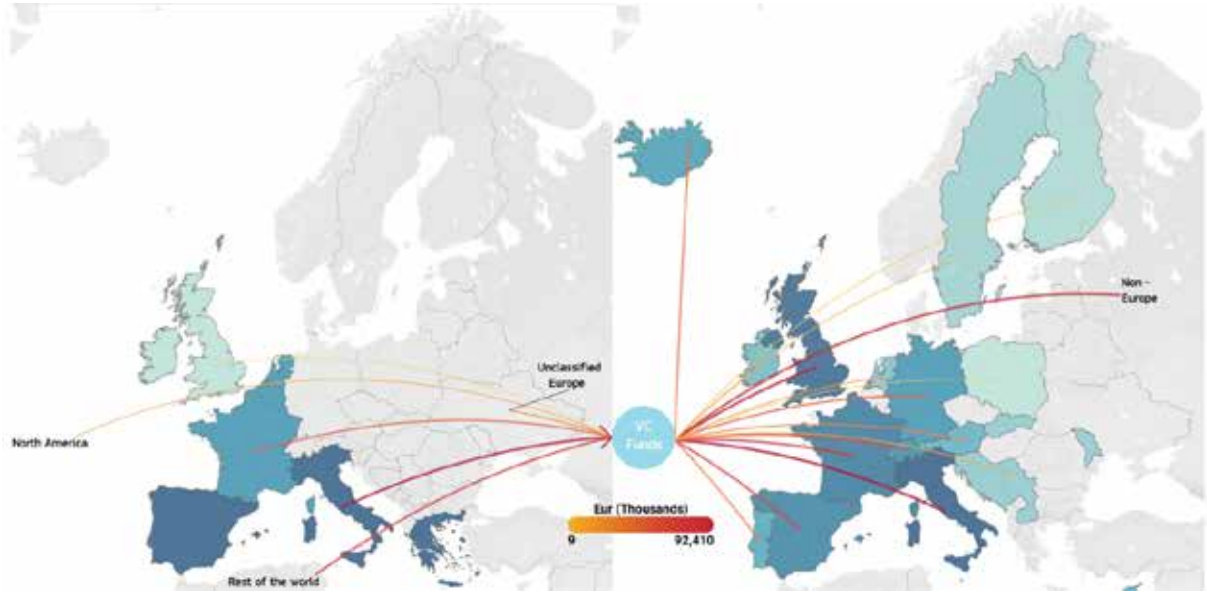
Table Description: Greece

The gravity equations for Greece suggest that the GDP of Greece has no significant effect on either the outflows, inflows or two-way flows of venture capital. The GDP of the partner country acquires only a significant effect on outflows and only in the presence of controls for Greece. In this case the GDP of the partner countries is estimated to be positive and highly significant. The two-way flows between non-Europe and Greece are estimated to have a positive and highly significant effect on inflows, outflows, and two-way flows in one of the two specifications. The two-way flows between non-Europe and the other countries are also estimated to have a positive effect on inflows, outflows, and two-way flows in the presence of controls for the partner countries, but a large negative effect on outflows in the presence of Greek controls. Economic freedom negatively impacts outflows, but under partner controls it has a positive effect on both inflows and two-way flows. On the contrary, higher

ease of business has a negative effect on inflows and two-way flows with partner controls and a positive effect on outflows with Greek controls. The fact that the partner country is a bank-based economy has a very small negative effect on both inflows and two-way flows. The fact that Greece is bank-based on the other hand is estimated to have a small positive effect on outflows. The three-year average of funds raised in IPOs has positive effects in the presence of controls for the partner countries. The distance has a significant positive effect on both inflows and two-way flows in the presence of controls for the partner countries. For outflows, on the other hand, distance is estimated to have a negative effect in the presence of Greek controls. Finally, the presence of a common border is estimated to have a positive effect on outflows.

Italy

Flows from European fundrasing to Italian VC funds vs *Flows from Italian VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Italy (ITA)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on ITA	(5) Outflow, controls on ITA	(6) Two-way flow, controls on ITA
GDP i (EUR tn)	18.48*	-1.89	2.26	1.12***	.9***	.97***
	(10.96)	(1.48)	(3.55)	(.38)	(.29)	(.27)
GDP j (EUR tn)	.52**	1.32***	.88***	-15.23***	8.87	.24
	(.24)	(.4)	(.26)	(3.93)	(14.18)	(6.55)
Two-way flows between non-Europe and country i (EUR bn)	-22.78	26.6	9.22	3.1***	3.22***	3.6***
	(19.07)	(18.48)	(7.39)	(1.01)	(1.09)	(.96)
Two-way flows between non-Europe and country j (EUR bn)	1.89*	2.97*	2.83***	102.63***	-58.54	-3.47
	(1.14)	(1.68)	(1.03)	(20.91)	(44.71)	(26.04)

Economic Freedom	24.98***	18.45	14.79	180.89***	-71.39	47.44
	(9.45)	(14.45)	(9.17)	(28.36)	(87.15)	(41.3)
Bank-based economy	-.01**	0	0**	-.01***	0	0*
	(0)	(0)	(0)	(0)	(0)	(0)
Ease of business	-9.07***	-1.3	-2.86	34.96***	3.42	17.76**
	(3.37)	(1.76)	(2.57)	(5.4)	(9.86)	(7.13)
Three-year average of funds raised in IPOs (EUR bn)	.06	-.19**	-.04	-.25***	.11	-.14
	(.04)	(.09)	(.05)	(.09)	(.39)	(.1)
Distance (in thousand km)	.09	1.84**	1*	1.09	1.11***	1.11***
	(1.08)	(.8)	(.56)	(.67)	(.39)	(.35)
Common border	.32	3.51***	2.34***	3.13***	1.22**	2.48***
	(.88)	(.88)	(.75)	(.69)	(.59)	(.53)
Common language	.06	1.11	.75	2.06***	1.4***	1.81***
	(1.82)	(1.46)	(1.03)	(.72)	(.49)	(.47)
Constant	-53.66**	-23.13*	-23.57**	-133.34***	26.49	-51.78**
	(20.84)	(12.05)	(11.03)	(21.35)	(73.59)	(25.02)
Observations	214	214	214	275	275	275
R-squared	.64	.49	.56	.74	.59	.72

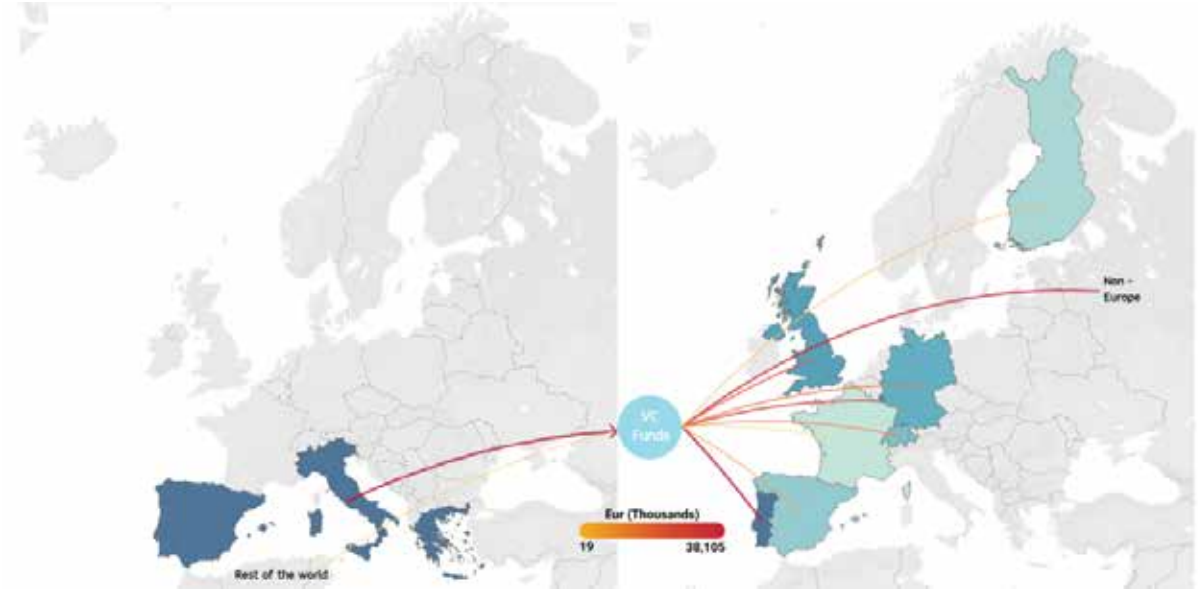
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Italy

The gravity equations for Italy suggest that the GDP of Italy exerts a positive effect on outflows. In addition, the Italian GDP is estimated to have a positive effect on both inflows and two-way flows in the presence of controls on Italy. The GDP of the partner country acquires a significant positive effect on inflows, outflows, and two-way flows in the presence of controls for Italy. In the presence of controls for Italy, the GDP of the partner country is on the other hand estimated to have a negative effect on inflows. The two-way flows between non-Europe and Italy have a positive and highly significant effect on inflows, outflows, and two-way flows in the presence of the Italian controls. The two-way flows between non-Europe and the other countries are also estimated to have a positive effect on inflows, outflows, and two-way flows in four out of the six specifications. The fact that Italy or the partner country is bank-based has a nearly zero effect on all flows. The three-year average of funds raised in IPOs has negative effects on inflows. Distance has a positive effect on two-way flows, on inflows in the presence of controls for the partner countries, and on outflows in the presence of the Italian controls. The presence of a common border is almost always significant, thus lending support to the importance of geographical proximity. Non geographical proximity (common language) is also significant in the specifications with controls on Italy. Finally, higher ease of business and economic freedom, as indicators of institutional quality, have a positive effect on outflows under Italian controls and an ambiguous effect on outflows, controlling for the partner countries' characteristics.

Portugal

Flows from European fundraising to Portuguese VC funds vs *Flows from Portuguese VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Portugal (POR)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on POR	(5) Outflow, controls on POR	(6) Two-way flow, controls on POR
GDP i (EUR tn)	11.26 (41.13)	1.34 (31.06)	-7.45 (20.73)	.96** (.48)	-1.78 (1.65)	-.09 (.67)
GDP j (EUR tn)	-1.34 (2.11)	1.51*** (.49)	.29 (.92)	-13.59 (70.98)	11.28 (97.3)	-19.36 (79.87)
Two-way flows between non-Europe and country i (EUR bn)	96.63 (82.39)	- 143.67** (60.07)	-18.9 (55.25)	-1.59 (3.86)	5.19 (4.25)	.26 (1.82)
Two-way flows between non-Europe and country j (EUR bn)	.06 (2.11)	-2.92 (3.51)	-1.17 (1.63)	154.32 (221.6)	- 607.76*** (206.55)	-6.09 (159.91)
Economic Freedom	-22.84 (17.56)	- 53.85*** (15.53)	-38.4*** (13.54)	124.15* (64.44)	282.53*** (35.11)	135.7** (63.36)
Bank-based economy	-.02 (.02)	-.01 (.01)	-.01** (0)	-.01 (0)	.06** (.02)	0 (0)
Ease of business	-.43 (5.89)	9.25* (5.54)	6.39** (3.21)	-1.45 (4.86)	50.38*** (9.74)	8.54 (9.89)

Three-year average of funds raised in IPOs (EUR bn)	.37 (.26)	.03 (.07)	.14* (.08)	-.1 (.72)	10.85*** (2.75)	1.86** (.87)
Distance (in thousand km)	-2.48 (1.77)	-2.31** (.98)	-2.52** (1.22)	-6.84*** (2.37)	-2.87** (1.16)	-4.06*** (1.26)
Common border	-2.54 (2.18)	.9 (1.31)	-.72 (1.49)	-4.09** (1.87)		-3.16** (1.4)
Constant	13.27 (14.88)	31.38*** (10.51)	25.09* (13.7)	-89.1** (40.14)	-258.01*** (28.62)	-105.05*** (37.97)
Observations	217	217	217	200	192	200
R-squared	.22	.35	.17	.67	.26	.14

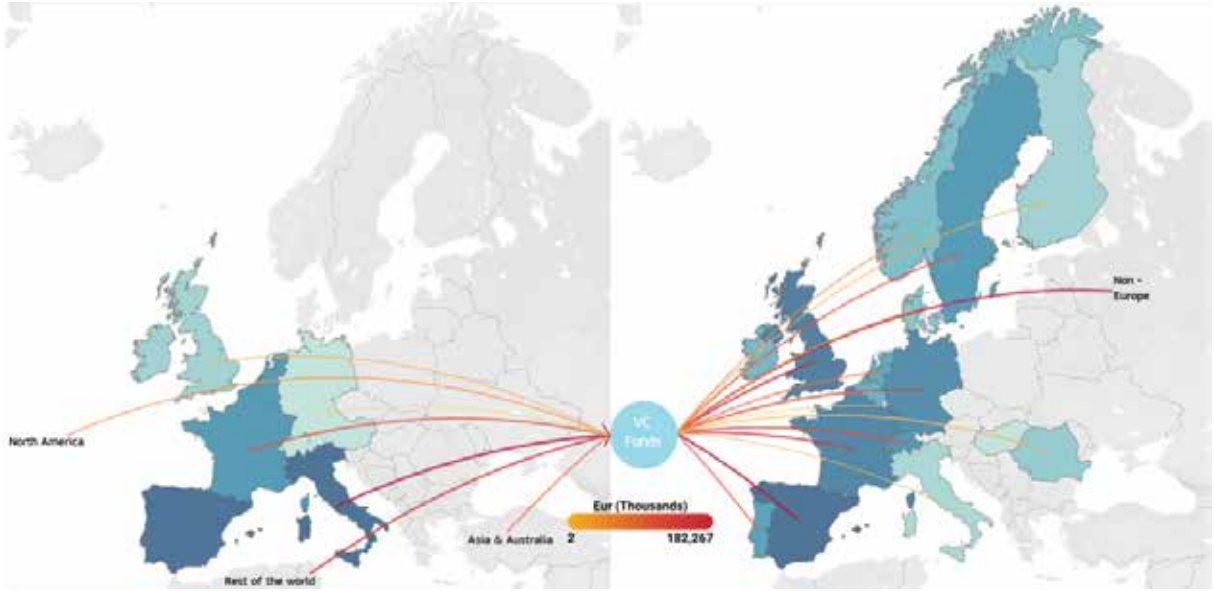
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Portugal

The gravity equations for Portugal suggest that the GDP of Portugal has a small positive effect on the inflows of venture capital in the presence of Portuguese controls. The GDP of the partner country acquires a significant positive effect on inflows only in the presence of controls for Portugal. The two-way flows between non-Europe and Portugal are estimated to have a high negative effect on inflows in the presence of controls for the partner countries. The two-way flows between non-Europe and the other countries have a high negative effect on outflows in the presence of controls for Portugal. Economic freedom is significant in five out of six specifications and reports a negative effect on the outflows and the two-way flows with controls on the partner country. Ease of business also has a positive effect on inflows and two-way flows under the partner country's controls and on outflows under Portuguese controls. The fact that the partner country is a bank-based economy has a very small negative effect on two-way flows. The fact that Portugal is bank-based on the other hand is estimated to have a very small positive effect on outflows. The three-year average of funds raised in IPOs has positive effects on two-way flows and a strong positive effect on outflows in the presence of Portuguese controls. Distance is estimated to have a negative effect on inflows, outflows, and two-way flows in five out of six specifications. Also the presence of a common border is estimated to have a negative effect, namely on inflows and two-way flows with Portuguese controls.

Spain

Flows from European fundraising to Spanish VC funds vs *Flows from Spanish VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Spain (SPA)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on SPA	(5) Outflow, controls on SPA	(6) Two-way flow, controls on SPA
GDP i (EUR tn)	.49 (3.14)	5.56*** (1.94)	4.64*** (1.48)	.79*** (.24)	.48*** (.16)	.73*** (.21)
GDP j (EUR tn)	.64*** (.24)	.72*** (.18)	.69*** (.15)	3.23* (1.82)	-1.63 (3.62)	2.16 (1.83)
Two-way flows between non-Europe and country i (EUR bn)	.72 (1.97)	-1.07 (3.03)	-.73 (2.42)	1.81*** (.57)	3.02*** (.82)	2.02*** (.56)
Two-way flows between non-Europe and country j (EUR bn)	1.61*** (.42)	.21 (.35)	.43 (.31)	-4.76 (6.19)	.52 (6.6)	-3.48 (5.52)
Economic Freedom	14.76* (7.9)	2.8 (15.56)	5.58 (12.55)	40.74 (27.34)	49.46 (31.69)	42.63** (19.48)
Bank-based economy	0* (0)	0 (0)	0 (0)	-.02* (.01)	-.02** (.01)	-.02** (.01)
Ease of business	.97 (1.91)	1.31 (3.66)	1.21 (3.06)	1.31 (2.12)	2.34 (4.32)	1.53 (1.32)
Three-year average of funds raised in IPOs (EUR bn)	-.01 (.04)	.09*** (.03)	.08*** (.03)	.12 (.12)	-.08 (.25)	.08 (.12)

Distance (in thousand km)	-.09	-1.43**	-1.05**	-2.18***	-1.03	-1.87***
	(.45)	(.61)	(.49)	(.69)	(.83)	(.64)
Common border	1.09*	-.4	-.04	-1.29*	.05	-.99
	(.64)	(.67)	(.54)	(.7)	(.7)	(.62)
Constant	-19.97***	-13.06	-14.45	-36.14*	-39.95*	-36.53***
	(7.44)	(12.73)	(10.03)	(18.6)	(23.34)	(12.72)
Observations	215	215	215	250	250	250
R-squared	.44	.68	.72	.52	.43	.58

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Spain

The gravity equations for Spain suggest that the GDP of Spain has a highly significant positive effect on outflows, inflows, and two-way flows of venture capital in five out of six specifications. The GDP of the partner country acquires a significant positive effect on inflows, outflows, and two-way flows in four out of six specifications. The two-way flows between non-Europe and Spain are estimated to have a positive and highly significant effect on inflows, outflows, and two-way flows in the presence of controls for Spain. The two-way flows between non-Europe and the other countries have a positive effect on outflows in the presence of controls for the partner countries. Economic freedom positively affects outflows and two-way flows with controls on the partner and on Spain, respectively. The fact that Spain is bank-based is estimated to have a very small negative effect on inflows, outflows, and two-way flows. The three-year average of funds raised in IPOs has positive effects on inflows and two-way flows in the presence of controls for the partner countries. Distance has a significant negative effect on inflows and two-way flows, while the presence of a common border has a positive effect on outflows (with partner controls) and a negative effect on inflows (Spanish controls).

4.2.2 DACH area[21]

The DACH area, comprising Germany, Austria, and Switzerland, has a well-developed banking system as the majority of the other European countries (however, with a tendency to a market system for Germany). Yet, there are differences in investment behaviours among these countries. As shown in *Graphs 1* and *2*, Austria and Switzerland exhibit a high percentage of foreign investments made by their domestic private equity funds – with Switzerland being the only country surpassing the 50% threshold (other than Luxembourg) – and have a significant percentage of their domestic investments made by foreign PE funds (83% of total PE domestic investments for Austria). However, these figures could be misleading for Switzerland, as many PE intermediaries located there may be under the control of companies based in other countries. On the other hand, the German private equity market tends to be more focused within national borders, with only 19% of German PE funds' investments being international and 35% of domestic investments being made by foreigners. Moreover, Germany experiences a high level of investment reciprocity, with an average Grubel-Lloyd index above 0.5. Overall, the German private equity market stands out as the most developed, in term of volumes, among the DACH countries.

Regarding German PE/VC fundraising, there are fluctuations over time, but when comparing the years 2009 and 2019, the absolute value of fundraising shows an overall increase. However, if we extend the analysis to include the years 2007 and 2020, the absolute value of PE/VC investments

[21] See descriptive country tables in Annex 7.2.

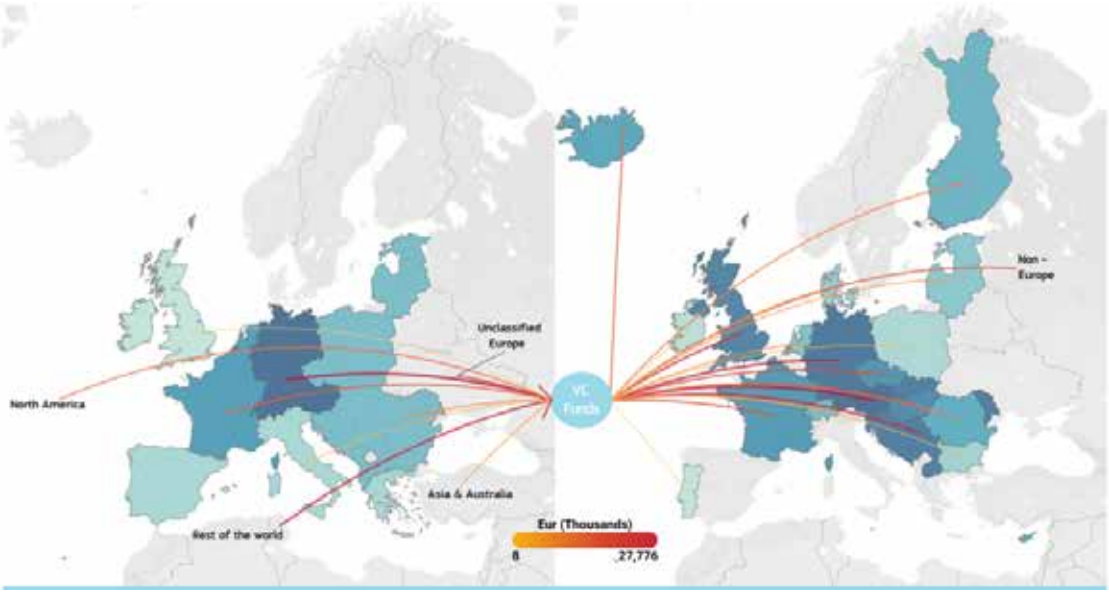
remains relatively stable, with a slight increase in the relative share of VC funds compared to private equity funds. In Austria, an increase in venture capital fundraising can be detected during the last five years, with some fluctuations along the way. According to the gravity model, France and Benelux serve as significant partners in terms of fundraising.

Looking at domestic investments, foreign venture capital funds have been steadily investing in Germany over the last decade, with a peak in 2019. Conversely, other private equity funds have experienced a downturn in investments during 2009-2016 (with a few ups and downs) but have rebounded in the last five years. In Austria, there was a significant outflow of investments made by Austrian PE/VC funds in 2007, followed by a decrease in the total amount in subsequent years, with a local peak of almost EUR 200 million in 2019. On the other hand, the share of VC funds investing into foreign portfolio companies has been increasing in both absolute and relative terms. In contrast, inflows to Austria have been more homogenous over the past decade, with four large investment surges of over EUR 700 million in 2007, 2010, 2015 (reaching almost EUR 1.2 billion), and 2018. However, the Austrian PE market has not followed a linear path, with net investments being almost zero in years without significant foreign investments, and a contraction of the market in 2019 due to a large gross divestment.

The results of the gravity equations for the DACH area support the theory that predicts larger venture capital flows between countries with higher GDPs. A higher degree of financial globalisation in the international venture capital market also appears to have a positive effect on the financial integration of the DACH countries in Europe. As also noted in the aggregate equation, VC flows appear to be unaffected by the financial structure of both the origin and destination countries. A higher degree of economic freedom seems to have a positive effect on VC flows, while a higher degree of economic ease is estimated to have a negative effect on VC flows in both Germany and Switzerland, but positive in Austria. Therefore, we cannot find a clear impact of institutional quality on VC flows in the DACH area. Geographic distance, measured in km, has a negative effect on inflows and two-way flows in all DACH countries, depending on the controls, but the presence of a common border also has a negative effect on inflows and two-way flows in Austria, suggesting a trade-off between diversification and transaction costs/information asymmetries. Cultural proximity, as measured by the presence of a common language, has a positive effect on venture capital flows in the DACH area.

Austria

Flows from European fundraising to Austrian VC funds vs *Flows from Austrian VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Austria (AUS)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on AUS	(5) Outflow, controls on AUS	(6) Two-way flow, controls on AUS
GDP i (EUR tn)	-5.08	-9.22	-8.68	.91***	.56*	.84***
	(8.15)	(5.64)	(5.32)	(.22)	(.29)	(.14)
GDP j (EUR tn)	.74***	1.62***	1.39***	-44.73*	98.87**	-22.48
	(.2)	(.14)	(.13)	(23.83)	(42.9)	(23.42)
Two-way flows between non-Europe and country i (EUR bn)	-49.02**	56.59***	44.84***	2.77***	3.99***	2.82***
	(21.31)	(14.09)	(12.63)	(.92)	(1.43)	(.76)
Two-way flows between non-Europe and country j (EUR bn)	3.65***	1.06***	1.55***	58.61***	71.45	64.41***
	(.75)	(.4)	(.44)	(10.5)	(57.27)	(10.18)
Economic Freedom	-11.7*	19.83***	12.82***	77.49	-71.7	68.2*
	(6.22)	(5.21)	(4.6)	(51.97)	(110.26)	(40.27)
Bank-based economy	.01***	0	0	0	-.01***	0
	(0)	(0)	(0)	(0)	(0)	(0)
Ease of business	2.63	4.16***	3.65***	-3.98	14.83***	-.89
	(2.22)	(1.03)	(.93)	(3.08)	(4.63)	(2.91)
Three-year average of funds raised in IPOs (EUR bn)	.08	-.13***	-.09***	1.99*	-4.65***	.97
	(.11)	(.03)	(.03)	(1.16)	(1.69)	(1.08)
Distance (in thousand km)	-1.13	-1.82***	-1.54***	-.13	-2.79	-.4
	(.94)	(.65)	(.52)	(.54)	(2.16)	(.52)
Common border	-.47	-1.47***	-1.1**	-.12	.27	.06
	(.83)	(.4)	(.43)	(.65)	(1.24)	(.57)
Common language	.68	.39	.46	1.41***	.25	1.16**
	(.63)	(.36)	(.45)	(.54)	(.6)	(.48)
Constant	-.12	-21.16***	-15.65***	-53.11	12.2	-53.42*
	(4.98)	(4.15)	(3.88)	(35.43)	(92.89)	(27.61)
Observations	217	217	217	200	200	200
R-squared	.6	.76	.78	.82	.59	.82

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

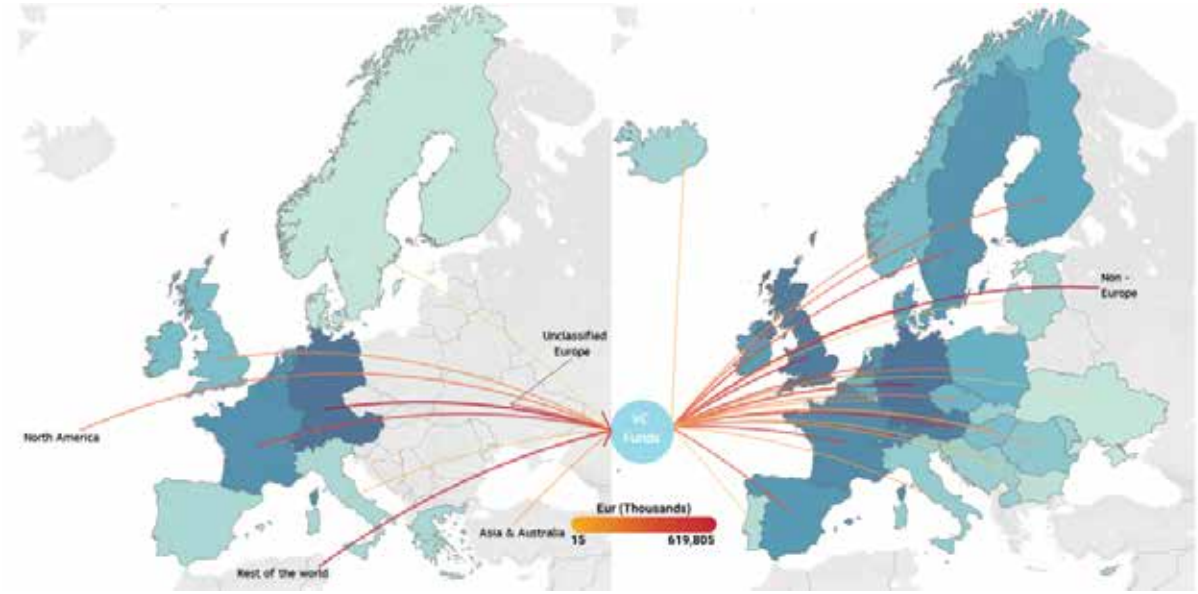
Table Description: Austria

The gravity equations for Austria suggest that the GDP of Austria has a small positive effect on outflows, inflows, and two-way flows of venture capital in the presence of Austrian controls. In the presence of controls for the partner countries, the GDP of the partner country acquires a significant positive effect on inflows, outflows, and two-way flows. In the presence of controls for Austria, on

the other hand, the GDP of the partner country is estimated to have a negative effect on inflows and a positive effect on outflows. The two-way flows between non-Europe and the partner countries have a highly significant positive effect on inflows, outflows, and two-way flows in five out of six specifications. In the presence of controls on the partner countries, however, the two-way flows between non-Europe and the other countries acquire a negative effect on outflows. The two-way flows between non-Europe and Austria are estimated to have a highly significant positive effect on inflows, outflows, and two-way flows in five out of six specifications. The fact that the partner country is a bank-based economy has a very small positive effect on outflows, but when including controls on Austria the effect becomes slightly negative. The three-year average of funds raised in IPOs has negative effects on inflows and two-way flows in the presence of controls for the partner countries; when considering Austrian controls it has a positive effect on inflows and a strong negative effect on outflows. Distance, as well as the presence of a common border, has a negative effect on both inflows and two-way flows in the presence of controls for the partner countries. Sharing a common language seems to have a positive effect on inflows and two-way flows, in the presence of Austrian controls.

Germany

Flows from European fundraising to German VC funds vs *Flows from German VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Germany (Ger)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on DEU	(5) Outflow, controls on DEU	(6) Two-way flow, controls on DEU
GDP i (EUR tn)	.17 (.6)	.15 (.72)	.15 (.56)	1.1*** (.13)	.88*** (.23)	.99*** (.16)
GDP j (EUR tn)	.86*** (.24)	1.18*** (.18)	1.01*** (.17)	3.17*** (.49)	-.99 (1.47)	1.58*** (.55)
Two-way flows between non-Europe and country i (EUR bn)	1.2 (1.21)	.16 (.9)	.49 (.78)	2.72*** (.75)	1.46 (.99)	2.34*** (.8)
Two-way flows between non-	.63	1.51***	1.35***	2.43**	-.36	1.16

Europe and country j (EUR bn)	(.69)	(.51)	(.48)	(1.03)	(.95)	(.83)
Economic Freedom	5.29	15.6***	10.67**	41.07***	-7.71	20.85*
	(6.43)	(5.12)	(5.03)	(13.79)	(20.76)	(11.27)
Bank-based economy	0	0**	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)
Ease of business	1.29	1.2	1.19	-7.8***	-.94	-5.06***
	(1.28)	(1.06)	(.96)	(1.08)	(1.09)	(.75)
Three-year average of funds raised in IPOs (EUR bn)	.01	-.03	-.01	-.54***	.24	-.23**
	(.05)	(.03)	(.03)	(.12)	(.17)	(.1)
Distance (in thousand km)	-.32	-1.45***	-.8	-2.13***	-.96	-1.49***
	(.73)	(.41)	(.52)	(.52)	(.75)	(.58)
Common border	-.13	.32	.16	-.13	-.33	-.18
	(.56)	(.44)	(.41)	(.36)	(.49)	(.39)
Common language	1.08	-.12	.42	.84	1.33**	1.03**
	(.75)	(.29)	(.44)	(.59)	(.52)	(.42)
Constant	-11.16**	-	-	-	3.29	-22.01**
	(4.89)	17.81***	13.91***	40.42***	(19.1)	(9.13)
		(3.97)	(3.97)	(10.97)		
Observations	214	214	214	275	275	275
R-squared	.61	.86	.86	.85	.57	.83

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Germany

The gravity equations for Germany suggest that the GDP of Germany has a small positive effect on outflows, inflows, and two-way flows of venture capital in the presence of German controls. The GDP of the partner country acquires a highly significant, positive effect on inflows, outflows, and two-way flows in five out of six specifications. The two-way flows between non-Europe and Germany are estimated to have a positive effect on inflows and two-way flows in the presence of controls for Germany. In three out of four specifications, the two-way flows between non-Europe and the other countries have a significant, positive effect on inflows and two-way flows. The results suggest that the flows of venture capital are independent of Germany, or the partner countries being bank-based. Economic Freedom has a significant and positive effect on inflows and two-way flows. On the other hand, Ease of Business appears to have a negative effect on inflows and two-way flows in the presence of German controls. The three-year average of funds raised in IPOs has negative effects on inflows and two-way flows in the presence of German controls. Distance is estimated to have a highly significant negative effect on both inflows and two-way flows in three out of four specifications, while sharing a common border doesn't seem to have a significant effect. Sharing a common language seems to have a positive effect on outflows and two-way flows, in the presence of German controls.

Switzerland

Gravity model: Switzerland (SWI)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on SWI	(5) Outflow, controls on SWI	(6) Two-way flow, controls on SWI
GDP i (EUR tn)	-3.17	1.79	-1.08	.77***	1.25***	1.01***
	(2.36)	(2.07)	(2.29)	(.27)	(.18)	(.17)
GDP j (EUR tn)	1***	.68**	.88***	3.34	-3.02	-.07
	(.14)	(.33)	(.15)	(2.32)	(3.05)	(2.75)
Two-way flows between non-Europe and country i (EUR bn)	3.18**	.77	2.5	1.87**	.85**	1.32***
	(1.5)	(3.58)	(2.09)	(.87)	(.37)	(.5)
Two-way flows between non-Europe and country j (EUR bn)	.2	.88	.46	.48	1.5	1.44
	(.3)	(.73)	(.45)	(1.89)	(2.38)	(1.63)
Economic Freedom	17.47**	3.95	10.48*	-2.23	7.56	3.9
	(7.56)	(9.33)	(5.76)	(34.45)	(32.75)	(29.03)
Bank-based economy	0	-.01***	0**	-.01	.01	0
	(0)	(0)	(0)	(.01)	(.02)	(.02)
Ease of business	.18	2.23	1.27	-5.31**	-2.74	-3.85**
	(1)	(1.37)	(.97)	(2.46)	(1.81)	(1.85)
Three-year average of funds raised in IPOs (EUR bn)	-.03	-.03	-.04	-.07	.04	-.02
	(.03)	(.04)	(.03)	(.15)	(.12)	(.12)
Distance (in thousand km)	-.27	-1.74***	-1.02**	-1.58***	-.69	-1.15**
	(.47)	(.52)	(.43)	(.6)	(.52)	(.51)
Common border	.31	-1.13	-.83***	-1.56**	-.39	-1.22***
	(.24)	(.72)	(.32)	(.67)	(.38)	(.36)
Common language	-.19	.79**	.6*	.84*	-.19	.56
	(.39)	(.38)	(.36)	(.45)	(.43)	(.43)
Constant	-18.14***	-9.03	-12.56**	-1.08	-9.24	-5.51
	(6)	(7.5)	(4.96)	(29.09)	(27.32)	(24.29)
Observations	214	214	214	275	275	275
R-squared	.63	.52	.64	.5	.67	.68

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Switzerland

The gravity equations for Switzerland suggest that the Swiss GDP has a small positive effect on outflows, inflows, and two-way flows of venture capital in the presence of Swiss controls. In the presence of controls for the partner countries, the GDP of the partner country acquires a significant positive effect on inflows, outflows, and two-way flows. The two-way flows between non-Europe and Switzerland are estimated to have a positive effect on inflows, outflows, and two-way flows in four

out of six specifications. On the other hand, the two-way flows between non-Europe and the partner country seem not to have any significant effect on the flows of venture capital. A higher degree of economic freedom positively affects outflows and two-way flows under partner controls. On the other hand, a higher degree of ease of business has a negative effect on inflows and two-way flows under Swiss controls. The fact that the partner country is a bank-based economy is estimated to have a very small negative effect on inflows. The fact that Switzerland is bank-based on the other hand seems not to have a significant influence on the flows of venture capital. The three-year average of funds raised in IPOs doesn't seem to have any significant effect on flows. Distance has a negative effect on both inflows and two-way flows in four out of four specifications. Sharing a common language seems to have a positive effect on inflows and, in the presence of controls on the partner country, two-way flows, while sharing a common border has a negative effect on inflows and two-way flows under Swiss controls, and on two-way flows under controls on the partner country.

4.2.3 Northern Europe[22]

The Northern European area presents an environment where bank systems (Finland, Norway and Denmark) and market-based systems (Sweden) coexist. This is also reflected in the size of the PE market in the countries, and in the high degrees of reciprocity of two-way flows, with Sweden having the highest average Grubel-Lloyd index. Investment in the Nordic countries accurately reflects the prediction of the gravity model. They present a relatively low value of foreign investment by local equity firms and of local investment by foreign firms; the few instances of the latter mainly originate from other Northern European countries. However, specific cases present different patterns. As shown in *Graphs 1* and *2*, Sweden exhibits the lowest value of domestic investments made by foreign firms (only 32.39% of total domestic investment) but presents a high value of foreign investment made by local firms, being the only country – together with Denmark – to exceed the EU mean (33% of the total PE investment made by local firms). Norway and Finland instead have a value below 20%. Sweden is therefore among the few net exporters of PE flows in Europe.

In Northern Europe the venture capital market is well developed. Finland, Sweden and Denmark all made VC investments amounting to more than 0.05% of their GDP, and Norway, though featuring a lower percentage, still is above the Euro Area mean (see *Graph 6*). Analysing the fundraising of the Northern European PE/VC funds, we note that in absolute terms the venture capital fundraising was higher in Sweden, where it surpassed EUR 1.4 billion in 2019, with the largest foreign contributors in this fundraising round being France and the Benelux. In relative terms, however, it has been higher in Finland, where it was on average 23.12%. The largest private equity fundraising took place in Sweden in 2018, with nearly EUR 13 billion, collected almost entirely through private equity flows, with very little venture capital flows. Apart from this year, fundraising in Sweden surpassed EUR 6 billion only in 2008, 2015, 2017 and 2020.

Analysing their specific domestic PE markets in general, different situations emerge, even if for all the Nordic countries domestic VC investments remain somewhat stable. In Finland net investments remained stable until 2013, when they became negative due to a huge divestment (close to EUR 1 billion). After 2013, investments began to reprise, thanks to foreign PE/VC inflows. In the Swedish market, instead, investments made by local funds abroad are roughly comparable to investments made by foreign funds. In Sweden we also see that from 2015 net investments started to become negative, only recovering in 2018, again due to the exceptionally gross divestments of almost EUR 3 billion that took place between 2016 and 2017. For Denmark, we note again a relative prevalence of investment made by foreign funds. The investment of Danish funds abroad instead remained at a low level, with the only exception of 2016 when the Danish funds invested roughly EUR 2 billion, of which almost EUR 1 billion in foreign companies. In general, the Danish PE market size decreased since 2007, from zero net investment to a negative net investment value in 2012. Starting from 2013,

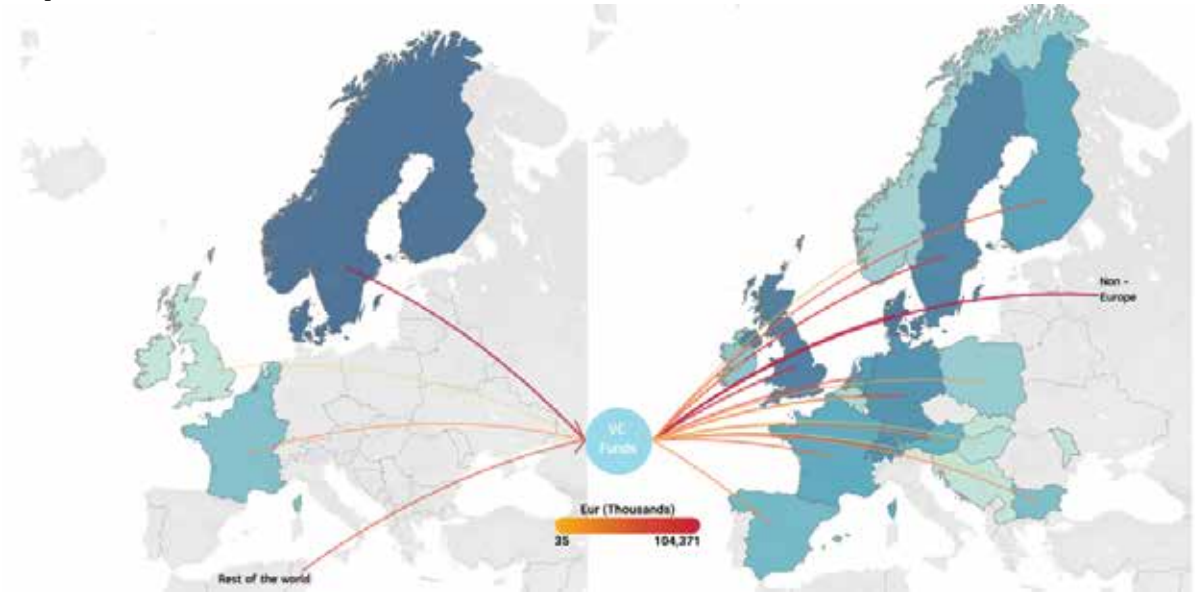
[22] See descriptive country tables in Annex 7.3.

with the injection of a consistent gross investment, the size of the market returned to positive levels, reaching a peak in 2018, again thanks to huge gross investments made by both local and foreign funds. Finally, Norway is the only country in the region – and, in fact, in the entire sample – where net investment remains positive over the course of the sample period, thanks to consistent inflows even during the period of the Eurozone crisis when numerous countries suffered from significant divestments.

The results of the gravity equations for the Northern European countries entail some contradictions concerning the role of GDP in influencing the VC flows. While the GDP of the partner country is in most specifications estimated to have a positive effect on VC flows, the GDP of the analysed Northern European country is estimated to have a negative effect in some specifications and a positive effect in others. A higher degree of financial globalisation in the international VC market has a positive effect on the financial integration of Northern European countries in Europe. As already noted in the aggregate equation, VC flows appear to be unaffected by the financial structure of both the origin and the destination country. Overall, a higher degree of economic freedom seems to positively affect VC flows, while a higher degree of economic ease is mostly estimated to have no or even a negative effect on VC flows. Therefore, we could not find a clear impact of institutional quality on VC flows for the Northern European countries. Geographic distance, measured by distance in km, is overall estimated to negatively influence VC flows. On the other hand, the presence of a common border seems to positively impact flows, with the only exception of Denmark, where a common border is estimated to have a negative effect on VC flows.

Denmark

Flows from European fundraising to Danish VC funds vs *Flows from Danish VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Denmark (DNK)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on DNK	(5) Outflow, controls on DNK	(6) Two-way flow, controls on DNK
GDP i (EUR tn)	-11.16*	-.58	-7.87	1.2***	1.16***	1.18***
	(6.35)	(17.66)	(7.81)	(.26)	(.39)	(.32)

GDP j (EUR tn)	1.32***	1.77***	1.53***	-31.67	-25.33	-27.71
	(.33)	(.3)	(.26)	(30.48)	(16.79)	(17.53)
Two-way flows between non-Europe and country i (EUR bn)	5.32***	6.23*	5.95***	1.09**	1.43*	1.28**
	(1.99)	(3.41)	(1.63)	(.53)	(.84)	(.59)
Two-way flows between non-Europe and country j (EUR bn)	-.4	.21	-.41	6.5**	4.83*	5.57**
	(.54)	(.66)	(.53)	(3.23)	(2.73)	(2.24)
Economic Freedom	26.65***	19.46***	23.5***	35.53	31.39	32.03***
	(6.51)	(6.1)	(5.75)	(40.71)	(21.58)	(10.11)
Bank-based economy	0**	0*	0***	0	0	0
	(0)	(0)	(0)	(.01)	(0)	(0)
Ease of business	.41	-.94	.01	1.05	-7.21**	-4
	(1.78)	(2.38)	(1.74)	(7.45)	(3.22)	(2.72)
Three-year average of funds raised in IPOs (EUR bn)	-.06*	-.23***	-.12***	.02	.27*	.17
	(.04)	(.04)	(.03)	(.2)	(.14)	(.13)
Distance (in thousand km)	-2.73***	-3.8***	-3.07***	-3.15***	-2.66**	-2.85***
	(1.01)	(.79)	(.81)	(.9)	(1.14)	(1.02)
Common border	-2.32***	-3.9***	-3***	-3.29***	-2.58***	-2.84***
	(.74)	(.7)	(.6)	(.62)	(.85)	(.7)
Constant	-22.67***	-18.76***	-20.14***	-26.09	-18.78	-20.2***
	(4.86)	(6.11)	(4.49)	(25.88)	(14.3)	(7.79)
Observations	214	214	214	275	275	275
R-squared	.78	.47	.71	.35	.61	.57

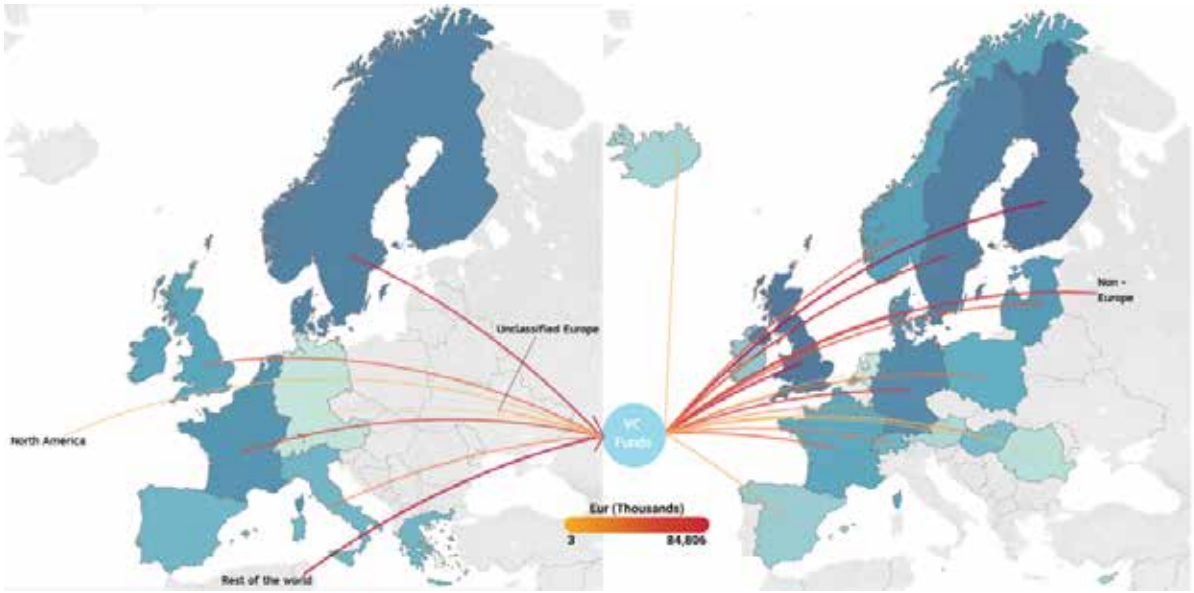
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Denmark

The gravity equations for Denmark suggest that the GDP of Denmark has a small positive effect on outflows, inflows, and two-way flows of venture capital in the presence of Danish controls. In the presence of controls for the partner countries, the GDP of Denmark acquires, however, a negative effect on outflows. The GDP of the partner country acquires a significant positive effect on inflows, outflows, and two-way flows in the presence of controls for the partner countries. The two-way flows between non-Europe and Denmark have a significant positive effect on inflows, outflows, and two-way flows. The two-way flows between non-Europe and the partner country are estimated to have a significant positive effect on inflows, outflows, and two-way flows in the presence of controls for Denmark. Economic freedom has a positive effect on all flows under partner controls, and also on two-way flows under Danish controls. Ease of business, on the other hand, has a negative effect on outflows with controls on Denmark. The results suggest that the flows of venture capital are independent of Denmark, or the partner countries, being bank-based. The three-year average of funds raised in IPOs has negative effects in the presence of controls for the partner countries and a positive effect on outflows in the presence of Danish controls. Distance, as well as sharing a common border, has a negative effect on inflows, outflows, and two-way flows in all specifications.

Finland

Flows from European fundraising to Finnish VC funds vs *Flows from Finnish VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Finland (FIN)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on FIN	(5) Outflow, controls on FIN	(6) Two-way flow, controls on FIN
GDP i (EUR tn)	-4.79 (13.55)	10.13 (22.45)	4.36 (17.9)	.59*** (.2)	.57*** (.19)	.56*** (.19)
GDP j (EUR tn)	.55*** (.12)	.7*** (.19)	.6*** (.14)	2.02 (12.23)	41.41 (25.6)	15.18 (13.01)
Two-way flows between non-Europe and country i (EUR bn)	24.84 (35.39)	18.05 (60.03)	22.2 (44.75)	4.06*** (.63)	3.12*** (.75)	3.85*** (.62)
Two-way flows between non-Europe and country j (EUR bn)	1.21*** (.46)	2.15*** (.28)	2*** (.25)	47.78 (49.83)	28.11 (53.27)	38.81 (48.91)
Economic Freedom	7.89* (4.59)	8.2 (5.87)	8.19* (4.28)	-66.37* (39.94)	-26.46 (34.4)	-51.11* (30.44)
Bank-based economy	0* (0)	-.01** (0)	-.01*** (0)	.01 (.01)	0 (.01)	.01 (.01)
Ease of business	-.12 (1.92)	.6 (1.91)	.21 (1.09)	4.18 (3.22)	-.79 (4.52)	2.33 (3.25)
Three-year average of funds raised in IPOs (EUR bn)	.07*** (.02)	.02 (.04)	.04 (.03)	.13 (1)	-1.91* (1)	-.51 (.76)
Distance (in thousand km)	-1.73***	-1.15**	-1.37***	-.79**	-1.49***	-1.06***

	(.28)	(.48)	(.33)	(.36)	(.27)	(.31)
Common border	.09	.85	.58	1.97***	.79***	1.51***
	(.32)	(.57)	(.41)	(.48)	(.25)	(.37)
Constant	-10.23***	-14.15***	-11.99***	40.22	6.88	28.46
	(3.46)	(3.24)	(2.97)	(27.54)	(23.83)	(20.86)
Observations	214	214	214	275	275	275
R-squared	.42	.52	.57	.6	.42	.63

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Finland

The gravity equations for Finland suggest that both the GDP of Finland and the two-way flows between non-Europe and Finland exert a positive effect on inflows, outflows, and two-way flows in the presence of Finish controls. The GDP of the partner countries and the two-way flows between non-Europe and the partner countries acquire a significant positive effect on inflows, outflows, and two-way flows in the presence of controls for the partner countries. Whether the partner country is bank-based has a nearly zero effect on all flows. The three-year average of funds raised in IPOs has a near zero positive effect on outflows in the presence of controls for the partner countries and a negative effect on outflows in the presence of Finish controls. Distance has a negative effect, and the presence of a common border has a positive effect in the presence of Finish controls, thus lending support to the importance of geographical proximity. Economic freedom, as an indicator of institutional quality, has a positive effect on outflows and two-way flows in the presence of controls for the partner countries and a strong negative effect on inflows and two-way flows in the presence of Finnish controls.

Norway

Gravity model: Norway (NOR)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on NOR	(5) Outflow, controls on NOR	(6) Two-way flow, controls on NOR
GDP i (EUR tn)	-6.62**	-3.19	-5.13***	.68**	.94***	.81***
	(2.96)	(2.42)	(1.99)	(.34)	(.3)	(.25)
GDP j (EUR tn)	1.59***	.92***	1.24***	-2.96	-10.8	-7.81
	(.28)	(.32)	(.19)	(4.97)	(9.81)	(5.18)
Two-way flows between non-Europe and country i (EUR bn)	31.57**	17.35	25.93	4.57***	2.37***	3.53***
	(12.7)	(27.01)	(16.89)	(1.49)	(.73)	(.86)
Two-way flows between non-Europe and country j (EUR bn)	-.44**	2.62***	1.1***	31.64	51.57	43.57*
	(.22)	(.5)	(.23)	(19.27)	(34.37)	(24.04)
Economic Freedom	37.78***	35.3***	36.28***	16.28**	9.25	11.51
	(7.7)	(8.42)	(7.26)	(7.56)	(15.8)	(11.72)
Bank-based economy	0	-.01***	-.01***	-.01	.01	0
	(0)	(0)	(0)	(.01)	(.01)	(.01)

Ease of business	.67	-6.08***	-2.54	-8.28	-3.29	-5.47
	(1.53)	(1.99)	(1.63)	(10.3)	(2.48)	(4.09)
Three-year average of funds raised in IPOs (EUR bn)	-.14***	-.17*	-.15***	.22	.45	.34
	(.04)	(.09)	(.04)	(.29)	(.33)	(.28)
Distance (in thousand km)	.18	-1.77***	-.73	-1.43**	-.49	-.86*
	(.63)	(.68)	(.62)	(.65)	(.39)	(.5)
Common border	3.28***	2.25***	2.75***	2.14***	2.54***	2.38***
	(.83)	(.67)	(.65)	(.69)	(.72)	(.63)
Constant	-36.72***	-	-	-13.7***	-10.52	-10.48
	(6.15)	28.92***	31.96***	(3.23)	(11.46)	(7.28)
		(5.81)	(5.18)			
Observations	214	214	214	275	275	275
R-squared	.55	.62	.73	.4	.45	.51

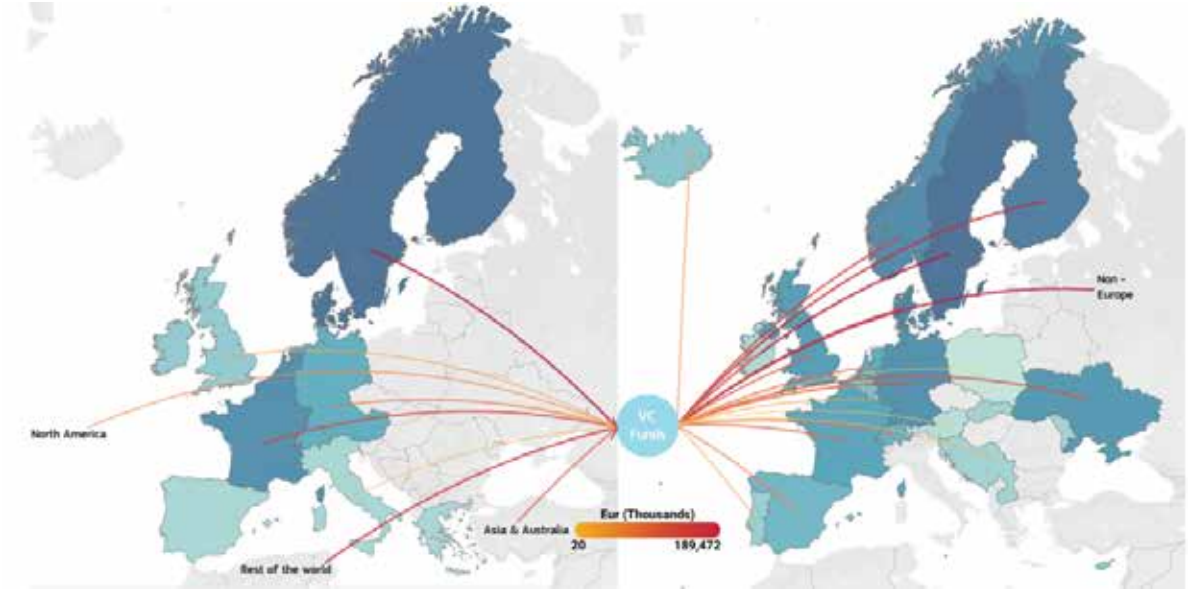
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Norway

In the gravity equations for Norway, the results depend heavily on the controls used in the different specifications. The use of controls sharpens the significance and "corrects" the sign of some corresponding gravity regressors (GDPs, extra-European flows and bank-based economy). In the presence of controls the partner countries, Norway's GDP has a negative effect on outflows and two-way flows, while when controlling for Norway's characteristics, the GDP of Norway acquires a positive and significant effect on all flows. Likewise, with controls on other countries, their GDP has a positive and significant effect on all flows. Two-way flows between non-Europe and Norway have a significant positive effect on inflows and two-way flows using the controls for Norway and on outflows using both specifications. Two-way flows between non-Europe and the other countries have a significant positive effect on two-way flows for both specifications, while there is a negative effect on outflows and a positive effect on inflows under controls on the partner country. The variable bank-based has a significant effect on inflows and gross flows only when using the controls on the other countries: the effect is small and negative. Economic freedom has a positive effect on all flows under partner controls, and on inflows under Norwegian controls. Ease of business negatively affects inflows with controls on the partner countries. The three-year average of funds raised in IPOs has a negative effect on all flows in the presence of controls for the partner countries. Distance has a significant negative effect on inflows and, using the Norwegian controls, on the two-way flows. A common border has a significant positive effect on inflows, outflows, and two-way flows under all specifications.

Sweden

Flows from European fundraising to Swedish VC funds vs *Flows from Swedish VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Sweden (SWE)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on SWE	(5) Outflow, controls on SWE	(6) Two-way flow, controls on SWE
GDP i (EUR tn)	-3.76	-5.75**	-5.45*	.44*	.46**	.43**
	(3.7)	(2.39)	(3.25)	(.23)	(.22)	(.2)
GDP j (EUR tn)	.53***	.41**	.4***	-7.61**	6.76	-2.37
	(.19)	(.18)	(.15)	(3.55)	(8.01)	(3.69)
Two-way flows between non-Europe and country i (EUR bn)	16.02**	9.67	11.91**	4.87***	1.93**	3.73***
	(8.17)	(6.93)	(5.11)	(.61)	(.92)	(.53)
Two-way flows between non-Europe and country j (EUR bn)	1.87***	2.8***	2.77***	8.94	10.92*	10.04**
	(.73)	(.35)	(.33)	(5.53)	(6.41)	(4.11)
Economic Freedom	-23.87***	19.43***	-9.04	22.7**	-4.3	8.1
	(4.49)	(7.49)	(11.09)	(10.57)	(8.71)	(7.35)
Bank-based economy	0	0	0	0	-.03**	-.01
	(0)	(0)	(0)	(0)	(.01)	(.01)
Ease of business	3.94*	-1.09	1.97	1.67	-3.06	-.36
	(2.14)	(1.77)	(2.55)	(2.33)	(5.04)	(2.79)
Three-year average of funds raised in IPOs (EUR bn)	.09*	.06**	.08*	-.04	0	.01
	(.05)	(.02)	(.04)	(.11)	(.14)	(.08)
Distance (in thousand km)	-1.49**	-1.68***	-1.32***	-1.5**	-1.17*	-1.33**

	(.59)	(.43)	(.42)	(.59)	(.69)	(.56)
Common border	.83	.35	.47	.49	1.4**	.97*
	(.65)	(.34)	(.37)	(.52)	(.6)	(.52)
Constant	12.09***	-16.87***	3.63	-20.71***	-2.89	-9.79*
	(3.14)	(4.96)	(7.73)	(7.97)	(7.14)	(5.58)
Observations	214	214	214	275	275	275
R-squared	.37	.7	.64	.65	.31	.62

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Sweden

The gravity equations for Sweden suggest that the GDP of Sweden exerts a positive effect on inflows, outflows, and two-way flows in the presence of Swedish controls. In the presence of controls for the partner countries, on the other hand, the equations suggest a negative effect of the Swedish GDP on inflows and two-way flows. The GDP of the partner country acquires a significant positive effect on inflows, outflows, and two-way flows in the presence of controls for the partner countries and a negative effect on inflows in the presence of Swedish controls. The two-way flows between non-Europe and Sweden and between non-Europe and the partner countries have a positive effect on inflows, outflows, and two-way flows in five out of six specifications. Whether Sweden or the partner country is bank-based has a nearly zero effect on all flows. Economic freedom has an ambiguous effect under partner controls, positively affecting inflows and negatively affecting outflows; under Swedish controls, it has a positive effect on inflows. Ease of business, instead, has a positive effect on inflows with controls on the partner countries. The three-year average of funds raised in IPOs has a positive effect in the presence of controls for the partner countries. Distance has a negative effect on all flows, thus lending support to the importance of geographical proximity, supported by a positive effect of the presence of a common border on outflows and two-way flows under Swedish controls.

4.2.4 France & Benelux[23]

France and the Benelux area present both well-developed bank systems (in Belgium and Luxemburg), and market-based systems (in the Netherlands and France). This is reflected in the different sizes of the PE fundraising and investment markets, which are consistently larger in the market-based countries. Fundraising and cross border investments are also conform to the "proximity" view, the other countries in this group being their major partners, with the only exception of Luxembourg. The latter is, among all the European countries, an outlier in both exports and imports of PE investments. Luxembourg has the highest value in Europe for both domestic investments made by foreign PE funds (90.42% of total domestic investments, see *Graph 2*), and foreign investment made by Luxembourg funds (90.60% of their total PE investments, see *Graph 1*). As in the case of Switzerland, this is also due to the fact that many PE funds located in Luxembourg are controlled by foreign owners. This also leads Luxembourg to be one of the few net exporters of PE flows (see *Graph 3*). The only other country in this group that is a net exporter of PE flows is France. However, France's status is more due to a low value of domestic investment made by foreign funds (only 13.42% of total domestic investment, *Graph 2*), than to a high level of exports of PE flows made by French funds (equal to 21.74% of their total investment, *Graph 1*), which is below the European average (33.01%).

The internationalisation of Luxembourg is reflected also in the number of different partners for venture capital fundraising in comparison to France and the other Benelux countries. Particularly consistent was the North American contribution to its VC fundraising in 2008 (the major partner), 2014 and 2017. However, the size of the PE/VC fundraising in Luxembourg is relatively small with respect to the other countries, during the entire 2007-2020 period, with the only exception of 2018 with a private equity fundraising of almost EUR 5 billion. In Belgium, average fundraising volumes remain low for most of the period of interest, with the difference of a relatively higher share of venture capital funds. Only in 2017 and 2019 did the Belgian funds raise more than EUR 600 million, reaching EUR 2 billion. On the other hand, France and the Netherlands present a stable level of fundraising with an increasing trend over the years, reaching EUR 7 billion for the Netherlands and EUR 20 billion for France in 2020, in line with the European trend over the period. This difference is also visible in the share of GDP devoted to VC investments (illustrated in *Graph 6*), equal to 0.042% in Belgium, France and the Netherlands and to only 0.028% in Luxembourg, which is below the euro area average.

Analysing national PE markets, different trends emerge. In the market-based countries, the net investments decreased and remained relatively low from 2009 to 2015 (in France), and to 2016 (in the Netherlands). Subsequently, they rapidly increased, especially in the Dutch PE market, that in 2020 experienced a net investment value almost 10 times larger than in 2016, while in France net investment in 2020 is about three times larger than in 2015. In Belgium, instead, the net investment has never surpassed EUR 1 billion. Moreover, it became negative in 2018 , but mainly due to an extraordinary gross divestment of almost EUR 3 billion, as the gross investments remained close to the 2017 value. In Luxembourg, finally, the net investment value was at its maximum of almost EUR 1,2 billion in 2008. Afterwards, its gross investments started to decline until 2013, when the gross divestments increased, leading to a negative net investment value. The balance remained negative until 2016, when we observe a consistent decrease in the gross divestment and also a huge gross investment, comparable to 2008 values. Cyclically, since 2017 the size of the market has begun to decline again, reaching a negative net investment value, again due to a massive divestment in 2019.

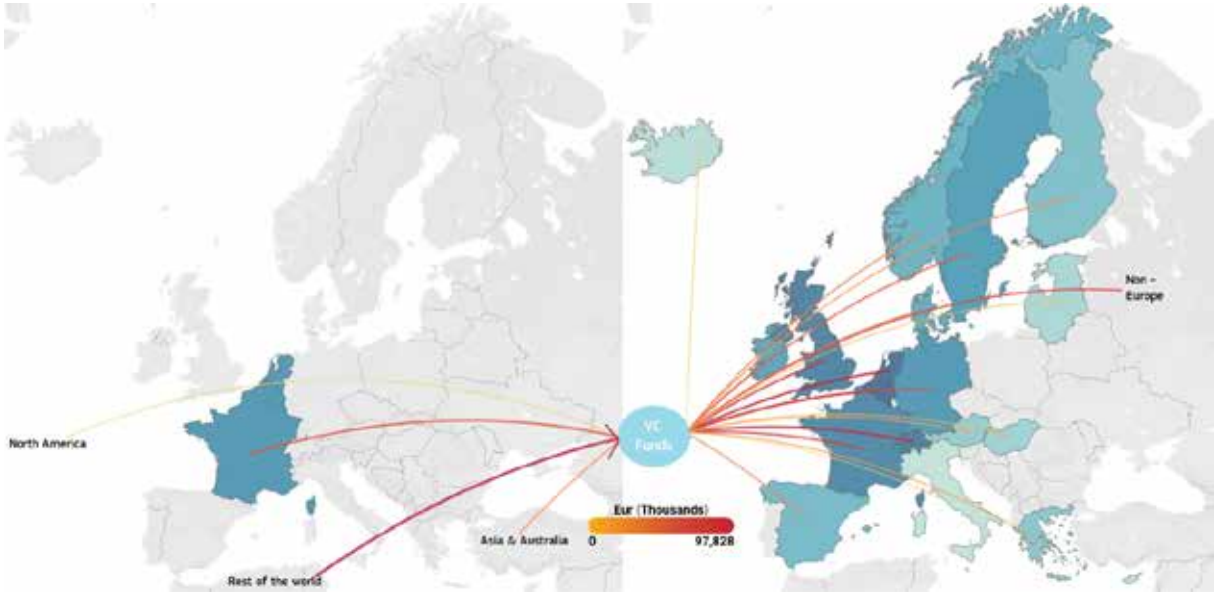
The results of the gravity equations for France and Benelux support the gravity tenet predicting larger VC flows between countries with higher GDPs. A higher degree of financial globalisation in the international VC market also seems to have a positive effect on the financial integration of France and Benelux in Europe. As already noted in the aggregate equation, VC flows appear to be unaffected by the financial structure of either the origin or the destination country. Institutional quality does not

[23] See descriptive country tables in Annex 7.4.

seem to have a great influence on the VC flows in these countries: both economic freedom and ease of business is estimated to have no significant effect in most of the specifications. Geographic distance, measured in km, has the expected negative effect on VC flows in most of the specifications, while a common border is estimated to have no or even a negative effect in most of the specifications. This ambiguity seems to lend support to the existence of a trade-off between the search for diversification – which pushes towards investment in distant, and hence different countries – and the importance of transaction costs and information asymmetries, which push towards investment in similar and close-by countries. Cultural proximity, measured by the presence of a common language, is estimated to have a positive effect on VC flows.

Belgium

Flows from European fundraising to Belgian VC funds vs *Flows from Belgian VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Belgium (BEL)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on BEL	(5) Outflow, controls on BEL	(6) Two-way flow, controls on BEL
GDP i (EUR tn)	-1.36 (4.19)	6.56 (6.19)	1.89 (3.66)	.4 (.28)	.3 (.25)	.33 (.22)
GDP j (EUR tn)	.38 (.27)	.48** (.21)	.39** (.18)	12.21** (4.79)	20.1 (14.66)	17.93** (8.56)
Two-way flows between non-Europe and country i (EUR bn)	4.72 (13.49)	9.38 (11.32)	7.09 (9.18)	.13 (.68)	-.69 (1.19)	-.4 (.89)
Two-way flows between non-Europe and country j (EUR bn)	.34 (.97)	-.42 (.74)	.09 (.65)	-3.54 (24.97)	-7.95 (40.19)	-7.39 (21.01)

Economic Freedom	-2.27	-10.32	-4.81	-18.35	-50.48	-39.44**
	(13.36)	(8.68)	(9.72)	(33.47)	(44.35)	(18.88)
Bank-based economy	-.01***	-.01**	-.01***	0	.02***	.01***
	(0)	(0)	(0)	(0)	(.01)	(0)
Ease of business	1.06	.23	.68	-1.59	-4.13	-3.34
	(2)	(1.24)	(1.55)	(4.86)	(9.8)	(4.51)
Three-year average of funds raised in IPOs (EUR bn)	-.03	-.01	-.03	-.32	-.18	-.2
	(.05)	(.05)	(.03)	(.6)	(.33)	(.3)
Distance (in thousand km)	-2.43**	-3.27***	-2.74***	-2.95**	-3.54***	-3.34***
	(1.09)	(.98)	(.77)	(1.41)	(1.07)	(.91)
Common border	-.64	.5	-.21	.81	-1.33***	-.63
	(.88)	(.66)	(.69)	(.82)	(.51)	(.48)
Common language	.69	.04	.51	.31	.97**	.8***
	(.58)	(.24)	(.35)	(.29)	(.42)	(.29)
Constant	-2.37	.89	-.84	3.76	26.24	19.01
	(10.02)	(7.45)	(7.43)	(25.17)	(31.17)	(12.9)
Observations	215	215	215	250	250	250
R-squared	.4	.56	.61	.44	.49	.6

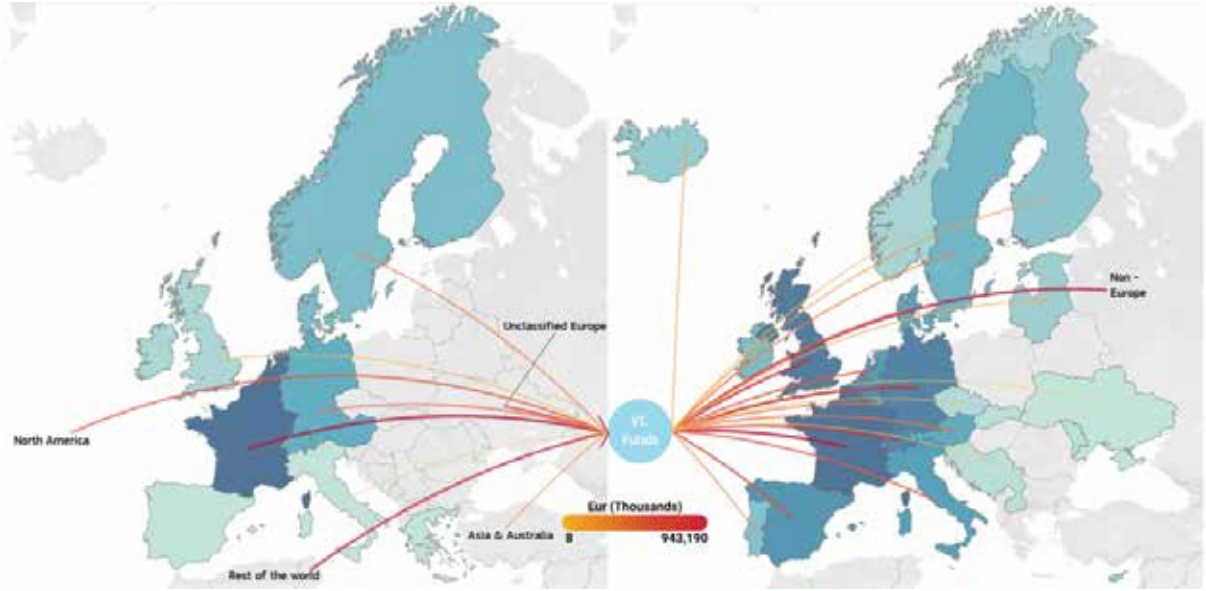
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Belgium

The gravity equations for Belgium suggest only a significant positive effect of the GDP of the partner countries on inflows and two-way flows, while the GDP of Belgium is estimated to have no significant effect on the flows. Moreover, the two-way flows between non-Europe and Belgium and between non-Europe and the partner countries do not seem to have a significant effect on the flows. Economic freedom has a strong negative effect on the two-way flows with controls on Belgium. Ease of business and the three-year average of funds raised in IPOs do not seem to have any significant effect on flows. Whether Belgium or the partner country is bank-based has a nearly zero effect on all flows. Distance has a negative effect on all flows, thus lending support to the importance of geographical proximity. However, sharing a common border negatively affects outflows under Belgian controls. Finally, cultural proximity as measured by a common language has a small positive effect on outflows and two-way flows under Belgian controls.

France

Flows from European fundraising to French VC funds vs *Flows from French VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: France (FRA)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on FRA	(5) Outflow, controls on FRA	(6) Two-way flow, controls on FRA
GDP i (EUR tn)	.44	-1.18	-.03	.99***	.7***	.77***
	(.69)	(1.78)	(.7)	(.24)	(.15)	(.14)
GDP j (EUR tn)	.57***	.94***	.63***	-3.31**	-.25	-1.36
	(.14)	(.29)	(.13)	(1.43)	(1.26)	(1.05)
Two-way flows between non-Europe and country i (EUR bn)	1.42	1.23	1.19	2.08***	1.42***	1.84***
	(.97)	(1.98)	(.92)	(.58)	(.43)	(.41)
Two-way flows between non-Europe and country j (EUR bn)	.9***	1.9***	1.45***	1.71	.4	.71
	(.21)	(.47)	(.2)	(1.97)	(.87)	(1.14)
Economic Freedom	9.36***	.01	6.49*	-35.22	-24.57	-28.51
	(3.48)	(5.58)	(3.8)	(35.32)	(19.22)	(22.7)
Bank-based economy	0	-.01***	0**	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)
Ease of business	-.68	.75	-.32	1.57	-2.7*	-1.05
	(.77)	(1.15)	(.76)	(5.41)	(1.6)	(2.31)
Three-year average of funds raised in IPOs (EUR bn)	0	-.01	0	.21	-.07	.04
	(.02)	(.04)	(.01)	(.18)	(.09)	(.07)
Distance (in thousand km)	-1.52***	-1.37**	-1.5***	-1.72**	-1.69***	-1.76***
	(.3)	(.59)	(.29)	(.74)	(.35)	(.35)

Common border	.06	-.7	-.16	-1.28***	-.13	-.51*
	(.29)	(.45)	(.26)	(.4)	(.29)	(.29)
Common language	.31	1.02	.46	1.89***	.84**	1.12***
	(.43)	(.65)	(.4)	(.67)	(.35)	(.3)
Constant	-12.19***	-2.74	-8.58**	27.5	15.85	20.85
	(3.47)	(5.46)	(3.35)	(29.14)	(16.73)	(19.29)
Observations	214	214	214	275	275	275
R-squared	.77	.85	.86	.85	.74	.85

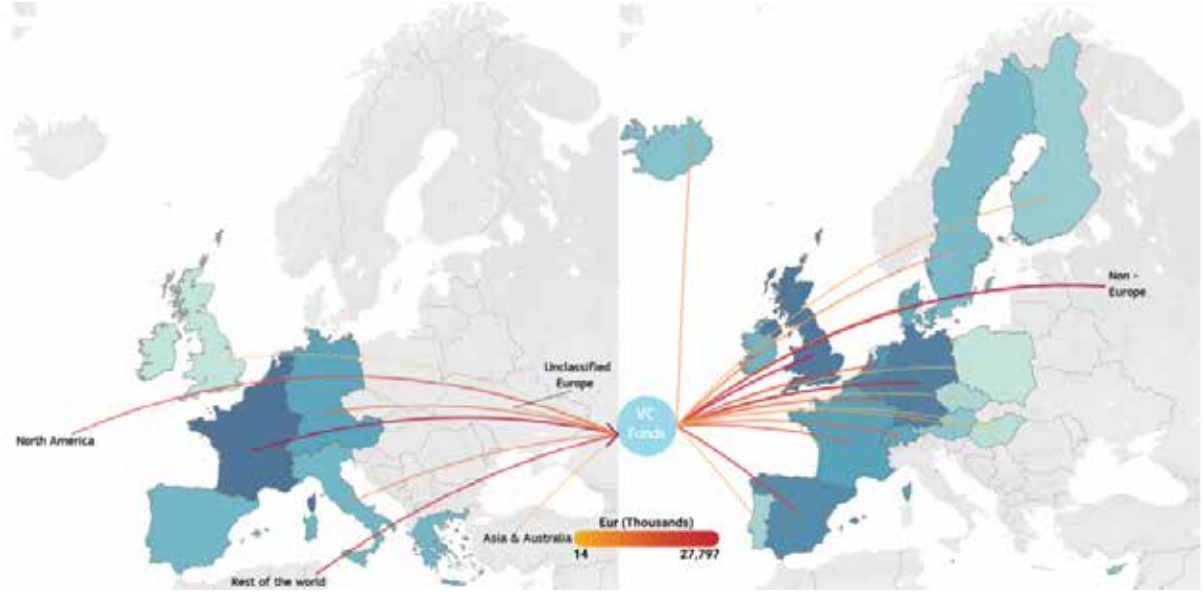
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: France

The gravity equations for France suggest that the GDP of France exerts a positive effect on inflows, outflows and two-way flows in the presence of controls for France. The GDP of the partner country acquires a significant positive effect on inflows, outflows, and two-way flows in the presence of controls for the partner country. In the presence of controls for France, the GDP of the partner country is on the other hand estimated to have a negative effect on inflows. The two-way flows between non-Europe and France have a positive and highly significant effect on inflows, outflows, and two-way flows in the presence of French controls. Symmetrically, the two-way flows between non-Europe and the partner countries are also estimated to have a positive effect on inflows, outflows, and two-way flows in the presence of controls for the partner countries. Economic freedom has a positive effect on outflows and two-way flows with controls on the partner countries. Ease of business is estimated not to have a significant effect on flows. Whether France or the partner country is bank-based has a nearly zero effect on all flows. The three-year average of funds raised in IPOs has no significant effect on flows. Distance has a significant negative effect on all flows. A common border on the other hand is estimated to have a negative effect on inflows and two-way flows in the presence of controls for France. Non geographical proximity (common language) has again a positive effect on all flows in the presence of French controls.

Luxembourg

Flows from European fundraising to Luxembourg VC funds vs *Flows from Luxembourg VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Luxembourg (LUX)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on LUX	(5) Outflow, controls on LUX	(6) Two-way flow, controls on LUX
GDP i (EUR tn)	-11.25 (28.78)	-1.01 (47.67)	-16.24 (23.87)	-.02 (.59)	.22 (.32)	.19 (.26)
GDP j (EUR tn)	.15 (.3)	-.47 (.73)	.15 (.28)	660.03*** (179.18)	-41.85 (63.11)	-.58 (51.31)
Two-way flows between non-Europe and country i (EUR bn)	-3.41 (15.59)	31.12 (32.07)	1.84 (15.32)	4.08** (1.8)	4.07*** (1.13)	4.05*** (.94)
Two-way flows between non-Europe and country j (EUR bn)	3.64*** (.8)	4.76*** (1.49)	3.58*** (.71)	-34.21 (22.82)	-8.28 (14.12)	-5.48 (14.02)
Economic Freedom	11.34 (9.92)	-6.47 (13.87)	7.51 (9.5)	-55.8* (32.38)	-2.18 (15.07)	-3.45 (13.18)
Bank-based economy	0 (0)	-.03*** (.01)	-.01*** (0)	-.03*** (.01)	0 (0)	0 (0)
Ease of business	-2.44 (1.72)	.3 (5.54)	-1.93 (1.78)	-25.7** (11.88)	1.97 (3.95)	.13 (3.41)
Three-year average of funds raised in IPOs (EUR bn)	.01 (.05)	.3* (.16)	.02 (.06)	-2.25** (.98)	-.03 (.18)	-.12 (.18)
Distance (in thousand km)	-.94 (1.02)	4.67*** (1.15)	-.12 (.94)	1.7** (.71)	-1.46** (.7)	-.85 (.52)
Common border	.49 (.74)	6.96*** (1.62)	1.04 (.86)	3.47** (1.39)	-.04 (.57)	.41 (.52)
Constant	-13.01 (8.52)	-9.44 (8.85)	-10.38 (7.88)	23.37 (24.84)	-3.56 (10.2)	-3.2 (9.35)
Observations	215	215	215	250	250	250
R-squared	.66	.5	.6	.11	.66	.57

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

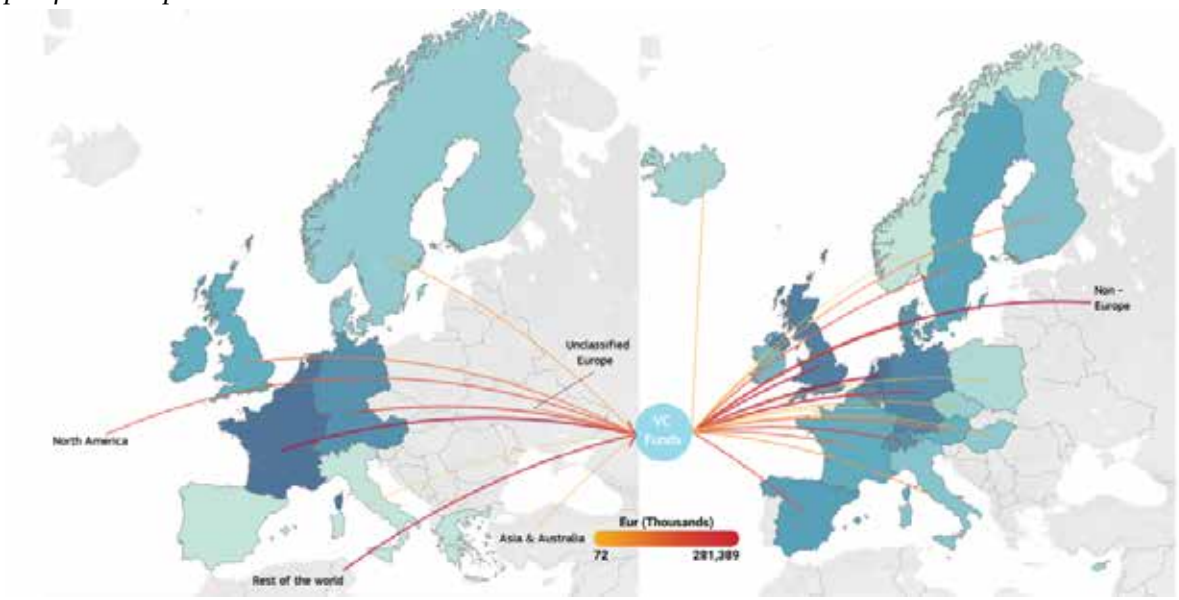
Table Description: Luxembourg

The gravity equations for Luxembourg suggest that the GDP of Luxembourg has no significant effect on the inflows, outflows, and two-way flows. The GDP of the partner countries is estimated to have a significant positive effect on inflows in the presence of Luxembourg controls. The two-way flows between non-Europe and Luxembourg have a positive effect on inflows, outflows, and two-way flows in the presence of the Luxembourg controls. Symmetrically, the two-way flows between non-Europe and the other countries are also estimated to have a positive effect on inflows, outflows, and two-way flows in the presence of controls for the partner countries. Both economic freedom and ease of business have a negative effect on inflows under Luxembourgish controls. Whether Luxembourg or

the partner country is bank-based has a nearly zero effect on all flows. The three-year average of funds raised in IPOs has a negative effect on inflows while Luxembourg controls are taken into account and a small positive effect on inflows with controls on Luxembourg. Distance has a positive effect on inflows and a negative effect on outflows in the presence of Luxembourg controls, while it has a positive effect on inflows using partner controls. A common border on the other hand is estimated to have a positive effect on inflows.

Netherlands

Flows from European fundraising to Dutch VC funds vs *Flows from Dutch VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Netherlands (NLD)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on NLD	(5) Outflow, controls on NLD	(6) Two-way flow, controls on NLD
GDP i (EUR tn)	-1.34	2.8	.13	.53**	.41	.45**
	(6.84)	(7.84)	(4.29)	(.23)	(.35)	(.19)
GDP j (EUR tn)	.42	.98***	.66***	6.96	6.92	6.25
	(.32)	(.23)	(.22)	(18.8)	(21.34)	(11.79)
Two-way flows between non-Europe and country i (EUR bn)	14.42	-4.37	7.32	1.81***	1.6	1.74***
	(8.99)	(11.51)	(5.17)	(.56)	(1.15)	(.57)
Two-way flows between non-Europe and country j (EUR bn)	.32	1.5***	.76**	-21.04	12.44	-1.08
	(.62)	(.38)	(.35)	(20.8)	(15.75)	(10.64)
Economic Freedom	23.49***	.73	13.34***	-4.49	-35.68	-21.28
	(5.47)	(4.39)	(3.77)	(46.75)	(53.18)	(32.76)
Bank-based economy	0**	0	0*	0	.01	0
	(0)	(0)	(0)	(.01)	(.02)	(.01)

Ease of business	-1.37	3.53**	.69	8.62	-6.02	-.11
	(1.79)	(1.54)	(1.61)	(6.67)	(4.93)	(5.09)
Three-year average of funds raised in IPOs (EUR bn)	.04	-.1***	-.02	-.09	.27	.12
	(.04)	(.02)	(.03)	(.09)	(.18)	(.09)
Distance (in thousand km)	-.16	-2.75***	-1.09*	-2.66***	-1.39	-1.78**
	(.67)	(.49)	(.57)	(.58)	(.91)	(.76)
Common border	.62	-1.18**	-.25	-.82*	-.28	-.48**
	(.56)	(.46)	(.42)	(.44)	(.65)	(.23)
Common language	1.09	2.39***	1.8***	1.36***	.65	1.03*
	(.79)	(.67)	(.59)	(.5)	(.9)	(.61)
Constant	-23.32***	-8.73**	-15.94***	-9.4	19.09	7.37
	(6.08)	(3.68)	(3.97)	(26.63)	(29.25)	(20.02)
Observations	217	217	217	200	200	200
R-squared	.7	.68	.8	.71	.54	.76

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Netherlands

The gravity equations for the Netherlands suggest that the GDP of the Netherlands exerts a positive effect on inflows and two-way flows in the presence of Dutch controls. Symmetrically, the GDP of the partner country acquires a significant positive effect on both inflows and two-way flows, in the presence of controls for the partner country. The two-way flows between non-Europe and the Netherlands have a positive effect on both inflows and two-way flows, in the presence of the Dutch controls. Likewise, the two-way flows between non-Europe and the partner countries are also estimated to have a positive effect on inflows and two-way flows, in the presence of controls for the partner countries. Controlling for the partner countries, economic freedom has a positive effect on outflows and two-way flows, while ease of business has a positive effect on inflows. Whether the Netherlands or the partner country is bank-based has a zero effect on all flows. The three-year average of funds raised in IPOs has a small negative effect on inflows when controlling for partner country. Distance has a negative effect on inflows and two-way flows while sharing a common language have a positive effect on inflows and two-way flows, thus lending support to the importance of geographical and cultural proximity. On the other hand, a common border is estimated to have a negative effect on inflows and, using partner controls, on the two-way flows as well.

4.2.5 UK & Ireland[24]

Although the two countries differ on a number of economic and social aspects, and are hardly comparable in some respects, they are grouped together because they are their own respective major trading partners, as confirmed by the gravity equation results.

The UK presents a predominantly market-based system, in line with the Anglo-Saxon tradition. The level of capital fundraised shows an increasing trend from 2009 onwards, with a peak in 2019 with more than EUR 60.000 million raised, an amount unrivalled by other European countries. On the other hand, Ireland shows two significant peaks in 2013 and 2016, but to a lower scale compared to the UK (respectively almost EUR 340 million and EUR 380 million).

[24] See descriptive country tables in Annex 7.5.

In 2007, the UK was Ireland's only fundraising partner, but over the years Irish fundraising has become more diversified, with consistent capitals coming from France & Benelux, whereas the UK is the only country, among the ones we are analysing in this paper, with a relevant share of funds coming from the US and North America. This is partly related to their similar Anglo-Saxon market structure.

Considering where these funds are invested, in 2016 we witness a peak of investment of Irish PE funds into portfolio companies, with EUR 62 million invested in VC and over EUR 433 million invested in other PE, even though the trend since 2008 shows a preponderance of VC funds. Looking at the UK, in absolute values the flows are larger in scale and private equity – as opposed to venture capital – represents the largest share of fundraising, the largest UK funds' share of investment, and the largest source of equity funds for UK's portfolio companies. For Ireland, the flows are directed mostly to domestic companies, the largest investment having been made in 2020 of over EUR 173 million. A similar domestic bias takes place in the UK.

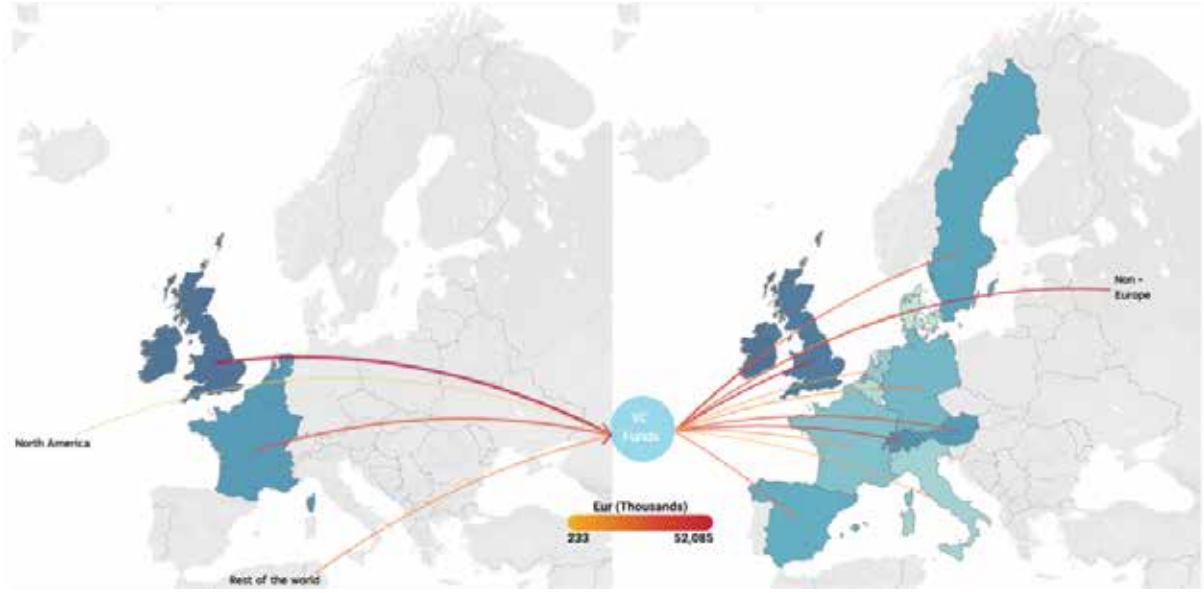
Looking at the investment/divestment trends in the PE market, the largest investments for Ireland and the UK took place in 2019. Relevant divestments are recorded in 2010, 2016 and 2017 for Ireland, while the UK shows a divestment increase from 2010 peaking in 2015 and then slowly decreasing. The magnitude of investments is not comparable between the two countries as the UK exhibited peaks of investments over EUR 20.000 million in 2007 and 2019. British PE funds are among the major investors in foreign businesses, as 48% of British PE funds are cross-border (see *Graph 1*), but at the same time it is also the country that receives less PE from foreign funds: only 13% of its total domestic PE investments comes from foreign sources (see *Graph 2*). This is reflected in *Graph 3*, with the UK being the largest net exporter of PE capitals. Ireland's investments in foreign PE lie below the EU average (see *Graph 1*) but receives from foreign funds more than double the EU average (see *Graph 2*), ending up as one of the main attractors of funds.

Lastly, looking at the GL index, the UK exhibits one of the highest degrees of VC reciprocity, due to balanced trade with a large group of financially developed partners (e. g., Switzerland), together with a slightly smaller group of essentially investee countries (e.g., Spain). Ireland is among the few countries with an average GL index of almost 0.5. Both countries have several balanced two-way flows.

The results of the gravity equations for the UK and Ireland show mixed results in terms of GDPs, although they generally support the theory predicting larger VC flows between countries with higher GDPs. A higher degree of financial globalisation in the international VC market also seems to have a positive effect on the financial integration of the UK and Ireland in Europe. As already noted in the aggregate equations, VC flows appear to be unaffected by the financial structure of both the origin and the destination country. Better institutional quality does not seem to have a great influence on the VC flows in these countries, especially for the UK. In particular, Ease of Business is estimated to have no significant effect in eleven out of twelve of the total specifications. Geographic distance, measured in km, has a negative effect on VC flows. A common border is in both countries estimated to exert a positive effect on outflows and a negative effect on inflows.

Ireland

Flows from European fundraising to Irish VC funds vs *Flows from Irish VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Ireland (IRE)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on IRE	(5) Outflow, controls on IRE	(6) Two-way flow, controls on IRE
GDP i (EUR tn)	12.57*	-8.51***	-2.46	.51**	.25	.45**
	(7.47)	(2.62)	(3.12)	(.2)	(.23)	(.19)
GDP j (EUR tn)	.64*	.78***	.68***	1.82	13.19	4.5
	(.33)	(.11)	(.13)	(2.59)	(8.02)	(3.01)
Two-way flows between non-Europe and country i (EUR bn)	-6.32	34.76***	23.08**	.94	1.69	1.1
	(19.26)	(6)	(9.37)	(.81)	(1.65)	(.79)
Two-way flows between non-Europe and country j (EUR bn)	.22	-.94**	-.62	16.24***	-17.7	6.43
	(.7)	(.42)	(.43)	(5.81)	(20.49)	(7.9)
Economic Freedom	12.72	29.47***	22.89***	-	-13.14	-29.87***
	(7.75)	(3.49)	(2.68)	35.46***	(18.01)	(10.4)
				(9.66)		
Bank-based economy	0	0***	0***	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)
Ease of business	1.6	-.68	-.12	-4.82**	-2.85	-4.59
	(3.41)	(1.2)	(1.28)	(2.37)	(6.19)	(2.89)
Three-year average of funds raised in IPOs (EUR bn)	-.14***	-.02	-.05**	1.49**	-.51	.91*
	(.05)	(.02)	(.02)	(.59)	(1.21)	(.55)
Distance (in thousand km)	-.23	-3.05***	-1.72***	-2.52***	-1.24***	-2.13***
	(.58)	(.49)	(.29)	(.44)	(.4)	(.28)

Common border	2.01***	-.99**	.25	-.02	1.2**	.33
	(.63)	(.5)	(.29)	(.33)	(.54)	(.29)
Constant	-20.88***	-25.34***	-22.49***	25.88***	3.11	20.89**
	(5.05)	(2.03)	(1.72)	(7.63)	(16.07)	(8.48)
Observations	215	215	215	250	250	250
R-squared	.56	.81	.8	.8	.77	.86

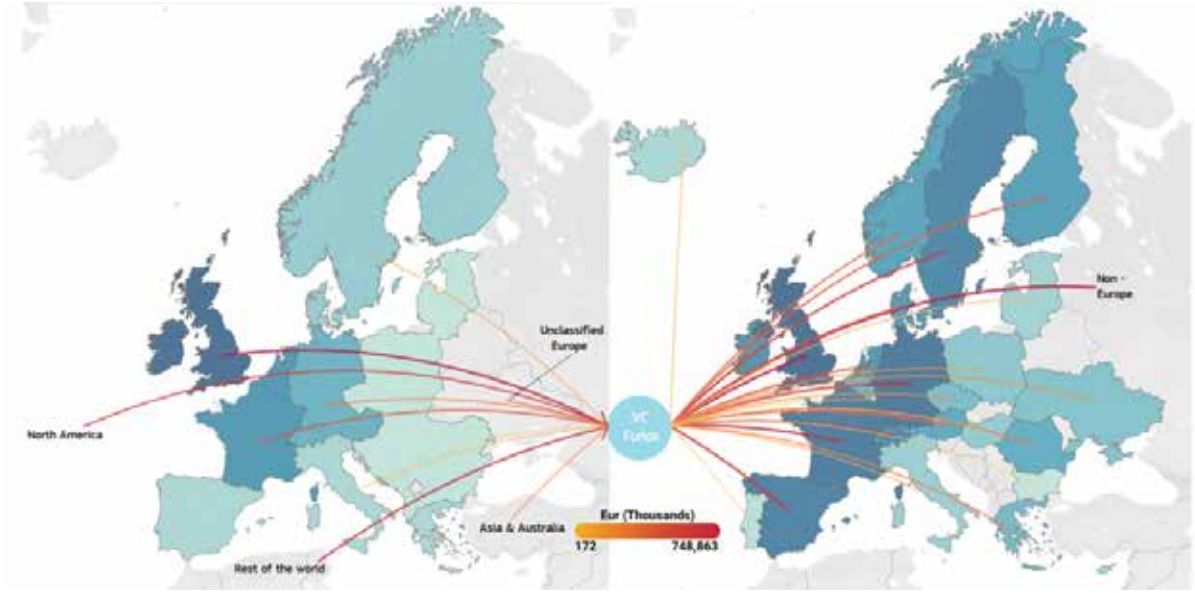
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Ireland

The gravity equations for Ireland suggest that the GDP of Ireland exerts a positive effect on VC outflows in the presence of controls for the partner countries, but it has no statistically significant effect when including controls for Ireland. The Irish GDP is estimated to have a positive effect on VC inflows in the presence of Irish controls, but a negative effect on inflows in the presence of controls for the partner countries. The Irish GDP has not a statistically significant impact on two-way flows when using partner countries' controls, but it exerts a positive effect on two-way flows when controls refer to Ireland. The GDP of the partner country has a positive effect on VC inflows, outflows, and two-way flows, when including controls on the partner country. The two-way flows between Ireland and non-European countries are positively correlated with VC inflows to Ireland and two-way flows between Ireland and European countries, in the presence of controls for the partner countries. The two-way flows between Ireland's partner countries and non-Europe are estimated to have a significant negative correlation with the VC inflows to Ireland in the presence of controls for the partner countries, but a positive correlation in the presence of controls for Ireland. Economic freedom, as indicator of institutional quality, has a positive effect on inflows and two-way flows in the presence of controls for the partner countries and a negative effect on inflows and two-way flows in the presence of controls for Ireland, while ease of business has a negative effect on inflows with Irish controls. Whether Ireland or the partner countries are bank-based has a nearly zero effect on all flows. The Three-year average of funds raised in IPOs is significant in most specifications, negatively affecting outflows and two-way flows under partner controls and positively affecting inflows and two-way flows under Irish controls. Distance has a negative effect on inflows, outflows, and two-way flows and it is statistically significant in five out of six specifications, thus lending support to the importance of geographical proximity. Finally, a common border is estimated to have a positive effect on outflows but a negative effect on inflows in the presence of controls for the partner countries.

UK

Flows from European fundraising to British VC funds vs *Flows from British VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: United Kingdom (GBR)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on GBR	(5) Outflow, controls on GBR	(6) Two-way flow, controls on GBR
GDP i (EUR tn)	.06 (.36)	.28 (.32)	.09 (.26)	.07 (.17)	.56*** (.16)	.36*** (.12)
GDP j (EUR tn)	.82*** (.17)	.35*** (.1)	.58*** (.12)	-1.4* (.82)	-1.39 (1.25)	-1.38 (.88)
Two-way flows between non-Europe and country i (EUR bn)	1.01*** (.24)	.44 (.4)	.83*** (.21)	5.88*** (1.8)	3.78** (1.8)	4.46*** (1.52)
Two-way flows between non-Europe and country j (EUR bn)	1.62 (1.52)	3.78*** (1.14)	2.41** (1.19)	.64 (.46)	1.54*** (.48)	1.2*** (.31)
Economic Freedom	-1.73 (4.8)	7.1*** (2.46)	1.02 (3.8)	26.14 (20.44)	23.53 (32.86)	24.19 (25.69)
Bank-based economy	0*** (0)	0 (0)	0*** (0)	0 (0)	0 (.01)	0 (.01)
Ease of business	1.88 (1.48)	1 (.99)	1.38 (1.05)	-.78 (1.46)	-1.19 (2.77)	-.92 (2.03)
Three-year average of funds raised in IPOs (EUR bn)	.06 (.08)	-.09** (.04)	.02 (.06)	.07 (.04)	.08 (.05)	.07** (.03)
Distance (in thousand km)	.22	-1.75***	-.55***	-1.86***	-.48*	-1***

	(.25)	(.24)	(.21)	(.24)	(.28)	(.25)
Common border	1.11***	-1.28***	.15	-1.01***	.63**	-.03
	(.22)	(.17)	(.17)	(.22)	(.28)	(.21)
Constant	-5.05*	-9.89***	-5.44**	-21.78	-21.4	-20.62
	(2.96)	(1.63)	(2.46)	(15.78)	(25.11)	(19.39)
Observations	214	214	214	275	275	275
R-squared	.64	.7	.71	.62	.58	.66

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: United Kingdom

The gravity equations for the UK suggest that the GDP of the UK exerts a significant positive effect on VC outflows and two-way flows in the presence of controls for the UK. The GDP of the partner country has a positive effect on VC inflows, outflows, and two-way flows in the presence of controls for the partner country. In the presence of controls for the UK, the GDP of the partner country is estimated to have a negative effect on VC inflows. The two-way flows between non-Europe and the UK have a positive effect on inflows, outflows, and two-way flows and it is significant in five out of six specifications. The two-way flows between non-Europe and UK's partner countries are also estimated to have a significant positive effect on inflows, outflows, and two-way flows in four out of the six specifications. The three-year average of funds raised in IPOs is only significant in two out of six specifications, with relatively small magnitude and opposite signs. Economic freedom has a positive effect on outflows under partner controls, while ease of business has no significant effect. Whether the UK or the partner country is bank-based has nearly zero effect on all flows. Distance has a significant negative effect on all flows in five out of six specifications, thus lending support to the importance of geographical proximity. The presence of a common border is estimated to have a positive effect on outflows but a negative effect on inflows.

4.2.6 Central and Eastern Europe[25]

The CEE group is composed of low, middle, and high-income nations, meaning that the dimension and the trends of the funds are not homogenous. Nonetheless, they are analysed together because they belong to the same geo-political area and are major trading partners, as confirmed by the gravity equations.

The funds raised in Baltic countries reached their peak in 2019, when over EUR 300 million were raised, mainly by PE funds. Bulgaria, on the other hand, showed low levels of raised funds in most years, except for a peak of EUR 120 million in 2020, all in the VC segment. In fact, starting from 2017, Bulgaria raised funds exclusively through VC. Czechia had the highest amount of funds raised in 2018, with an outlier of over EUR 250 million, primarily in PE funds. Hungary displayed an increasing trend from 2017 to 2019, peaking at over EUR 600 million, mostly for VC, in 2019. Poland raised notable large-scale funds, never falling below the amount of EUR 100 million per year throughout the entire period considered. It reached peaks of almost EUR 900 million in 2007 and 2017, when it recovered after a slight decline in 2009-10. Most of the funds in Poland were related to PE, with a growing trend in VC funds from 2017 to 2020. Romania exhibits the lowest amount of funds raised, with trends showing a focus on PE until 2017, when VC funds were introduced, but with a smaller magnitude compared to other countries in the region.

[25] See descriptive country tables in Annex 7.6.

The largest share of VC funds in these markets comes from the other Central and Eastern European countries. France & Benelux represent another major investor for specific countries in certain years, such as Czechia in 2019, Bulgaria in 2017-18, and Romania in 2017 and 2020.

In terms of flow of funds, all these countries are among the top net importers of PE flows (see *Graph 3*), with foreign investments in local portfolio companies not being on the same scale as domestic investments.

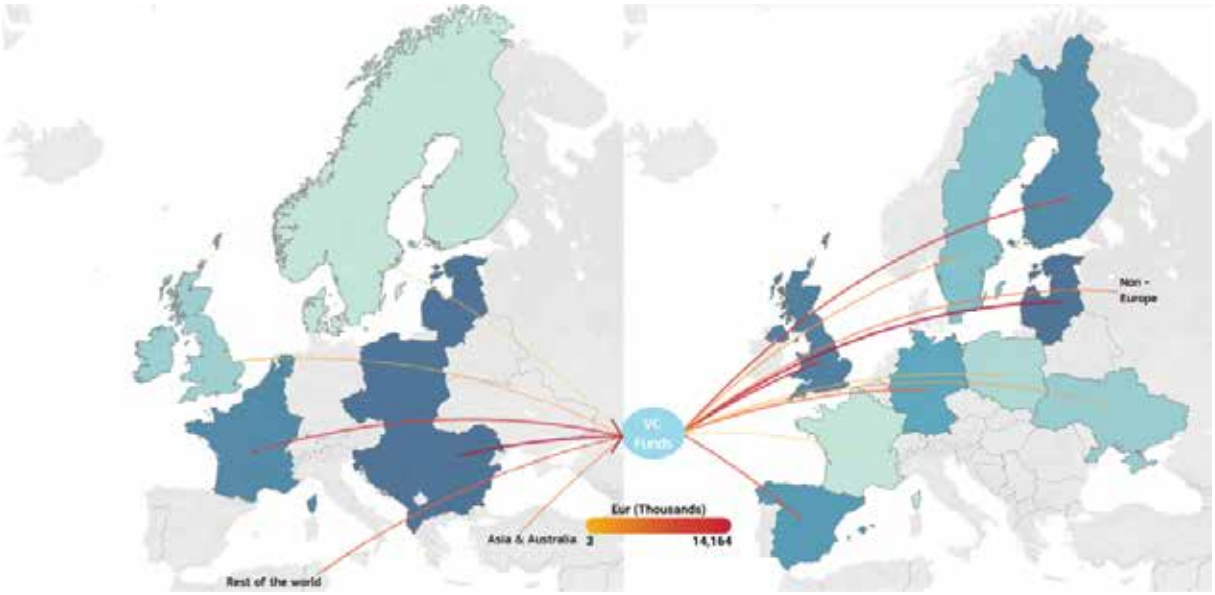
Overall, when accounting for investments and divestments, the Baltic countries have consistently seen a positive net investment trend over the years, peaking in 2019 with a massive gross investment of almost EUR 1 billion, almost ten times larger than the median investment amount. Bulgaria and Czechia experienced significant divestments during 2013-2016 and 2010-2014 respectively. Hungary generally had positive total investments, except for 2011 and 2017. Poland peaked in 2017, with another gross investment outlier of nearly EUR 2.5 billion and has recently shown a decreasing – although positive until 2020 – trend, with more divestments than investments, while Romania's PE market has shown an extraordinary increasing trend since 2013, peaking recently in 2019.

In terms of foreign investments by domestic PE funds (*Graph 1*), Czechia and Bulgaria are above the European average (with, respectively, 39.83% and 36.43%), while the remaining countries lie below. On the other hand, in terms of domestic investments by foreign PE funds *(Graph 2*), Czechia is the second country after Luxembourg in terms of foreign funds received (87%), followed by Austria (83.21%), other Central and Eastern European countries (81.62%), the Baltics (81.60%), and Bulgaria (78%). In conclusion, these Central and Eastern European countries appear to be major attractors of funds rather than foreign investors.

The results of the gravity equations for the Central and Eastern European area support the theory that predicts larger VC flows between countries with higher GDPs. A higher degree of financial globalisation in the international VC market has very different effects depending on the country and the specification used. For most countries, VC flows appear to be unaffected by the financial structure of both the origin and destination countries. The impact of institutional quality on VC flows appears to be highly dependent on the country and specification used. Geographic distance, measured in km, has a negative effect on VC flows in most of the countries in the area, while a common border seems to have a positive effect. It should be highlighted that, for Romania and Ukraine, STATA is unable to provide the output for all the specifications, but only for some of them. This is due to the fact that the observations in the dependent variable are almost always zero, i.e. there is no variability in the dependent variable.

The Baltics

Flows from European fundraising to Baltic VC funds vs *Flows from Baltic VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: The Baltics (BAL)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on BAL	(5) Outflow, controls on BAL	(6) Two-way flow, controls on BAL
GDP i (EUR tn)	80.62**	38.48	58.38**	.89**	.92***	.86***
	(37.24)	(24.63)	(27.06)	(.39)	(.34)	(.32)
GDP j (EUR tn)	.87**	1.22**	.96***	-169.68***	256.82**	8.41
	(.36)	(.55)	(.28)	(41.89)	(105.16)	(42.7)
Two-way flows between non-Europe and country i (EUR bn)	121.93	222.24	171.79	-1	-.06	-.34
	(431.04)	(235.6)	(274.87)	(1.35)	(1.45)	(1.04)
Two-way flows between non-Europe and country j (EUR bn)	-1.41	-1.85	-1.6	33.66	640.96	-261.59
	(1.77)	(2.17)	(1.11)	(430.23)	(564.02)	(188.51)
Economic Freedom	21.22	-12.67	2.1	-129.39**	147.14*	-25.15
	(17.52)	(17.03)	(11.11)	(63.04)	(77.76)	(27.53)
Bank-based economy	-.01*	-.01*	-.01**	-.09***	.06*	0
	(0)	(0)	(0)	(.02)	(.03)	(.05)
Ease of business	-4.28	4.4	.39	23.64***	-21.09*	4.76**
	(3.89)	(4)	(2.65)	(6.01)	(11.8)	(2.09)
Three-year average of funds raised in IPOs (EUR bn)	0	0	.01	76.94***	-64.34*	15.04
	(.07)	(.09)	(.03)	(22.22)	(35.42)	(19.39)

Distance (in thousand km)	.06 (1.28)	-.66 (1.3)	-.31 (1.03)	-.97 (1.23)	.22 (1.09)	-.36 (1.02)
Constant	-29.94** (13.23)	-3.84 (8.16)	-14.33* (7.89)	121.09** (49.79)	- 153.73** (71.85)	6.12 (32.01)
Observations	216	216	216	225	225	225
R-squared	.13	.11	.21	.06	.14	.12

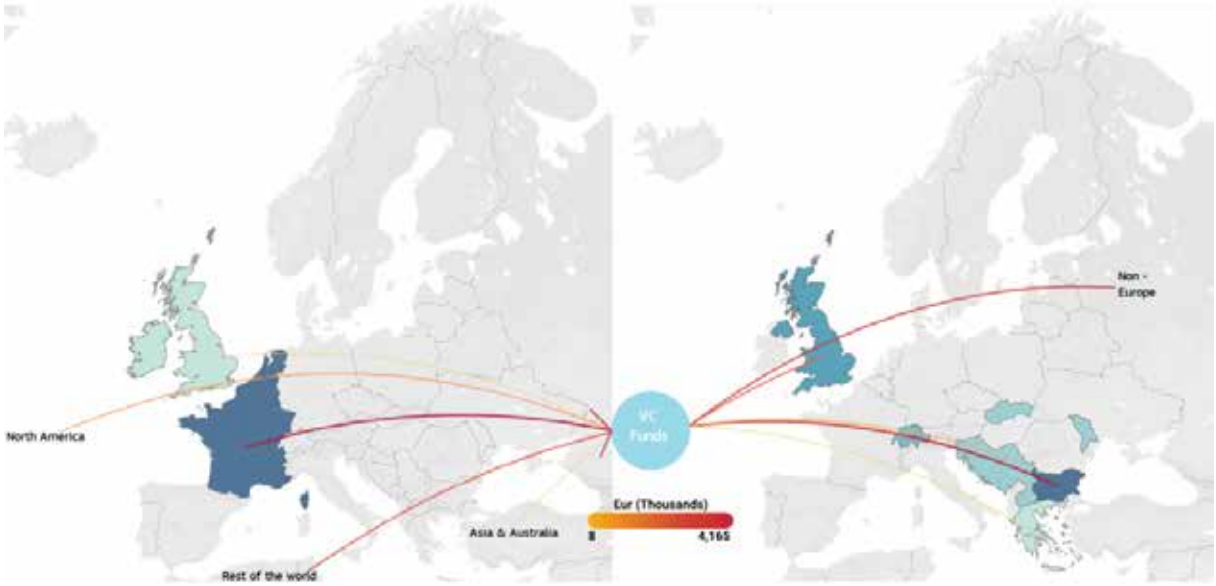
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: The Baltics

The gravity equations for the Baltics suggest that the GDP of the Baltics exerts a positive effect on inflows (under Baltic controls), outflows, and two-way flows and it is significant in five out of six specifications. The GDP of the partner country acquires a significant positive effect on inflows, outflows, and two-way flows in four out of six specifications. In the presence of Baltic controls, the GDP of the partner country is estimated to have a negative effect on inflows. The two-way flows between non-Europe and the Baltics and between non-Europe and the Baltics' partner countries are estimated to have no significant effect on all flows. Whether the Baltics or the partner countries are bank-based has nearly zero effect on all flows. Ease of business, as an indicator of institutional quality, is estimated to have a positive effect on inflows and two-way flows and a negative effect on outflows, while greater economic freedom has a negative effect on inflows and a positive effect on outflows, in the presence of controls for the Baltics. The three-year average of funds raised in IPOs positively affect inflows and negatively affects outflows, controlling for Baltic countries' characteristics. Finally, distance plays no significant role in the gravity equations for the Baltics.

Bulgaria

Flows from European fundraising to Bulgarian VC funds vs *Flows from Bulgarian VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Bulgaria (BGR)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on BGR	(5) Outflow, controls on BGR	(6) Two-way flow, controls on BGR
GDP i (EUR tn)	-67.87 (86.83)	-270.99 (251.53)	-129.48 (122.46)	-.48 (.55)	1.15** (.54)	.13 (.65)
GDP j (EUR tn)	1.69* (.94)	.79 (.6)	.77 (.49)	-1641.65*** (433.07)	-1491.5 (1055.73)	-1374.64*** (438.6)
Two-way flows between non-Europe and country i (EUR bn)	88.97 (213.5)	-34.28 (166.19)	130.91 (101.56)	2.62 (2.1)	15.88 (22.92)	1.86 (2.25)
Two-way flows between non-Europe and country j (EUR bn)	.61 (.95)	7.46* (4.42)	2.82 (2.86)	-5871.55*** (1491.12)	960.92 (4469.48)	-4445.72** (1749.88)
Economic Freedom	73.35*** (15.74)	9.09 (23.52)	26.99 (19.06)	-1388.36*** (332.2)	357.67 (616.69)	-1025.8** (402.14)
Bank-based economy	.01 (.01)	0 (0)	0 (0)	.07** (.03)	.13** (.06)	.06** (.02)
Ease of business	-3.78 (3.44)	14.31 (9.51)	5.91 (6.74)	96.18*** (23.11)	12.76 (124.53)	71.23*** (27.45)
Three-year average of funds raised in IPOs j (EUR bn)	-.11* (.06)	-.53* (.29)	-.21* (.11)	2284.81*** (589.96)	1162.39*** (403.33)	1842.21*** (600.13)
Distance (in thousand km)	3.72*** (1.35)	-.52 (1.01)	1.35 (1.06)	.28 (.23)	1.37** (.65)	.43 (.3)
Common border	7.47* (4.21)	4.43* (2.33)	5.36** (2.09)	-3.36*** (1.01)		-3.21*** (1.04)
Constant	-74.69*** (12.14)	-13.95 (23.14)	-32.26* (16.88)	1050.18*** (252.47)	-283.19 (452.11)	776.24** (307.19)
Observations	217	217	217	200	184	200
R-squared	.29	.19	.12	.05	.67	.07

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

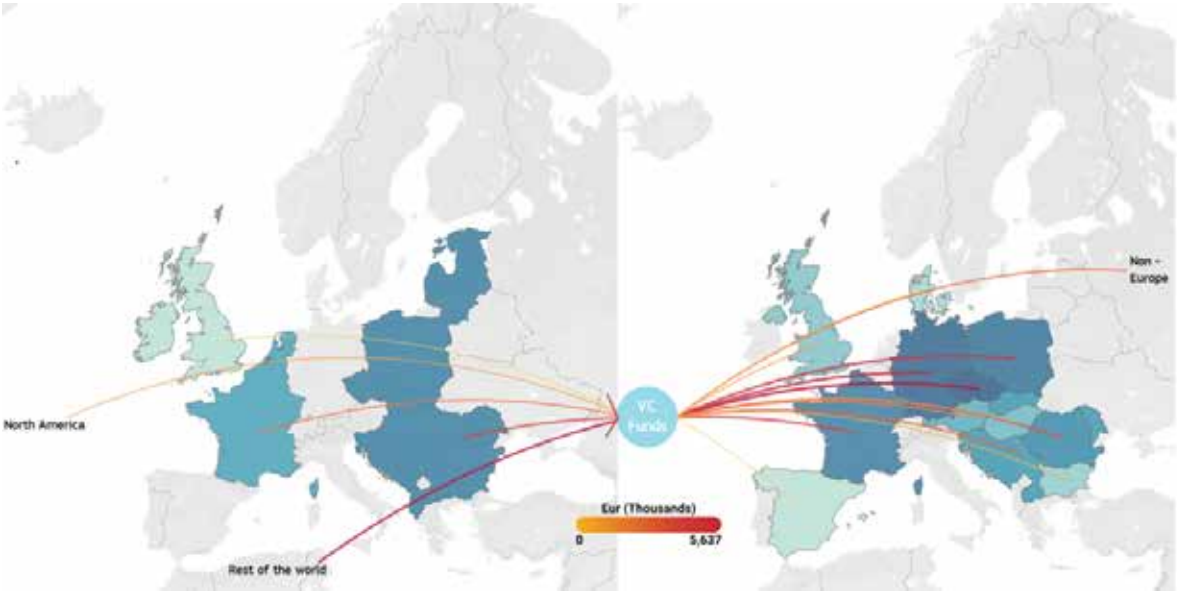
Table Description: Bulgaria

In the gravity equations for Bulgaria, controlling for the characteristics of Bulgaria's partner countries (columns 1-3), there are no noteworthy results on several indicators. Instead, controlling for Bulgaria's characteristics, the GDP of partner countries gains a strong negative significance on

inflows and two-way flows. Two-way flows between non-Europe and Bulgaria's partner countries are negatively correlated with inflows and two-way flows in the presence of controls for Bulgaria, while the two-way flows between non-Europe and Bulgaria have no significant effect. Bank-based economy and the three-year average of funds raised in IPOs have a significant and positive explanatory role in all the last three specifications, although the effect of three-year average of IPO-raised funds becomes negative (and much smaller) on all flows when using controls for the partner country. Ease of business is significant with a positive impact on inflows and two-way flows, in the presence of controls for Bulgaria, while economic freedom has a positive effect on outflows under partner controls and a negative effect on inflows and two-way flows with controls on Bulgaria. Sharing a common border is significant in all specifications available, with a positive effect when controlling for the partner's characteristics and a negative effect when controlling for Bulgaria's ones. Finally, distance has a positive effect on outflows in both specifications.

Czechia

Flows from European fundraising to Czech VC funds vs *Flows from Czech VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Czechia (CZE)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on CZE	(5) Outflow, controls on CZE	(6) Two-way flow, controls on CZE
GDP i (EUR tn)	48.59*** (8.45)	-39.99 (47.71)	20.59** (8.53)	-.49 (.53)	.71* (.36)	.59* (.35)
GDP j (EUR tn)	.66*** (.22)	.71* (.42)	.71** (.28)	12.38** (5.78)	221.55*** (64.39)	172.03*** (37.5)
Two-way flows between non-Europe and country i (EUR bn)	527.25* (315.19)	269.31 (582.93)	316.89 (382.08)	.01 (4.82)	-7.29* (4.26)	-6.33* (3.78)
Two-way flows between	3.36	5.86	6***	-352.22	-	-

non-Europe and country j (EUR bn)	(2.49)	(3.69)	(2.24)	(2740.66)	2702.59*** (899.86)	2045.07*** (707.82)
Economic Freedom	-3.95 (7.49)	27.37 (20.1)	13.14 (10.44)			
Bank-based economy	0 (0)	-.01*** (0)	-.01*** (0)			
Ease of business	-4.99** (2.03)	-9.02*** (3.11)	-7.51*** (1.61)			
Three-year average of funds raised in IPOs (EUR bn)	-.26 (.17)	-.44** (.21)	-.53*** (.05)			
Distance (in thousand km)	-1.77*** (.44)	.65 (.94)	-.1 (.81)	-1.55 (1.3)	-1.53 (1.2)	-1.55 (1.1)
Common border	.86** (.42)	2.54*** (.86)	1.98*** (.64)	1.88 (1.82)	1.95 (1.21)	1.93* (1.13)
Constant	-10.61* (5.66)	-19.39 (14.01)	-17.64** (8.42)	-11.6*** (1.95)	-45.31*** (11.88)	-36.73*** (6.75)
Observations	222	222	222	75	75	75
R-squared	.61	.4	.39	.14	.52	.5

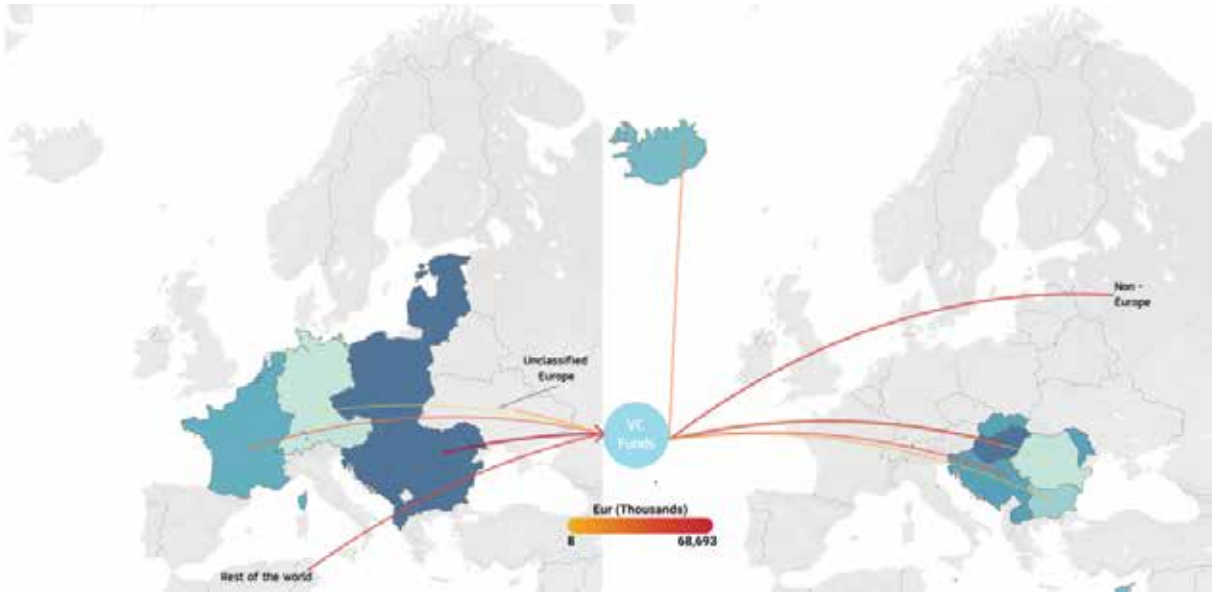
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Czechia

In the gravity equations for Czechia, the Czech GDP has sizeable positive and significant effects on outflows and two-way flows. The coefficient on other countries' GDP is significant as well, with a positive effect on all flows. Two-way flows between non-Europe and Czechia have a positive effect on outflows under partner controls and a negative effect on outflows and two-way flows with controls on Czechia. Two-way flows between non-Europe and Czechia's partner countries have a positive effect on two-way flows when controlling for the partner countries' characteristics, and a large negative effect on outflows and two-way flows under Czech controls. Economic freedom is not significant, while ease of business is significant in all three specifications and has a negative effect on all flows. Whether the partner country is a bank-based economy has a moderate, but significant negative impact on inflows and two-way flows. The three-year average of funds raised in IPOs has negative effects in the presence of controls for the partner countries on inflows and two-way flows. Distance only has a significant negative impact on outflows under the partner controls, while sharing a common border has a positive effect on two-way flows and, under partner controls, also on outflows and inflows.

Hungary

Flows from European fundraising to Hungarian VC funds vs *Flows from Hungarian VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Hungary (HUN)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on HUN	(5) Outflow, controls on HUN	(6) Two-way flow, controls on HUN
GDP i (EUR tn)	144.23*** (29.63)	59.49** (24.41)	57.52** (25.11)	.59* (.36)	-2.34 (3.4)	.42 (.32)
GDP j (EUR tn)	-170.24*** (.57)	1.01** (.42)	.93** (.41)	77.65 (54.12)	11460.45*** (38.46)	77.81 (51.63)
Two-way flows between non-Europe and country i (EUR bn)	-1119.83*** (102.97)	-103.52 (68.47)	-99.98 (70.13)	1.8* (1.06)	-6090.63*** (19.38)	2.12* (1.19)
Two-way flows between non-Europe and country j (EUR bn)	290.88*** (3.52)	.75 (.66)	.89 (.7)	-6316.92*** (368.89)	-53582.98*** (363.01)	-5038.99*** (394.45)
Economic Freedom	583.69*** (18.42)	13.2 (20.8)	12.94 (20.14)	-168.53* (89.61)	-720.63*** (82.32)	-276.01*** (75.67)
Bank-based economy	-.12*** (0)	-.01** (0)	-.01** (0)	.33*** (.02)	5.12*** (.03)	.32*** (.02)
Ease of business	-271.52*** (4.42)	.78 (5.2)	.49 (5.08)	211.41*** (24.89)	260.22*** (16.57)	192.3*** (23.93)

Three-year average of funds raised in IPOs (EUR bn)	11*** (.16)	-.12 (.13)	-.11 (.12)	226.85*** (46.55)	-1273.27*** (36.47)	205.76*** (44.9)
Distance (in thousand km)	-25.89*** (1.02)	1 (.91)	.89 (.89)	.05 (.56)	-.81 (.62)	-.26 (.56)
Common border	-26.84*** (1.32)	3.56*** (1.03)	3.34*** (.97)	.2 (.96)		-.26 (.81)
Common language	18.09*** (1.88)		-3.73*** (.5)			
Constant	-323.01*** (14.43)	-27.28** (13.82)	-26.51** (13.24)	-41.72 (72.14)	-1897.65*** (70.31)	50.94 (61.23)
Observations	218	209	218	168	154	168
R-squared	1	.12	.12	.12	.26	.1

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Hungary

In the gravity equations for Hungary, the results depend heavily on the controls used in the different specifications. When controlling for the characteristics of partner countries, the GDP of Hungary has positive and significant effects on all flows. Under these specifications, the GDP of other countries is significant as well, but it negatively impacts outflows; furthermore, there is a significant positive effect on outflows using controls for Hungary. Two-way flows between non-Europe and Hungary have a positive effect on inflows and two-way flows under Hungarian controls, but a large negative effect on outflows. When considering the two-way flows between non-Europe and Hungary's partner countries, there is a positive effect on outflows under partner controls, and a large negative effect on all flows under Hungarian controls. Likewise, also economic freedom has a positive, significant effect on outflows under partner's controls and a negative significant effect on inflows, two-way flows and, especially, outflows under Hungarian controls. Bank-based economy is significant in six out of six specifications, although the effect is sizeable only on outflows under Hungarian controls. Ease of business, like Economic freedom, is significant in four out of six specifications, suggesting a real impact of institutional quality, and is positive on all types of flows under controls on Hungary and negative on outflow under controls on the partner country. The three-year average of funds raised in IPOs has a positive effect on outflows in the presence of controls for the partner countries and strong positive effects on inflows and two-way flows, but negative on outflows, in the presence of Hungarian controls. Distance has a significant (and negative) effect only on outflows under partner's controls. Sharing a common border has a negative effect on outflows and a positive effect on inflows and two-way flows with control on the partner countries, while sharing a common language has a positive effect on outflows and a negative one on two-way flows.

Other Central and Eastern Europe (Bosnia-Herzegovina, Croatia, Macedonia, Moldovia, Montenegro, Serbia, Slovakia, Slovenia)

Gravity model: Other Central and Eastern Europe (CEE)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on CEE	(5) Outflow, controls on CEE	(6) Two-way flow, controls on CEE

GDP i (EUR tn)	19.58 (24.16)	39.86** (15.88)	27.94** (11.85)	.19 (.36)	1.63* (.89)	.38 (.39)
GDP j (EUR tn)	-.65 (.67)	.88* (.46)	-.26 (.26)	3.18 (12.26)	-101.72*** (26.17)	-1.19 (11.76)
Two-way flows between non-Europe and country i (EUR bn)	-1282.24 (816.39)	- 697.19** (275.2)	-424.02* (223.57)	4.42* (2.65)	3.35* (2.03)	2.35 (2.81)
Two-way flows between non-Europe and country j (EUR bn)	-.01 (1.49)	13.98*** (4.24)	2.77 (1.98)			
Economic Freedom	-14.04 (13.16)	27.2** (11.57)	12.24 (10.41)			
Bank-based economy	-.01* (0)	0 (0)	0 (0)			
Ease of business	1.85 (4.87)	-5.95*** (2.18)	-3 (1.97)			
Three-year average of funds raised in IPOs (EUR bn)	.36*** (.09)	-.54** (.24)	.29*** (.09)			
Distance (in thousand km)	-.09 (1.27)	-7.47*** (2.58)	-3.39*** (1.28)	-3.59*** (1.3)	1.91 (1.41)	-2.31** (1.01)
Constant	-5.54 (9.84)	- 32.35*** (9.45)	- 21.44*** (8.32)	-6.83* (3.5)	7.85 (5.08)	-6.57** (3.08)
Observations	223	223	223	50	50	50
R-squared	.32	.32	.21	.21	.64	.2

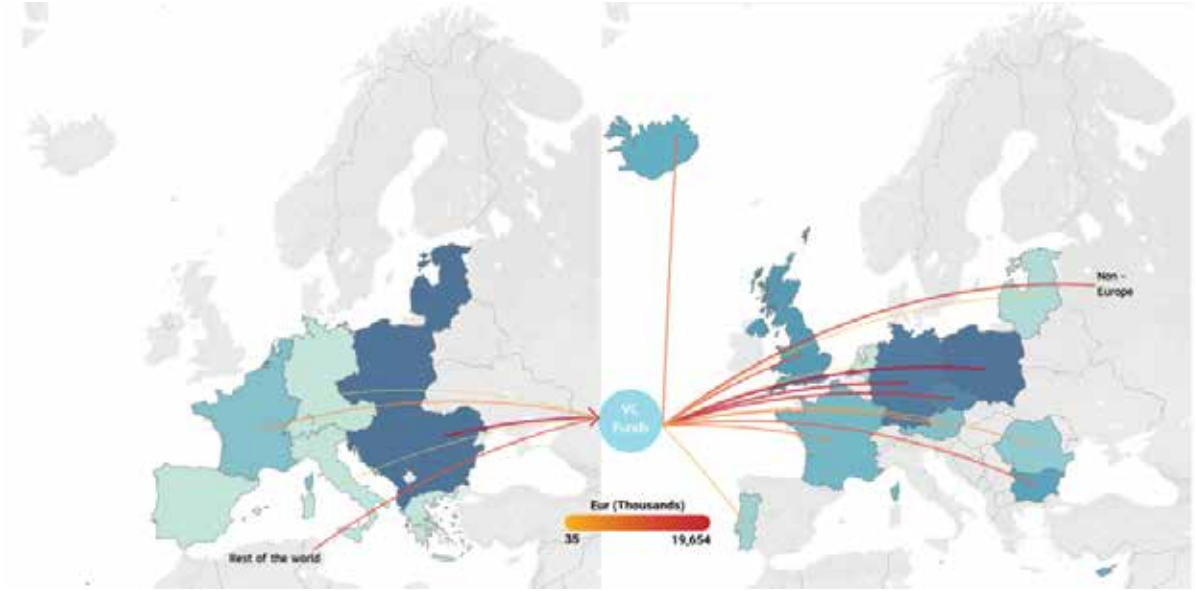
Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Other Central and Eastern Europe

The GDP of these countries has positive effect on the inflows and two-way flows under partner's controls and on outflows under controls on Other CEE. The GDP of the partner country has a small, positive and significant effect on inflows under own controls and a large, negative effect on outflows under Other CEE's controls. Two-way flows between Non-Europe and Other CEE have a positive effect on inflows under both sets of controls, a large negative effect on two-way flows under partner's controls and a small yet significantly positive effect on outflows with controls on Other CEE. Distance has a significantly negative effect on four out of six specifications, lending support to the importance of geographical proximity. The remaining variables' effects are only estimable under controls on the partner countries. In particular, the three-year average of funds raised in IPOs is significant in all three specifications although the effects are small. The effect of institutional quality is significant on inflows but with contrasting effects.

Poland

Flows from European fundraising to Polish VC funds vs *Flows from Polish VC funds to European portfolio companies*



Source: author's elaboration of Invest Europe data.

Gravity model: Poland (POL)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on POL	(5) Outflow, controls on POL	(6) Two-way flow, controls on POL
GDP i (EUR tn)	6.38 (5.36)	3.15 (4.84)	2.47 (4.48)	.33 (.53)	.46 (.41)	.33 (.42)
GDP j (EUR tn)	.62 (.39)	.1 (.52)	.23 (.41)	-1.65 (7.84)	6.46 (9.76)	-3.58 (6.94)
Two-way flows between non-Europe and country i (EUR bn)	-119.75*** (38.77)	65.97 (96.98)	33.28 (77.39)	4.43*** (1.4)	2.95 (2.04)	4.44*** (1.12)
Two-way flows between non-Europe and country j (EUR bn)	-1.91 (3.96)	3.3*** (1.02)	2.28*** (.86)	294.55*** (40.4)	-219.91** (92.05)	78.11 (49.29)
Economic Freedom	40.52 (26.27)	42.98 (27.03)	43.85* (22.4)	40.43* (23.72)	61.79* (36.02)	34.13** (16.61)
Bank-based economy	0 (.01)	0 (.01)	0 (0)	.06** (.02)	0 (.01)	.02* (.01)
Ease of business	-6.25 (4.88)	-7.06** (3.43)	-6.73*** (2.48)	8.85*** (3.29)	4.77 (4.53)	5.02 (3.62)
Three-year average of funds raised in IPOs (EUR bn)	.16*** (.06)	.03 (.06)	.08 (.05)	.88 (.58)	.43* (.24)	.43* (.24)
Distance (in thousand km)	.38 (1.1)	-.21 (.6)	-.17 (.6)	-.67 (.59)	-.01 (.88)	-.42 (.57)

Common border	3.22**	1.71	1.94**	.93	2.21***	1.44
	(1.25)	(1.2)	(.99)	(1.09)	(.85)	(.9)
Constant	-41.84**	-40.08**	-40.59**	-49.7**	-60.09**	-37.34***
	(20.04)	(20.03)	(16.98)	(22.95)	(27.81)	(11.15)
Observations	214	214	214	275	275	275
R-squared	.49	.37	.47	.34	.34	.34

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Poland

In the gravity equations for Poland, the GDP of either countries, as well as distance, appear not to be significant factors. The two-way flows between Non-Europe and Poland have a negative effect on outflows under partner's controls and a positive effect on inflows and two-way flows under Polish controls. The two-way flows between non-Europe and the partner countries have a positive effect on inflows (in both specifications), a positive effect on two-way flows with controls on the partner country and a negative effect on outflows under Polish controls. Economic freedom has a positive effect on all flows with controls on Poland and a positive effect on two-way flows with controls on the partner country. Ease of business seems to have an ambiguous effect on inflows and a negative effect on two-way flows under partner's controls. Whether Poland is bank-based or not, seems to have a small yet significant positive effect on inflows and two-way flows. Although distance is not significant, sharing a common border has a positive significant effect on outflows under both controls and on two-way flows under partner's controls. The three-year average of funds raised in IPOs has a nearly zero effect on all flows.

Romania

Flows from European fundraising to Romanian VC funds vs *Flows from Romanian VC funds to European portfolio companies*

Source: author's elaboration of Invest Europe data.

Gravity model: Romania (ROM)

	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(5) Outflow, controls on ROM	(6) Two-way flow, controls on ROM
GDP i (EUR tn)	.49	6.93	-.21	.42
	(.36)	(16.7)	(.5)	(.33)
GDP j (EUR tn)	-15.99	2.05**	100.33***	-12.66
	(52.08)	(.88)	(34.6)	(50.27)
Two-way flows between non-Europe and country i (EUR bn)	9.38***	-2621.89	2.44	9.58***
	(1.43)	(2000.89)	(7.26)	(1.55)
Two-way flows between non-Europe and country j (EUR bn)	2848.69	-6.9		3717.22
	(3498.17)	(4.94)		(3434.11)
Economic Freedom	-123.62***	24.76	-304.56***	-129.01***
	(28.01)	(27.41)	(69.38)	(26.67)
Bank-based economy	0	0	-.16***	-.01
	(.02)	(0)	(.01)	(.02)
Ease of business	2.93	6	9.66***	7.05
	(7.96)	(5.2)	(1.44)	(7.81)
Three-year average of funds raised in IPOs (EUR bn)	10.21***	-.14	25.36***	10.15***
	(3.31)	(.26)	(4.46)	(2.89)
Distance (in thousand km)	-.44	-7.45**	-.99	-.48
	(.76)	(3.64)	(1.39)	(.71)
Common border	-9.45***		2.36**	.6
	(1.68)		(1.03)	(1.3)
Common language	7.28***			-2.92***
	(.8)			(.66)
Constant	85.04***	-25.25	228.93***	89.13***
	(12.51)	(19.1)	(49)	(12.62)
Observations	225	195	192	225
R-squared	.91	.44	.48	.9

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*
Note: due to scarcity of observations, not all specifications could be implemented

Table Description: Romania

The gravity equations for Romania suggest that the GDP of Romania is not significant, while the GDP of the partner country acquires a positive effect on two-way flows under partner controls and on outflows under Romanian controls; the two-way flows between non-Europe and the other Romanian partner countries are also estimated to be non-significant while the two-way flows between non-Europe and Romania are strongly significant and have a positive effect on inflows and two-way flows with different control groups. Economic freedom is significant and has a negative effect in three out

of four specifications. Ease of business seems to positively affect flows, although it is only significant for outflows under Romanian controls. Whether Romania or the partner country is bank-based has nearly zero effect on all flows. The three-year average of funds raised in IPOs has positive effect on inflows in the presence of controls for the partner countries and on outflows and two-way flows in the presence of Romanian controls. Distance has a significant negative effect on two-way flows controlling for the partner countries' characteristics. Cultural proximity, instead, has an ambiguous effect, being positive for inflows and outflows under partner and Romanian controls, and negative for inflows and two-way flows with controls on the partner country and Romania, respectively.

Ukraine

Gravity model: Ukraine (UKR)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on (UKR)
GDP i (EUR tn)	-34.66	204.65	48.24**	.6
	(31.21)	(564.77)	(19.15)	(0)
GDP j (EUR tn)	2.34***	-2.99	.2	-590.5
	(.56)	(3.4)	(2.36)	(0)
Two-way flows between non-Europe and country i (EUR bn)	422.69***	396.35	270.83***	
	(111.99)	(819)	(100.46)	
Two-way flows between non-Europe and country j (EUR bn)	-.12	75.97***	27.25**	
	(2.21)	(11.29)	(12.07)	
Economic Freedom	246.32***	-107.69*	-20.55	1025.53
	(86.35)	(57.65)	(31.91)	(0)
Bank-based economy	.01	-.08***	-.03**	.14
	(.01)	(.02)	(.01)	(0)
Ease of business	-20.57***	-14.52	-5.62	231.22
	(5.58)	(21.09)	(5.95)	(0)
Three-year average of funds raised in IPOs (EUR bn)	.38*	-4.13***	-1.7***	84.99
	(.2)	(.56)	(.49)	(0)
Distance (in thousand km)	-7.86**	-8.19***	-5.8**	-.15
	(3.64)	(1.9)	(2.39)	(0)
Constant	-188.24***	70.32	15.9	-654.92
	(65.88)	(49.16)	(24.25)	(0)
Observations	192	192	192	132
R-squared	.87	1	.73	.09

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*
Note: due to scarcity of observations, not all specifications could be implemented

Table Description: Ukraine

The gravity equations for Ukraine with controls on the partner countries suggest that the GDP of Ukraine exerts a positive effect on two-way flows. The GDP of the partner country acquires a significant positive effect on outflows. The two-way flows between non-Europe and Ukraine have a positive and highly significant effect on both outflows and two-way flows, while the two-way flows

between non-Europe and the Ukrainian partner countries have a positive effect on inflows and two-way flows. Whether the partner country is bank-based has nearly zero effect on all flows. Distance has a negative effect on all flows, thus lending support to the importance of geographical proximity. Economic freedom, as an indicator of institutional quality, is estimated to have a positive effect on outflows but a negative effect on inflows, while greater ease of business negatively affects outflows. The three-year average of funds raised in IPOs is significant in three out of four specifications and has a slightly positive effect on outflows and a negative effect on both inflows and two-way flows. The gravity equation with Ukrainian controls instead, was only computed for inflows but no variable has a significant effect.

4.2.7 Other Europe (Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City)[26]

The flows of PE funds of these countries are characterised by large investments in Other Europe's portfolio companies, in comparison to the other European countries analysed. In 2015, PE investment in these countries reached a peak of nearly EUR 450 million. Although the share of VC funds has generally been low, it has shown an increase in recent years.

The level of Other Europe's PE funds' investment was notably high in 2007, amounting to over EUR 160 million. However, it sharply decreased thereafter, remaining at a very low level. In 2018, there was a slight recovery to nearly EUR 20 million, and it is noteworthy that the share of VC funds accounted for nearly 50% of the total.

Notably, PE funds from Other Europe seem to concentrate their investments in a select few countries. While the United Kingdom was the main investment target for Other Europe's PE funds between 2007-2009, Switzerland emerged as the primary recipient of investments in 2015. The countries investing in Other Europe's portfolio companies have become more diverse over time.

Gravity model: Other Europe (OEU)

	(1) Outflow, controls on destination	(2) Inflow, controls on origin	(3) Two-way flow, controls on j	(4) Inflow, controls on OEU	(5) Outflow, controls on OEU	(6) Two-way flow, controls on OEU
GDP i (EUR tn)	246.1**	12.92	50.72		-1.39*	-.14
	(101.98)	(32.89)	(42.68)		(.73)	(.51)
GDP j (EUR tn)	1.3	.76**	.68***			
	(1.04)	(.33)	(.23)			
Two-way flows between non-Europe and country i (EUR bn)	-270.66***	20.68	-26.95		5.85**	5.61***
	(53.44)	(90.13)	(74.89)		(2.32)	(1.56)
Two-way flows between non-Europe and country j (EUR bn)	3.08	4**	4.79***			
	(3.78)	(1.64)	(1.54)			
Economic Freedom	70.39***	-16.07*	3.63			
	(26.8)	(8.93)	(7.82)			
Bank-based economy	-.01**	0	0			
	(.01)	(0)	(0)			
Ease of business	-12.23	3.55	.63			
	(7.88)	(2.97)	(2.59)			
Three-year average of funds raised in IPOs (EUR bn)	-.88***	-.16	-.32**			
	(.22)	(.15)	(.13)			
Distance (in thousand km)	.22	.02	.45	-1.32	.29	.74
	(.92)	(.57)	(.39)	(1.11)	(.37)	(.48)
Constant	-69.38***	.59	-14.73**	-4.32	-8.89***	-10.18***
	(21.97)	(6.97)	(6.69)	(2.78)	(1.27)	(1.82)

[26] See descriptive country tables in Annex 7.7.

Observations	224	224	224	25	25	25
R-squared	.68	.28	.37	.08	.01	.56

Standard errors are in parentheses
**** p<.01, ** p<.05, * p<.1*

Table Description: Other Europe

The gravity equations for Other Europe suggest that the GDP of these countries has an ambiguous effect on outflows, while the GDP of the partner country positively affects inflows and two-way flows under partner's controls. The two-way flows between Non-Europe and Other Europe have a negative effect on outflows when controlling for the partner's characteristics, and a positive effect on outflows and two-way flows under Other Europe controls. On the other hand, the two-way flows between non-Europe and the partner country has a positive effect on both inflows and two-way flows under partner's controls. Greater economic freedom negatively affects inflows and positively affects outflows under partner's controls, while ease of business has no significant effect on flows. Whether the partner countries are bank-based or not has a small yet significant negative effect on outflows. The three-year average of funds raised in IPOs has a near zero although significant negative effect on outflows and two-way flows. Finally, distance doesn't seem to impact flows.

5. CONCLUSIONS

A well-functioning and efficient venture capital market is one of the key pillars for enhancing overall economic growth in the medium and long term, as it represents a crucial source of financing for start-ups and early-stage companies. However, European SMEs and small mid-caps face several barriers to financing and cannot benefit from a well-developed and integrated pan-European VC market, which has only partially recovered from the financial crisis. The nature and determinants of these cross-border flows have not been fully explored, and thus an evidence-based descriptive and empirical analysis has been conducted, in the interest of both theory and policy.

We analysed the geographic features of the VC/PE markets in Europe from the 2020 Yearbook of Invest Europe, looking at key indicators that identify the features of the European cross-border flows during the 2007-2020 period.

The European private equity market is relatively underdeveloped in terms of volumes, at least in comparison with the US, despite the two economies are comparable in terms of GDP. As regards financial integration, with the exception of financial hubs like Luxembourg and Switzerland, most of the investments of European private equity intermediaries remain largely within national borders. On aggregate, exports of capital from European countries overcome imports. This is mainly due to the United Kingdom being a massive net exporter of PE flows. France, Sweden, and Luxembourg are the only other net exporters, though to a far lesser degree. Yet, the level of development of the national economy and the exporting of capital by domestic private equity funds do not seem to be strictly related; indeed, middle-low income nations also exhibit net capital exports higher than average. This is not surprising, as the literature has identified other factors which, together with market size, contribute to shape cross-border private equity flows. An example are information asymmetries and inefficiencies, which induce investors to channel their equity flows towards countries which are similar, or trustable in terms of quality of institutions. A cluster of diverse countries can be identified, which includes Luxembourg, Czechia, Switzerland, Austria, and Bulgaria, exhibiting a relatively high level of both export of national private equity investments – as a ratio of total investments underwritten by domestic private equity firms – and import of foreign private equity capital, as a ratio of total private equity capital invested within the domestic borders. Countries that exhibit low values of foreign investments by local private equity firms belong to two groups: one group – which includes Germany, France, Italy, and the Nordic nations – characterised by a relatively low value of local

investments by foreign private equity firms; and a second group of countries – such as Romania, Greece, Hungary and other Eastern European countries – where a massive import of private equity capital occurs in relative terms. In this case, the degree of financial development of a country might be relevant in order to explain the size of its PE inflows.

After a steady increase in the volume of both fundraising and cross-border investment flows on the eve of the new century, the European venture capital market suffered a setback in the first years of the financial crisis, to then rebound up to the end of the 2010s. The VC market in Europe remains, however, highly fragmented, with each country featuring its own peculiarities. Disparities among European countries are evident. An analysis of the amount of VC investments in each country, in proportion to their GDP, clearly shows that Finland, Sweden, the UK, Ireland, Denmark, and Switzerland feature larger investment volumes than Southern and Eastern European countries.

We confirmed the home bias feature which characterises international financial markets: both fundraising and investment of venture capital funds privilege the domestic market to the international one. For example, the domestic component of investments accounts on average for 64.0% of the total VC activity, and cross-border investments within Europe account on average for only 23.1% during the period 2007-2020. This scarce internationalisation is also reflected at the European level, with domestic and within-Europe investments/fundraising largely exceeding extra-European flows.

Moreover, we used an adapted Grubel-Lloyd index that measures the degree of two-way investments between pairs of European countries for the period 2007-2020. It is worth noting that the highest values of two-way flows of venture capital investment are concentrated in the major financial centres, with a prominent role of the United Kingdom.

Using a gravity model framework, we also performed a theory-based analysis of the determinants of cross-border VC flows, both at the aggregate and at country level. In the aggregate, our results support the relevance of the proximity motive as a pull factor for financially developed countries. They also establish a correlation between European financial integration (measured by intra-European VC flows) and global financial integration (measured by extra-European VC flows). The covariates proxying for the quality of institutions exhibit some significant effect when referring to the destination country. It is also worth noting that VC flows seem unaffected by the financial structure of the destination country as measured by the bank-based index; yet the index's lack of significance is conditional on three significant covariates proxying for the degree of development and sophistication of financial markets. Looking at the country results, a few general patterns can be noticed across countries and across specifications. Consistently with the expectations on gravity equations, the GDP of both origin and destination countries as well as distance are almost always found to be strongly significant determinants of VC flows. Variables such as common border and common language are sometimes significant and sometimes not, perhaps because their effect is partly already captured by the variable distance. Looking at the set of economic indicators of a country's institution quality (*Economic Freedom, Ease of business, IPOs*), their related coefficients are often significant, but to a lesser degree compared to GDP or distance. As for the *Bank-based* economy index, it sometimes emerges as significant, but with a scarce impact on cross-border flows. Finally, VC flows between each country and non-EU countries are often important, lending further support to the hypothesis that global financial integration is an important driver of intra-European financial integration.

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7. ANNEX – COUNTRY PERSPECTIVE TABLES

The source of data for the following country tables is Invest Europe.

7.1 SOUTHERN EUROPE

7.1.1 Greece

Table 7.1.1.1. **Flows raised by Greek PE/VC funds (EUR million)**

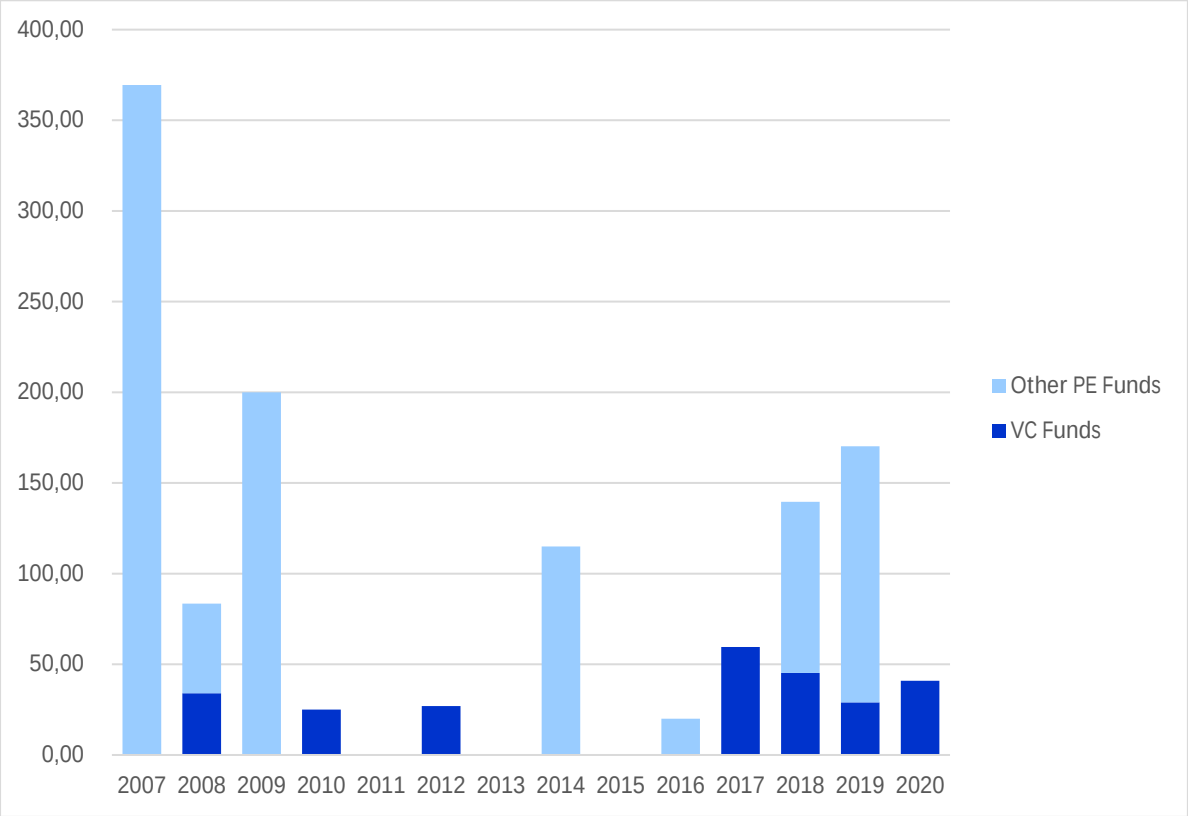
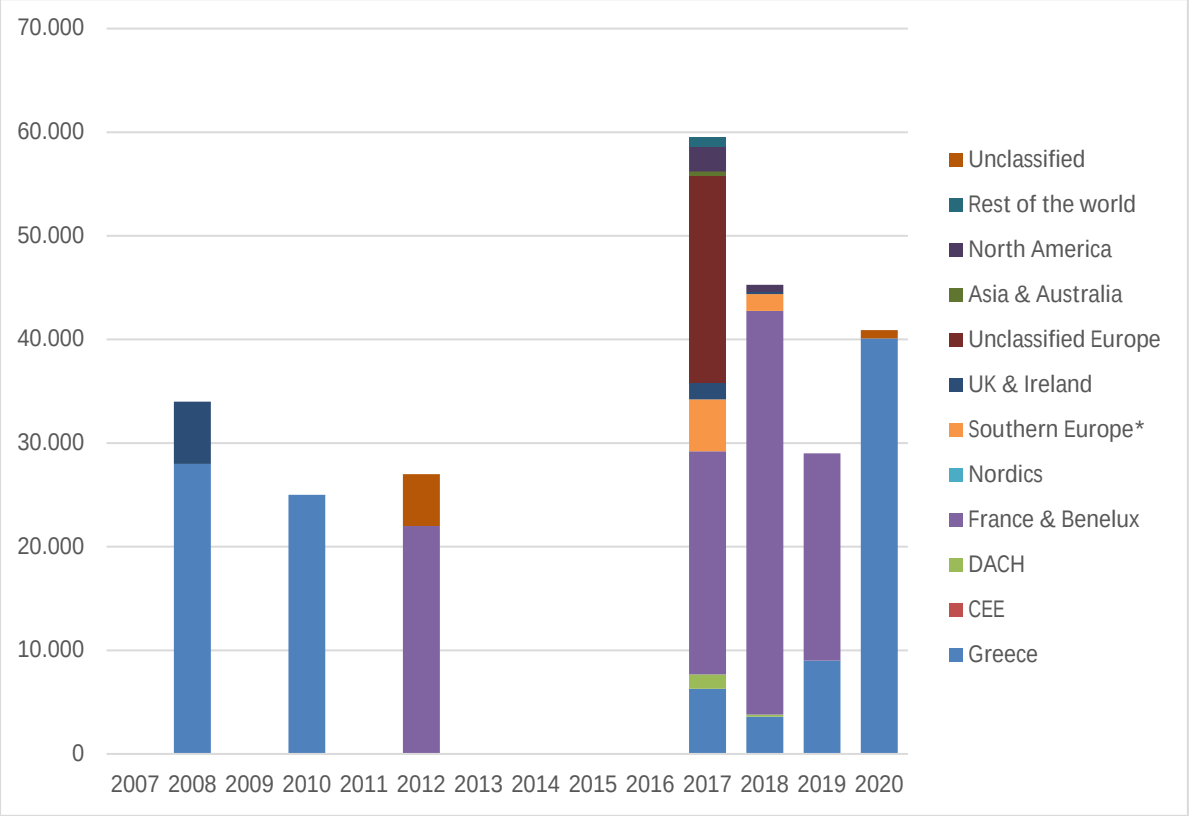


Table 7.1.1.2. **Geographical breakdown of Greek VC fundraising (EUR thousands)**



Southern Europe* - excluding Greece

Table 7.1.1.3. **Flows from Greek PE/VC funds to portfolio companies (EUR million)**

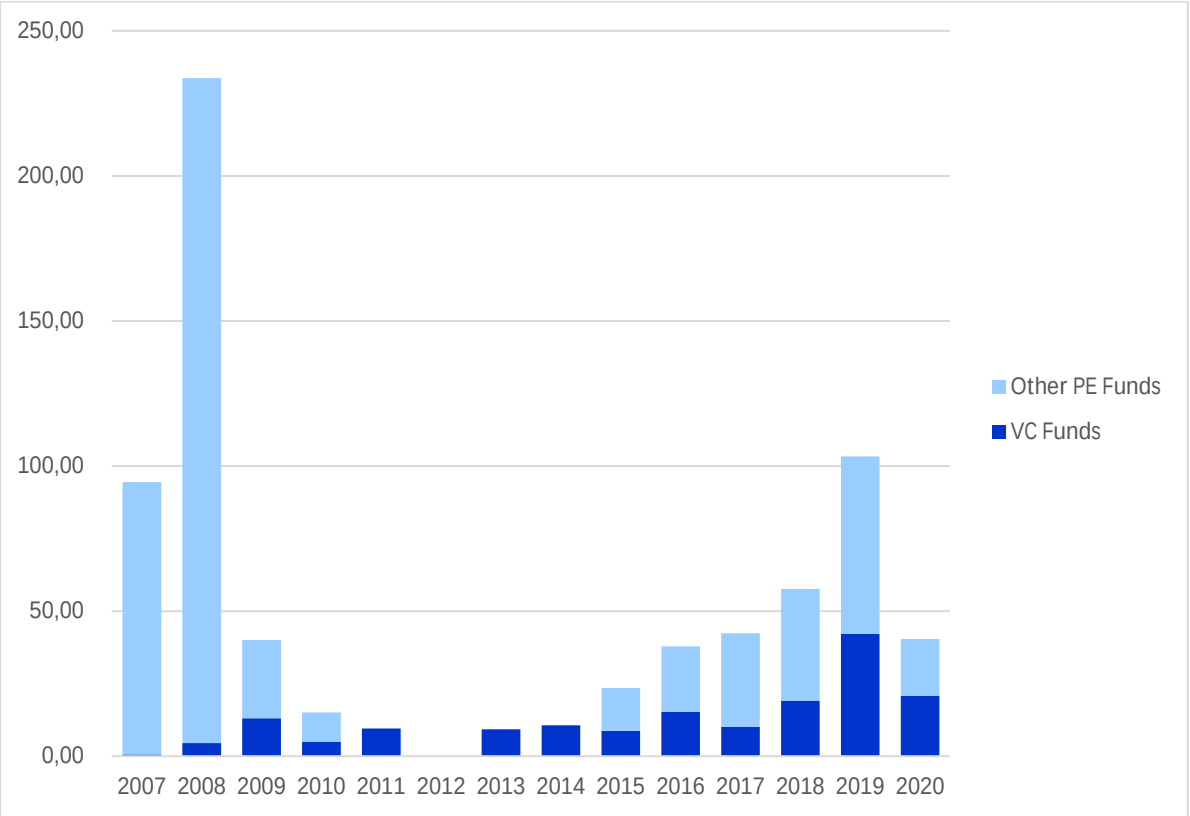


Table 7.1.1.4. **Top 5 foreign countries where Greek VC funds have invested (EUR thousands)**

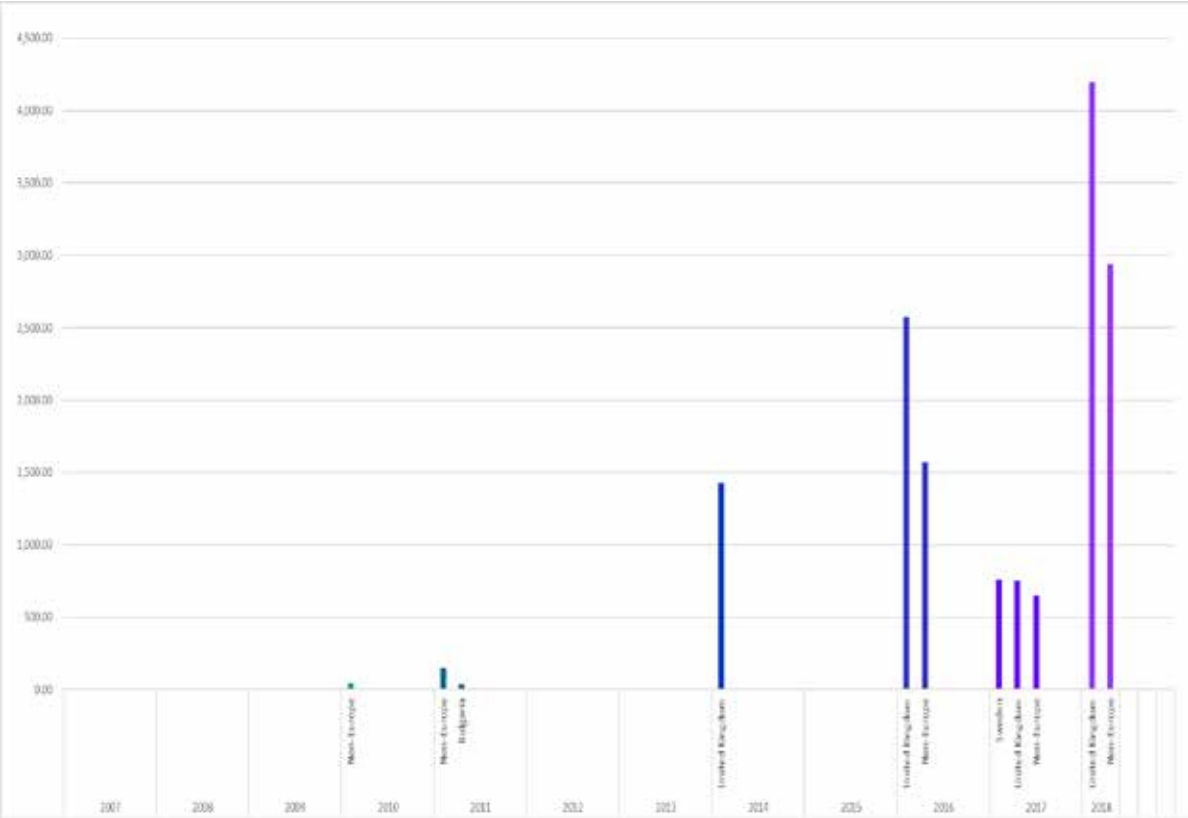
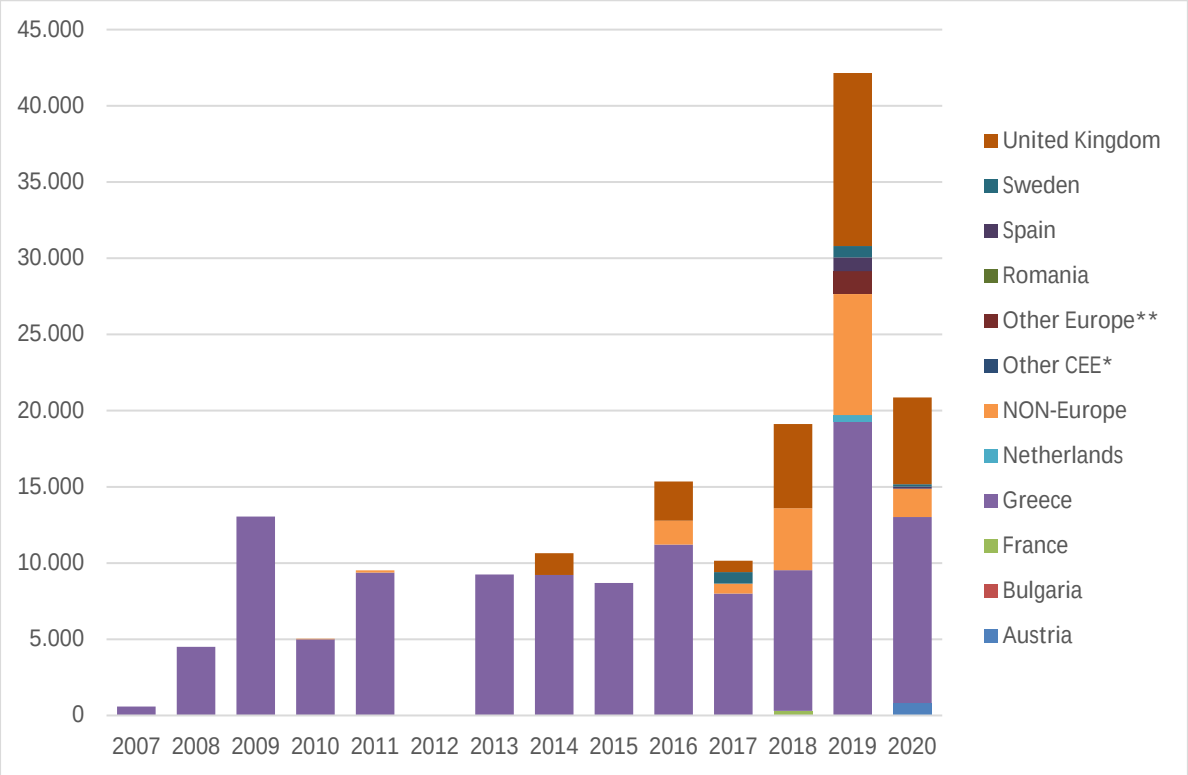


Table 7.1.1.5 **Geographical breakdown of flows from Greek VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.1.1.6. **Flows from PE/VC funds to Greek portfolio companies (EUR million)**

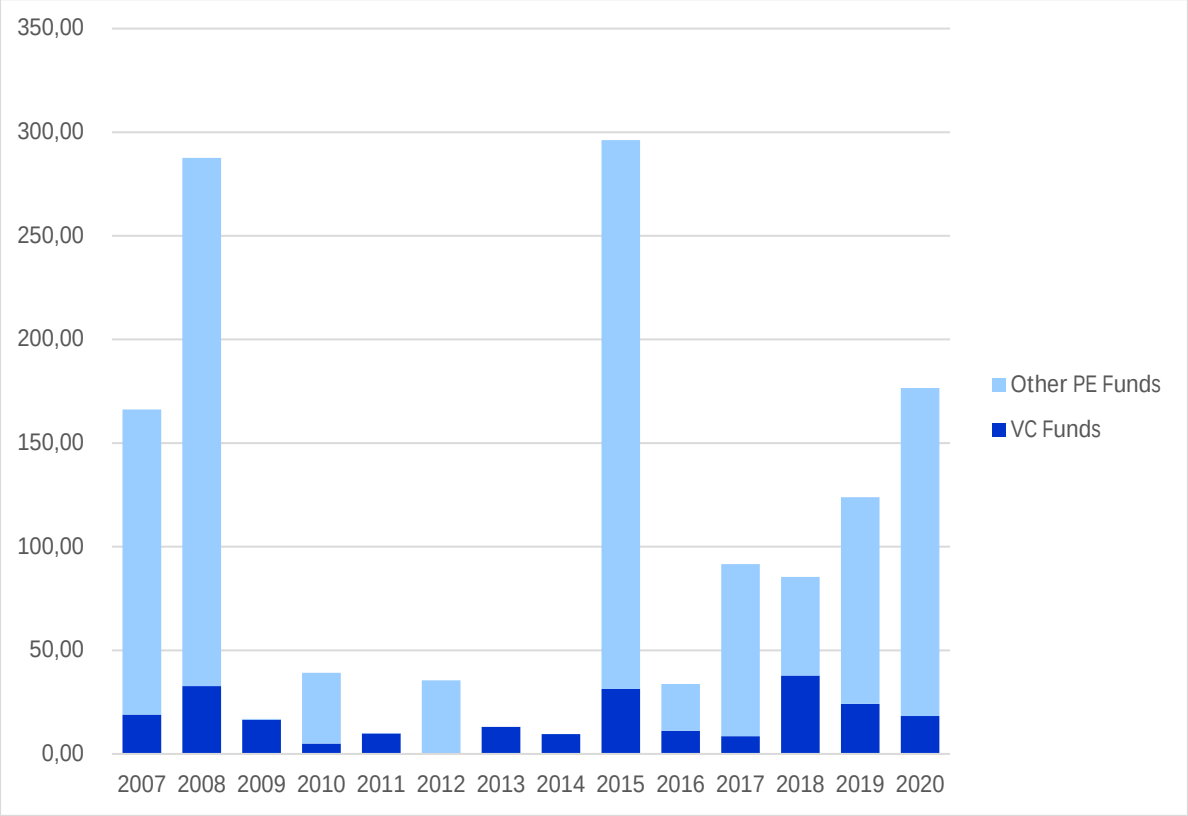


Table 7.1.1.7. **Top 5 foreign VC investors into Greek portfolio companies (EUR thousands)**

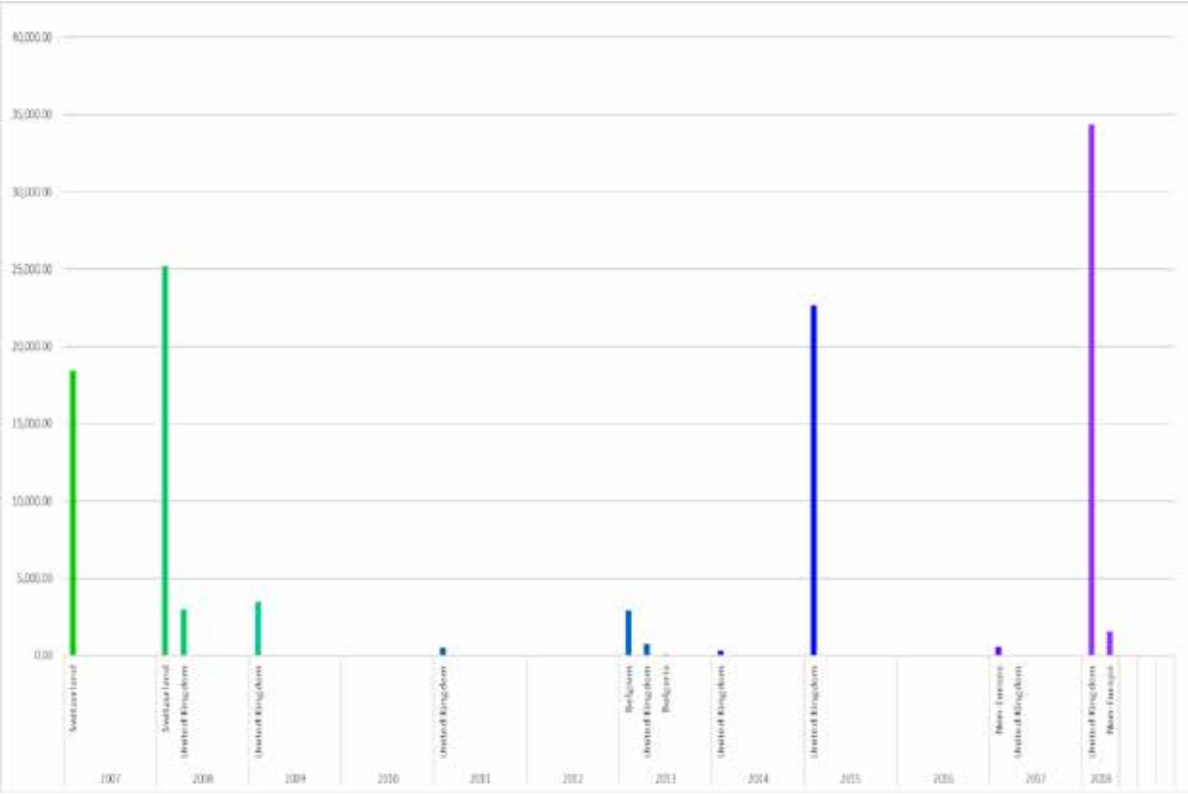


Table 7.1.1.8 **Geographical breakdown of flows from VC funds to Greek portfolio companies (EUR thousands)**

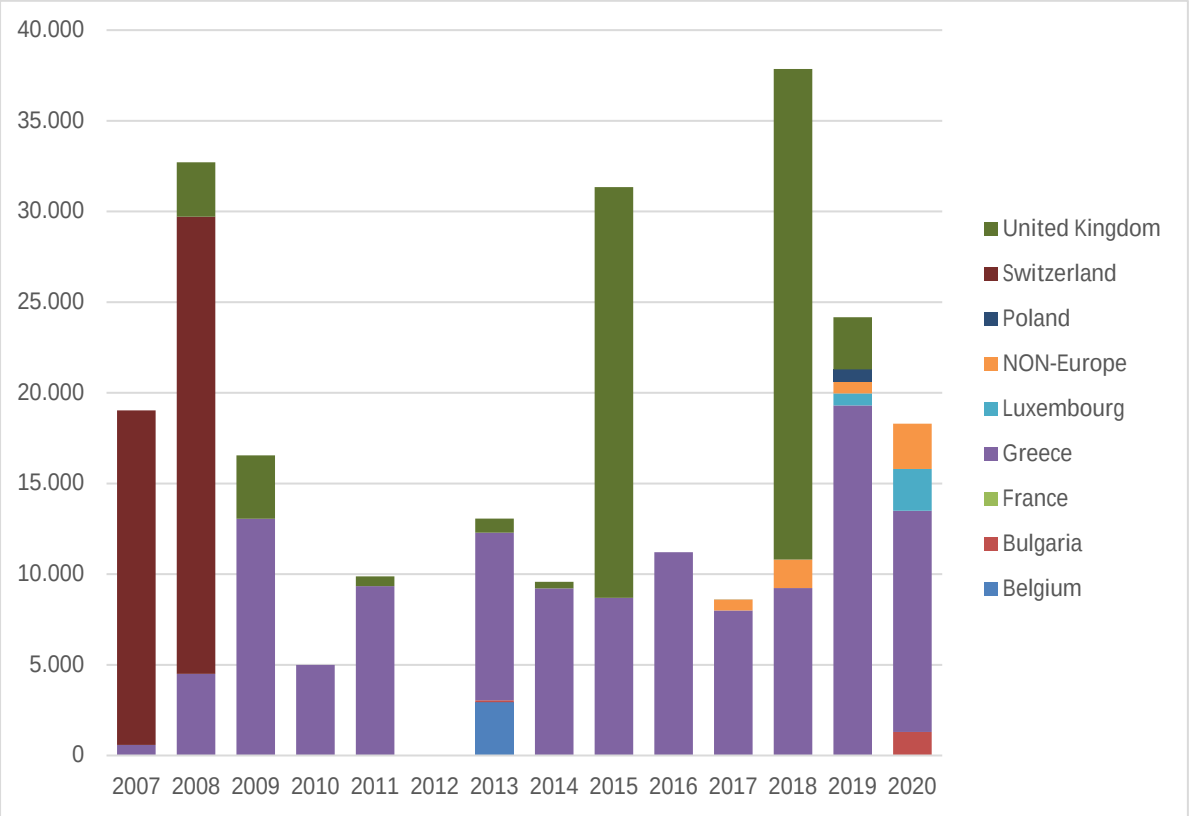
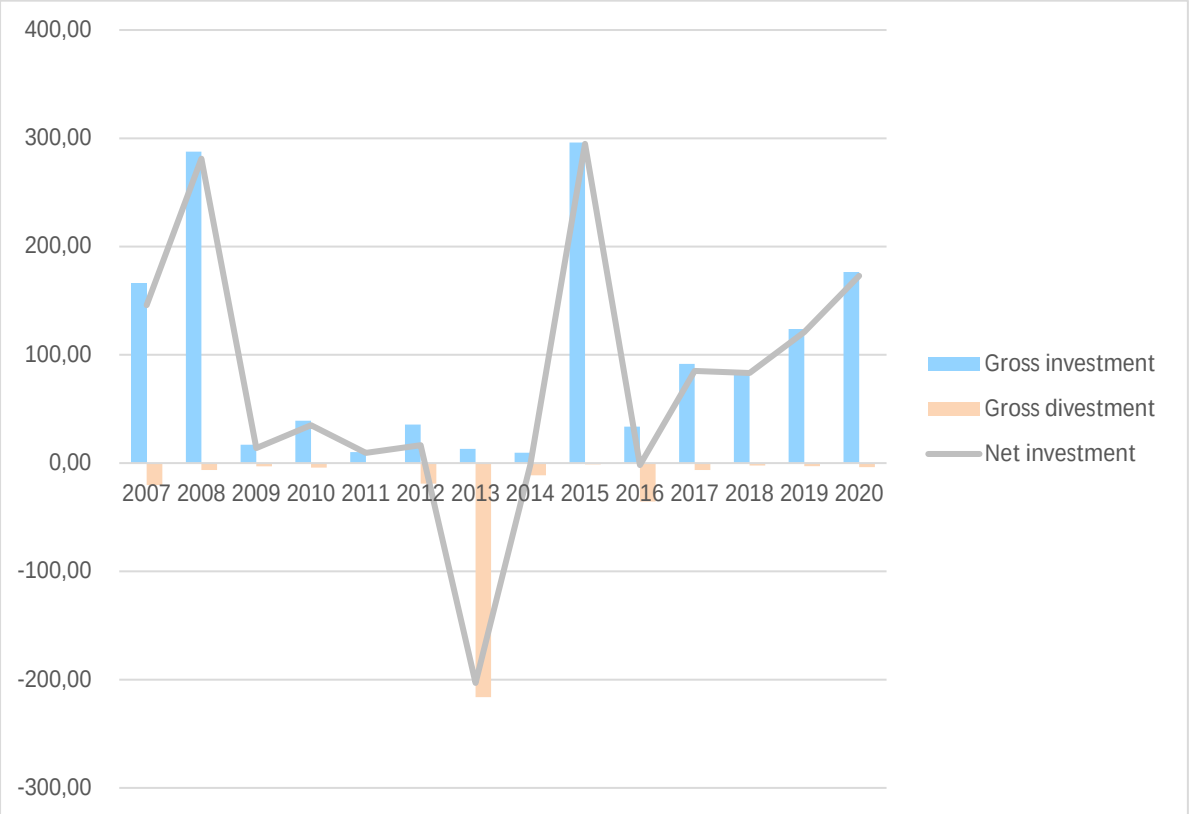


Table 7.1.1.9**. Investments and divestments of Greek PE funds (EUR million)**



7.1.2 Italy

Table 7.1.2.1. **Flows raised by Italian PE/VC (EUR million)**

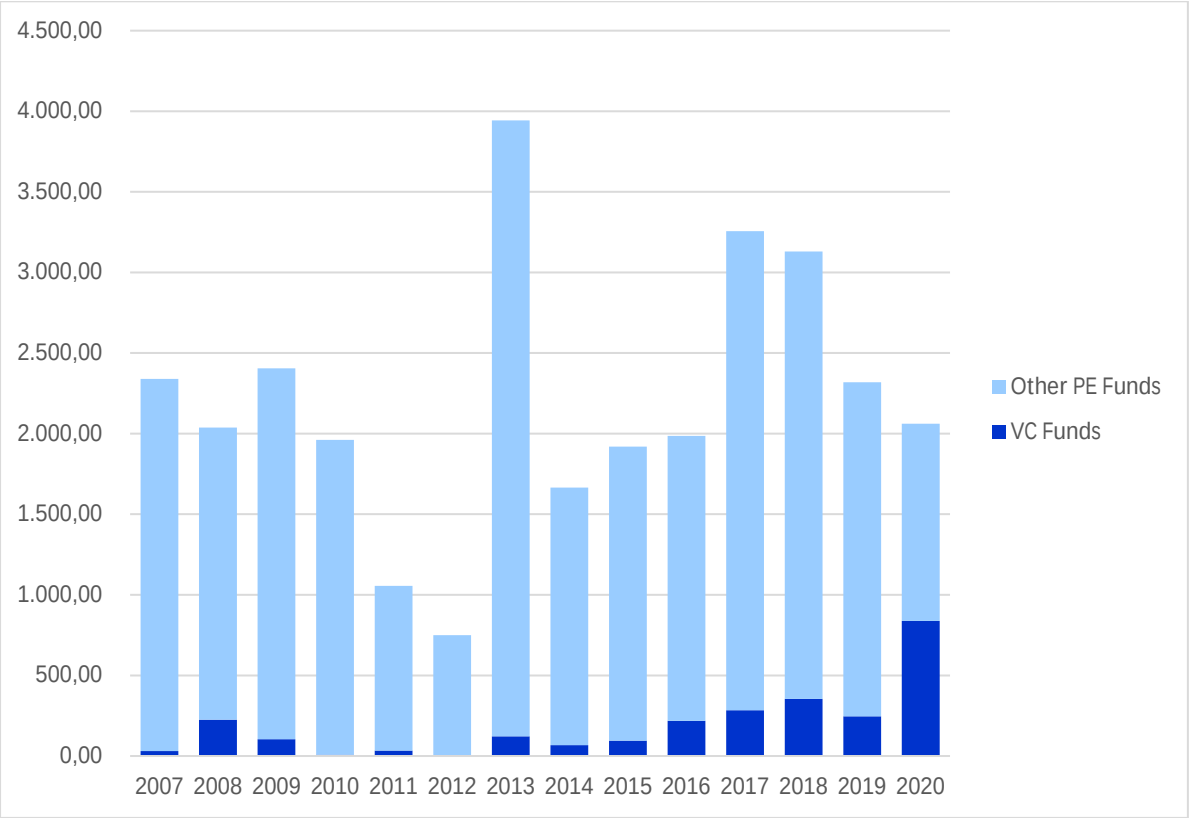
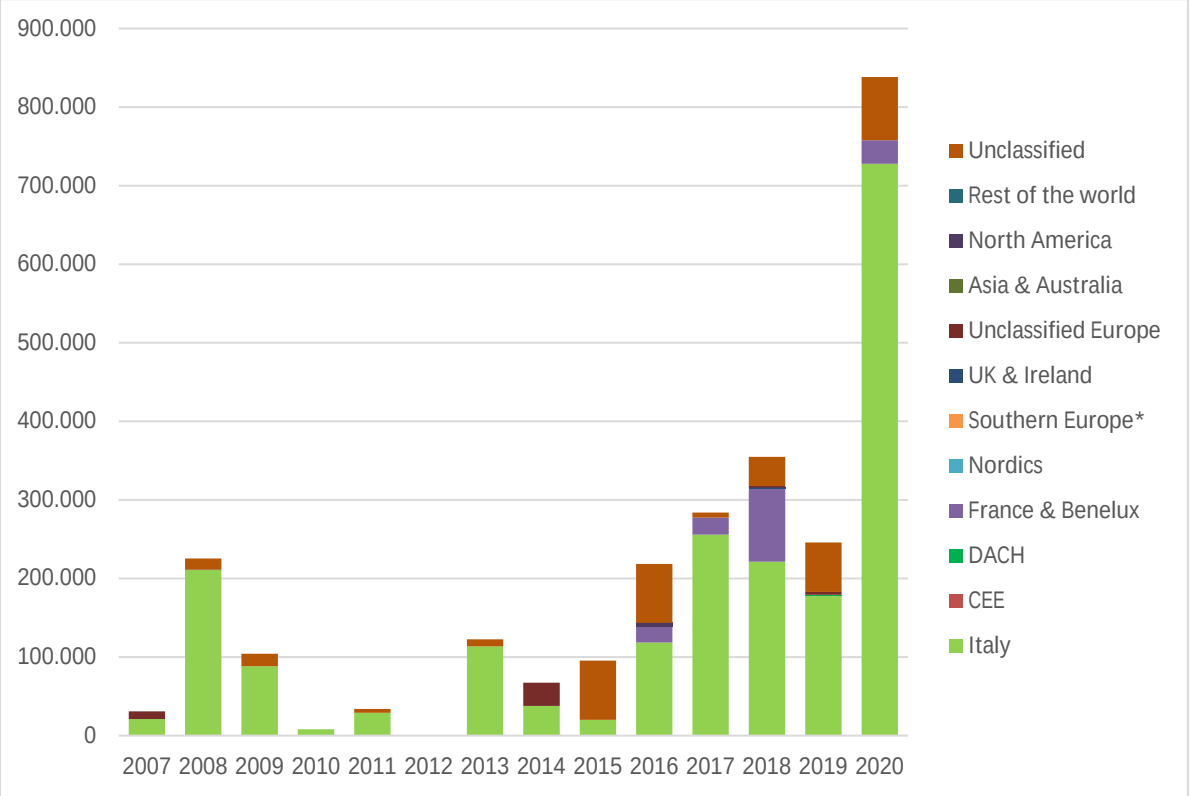


Table 7.1.2.2. **Geographical breakdown of Italian VC fundraising (EUR thousands)**



Southern Europe* - excluding Italy

Table 7.1.2.3. **Flows from Italian PE/VC funds to portfolio companies (EUR million)**

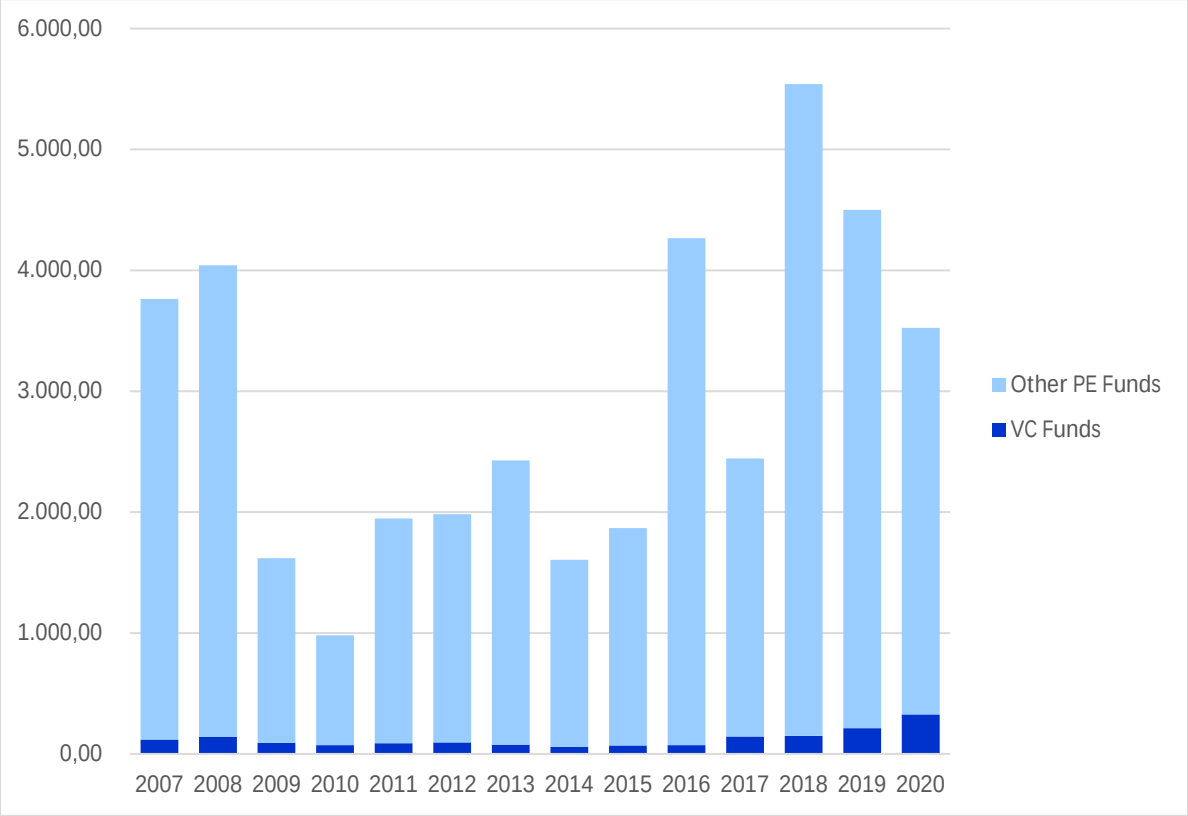
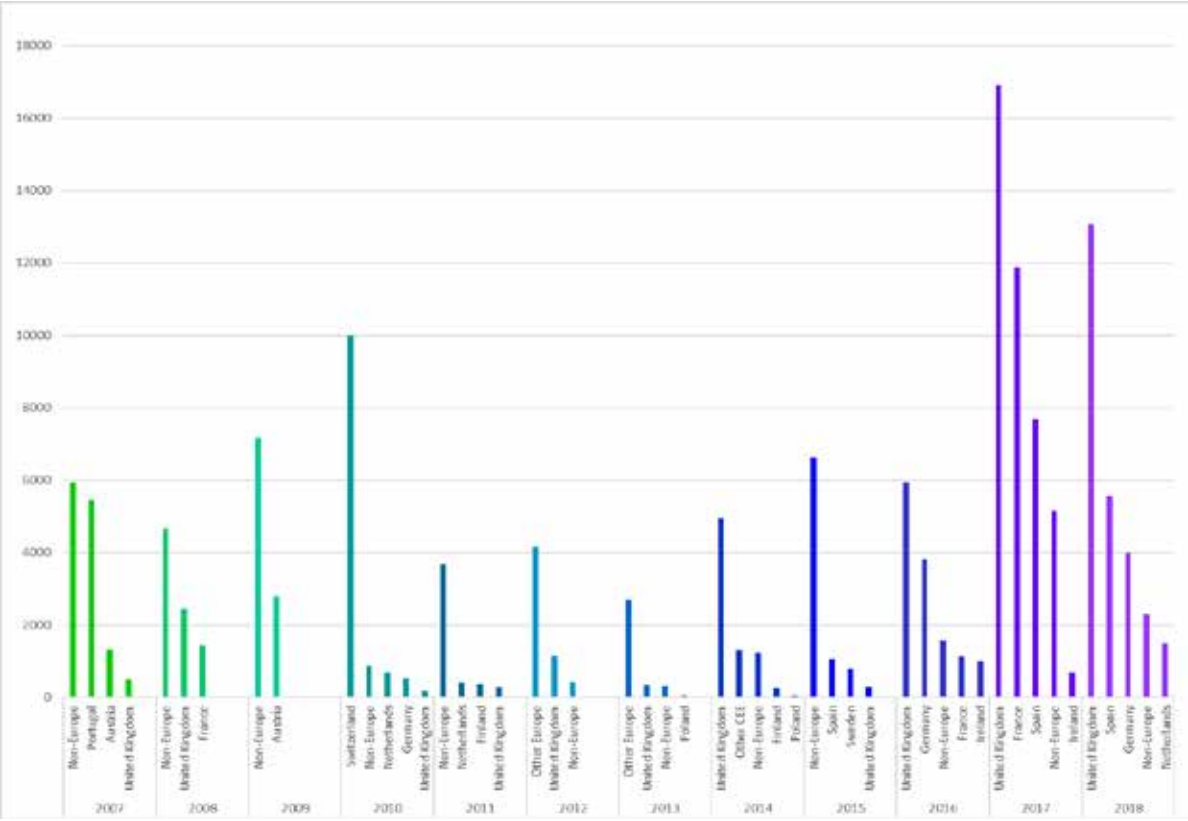
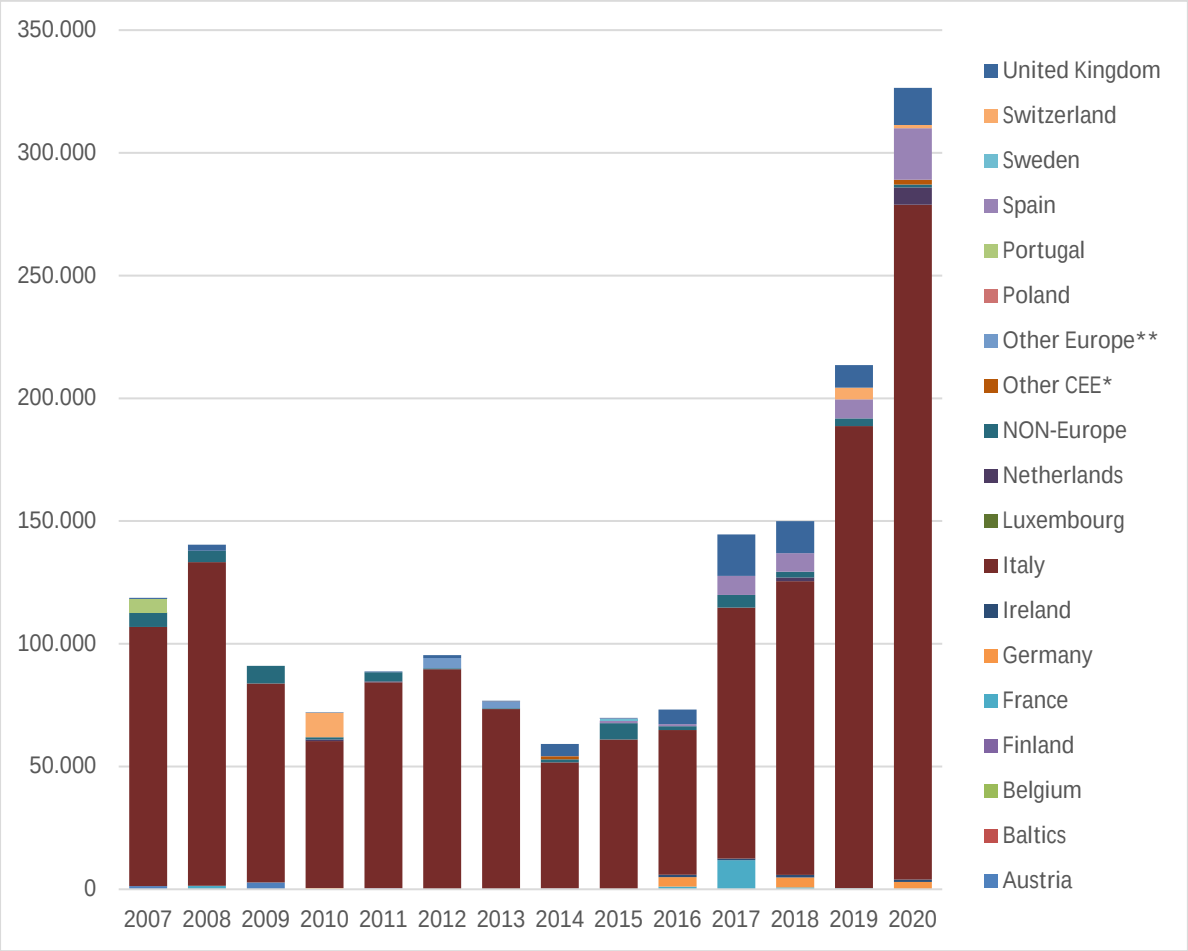


Table 7.1.2.4. **Top 5 foreign countries where Italian VC funds have invested (EUR thousands)**



Other CEE* - Bosnia-Herzegovina, Croatia, Macedonia, Moldovia, Montenegro, Serbia, Slovakia, Slovenia.

Table 7.1.2.5. **Geographical breakdown of flows from Italian VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.1.2.6. **Flows from PE/VC funds to Italian portfolio companies (EUR million)**

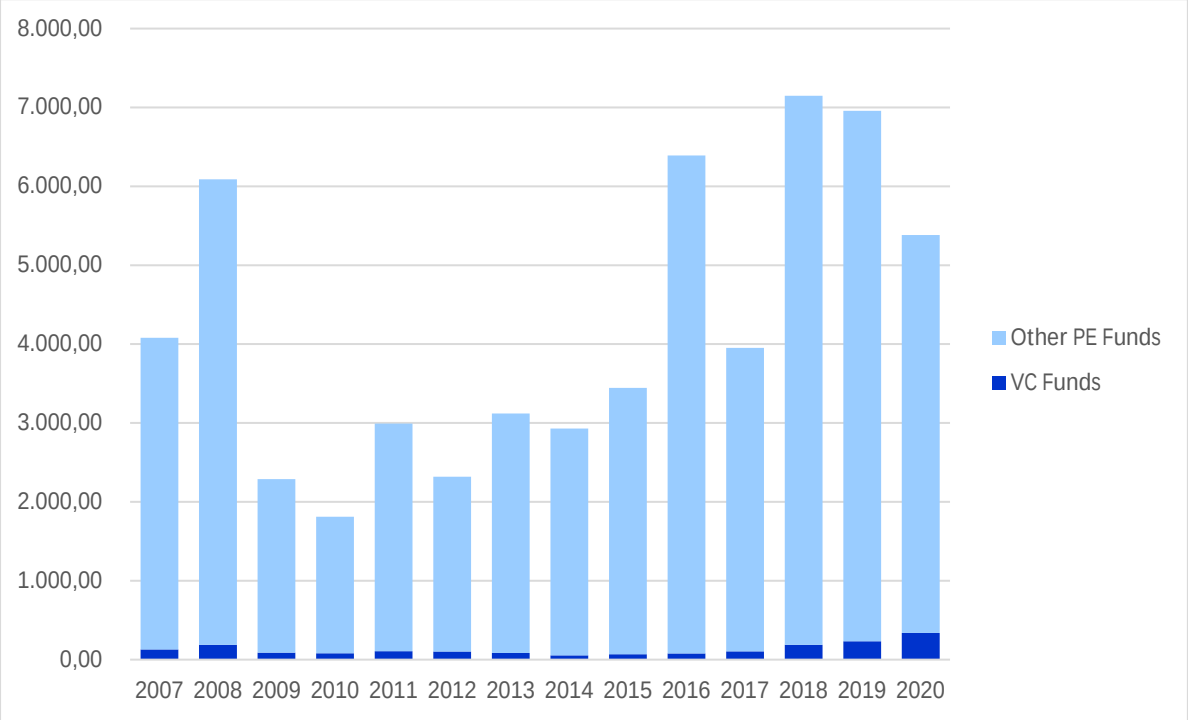


Table 7.1.2.7. **Top 5 foreign VC investors into Italian portfolio companies (EUR thousands)**

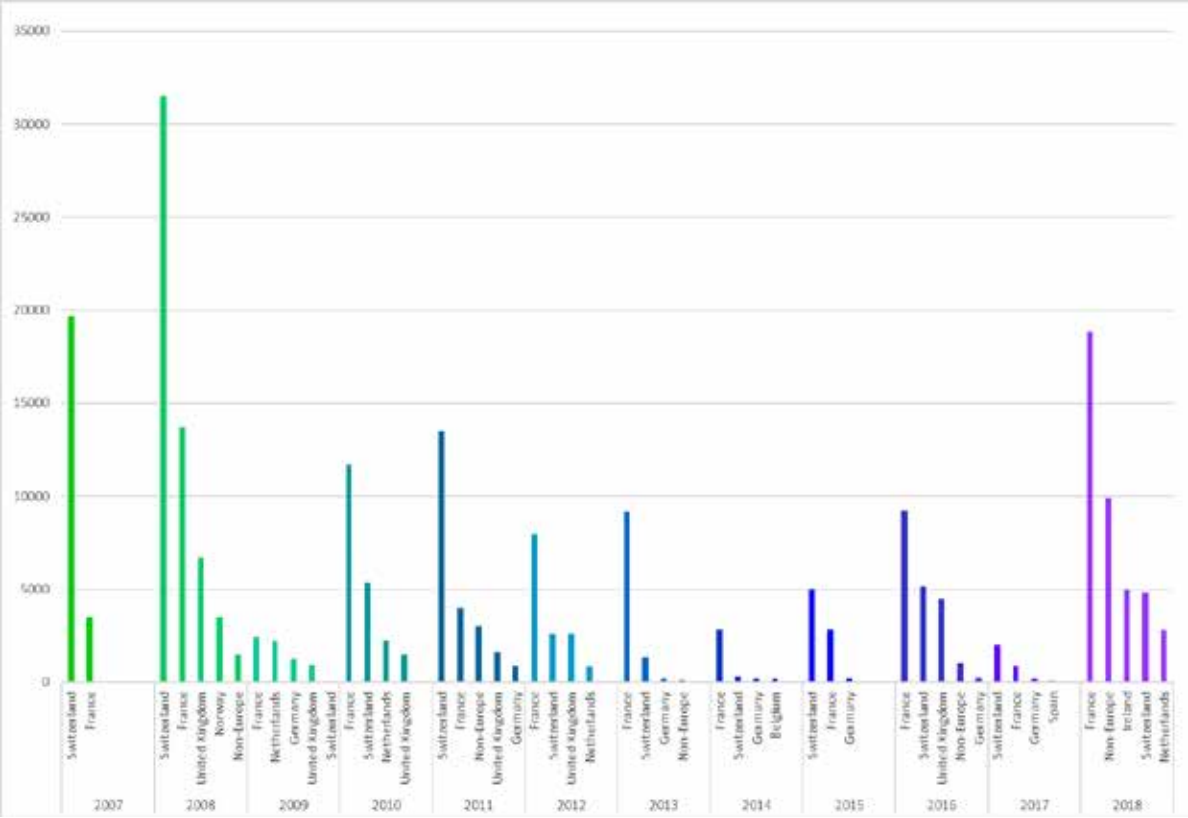


Table7.1.2.8 **Geographical breakdown of flows from VC funds to Italian portfolio companies (EUR thousands)**

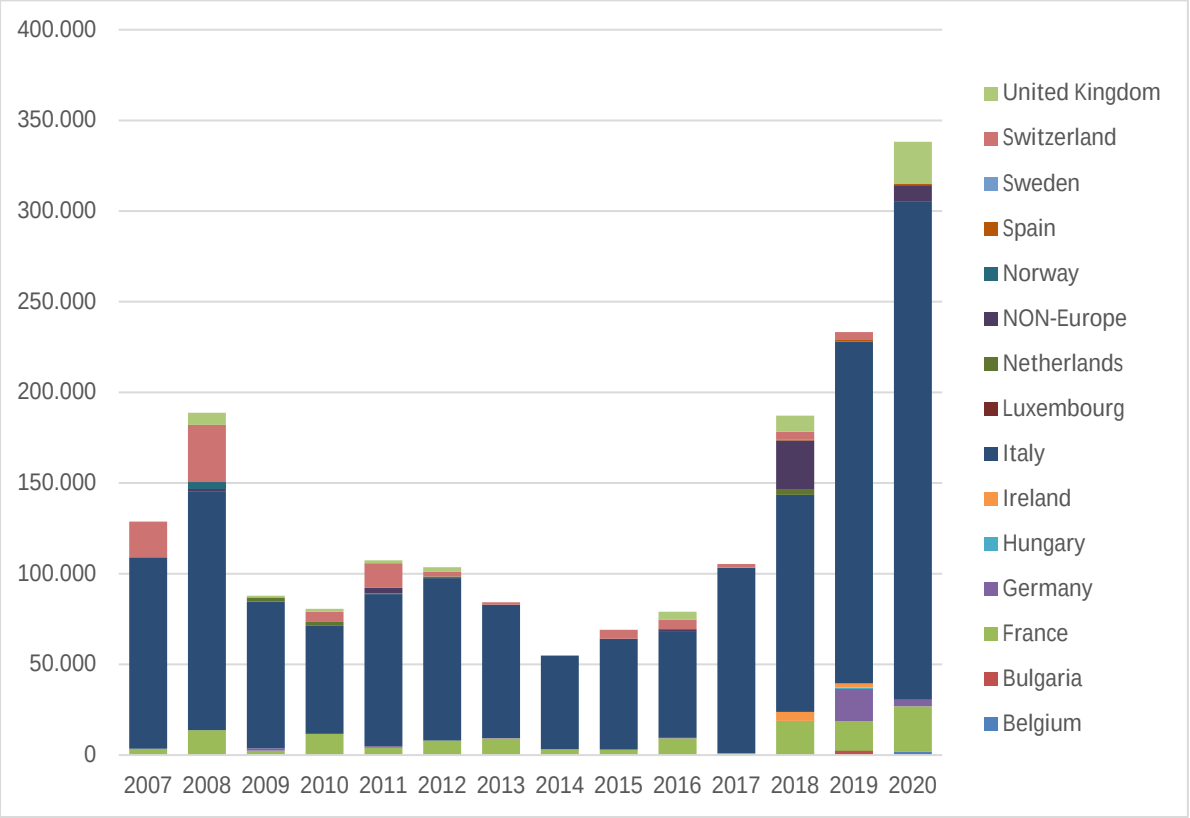
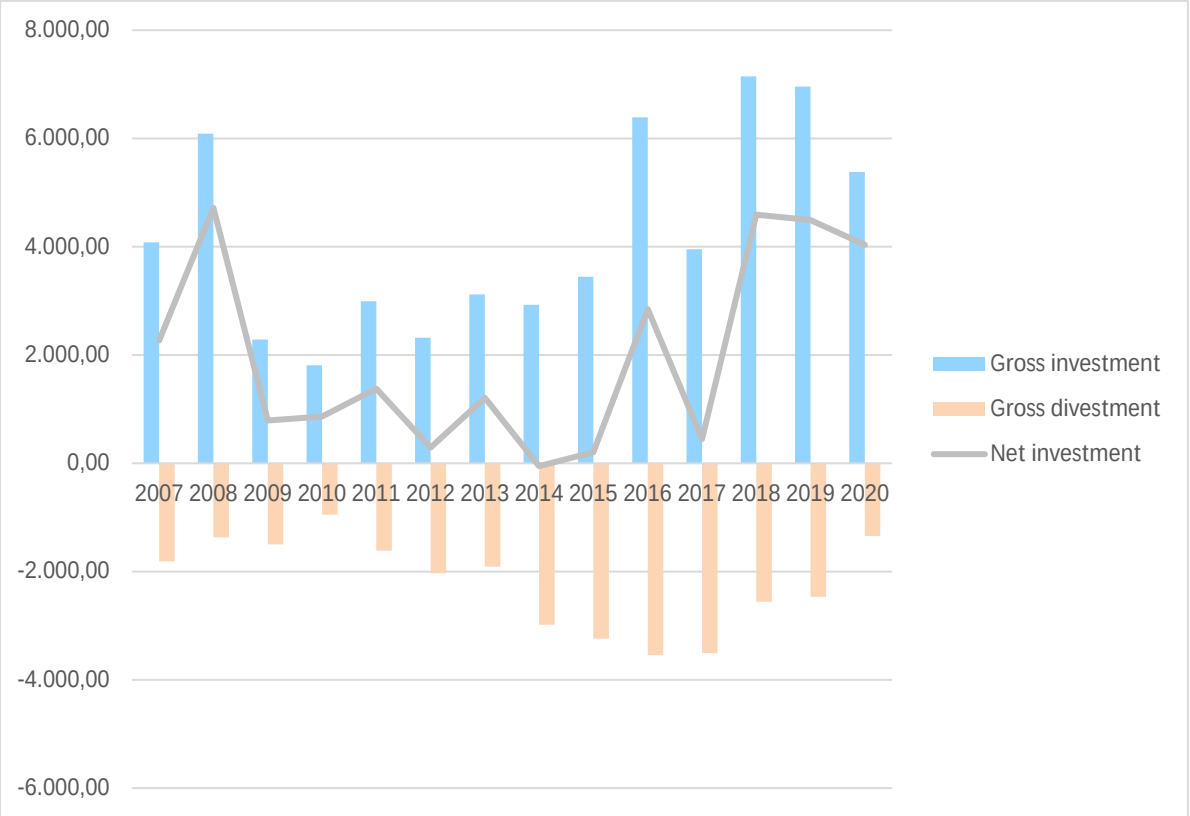


Table 7.1.2.9 **Investments and divestments of Italian PE funds (EUR million)**



7.1.3 Portugal

Table 7.1.3.1. **Flows raised by Portuguese PE/VC (EUR million)**

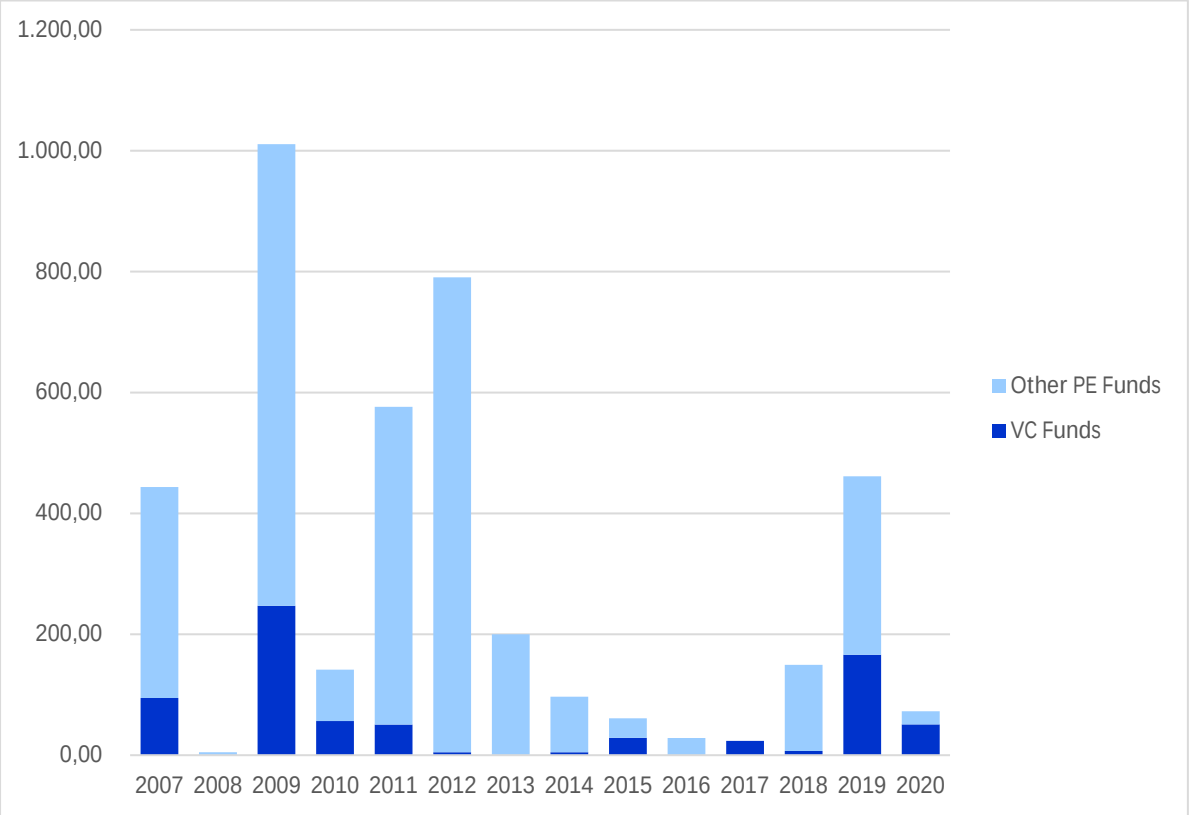
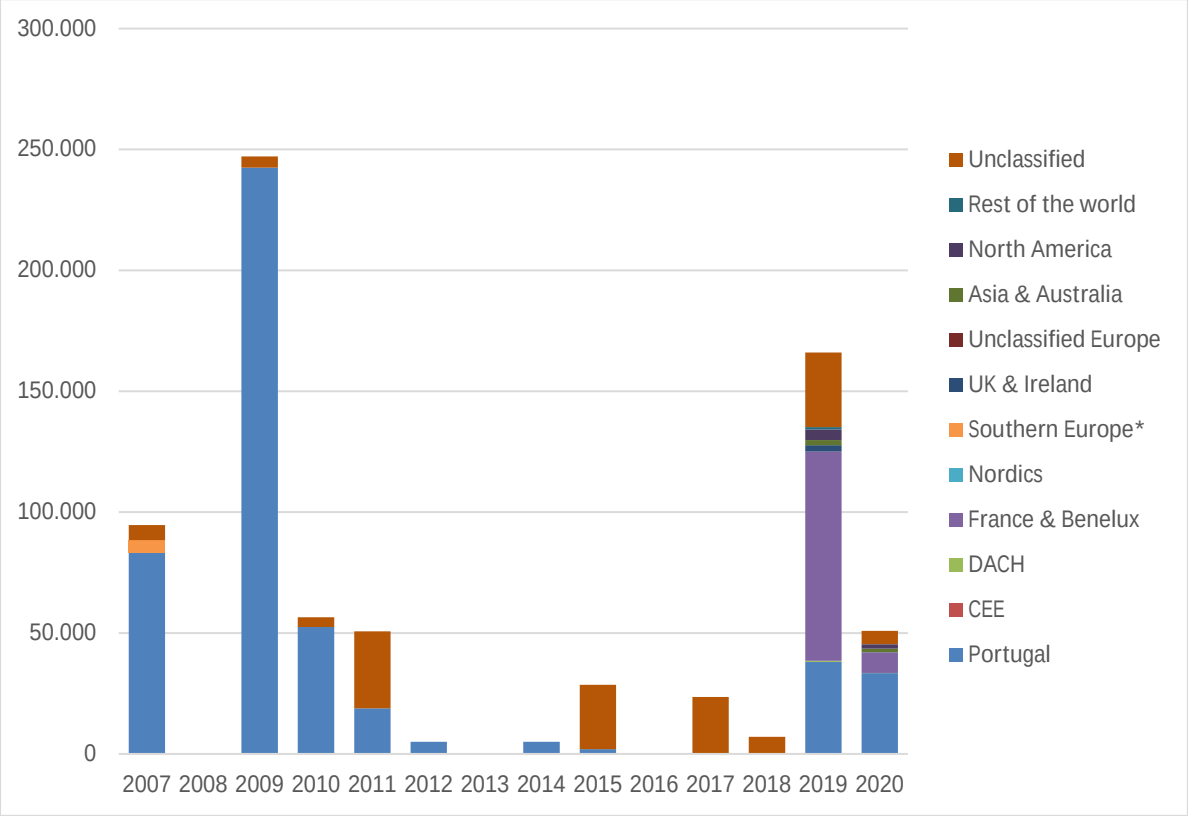


Table 7.1.3.2. **Geographical breakdown of Portuguese VC fundraising (EUR thousands)**



Southern Europe* - excluding Portugal

Table 7.1.3.3. **Flows from Portuguese PE/VC funds to portfolio companies (EUR million)**

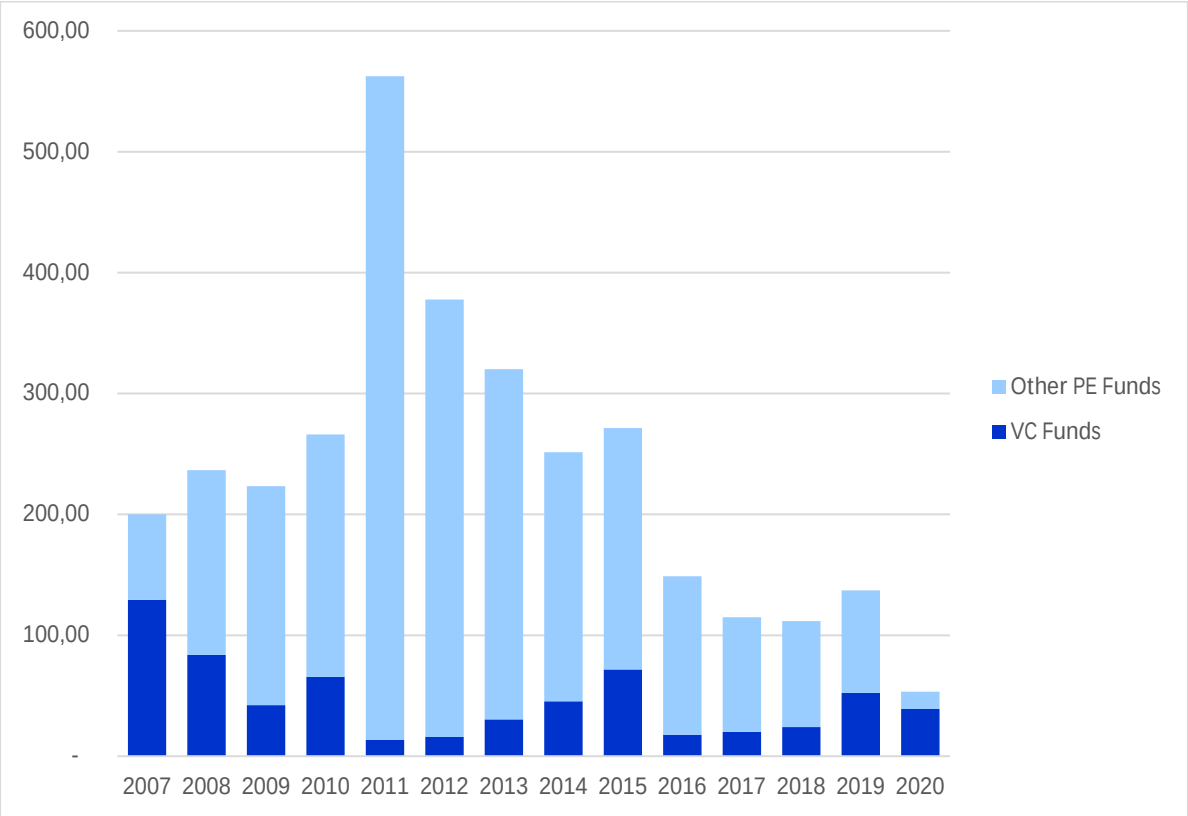


Table 7.1.3.4. **Top 5 foreign countries where Portuguese VC funds have invested (EUR thousands)**

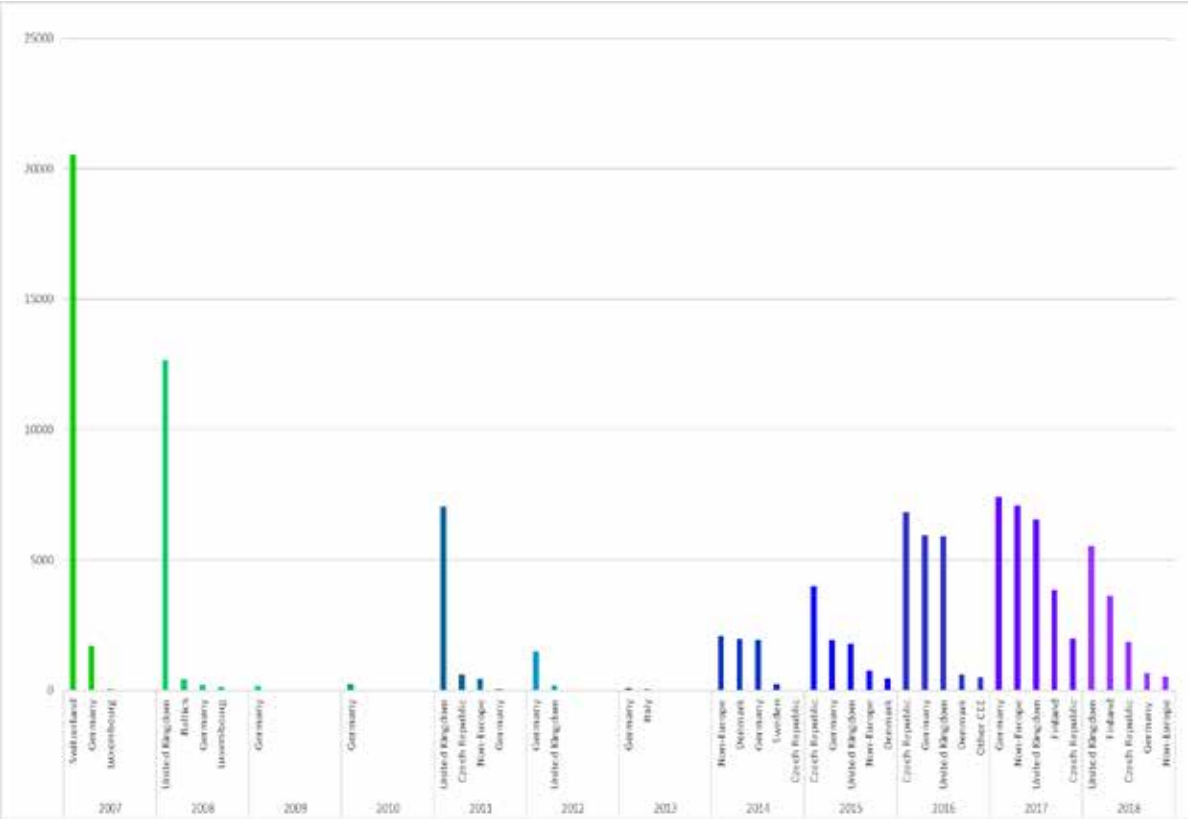
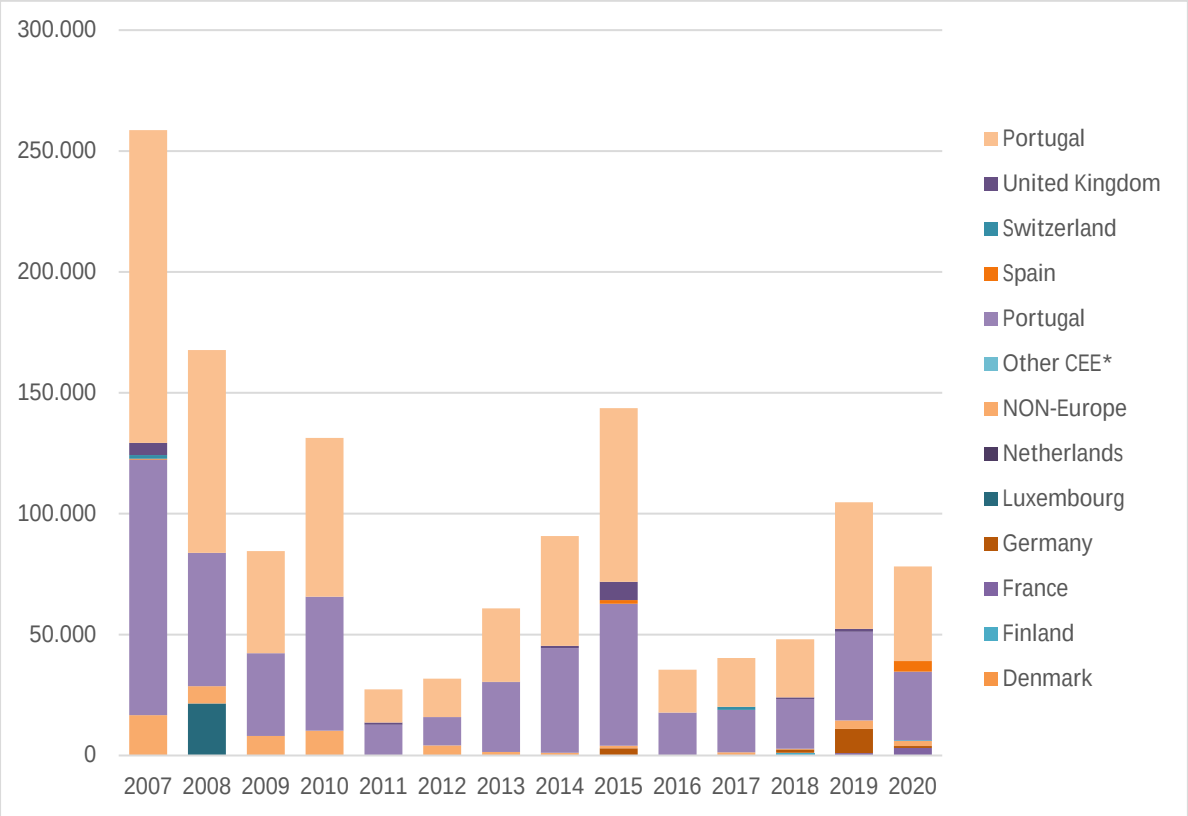


Table 7.1.3.5 **Geographical breakdown of flows from Portuguese VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia-Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

Table 7.1.3.6. **Flows from PE/VC funds to Portuguese portfolio companies (EUR million)**

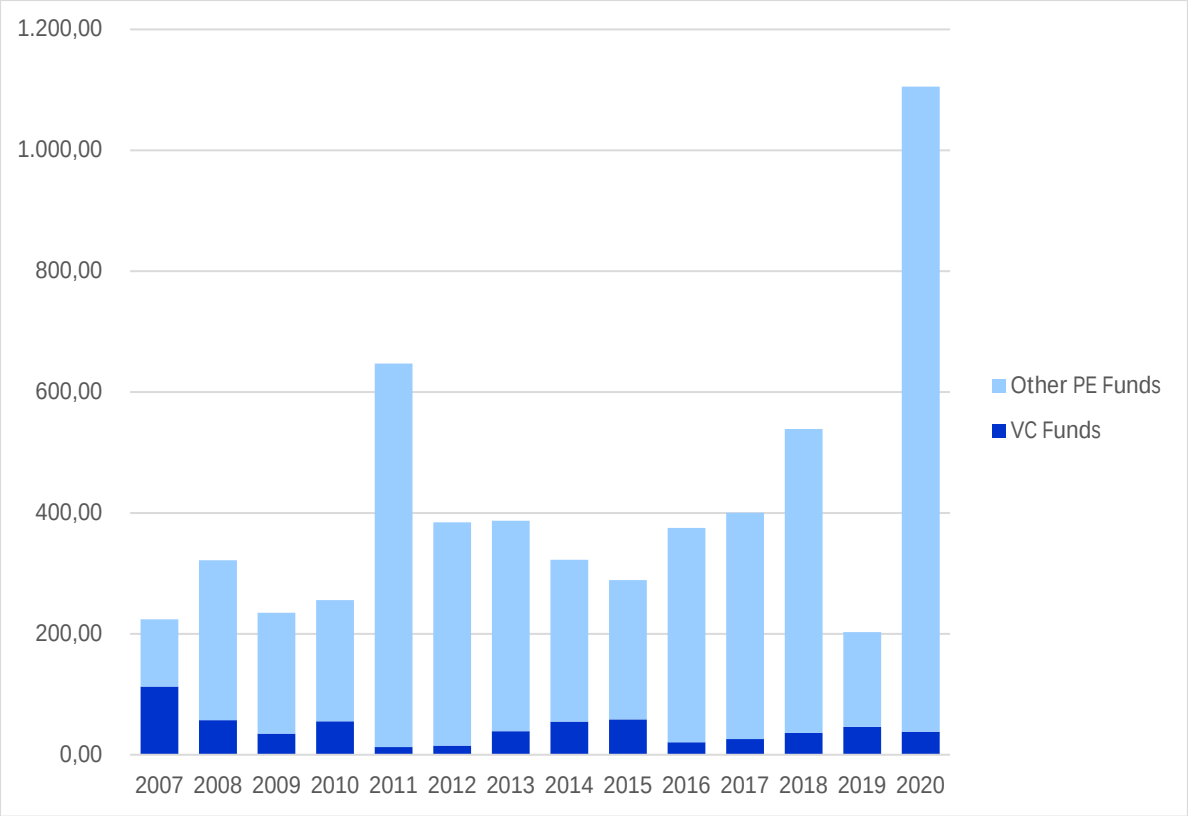


Table 7.1.3.7. **Top 5 foreign VC investors into Portuguese portfolio companies (EUR thousands)**

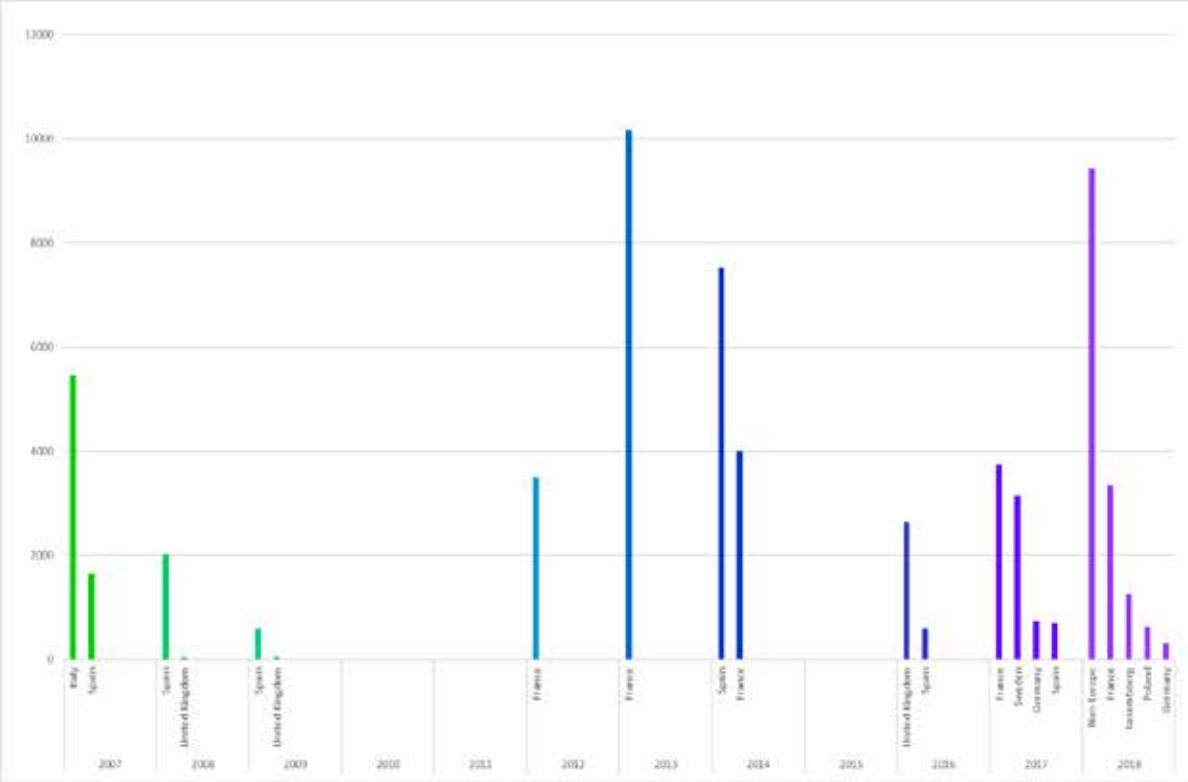


Table 7.1.3.8. **Geographical breakdown of flows from VC funds to Portuguese portfolio companies (EUR thousands)**

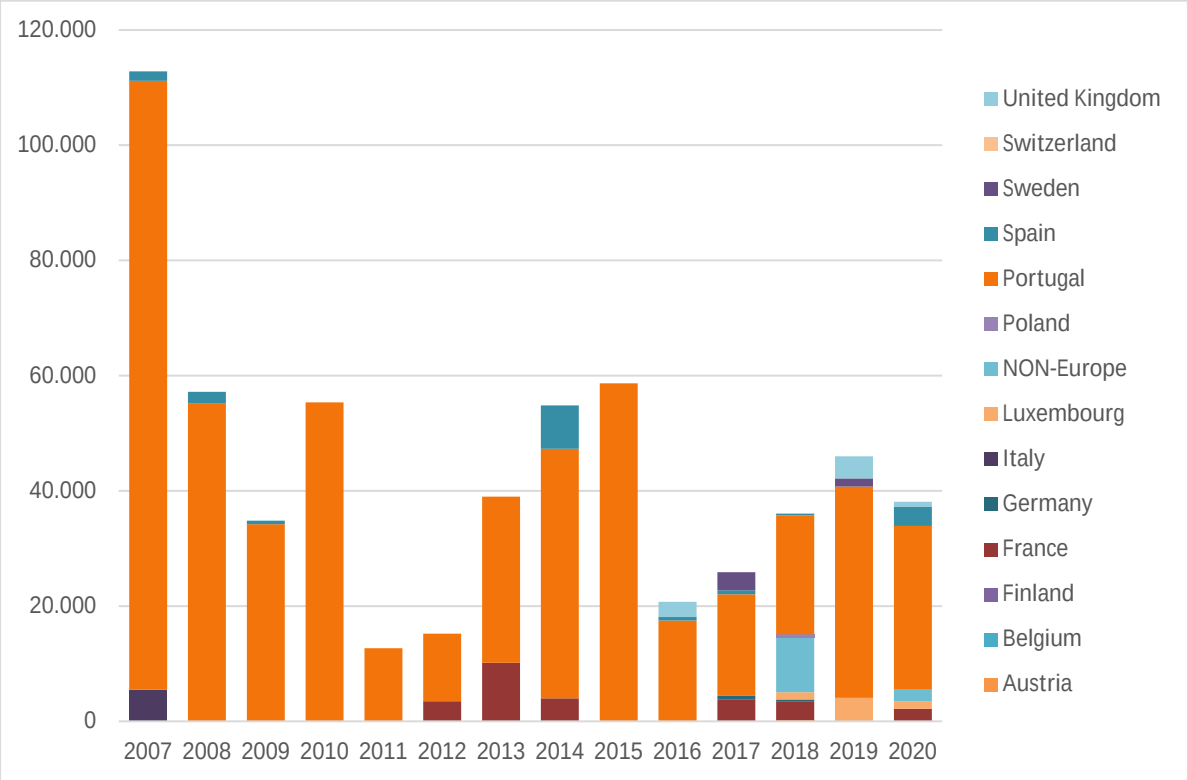
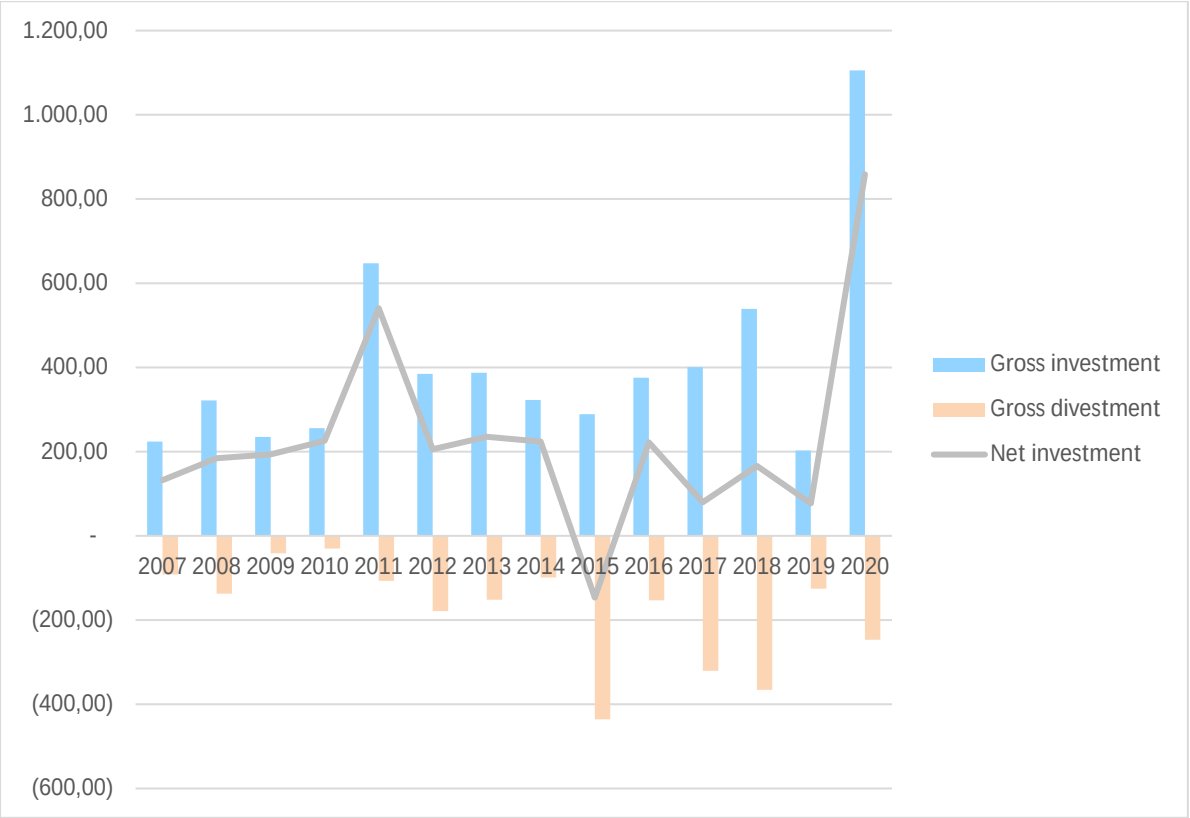


Table 7.1.3.9. **Investments and divestments of Portuguese PE funds (EUR million)**



7.1.4 Spain

Table 7.1.4.1. **Flow raised by Spanish PE/VC funds (EUR million)**

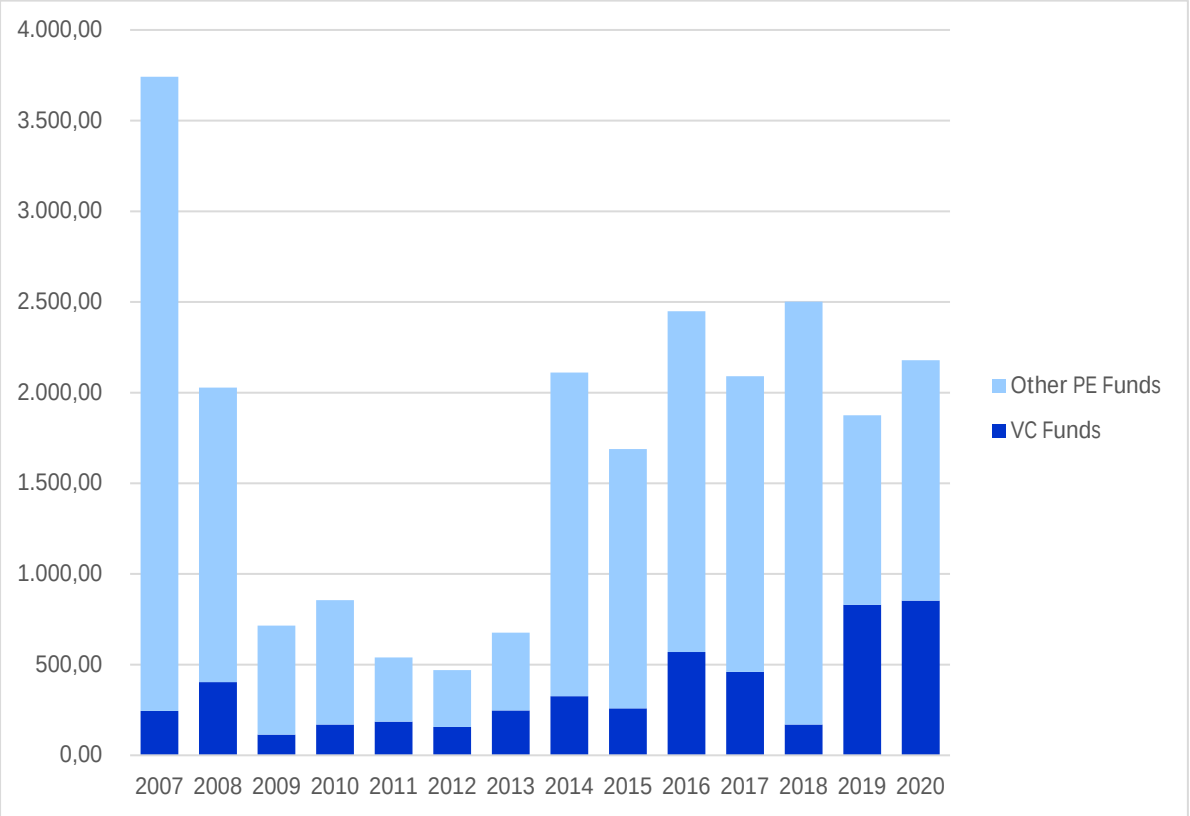
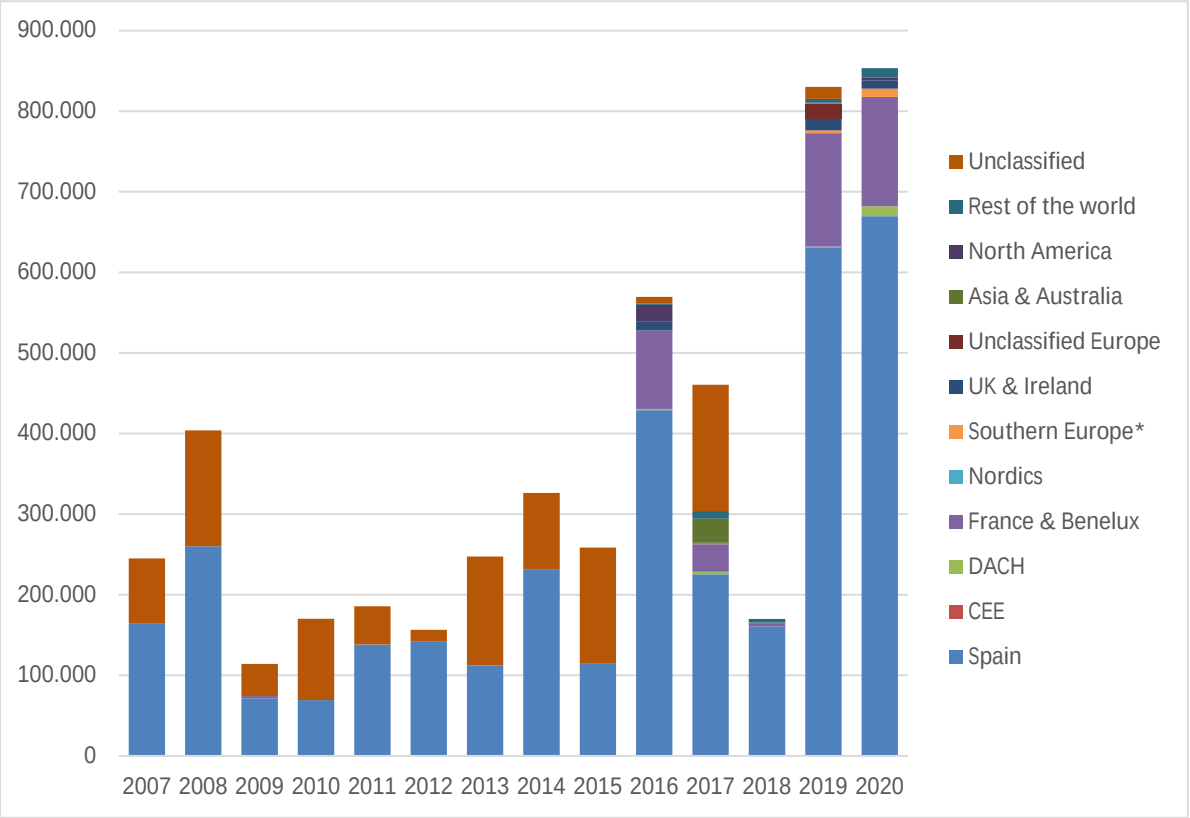


Table 7.1.4.2. **Geographical breakdown of Spanish VC fundraising (EUR thousands)**



Southern Europe* - excluding Spain

Table 7.1.4.3. **Flows from Spanish PE/VC funds to portfolio companies (EUR million)**

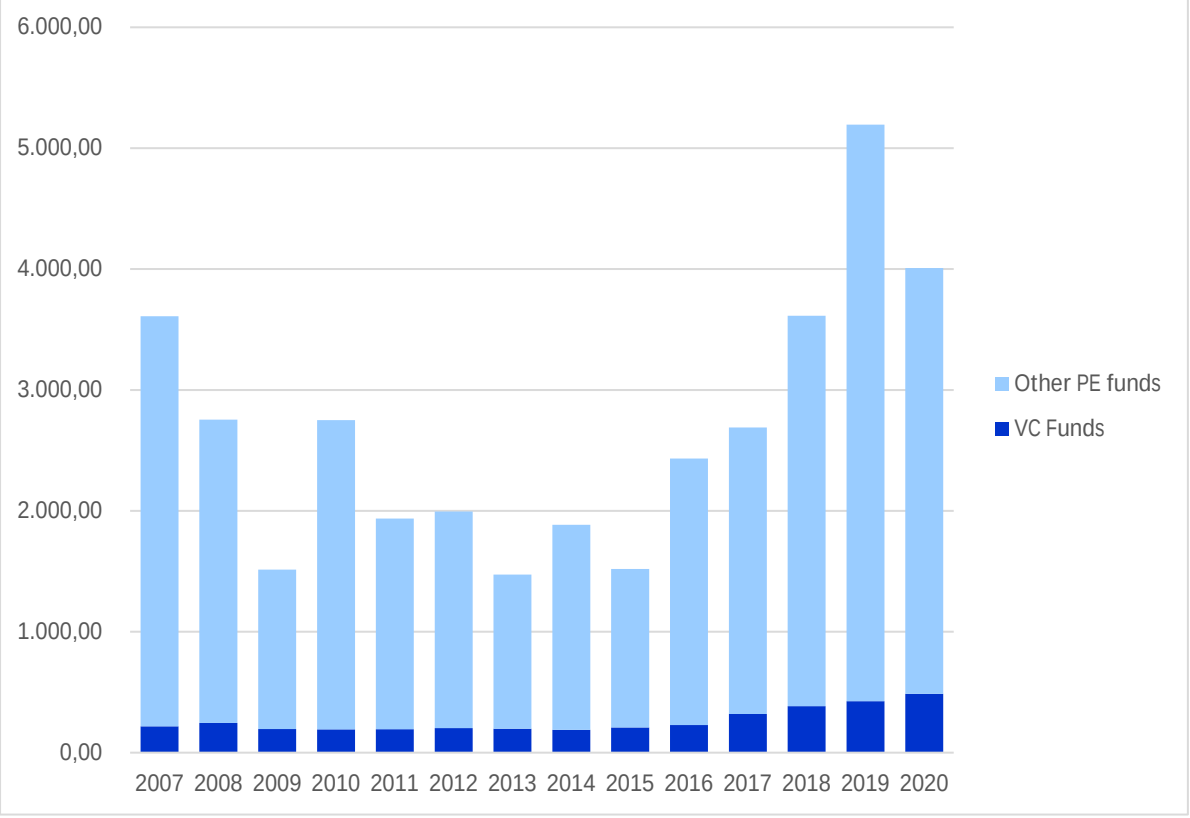


Table 7.1.4.4. **Top 5 foreign countries where Spanish VC funds have invested (EUR thousands)**

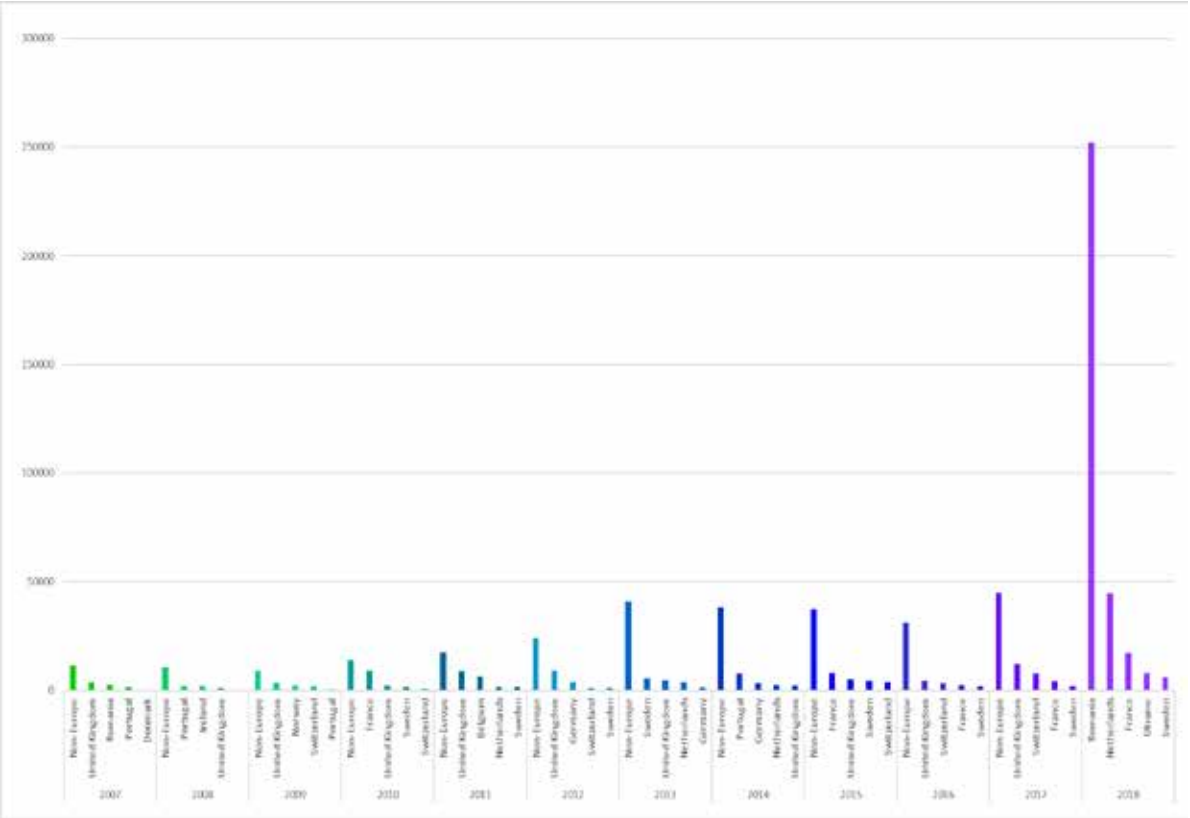
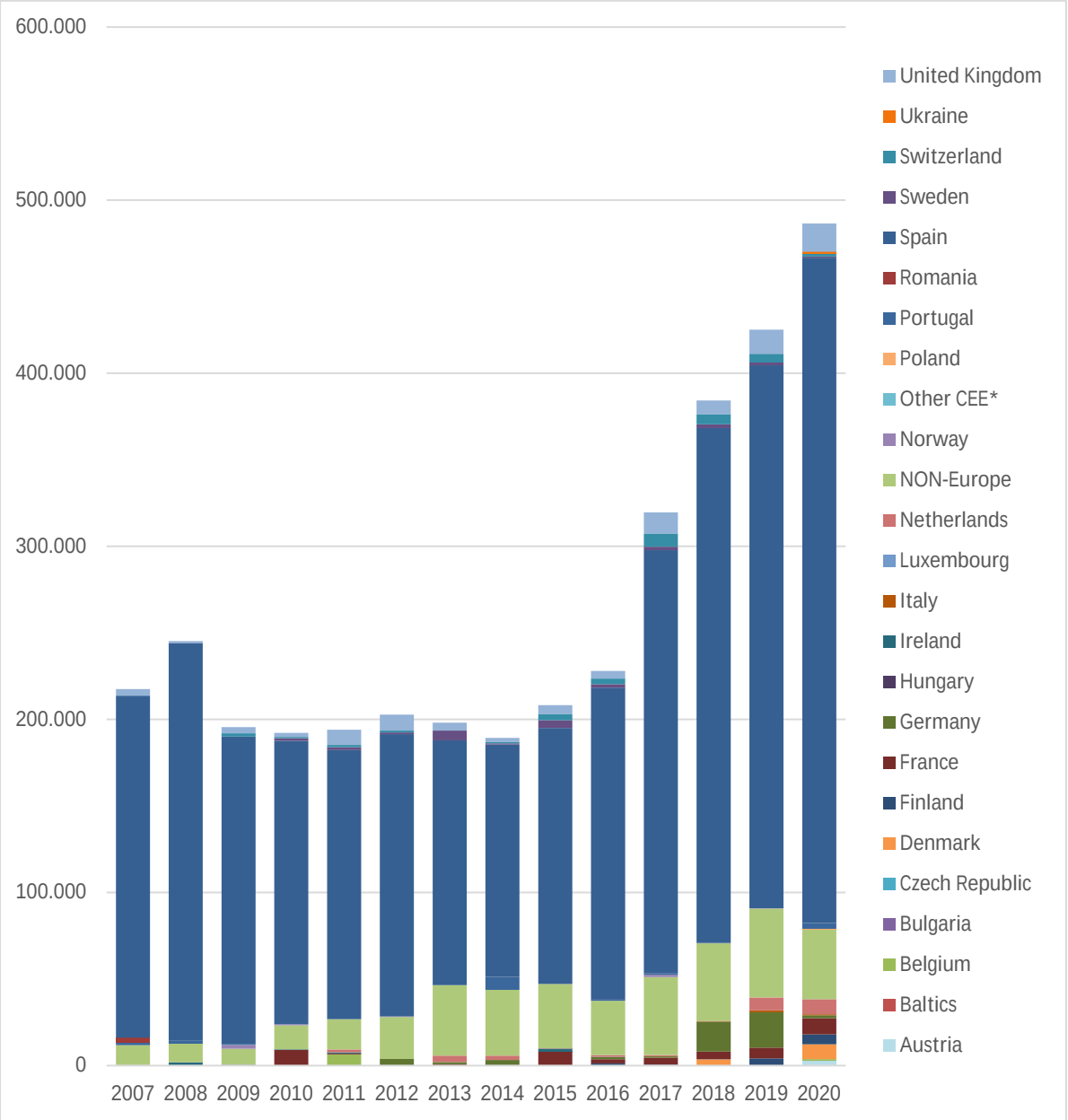


Table 7.1.4.5. **Geographical breakdown of flows from Spanish VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia-Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

Table 7.1.4.6. **Flows from PE/VC funds to Spanish portfolio companies (EUR million)**

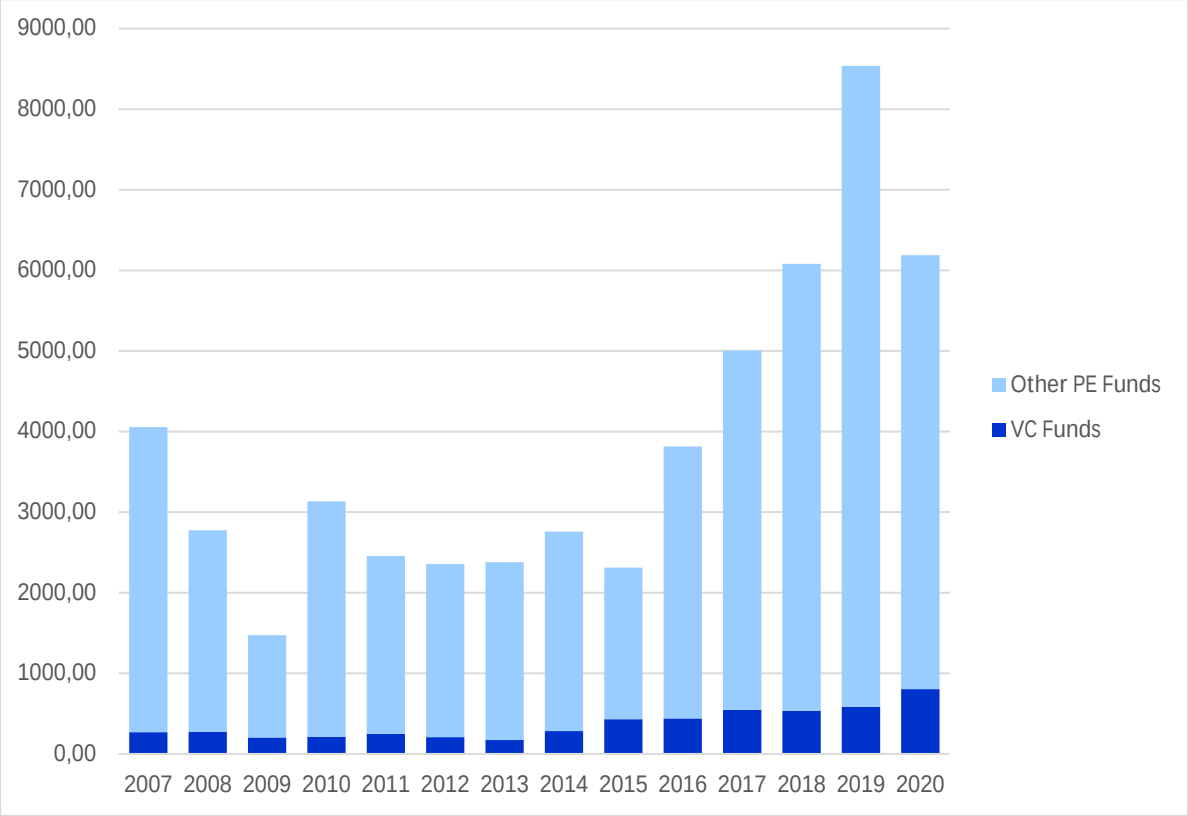


Table 7.1.4.7. **Top 5 foreign VC investors into Spanish portfolio companies (EUR thousands)**

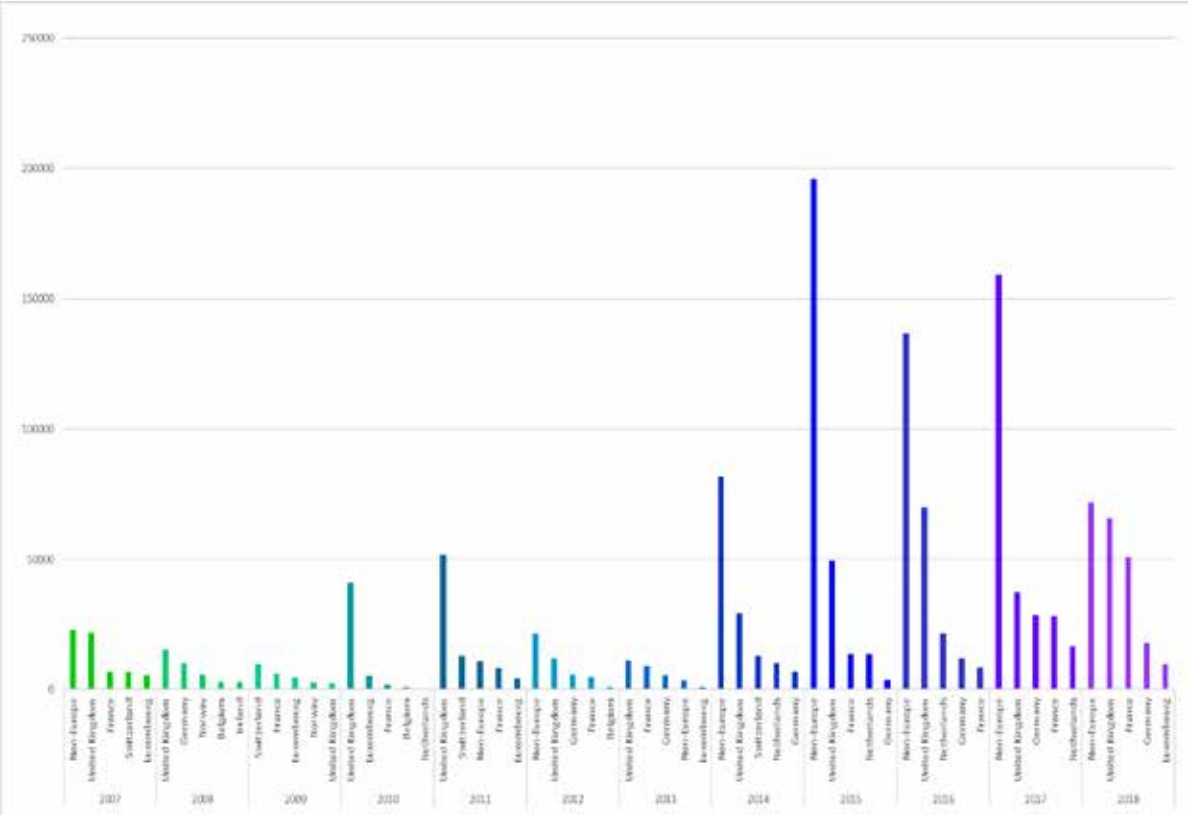
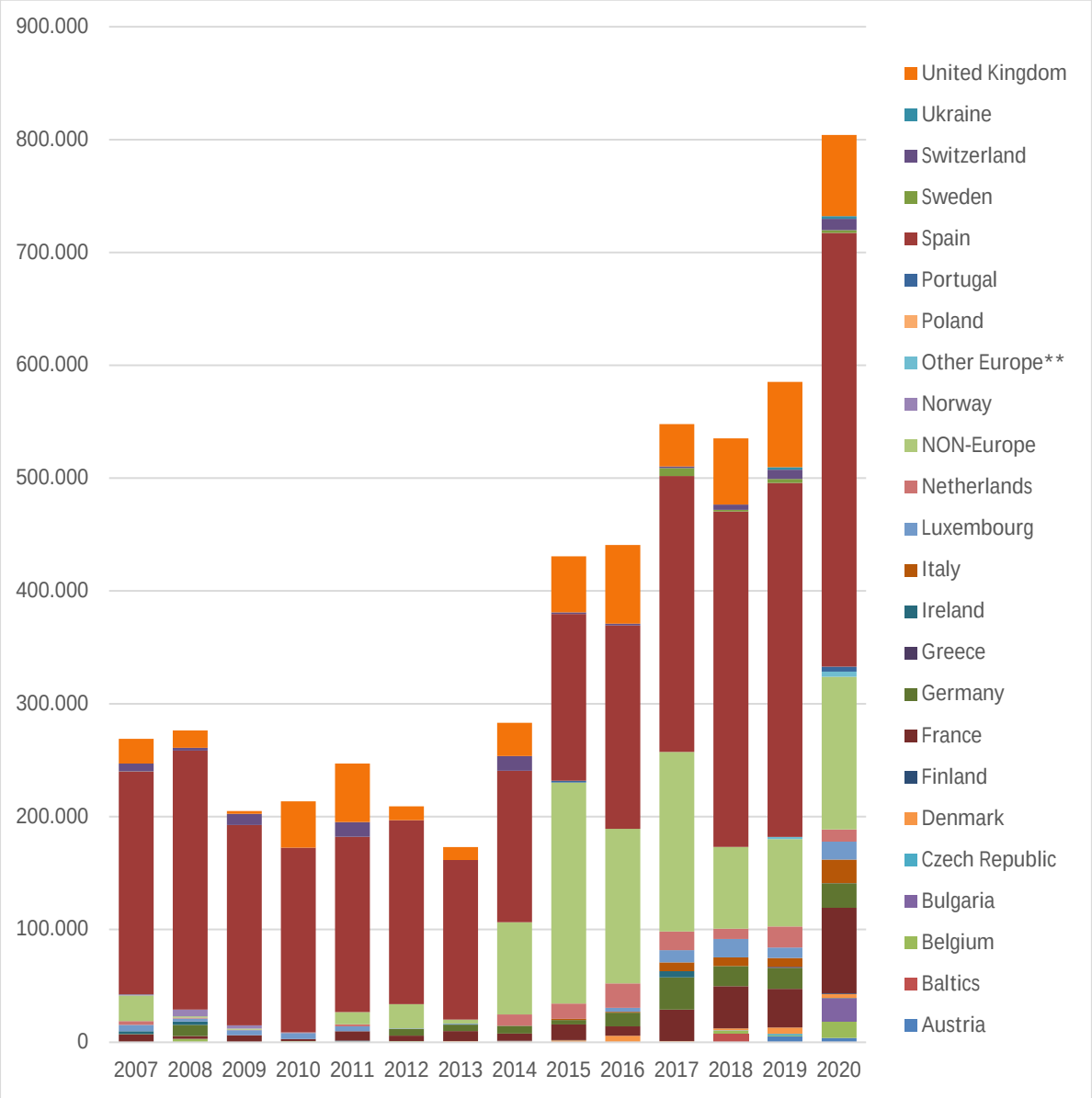
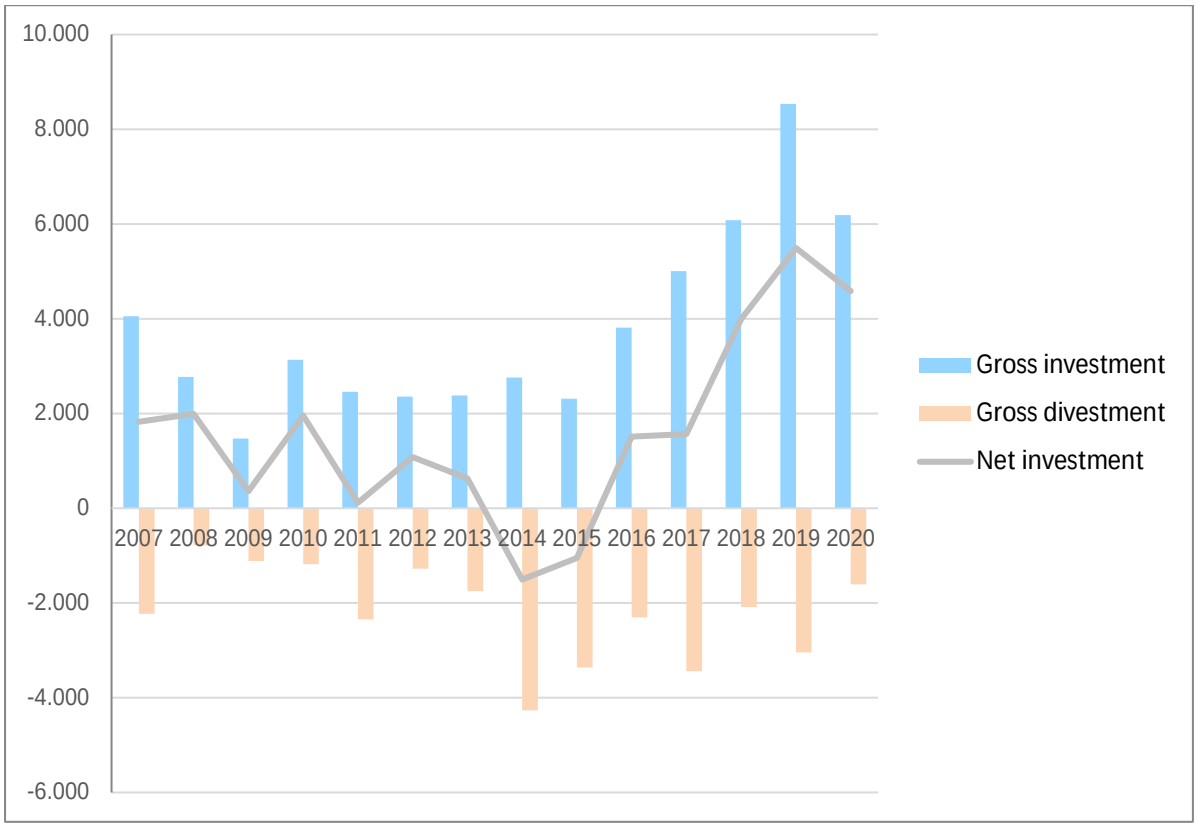


Table 7.1.4.8. **Geographical breakdown of flows from VC funds to Spanish portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.1.4.9. **Investments and divestments of Spanish PE funds (EUR million)**



7.2 DACH AREA

7.2.1 Austria

Table 7.2.1.1. **Flows raised by Austrian PE/VC funds (EUR million)**

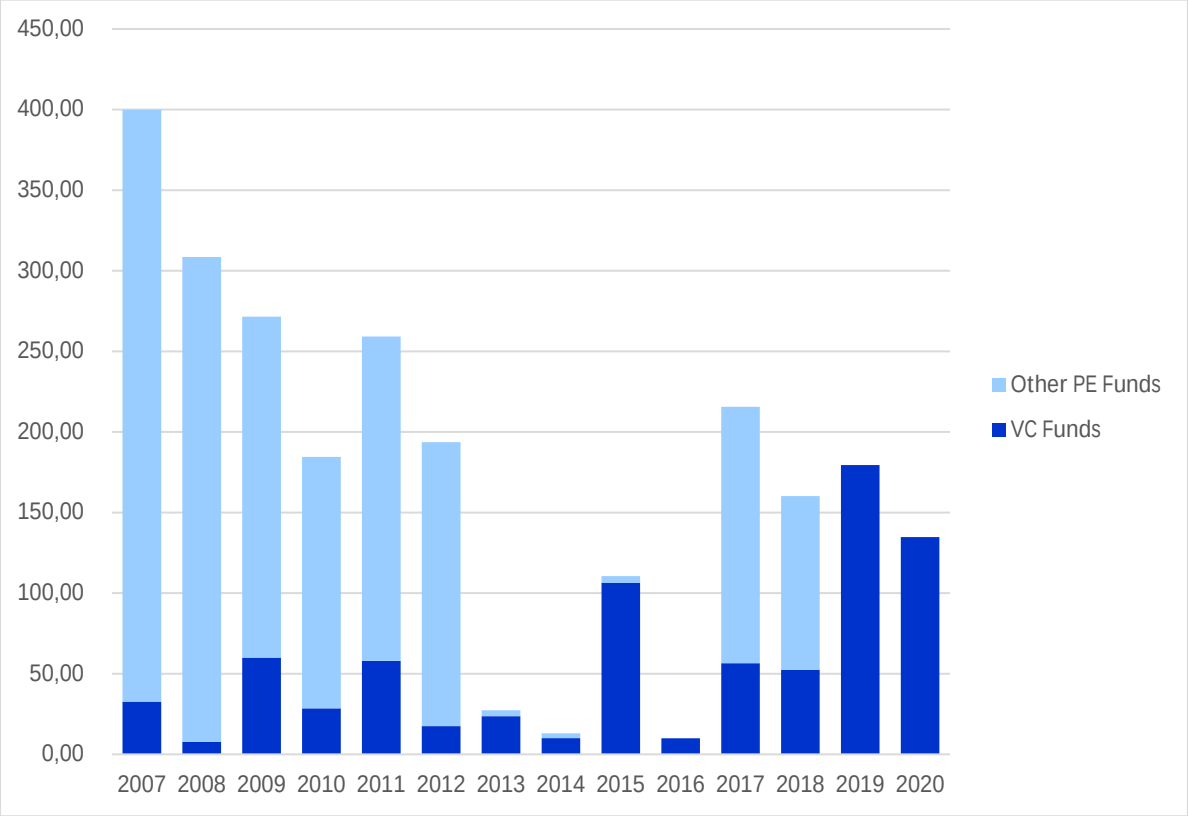
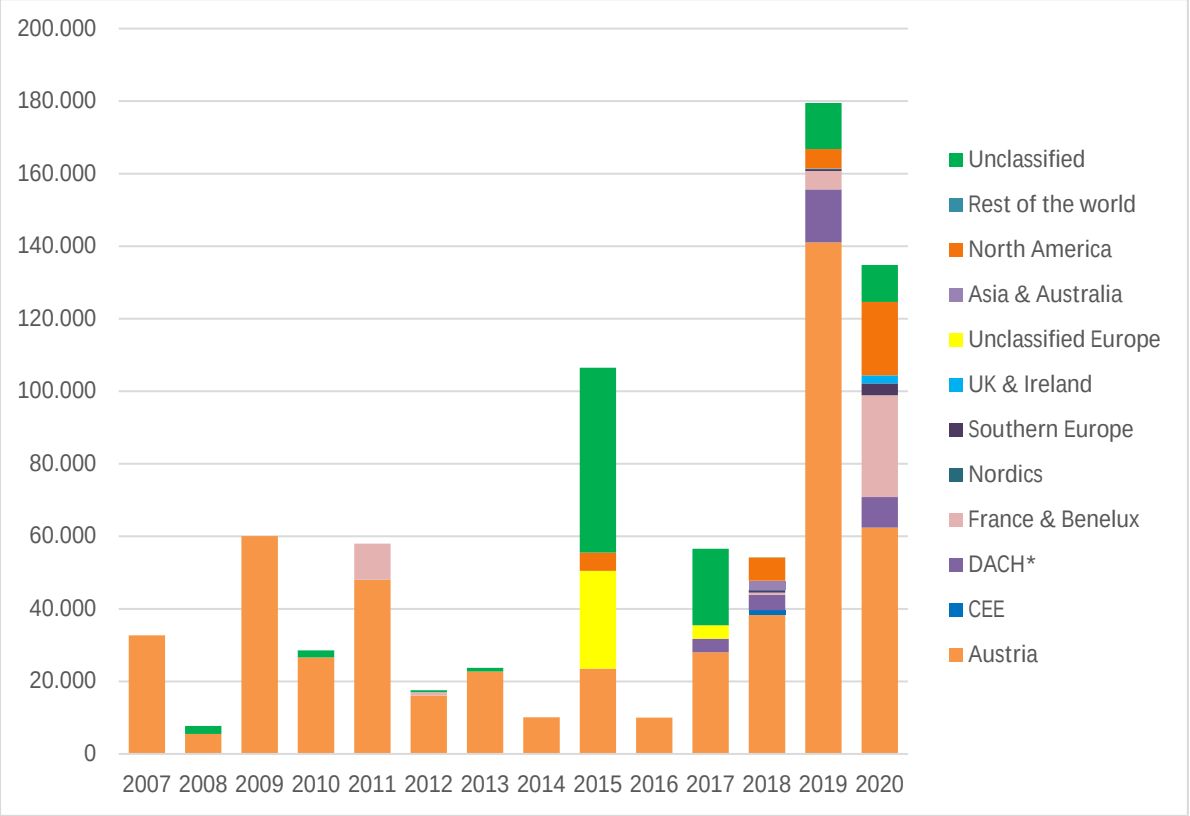


Table 7.2.1.2. **Geographical breakdown of Austrian VC fundraising (EUR thousands)**



DACH* - excluding Austria

Table 7.2.1.3. **Flows from Austrian PE/VC funds to portfolio companies (EUR million)**

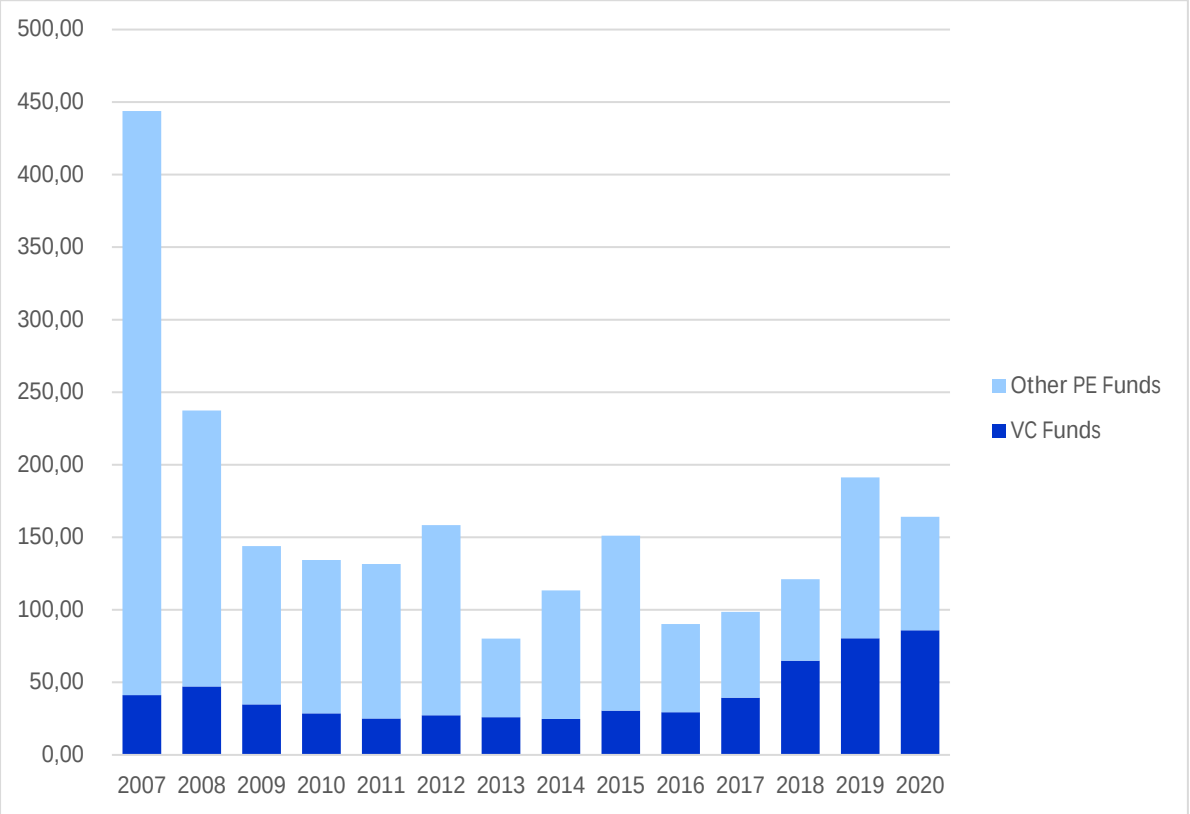
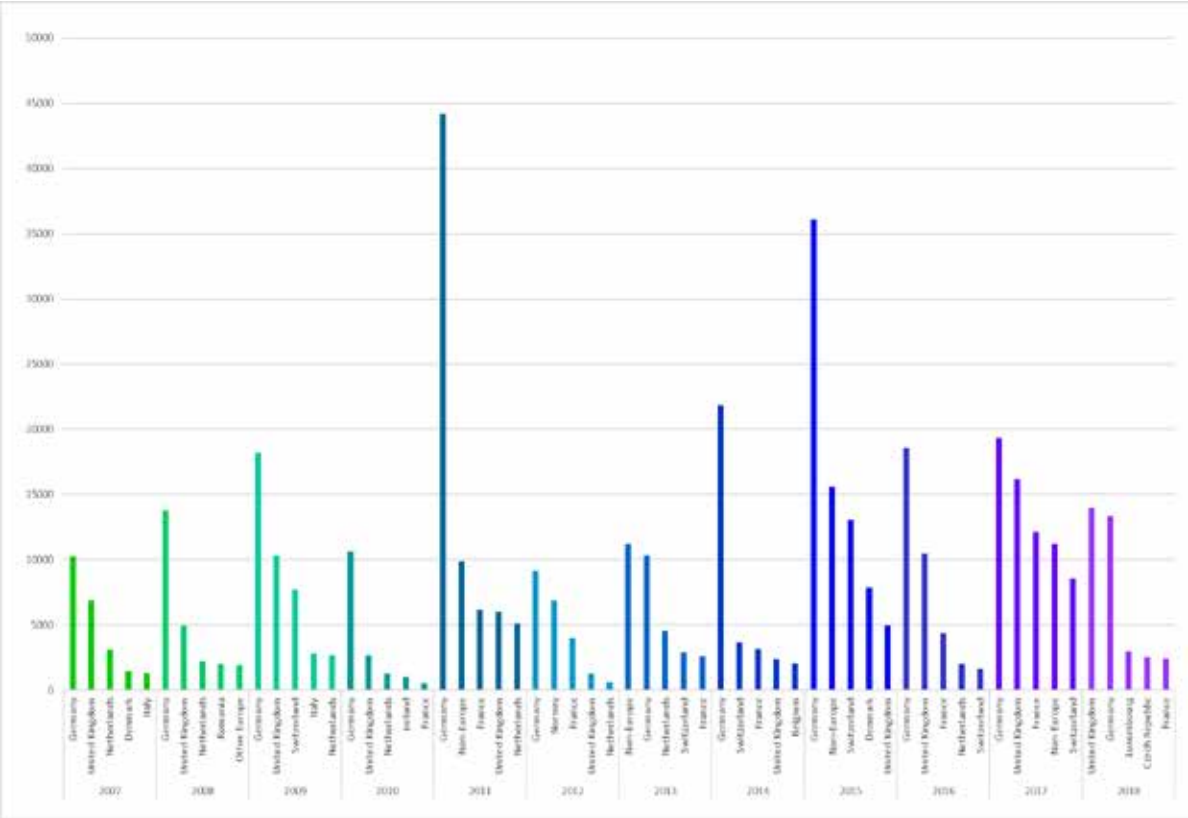
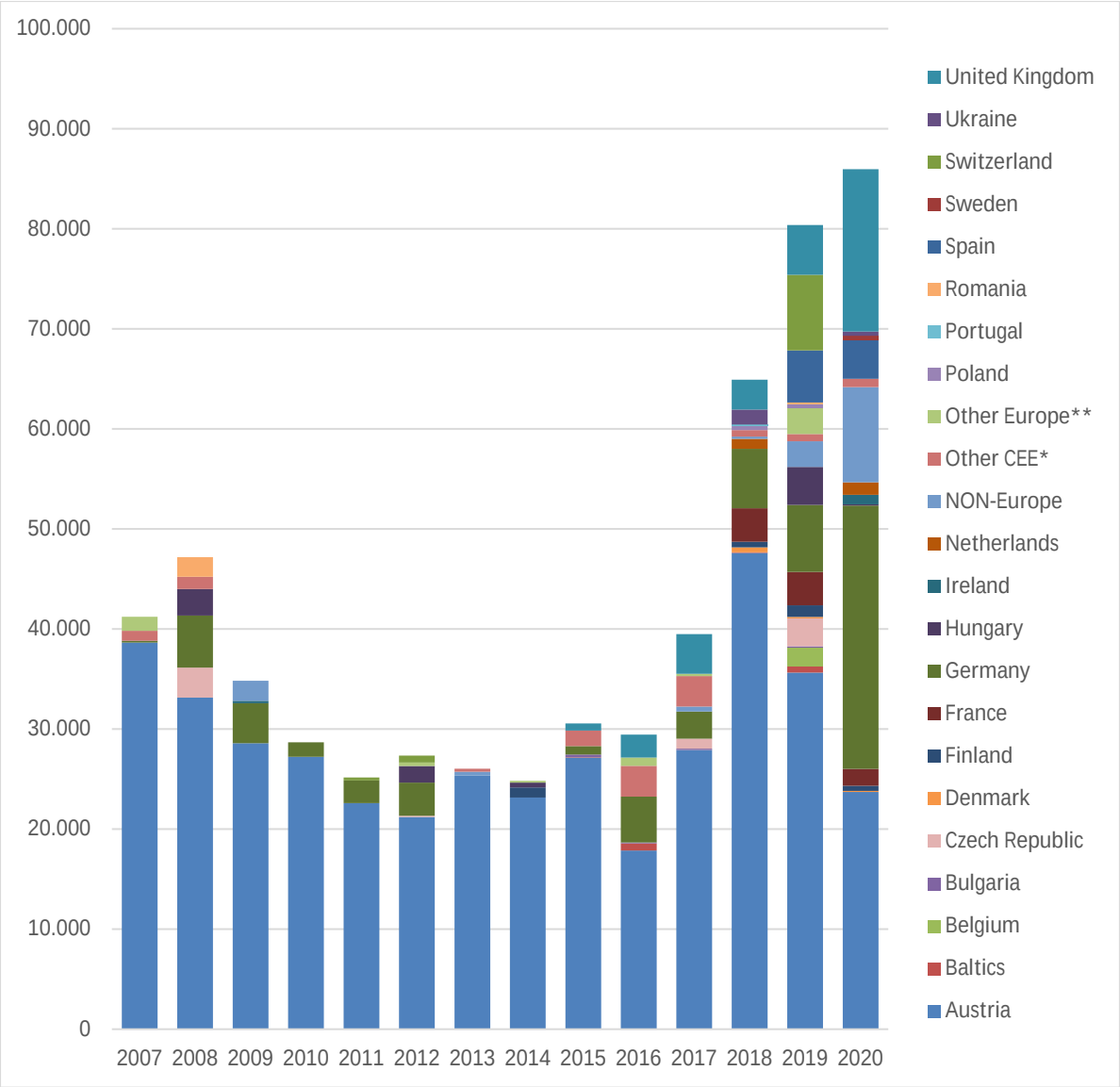


Table 7.2.1.4. **Top 5 foreign countries where Austrian VC funds have invested (EUR thousands)**



Other Europe ** - Cyprus, Iceland, Lichtenstein, Malta, San Marino, Vatican City.

Table 7.2.1.5. **Geographical breakdown of flows from Austrian VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.2.1.6. **Flows from PE/VC funds to Austrian portfolio companies (EUR million)**

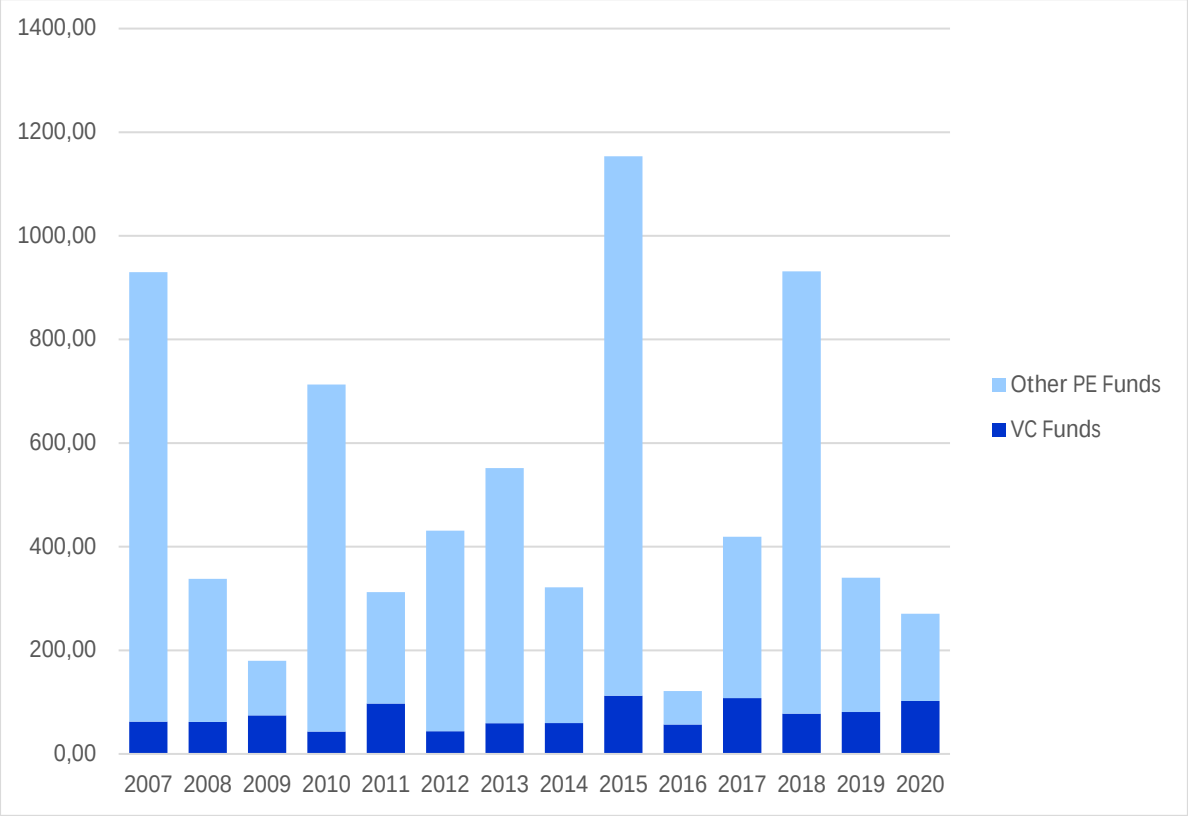


Table 7.2.1.7. **Top 5 foreign VC investors into Austrian portfolio companies (EUR thousands)**

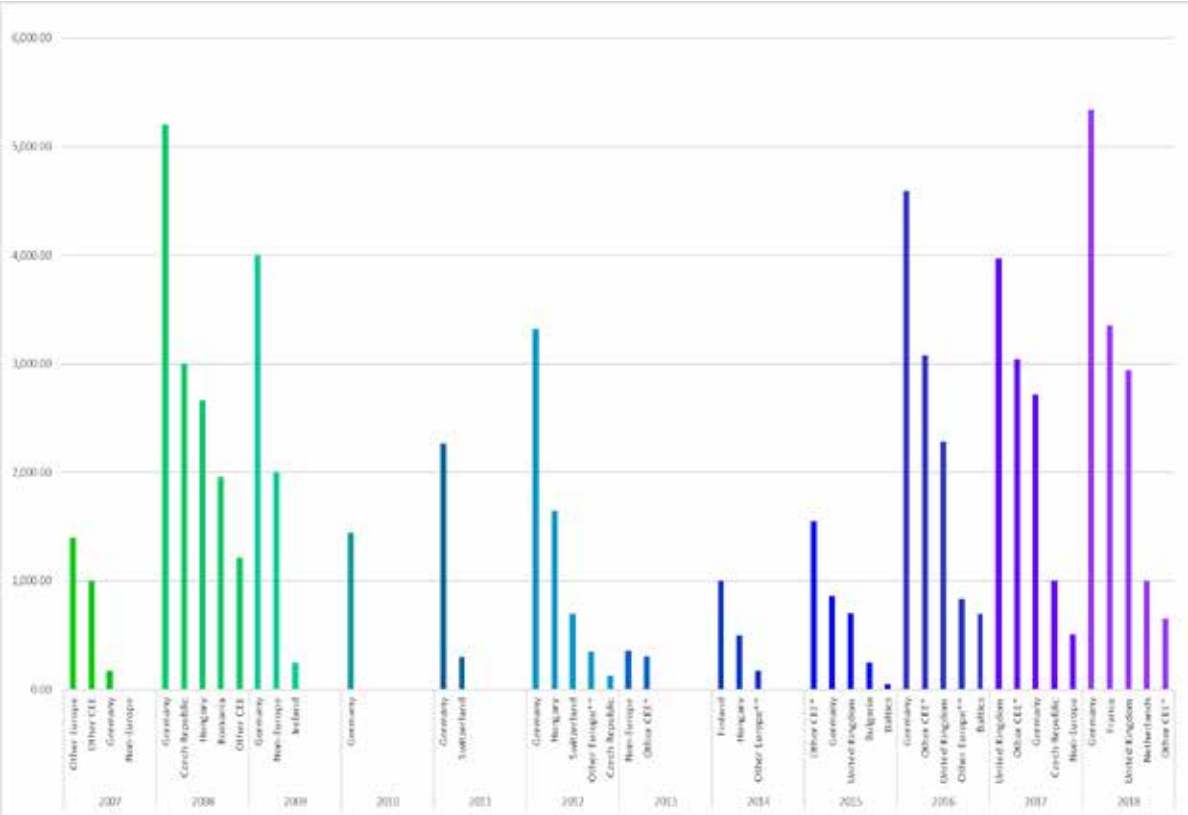
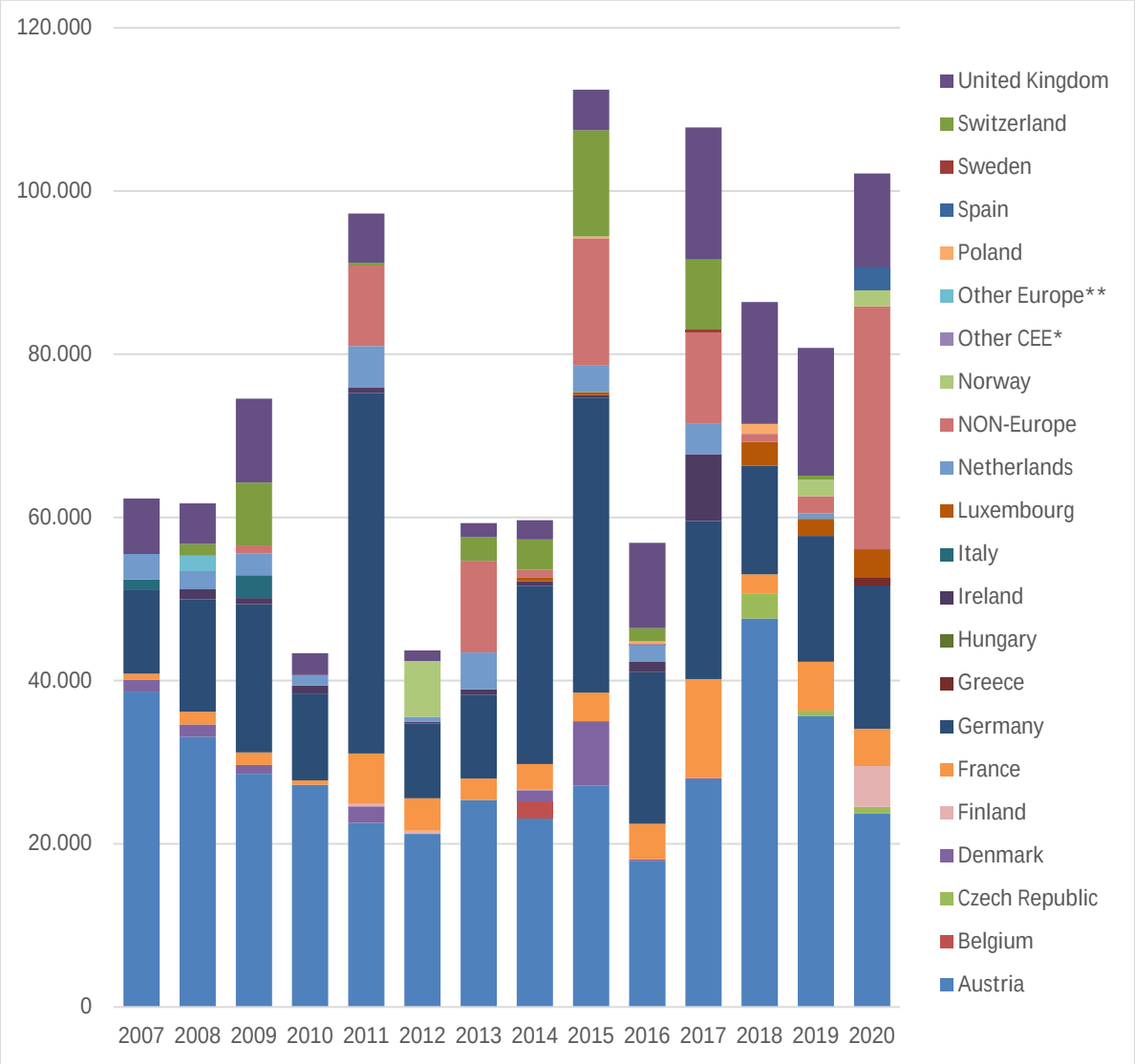
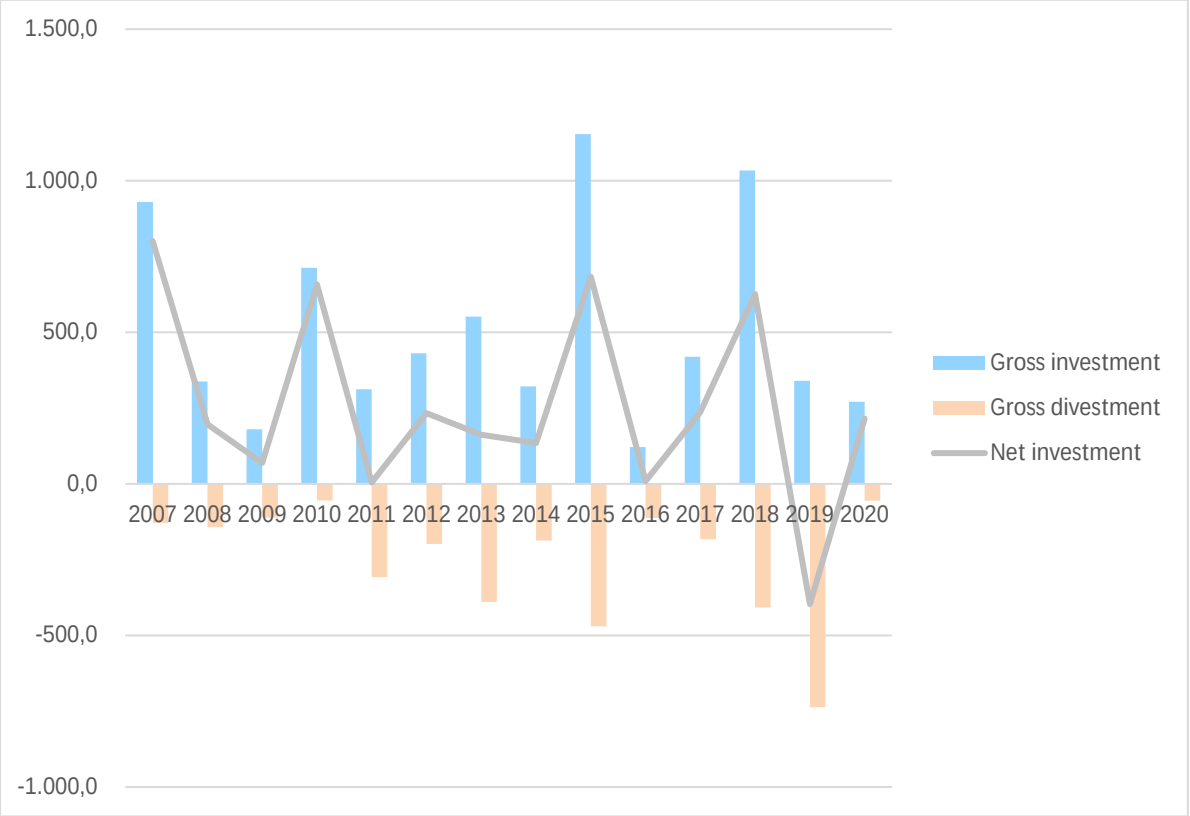


Table 7.2.1.8 **Geographical breakdown of flows from VC funds to Austrian portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.2.1.9. **Investments and divestments of Austrian PE funds (EUR million)**



7.2.2 Germany

Table 7.2.2.1. **Flows raised by German PE/VC funds (EUR million)**

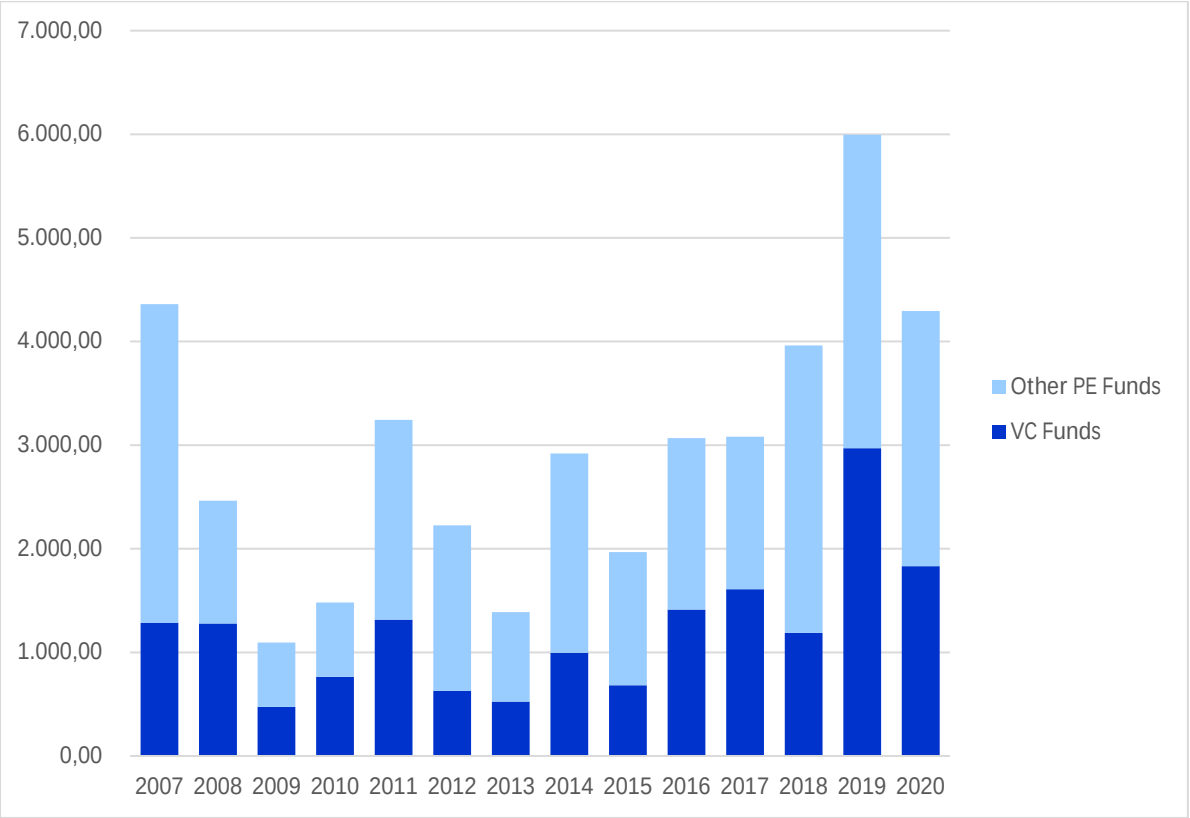
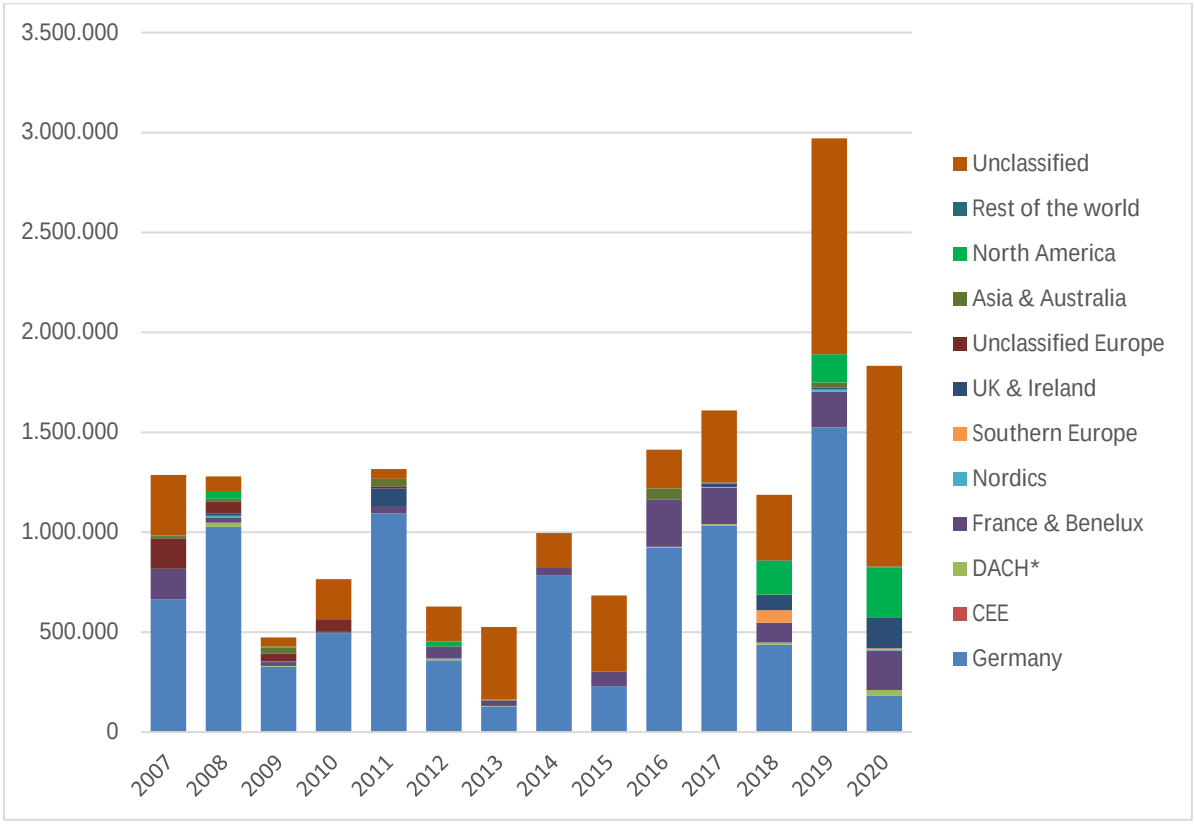


Table 7.2.2.2. **Geographical breakdown of German VC fundraising (EUR thousands)**



DACH* - excluding Germany

Table 7.2.2.3. **Flows from German PE/VC funds to portfolio companies (EUR million)**

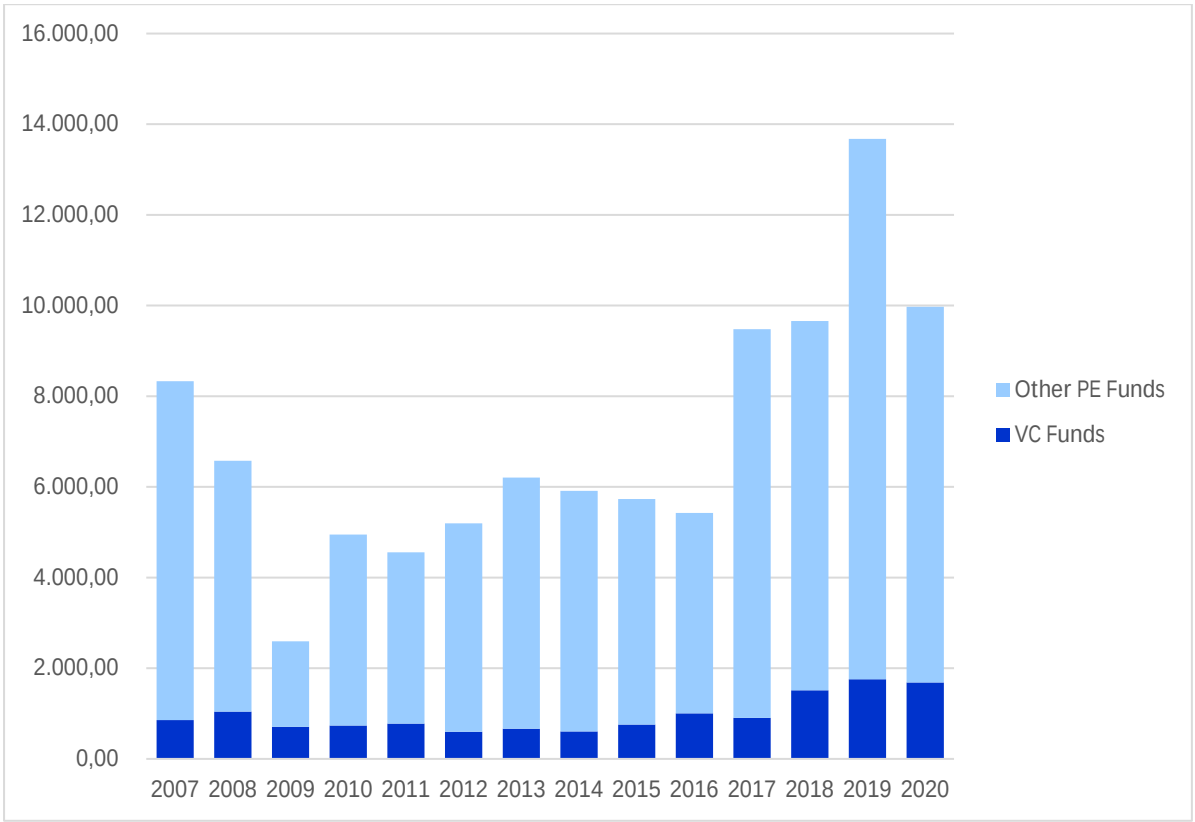


Table 7.2.2.4. **Top 5 foreign countries where German VC funds have invested (EUR thousands)**

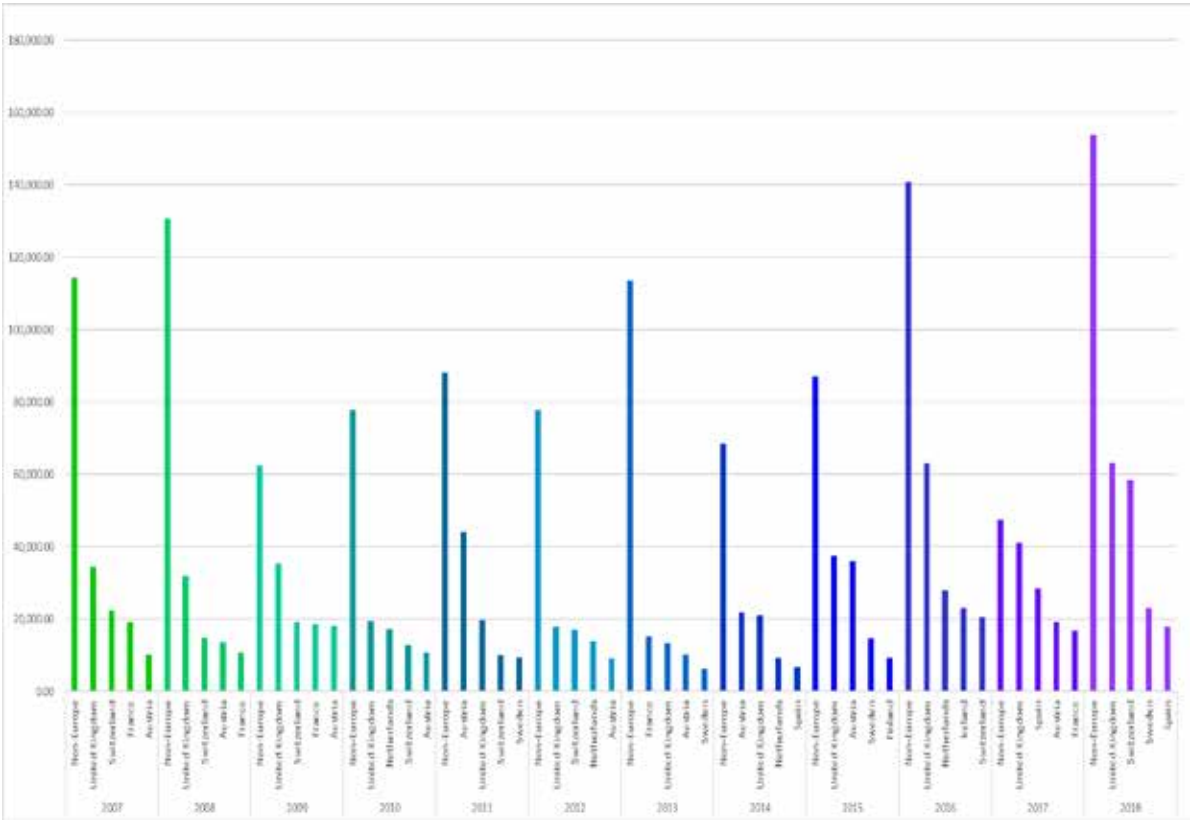
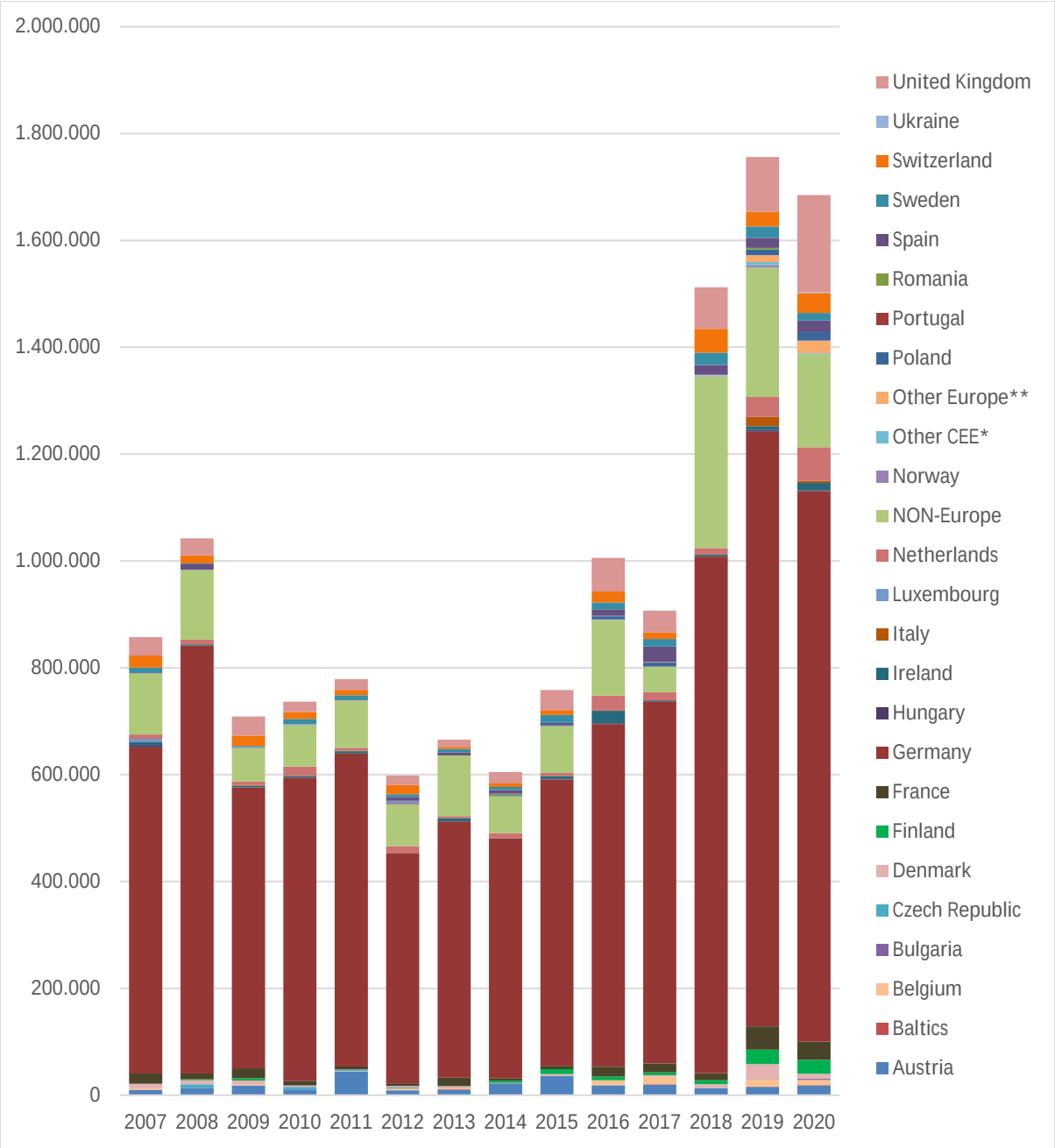


Table 7.2.2.5. **Geographical breakdown of flows from German VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.2.2.6. **Flows from PE/VC funds to German portfolio companies (EUR million)**

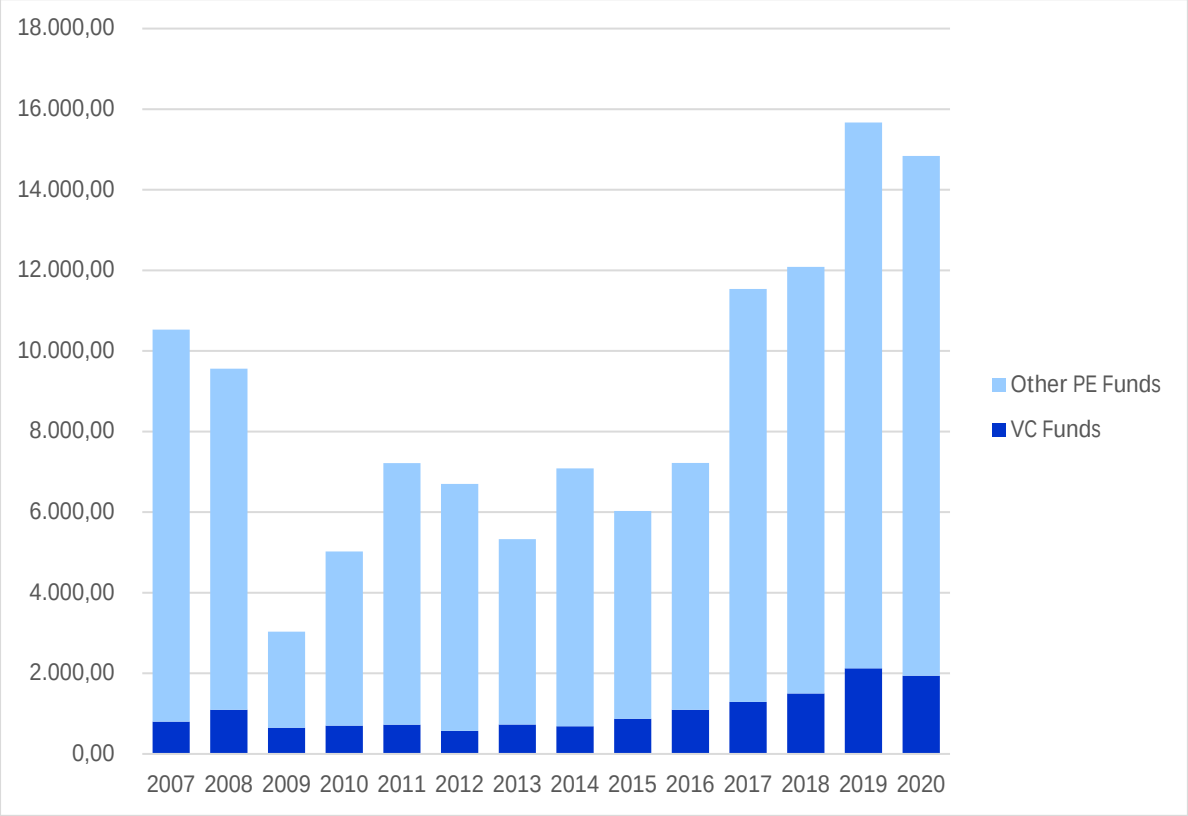


Table 7.2.2.7. **Top 5 foreign VC investors into German portfolio companies (EUR thousands)**

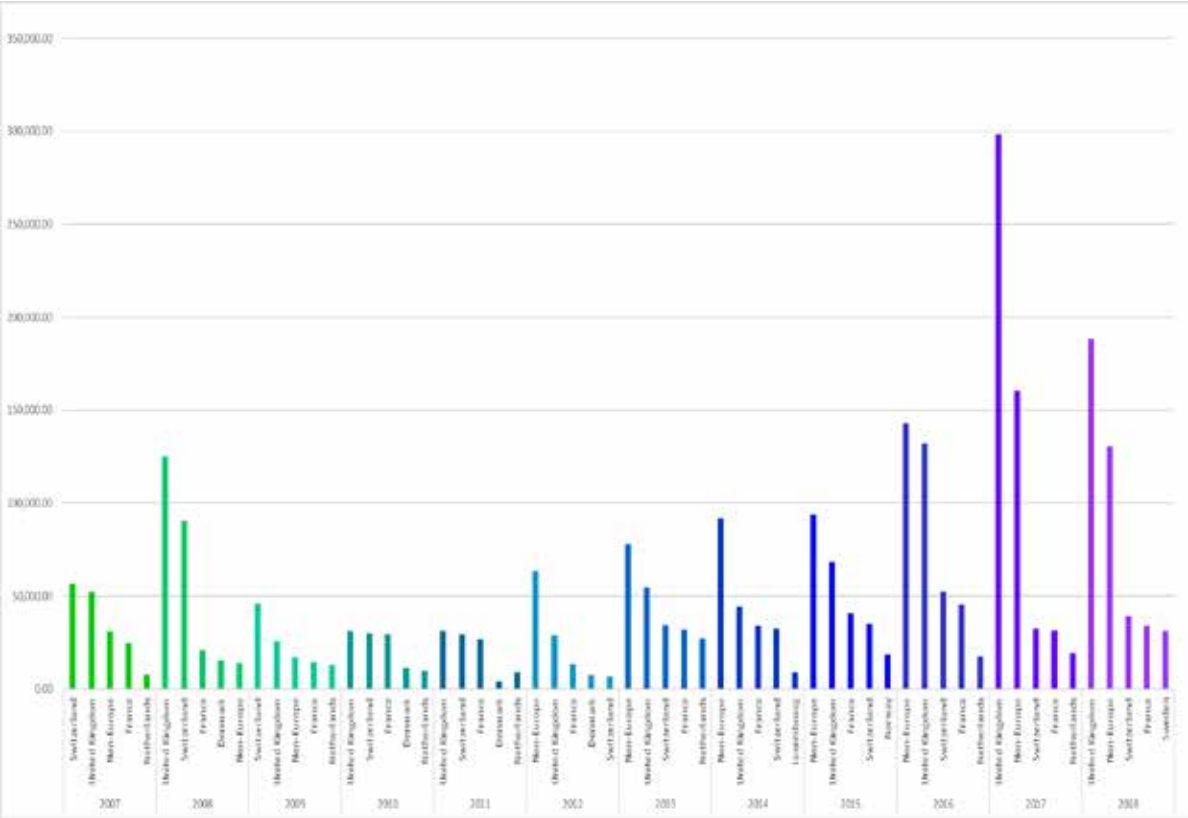
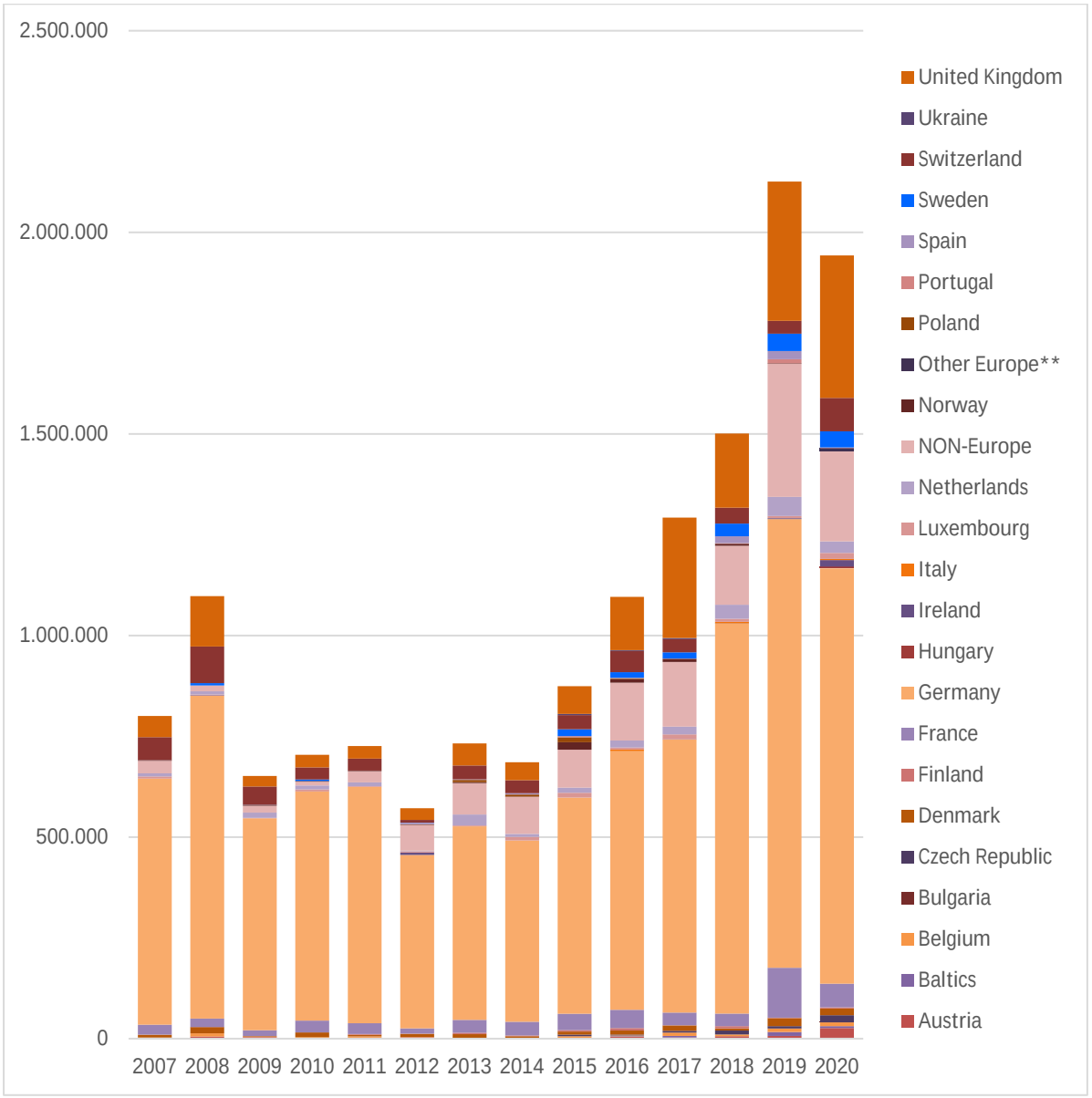
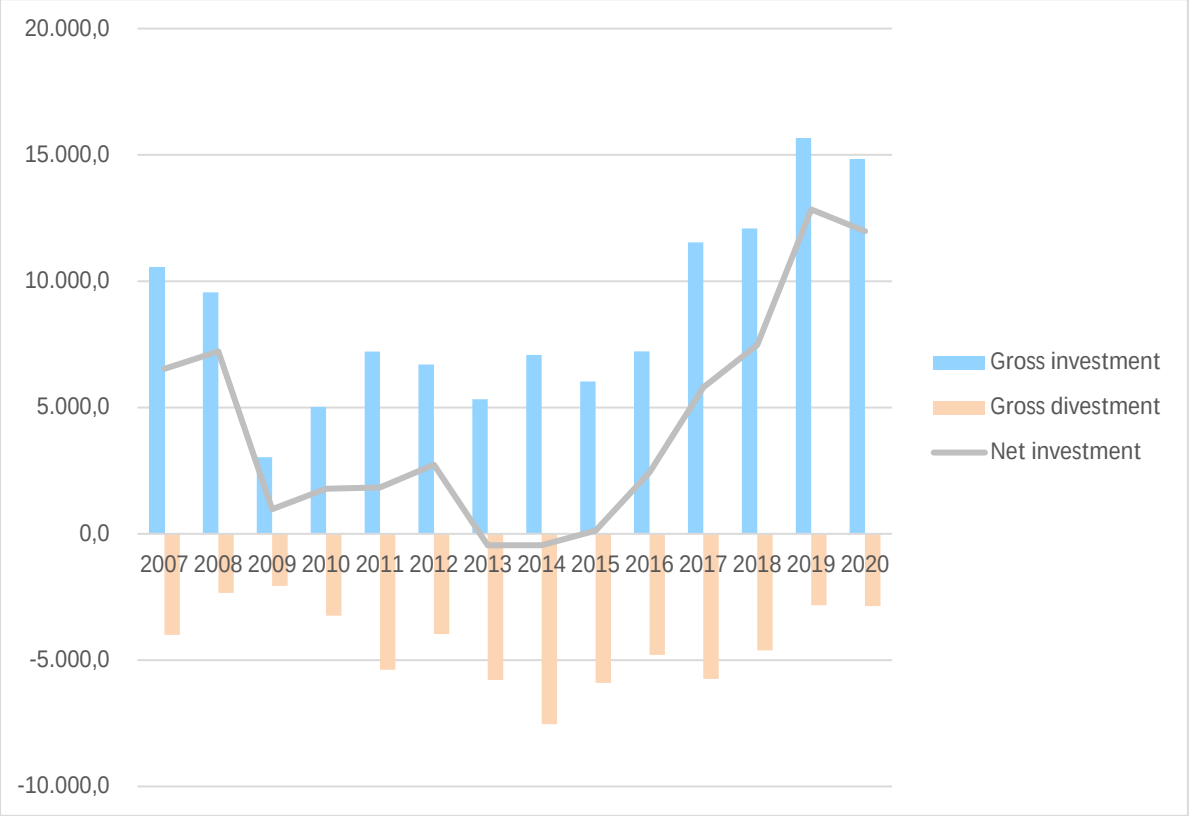


Table 7.2.2.8. **Geographical breakdown of flows from VC funds to German portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.2.2.9. **Investments and divestments of German PE funds (EUR million)**



7.2.3 Switzerland

Table 7.2.3.1. **Flows raised by Swiss PE/VC funds (EUR thousands)**

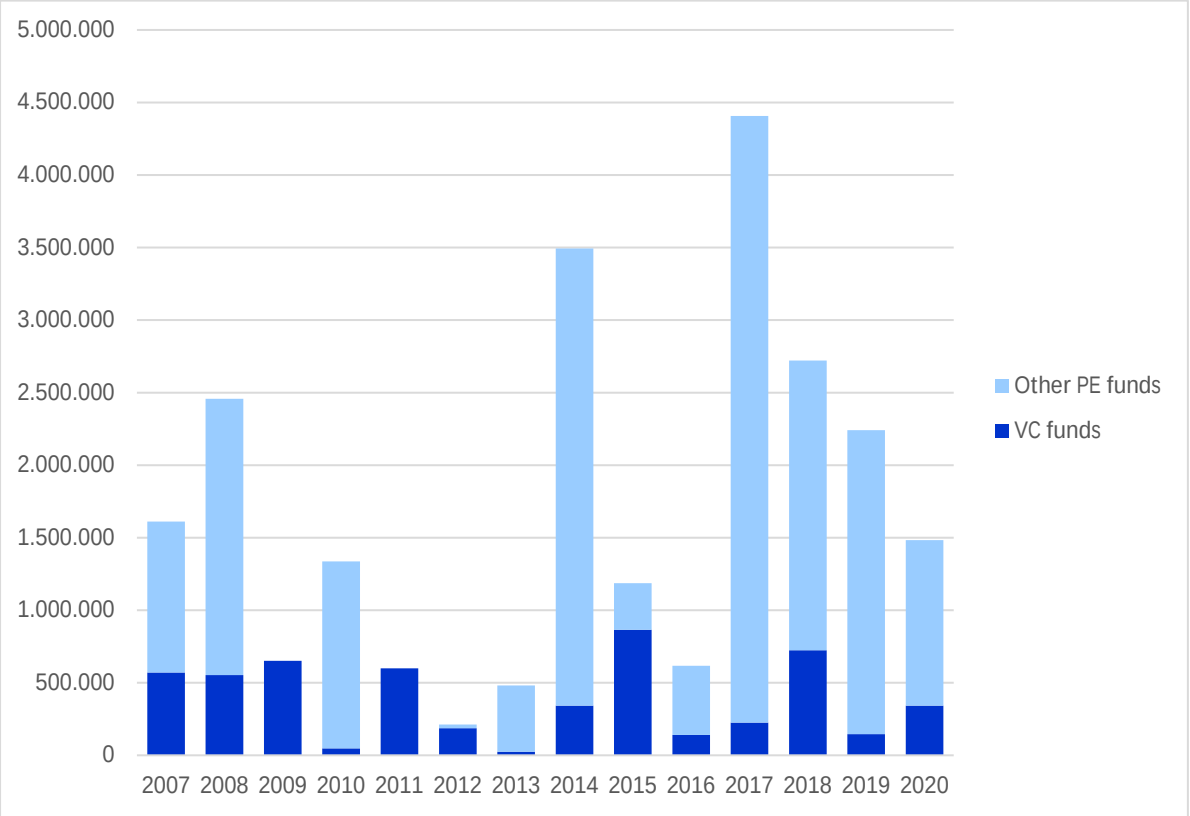
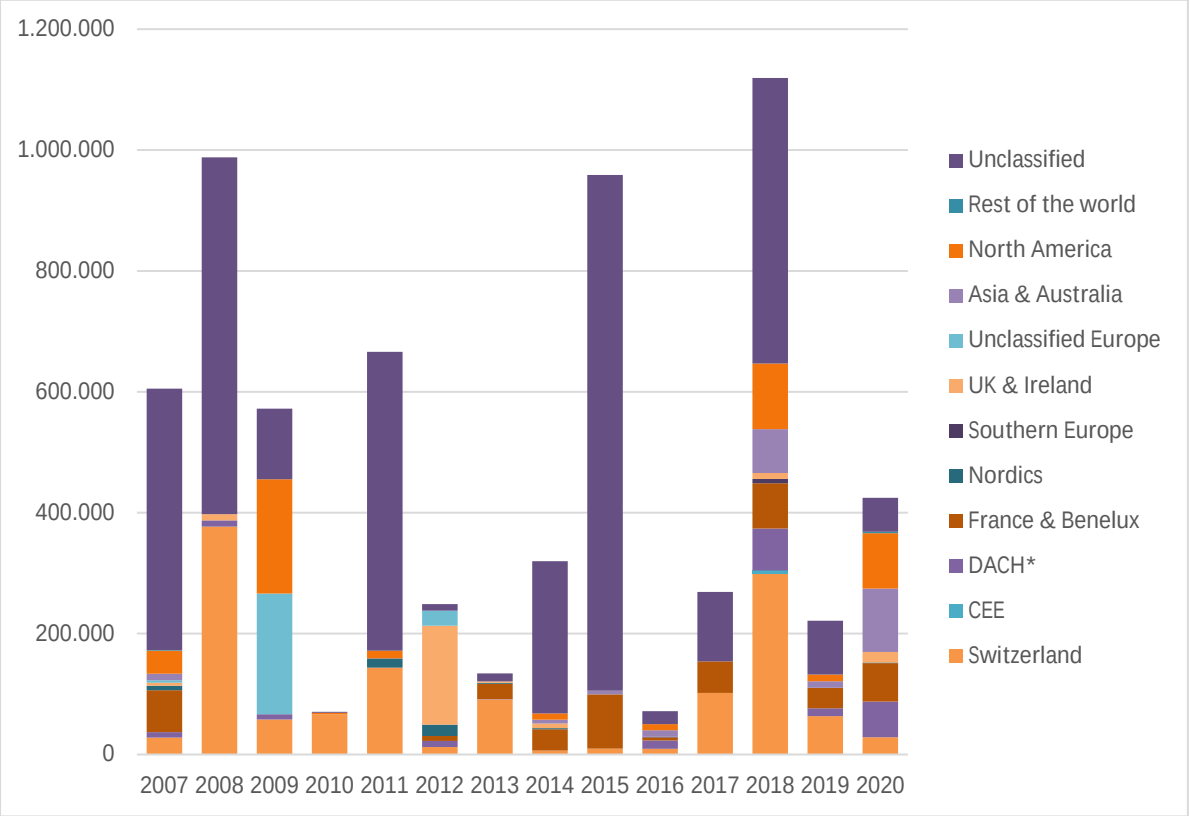


Table 7.2.3.2. **Geographical breakdown of Swiss VC fundraising (EUR thousands)**



DACH* - excluding Switzerland

Table 7.2.3.3. **Flows from Swiss PE/VC funds to portfolio companies (EUR thousands)**

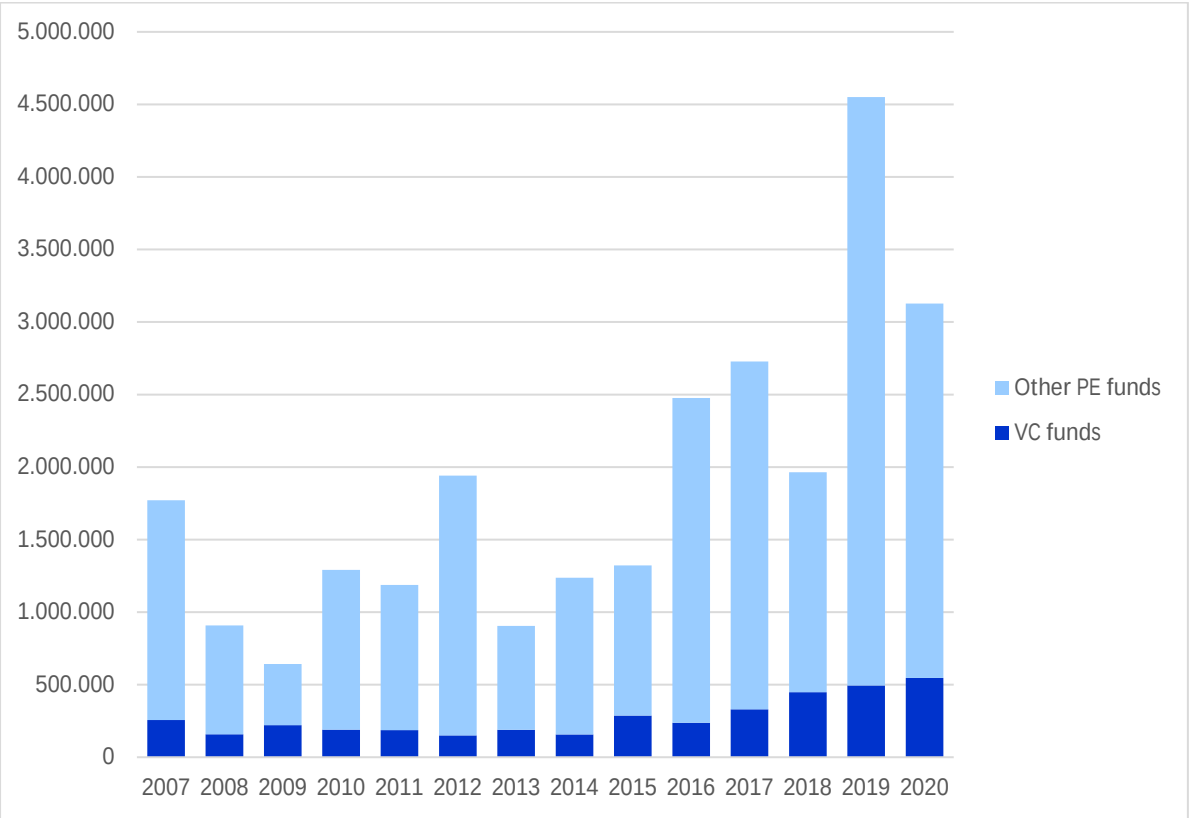


Table 7.2.3.4. **Top 5 foreign countries where Swiss VC funds have invested (EUR thousands)**

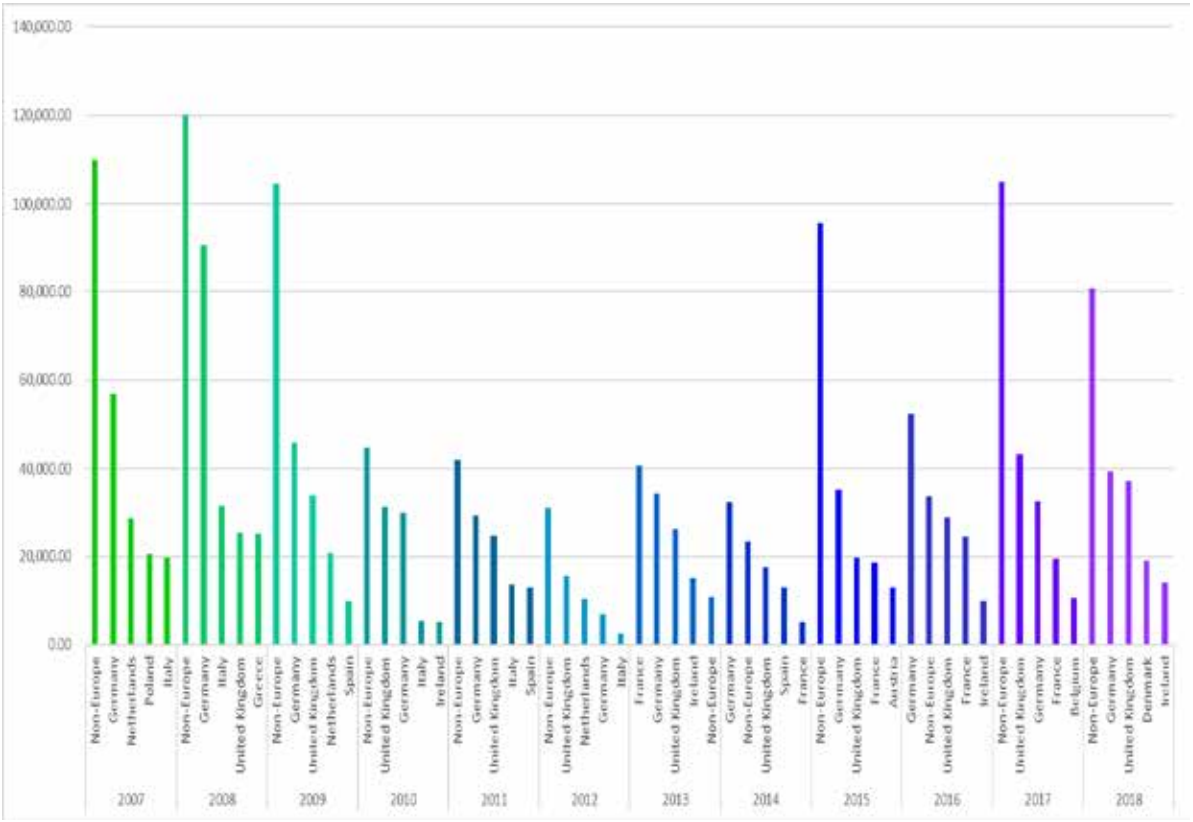
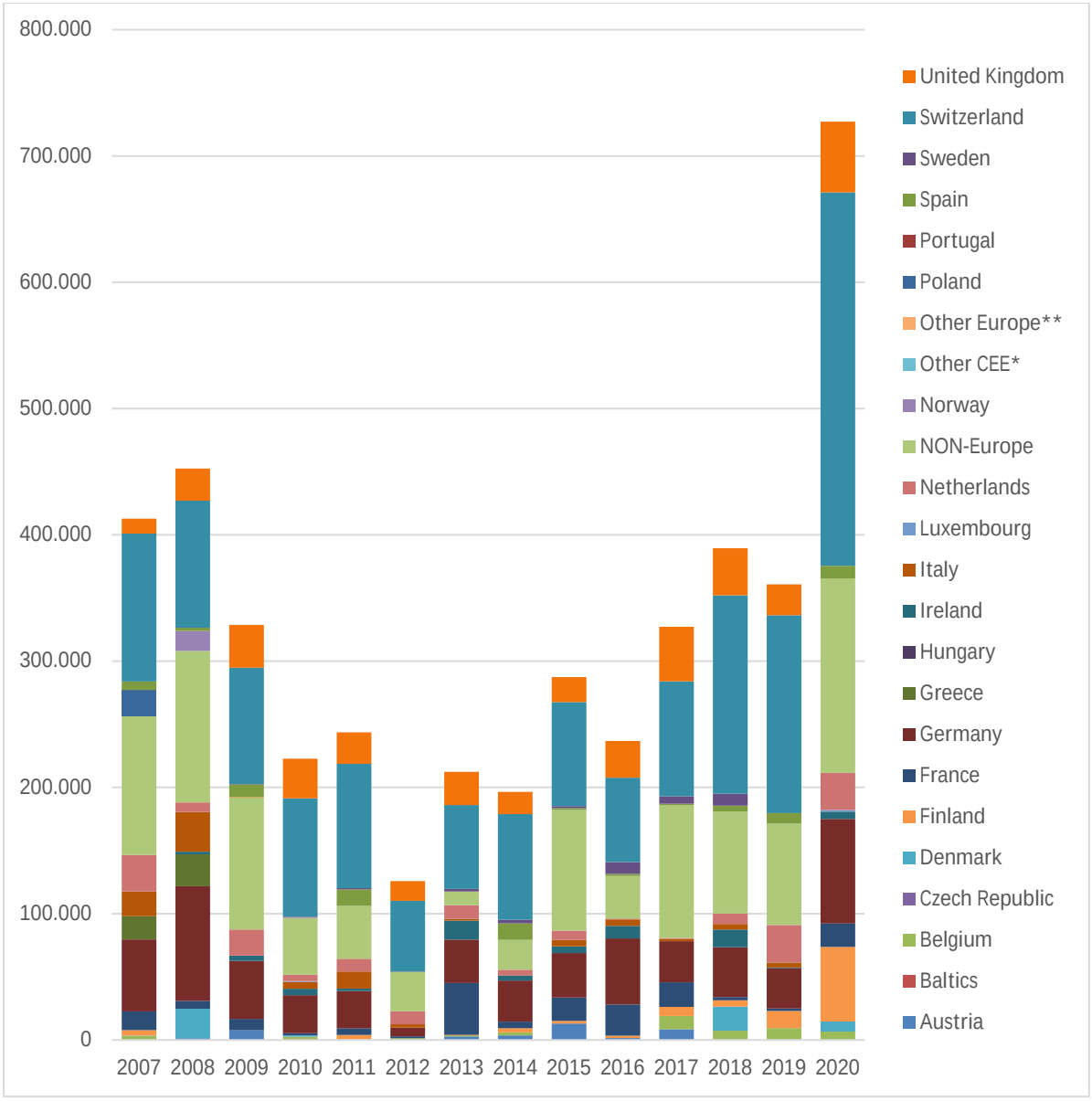


Table 7.2.3.5. **Geographical breakdown of flows from Swiss VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.2.3.6. **Flows from PE/VC funds to Swiss portfolio companies (EUR thousands)**

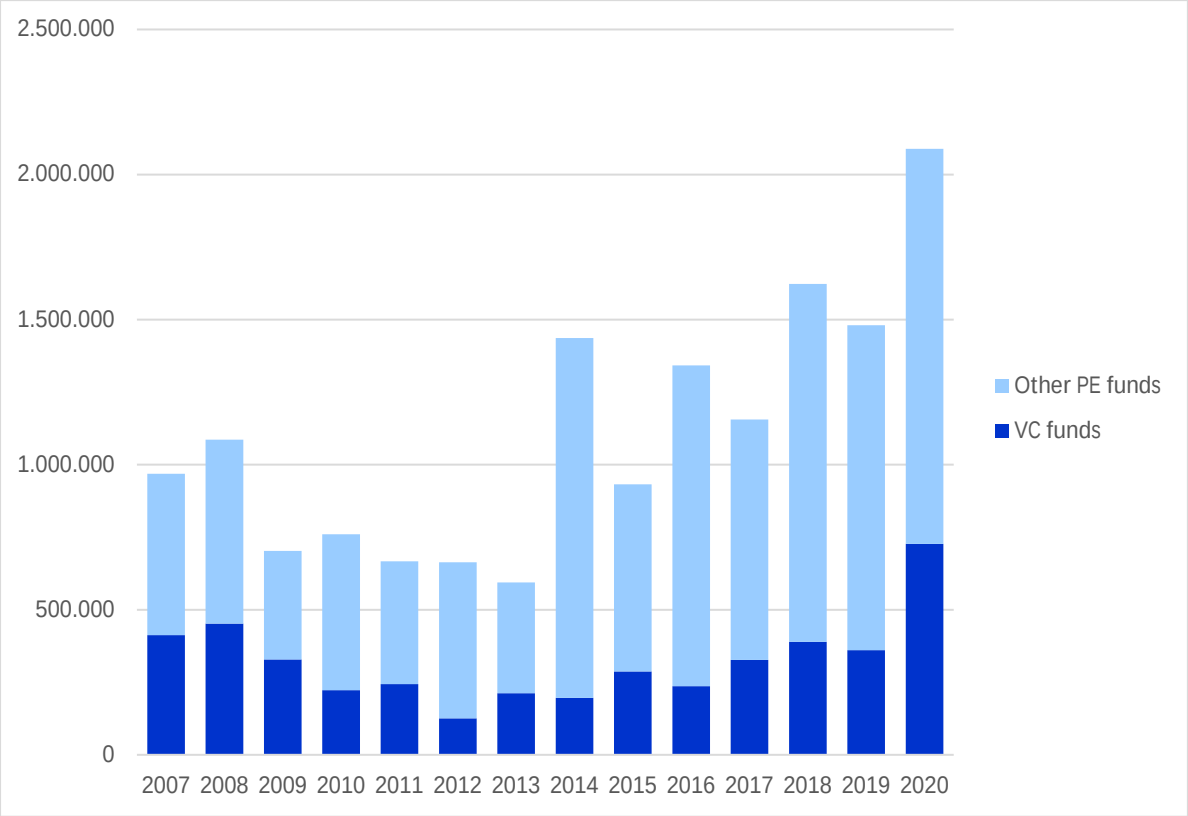


Table 7.2.3.7. **Top 5 foreign VC investors into Swiss portfolio companies (EUR thousands)**

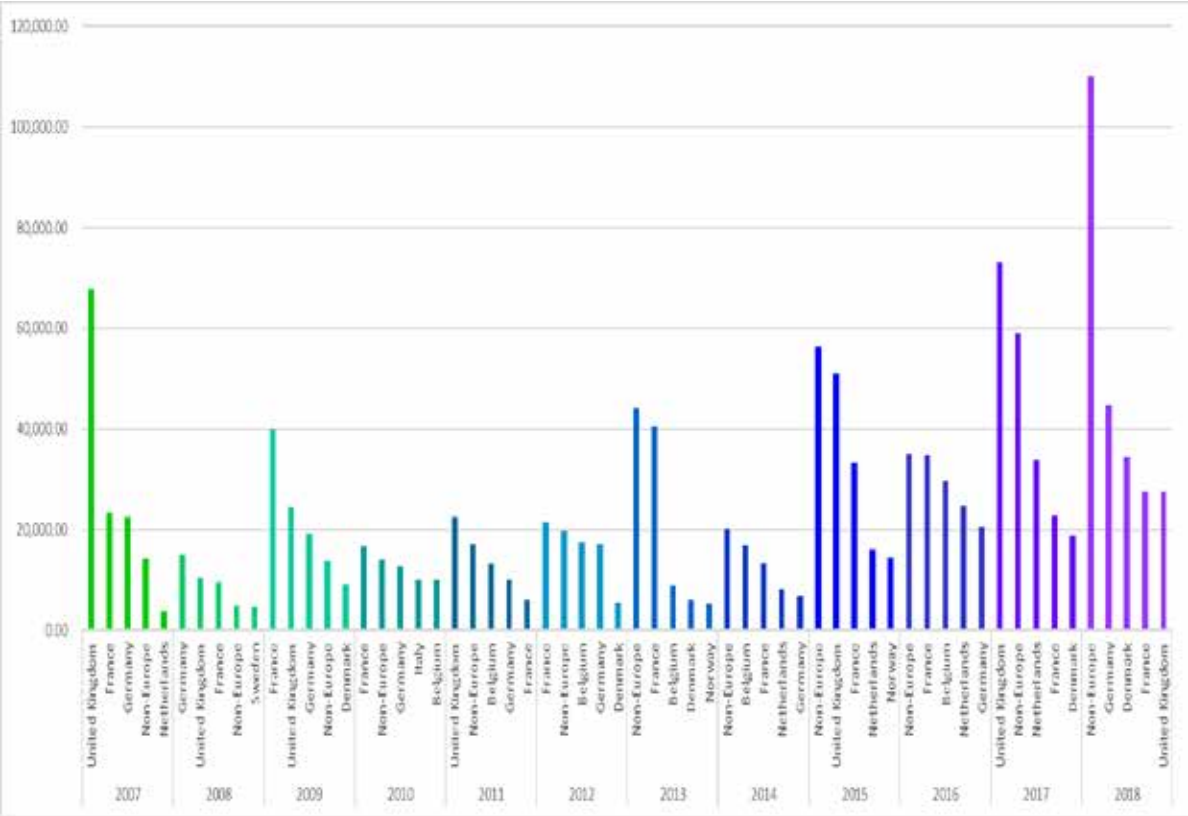
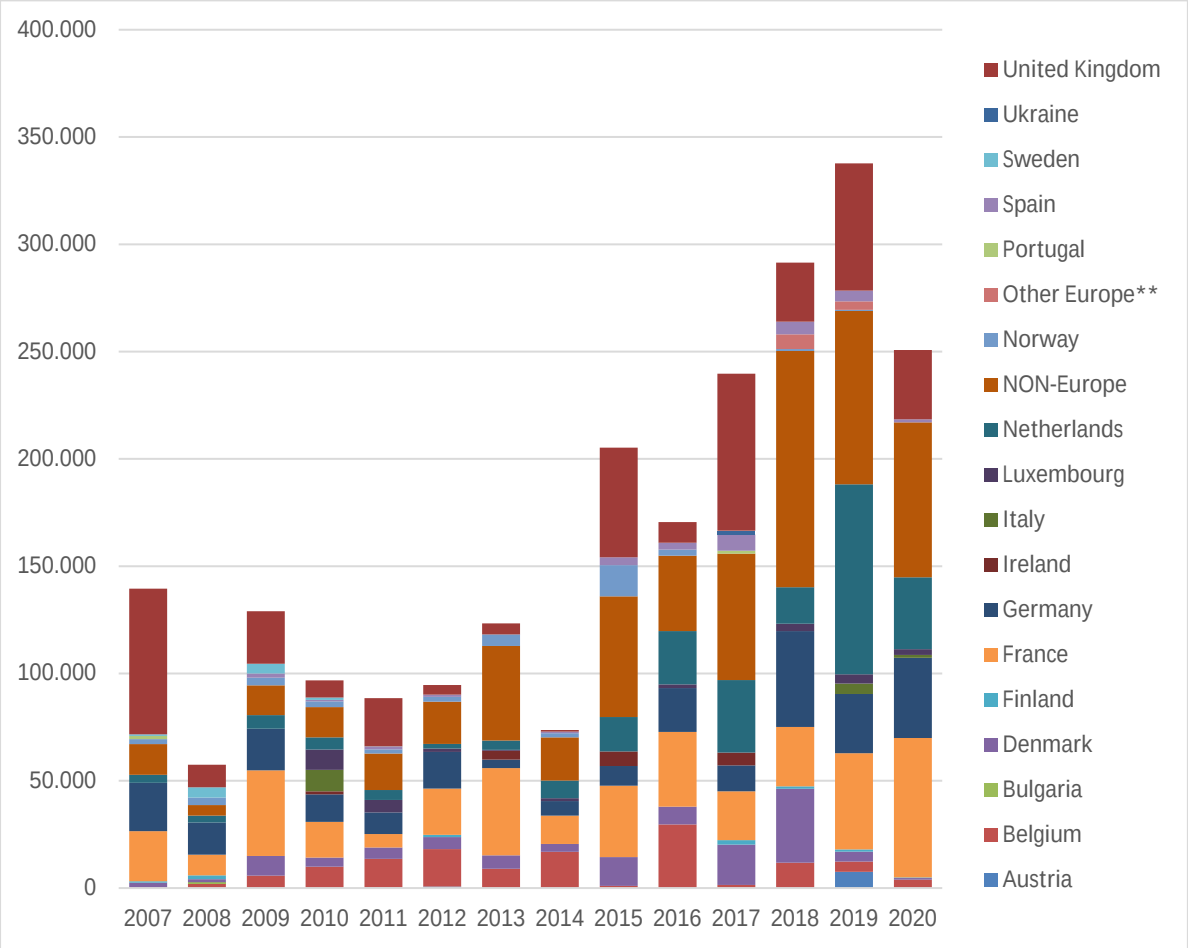
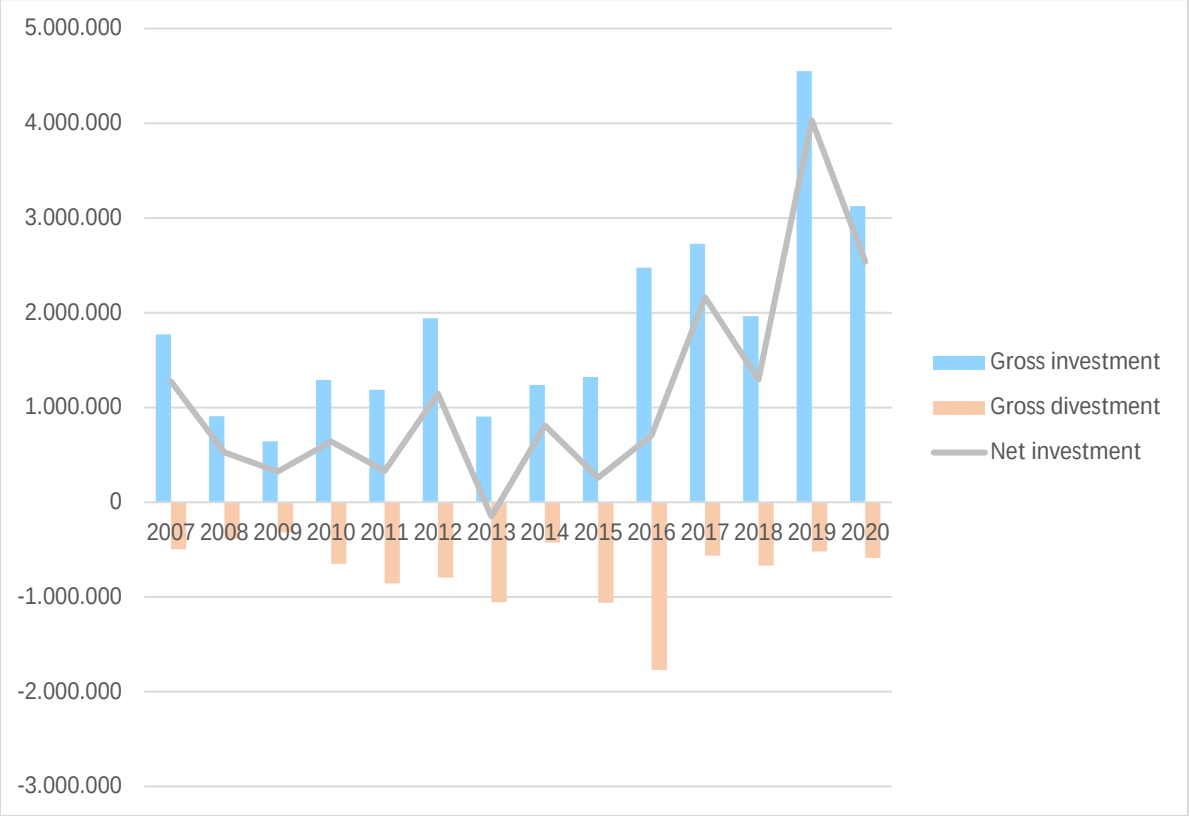


Table 7.2.3.8. **Geographical breakdown of flows from VC funds to Swiss portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.2.3.9. **Investments and divestments of Swiss PE funds (EUR thousands)**



7.3 NORTHERN EUROPE

7.3.1 Denmark

Table 7.3.1.1. **Flows raised by Danish PE/VC funds (EUR million)**

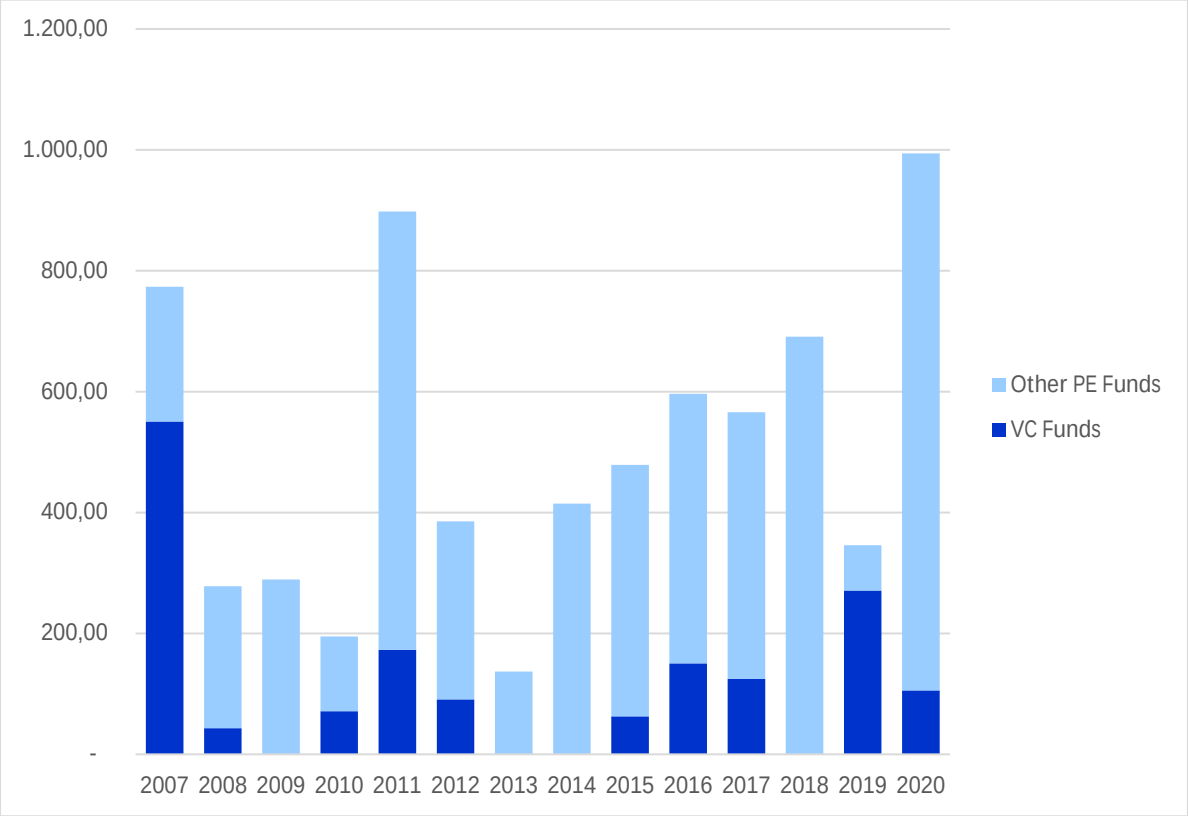
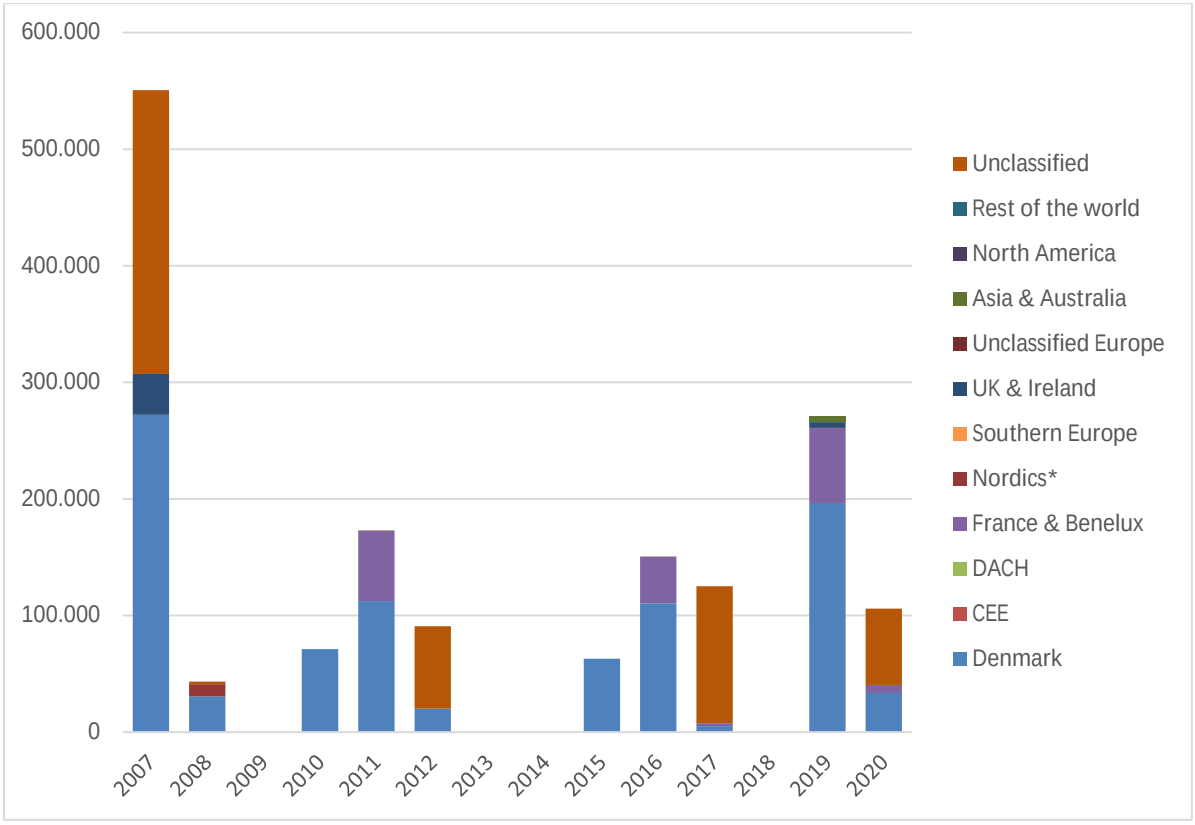


Table 7.3.1.2. **Geographical breakdown of Danish VC fundraising (EUR thousands)**



Nordics* - excluding Denmark

Table 7.3.1.3. **Flows from Danish PE/VC funds to portfolio companies (EUR million)**

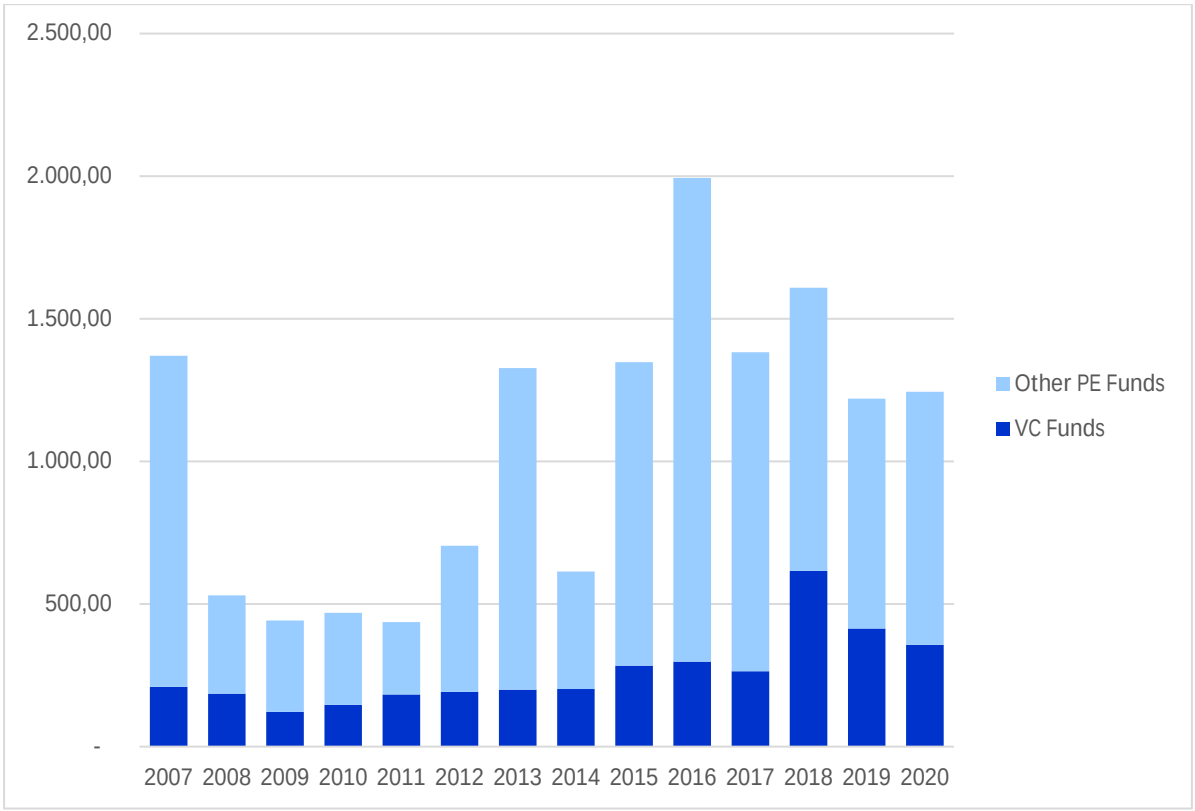


Table 7.3.1.4. **Top 5 foreign countriers where Danish VC funds have invested (EUR thousands)**

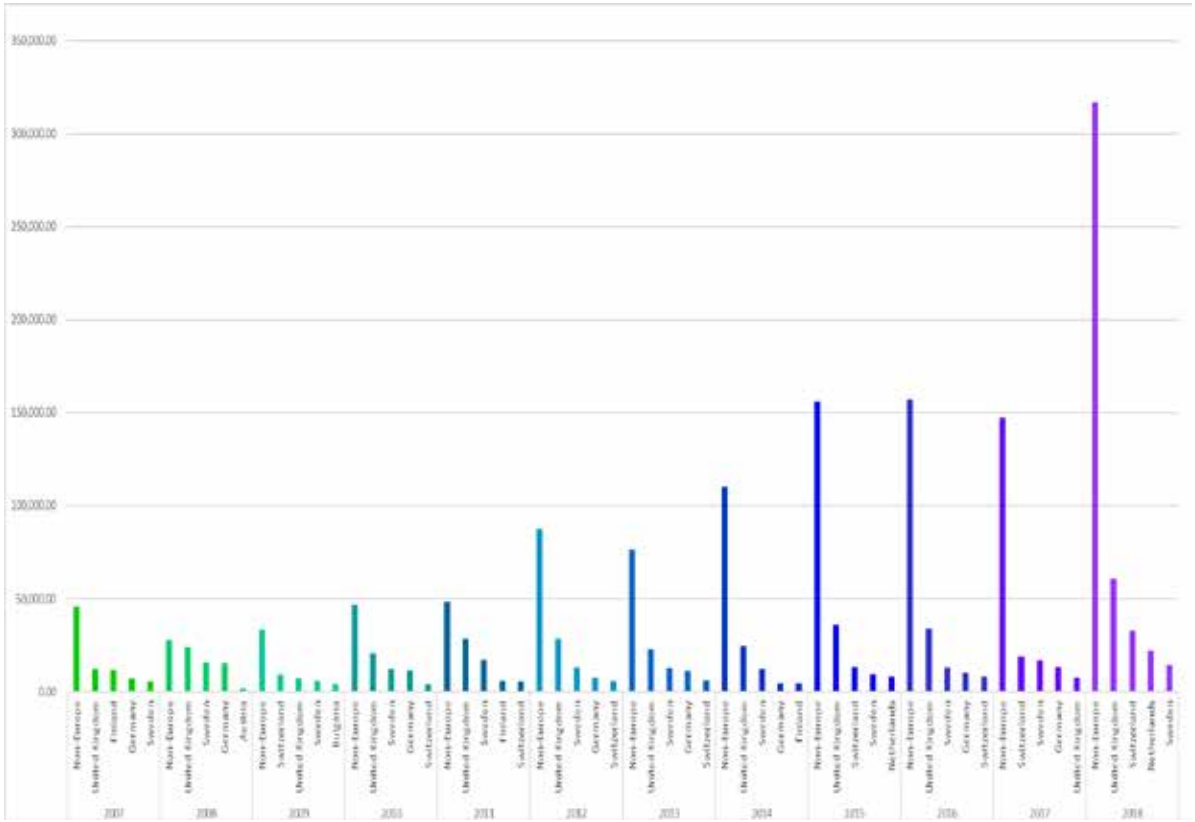
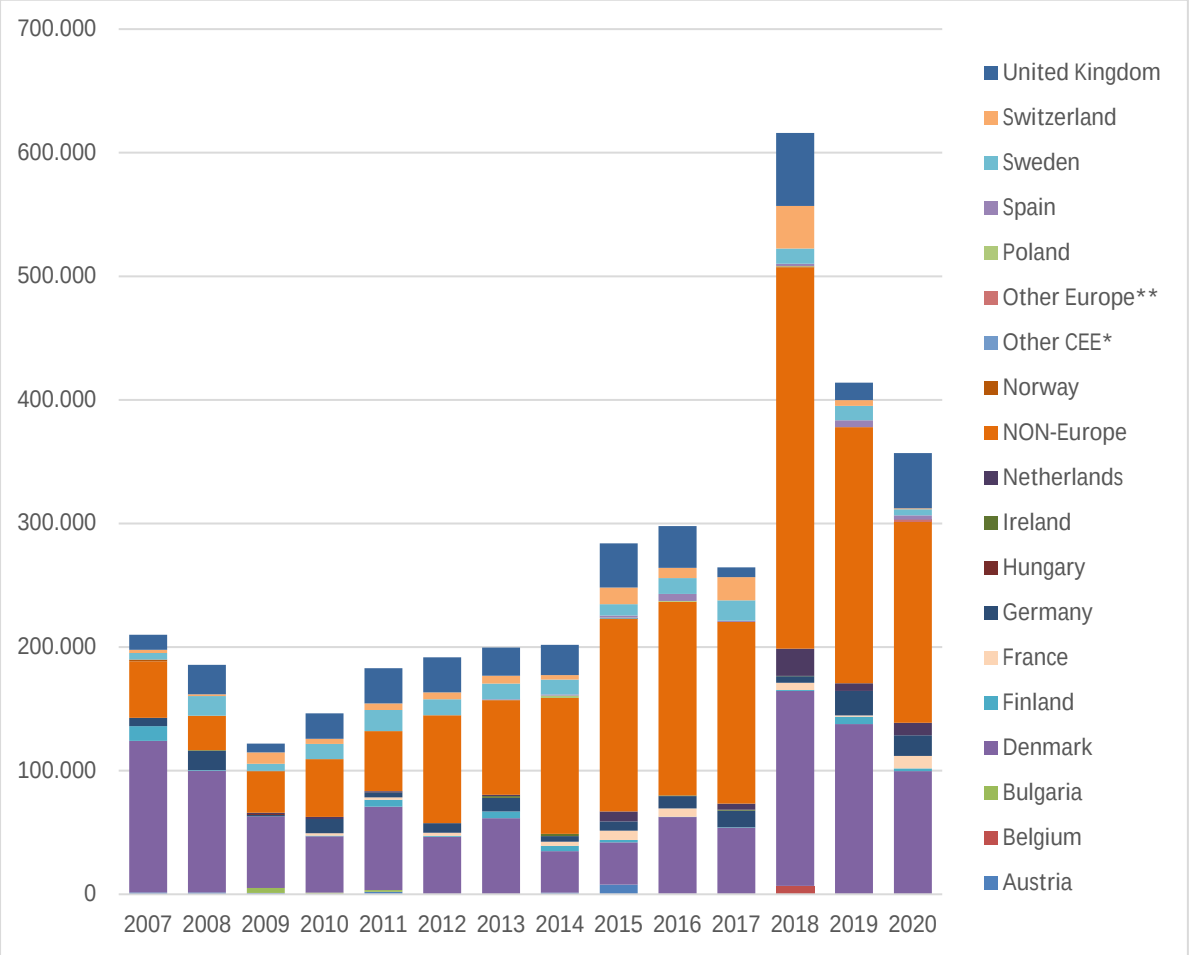


Table 7.3.1.5. **Geographical breakdown of flows from Danish VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.1.3.6. **Flows from PE/VC funds to Danish portfolio companies (EUR million)**

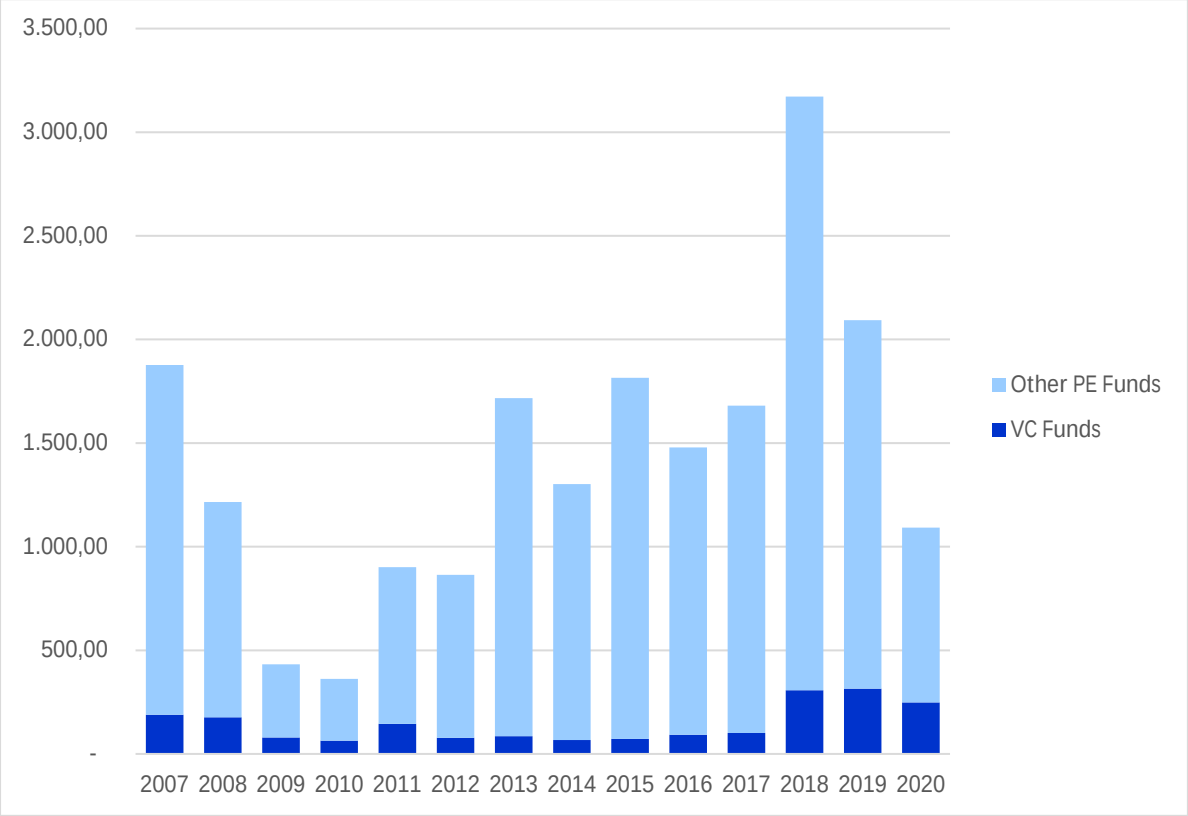
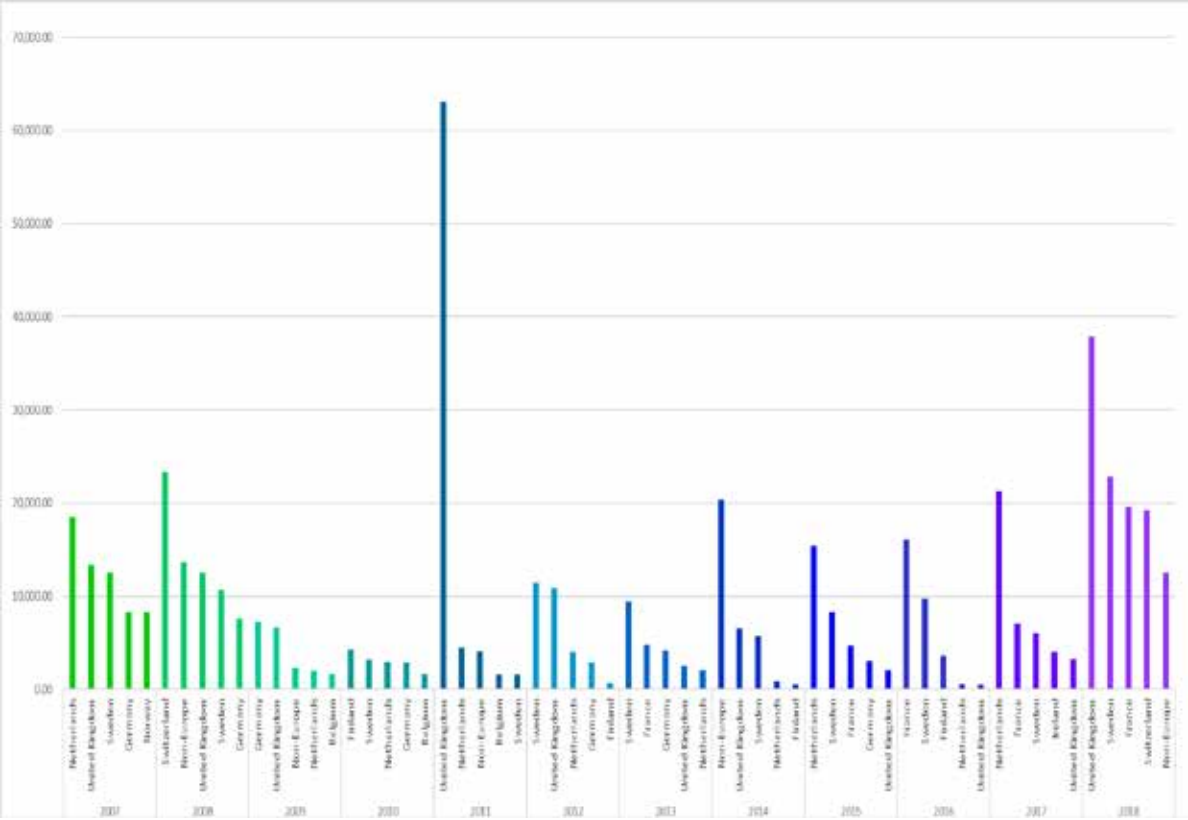


Table 7.1.3.7. **Top 5 foreign VC investors into Danish portfolio companies (EUR thousands)**



7.3.1.8. **Geographical breakdown of flows from VC funds to Danish portfolio companies (EUR thousands)**

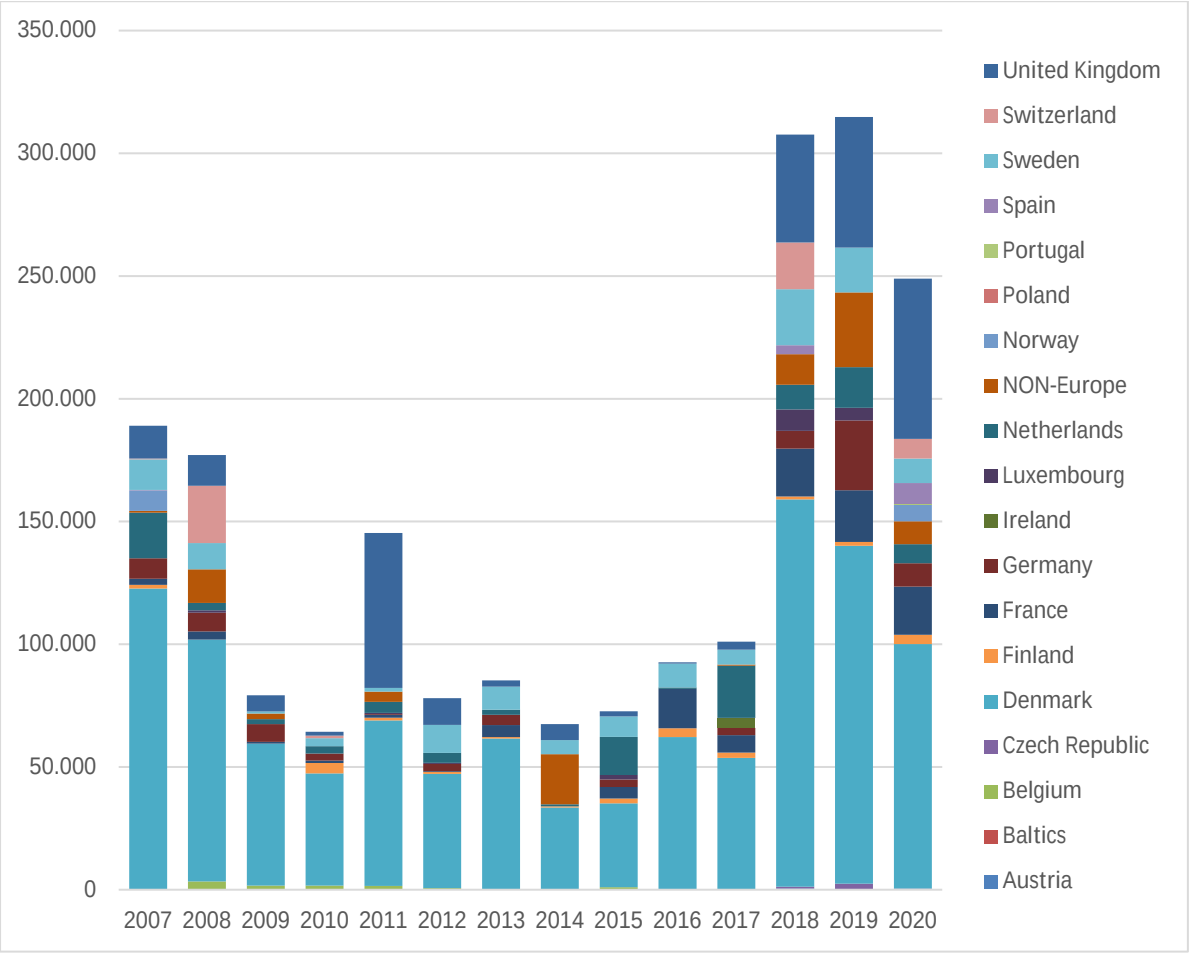
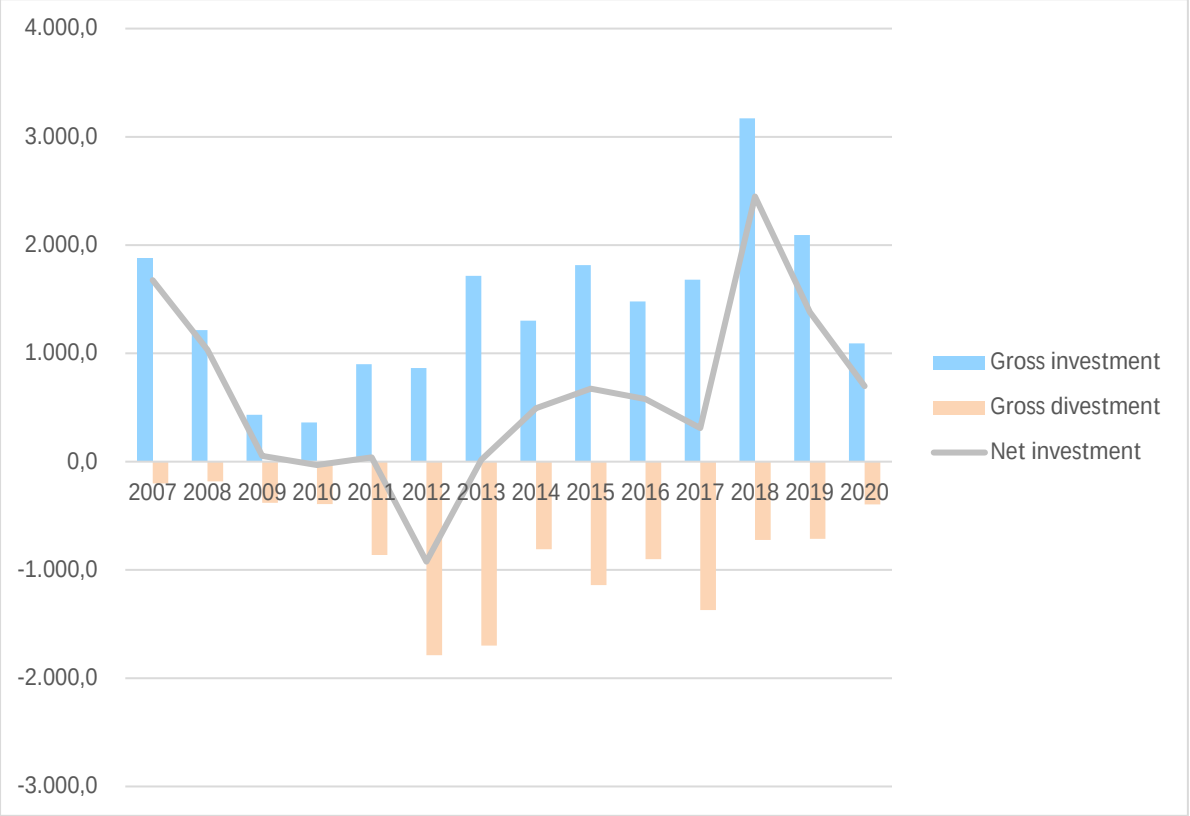


Table 7.3.1.9. **Investments and divestments of Danish PE funds (EUR million)**



7.3.2 Finland

Table 7.3.2.1. **Flows raised by Finnish PE/VC funds (EUR million)**

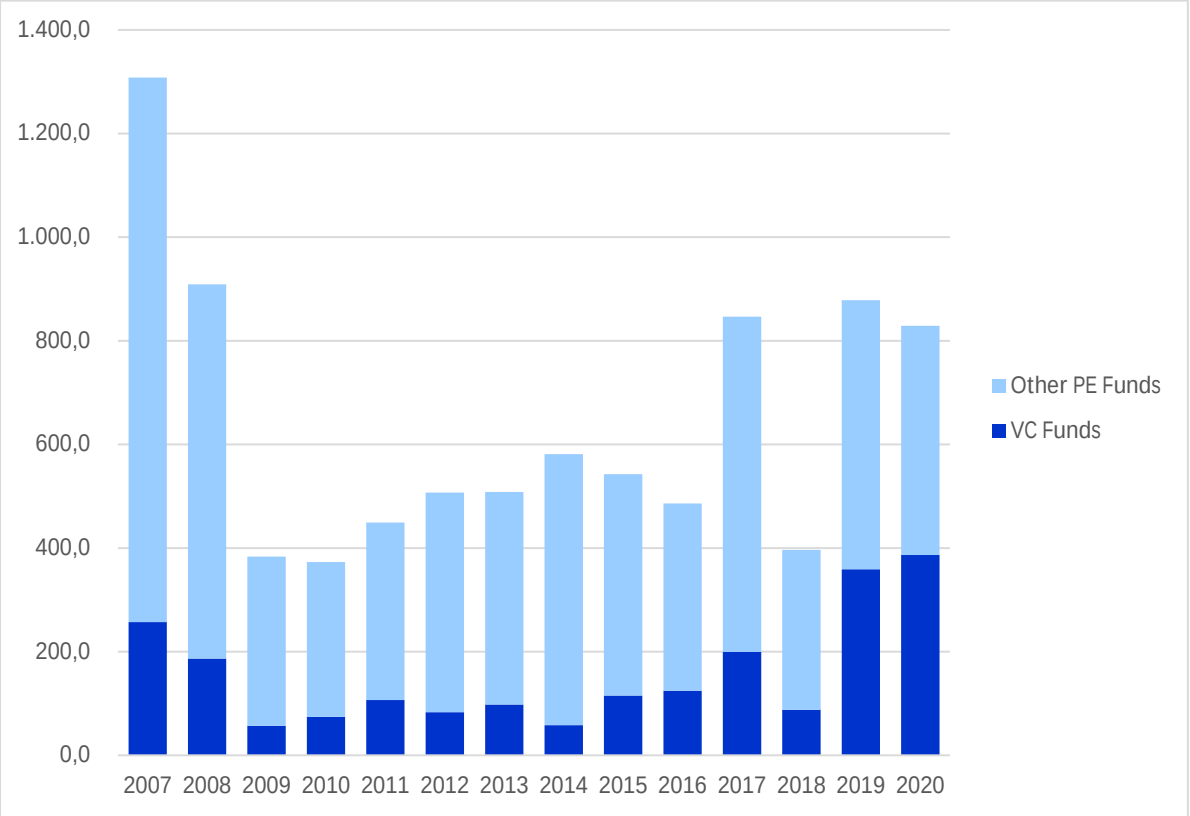
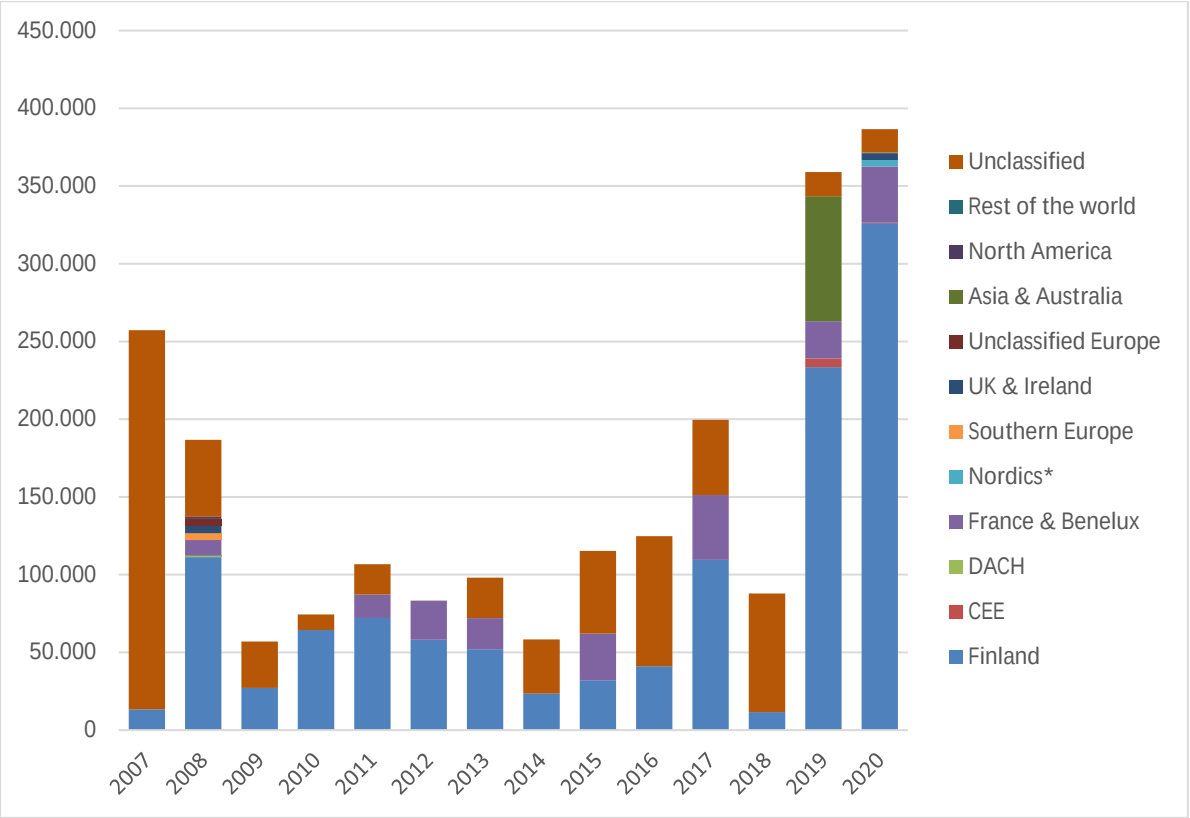


Table 7.3.2.2. **Geographical breakdown of Finnish VC fundraising (EUR thousands)**



Nordics* - excluding Finland

Table 7.3.2.3. **Flows from Finnish PE/VC funds to portfolio companies (EUR million)**

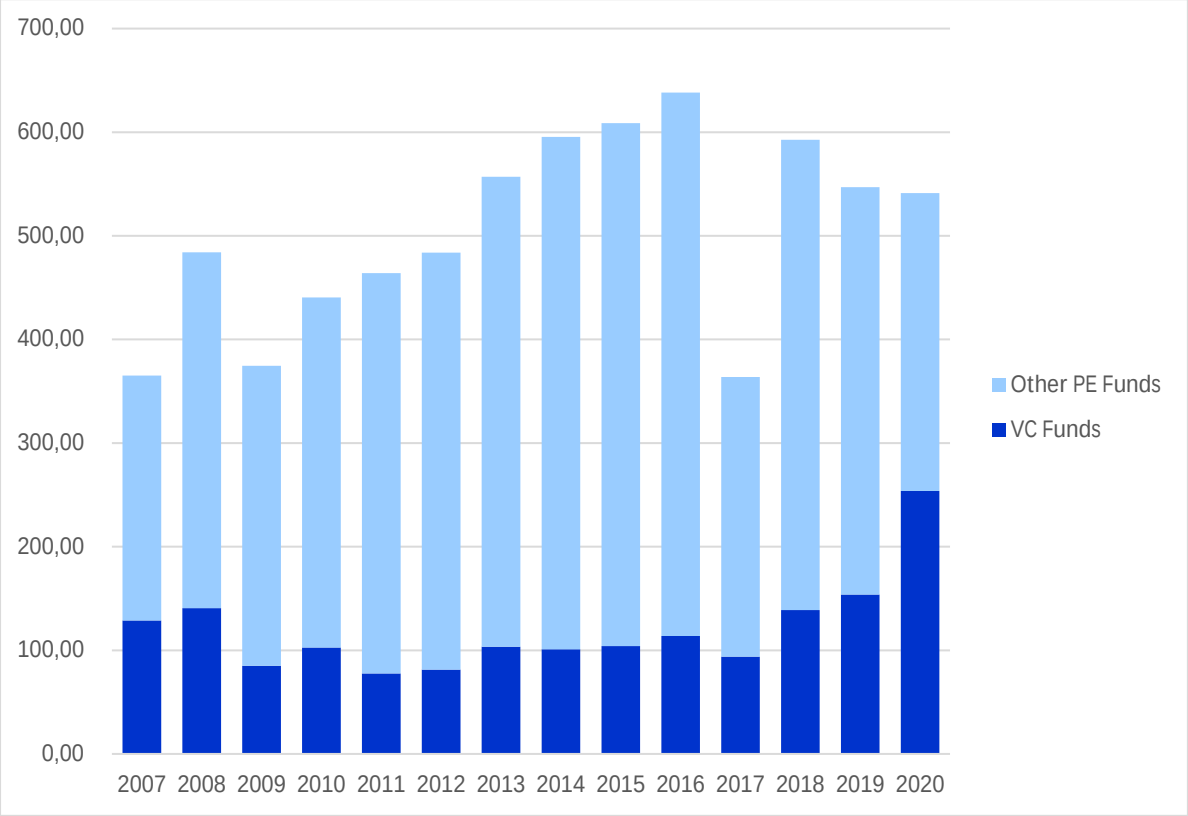


Table 7.3.2.4. **Top 5 foreign countries where Finnish VC funds have invested (EUR thousands)**

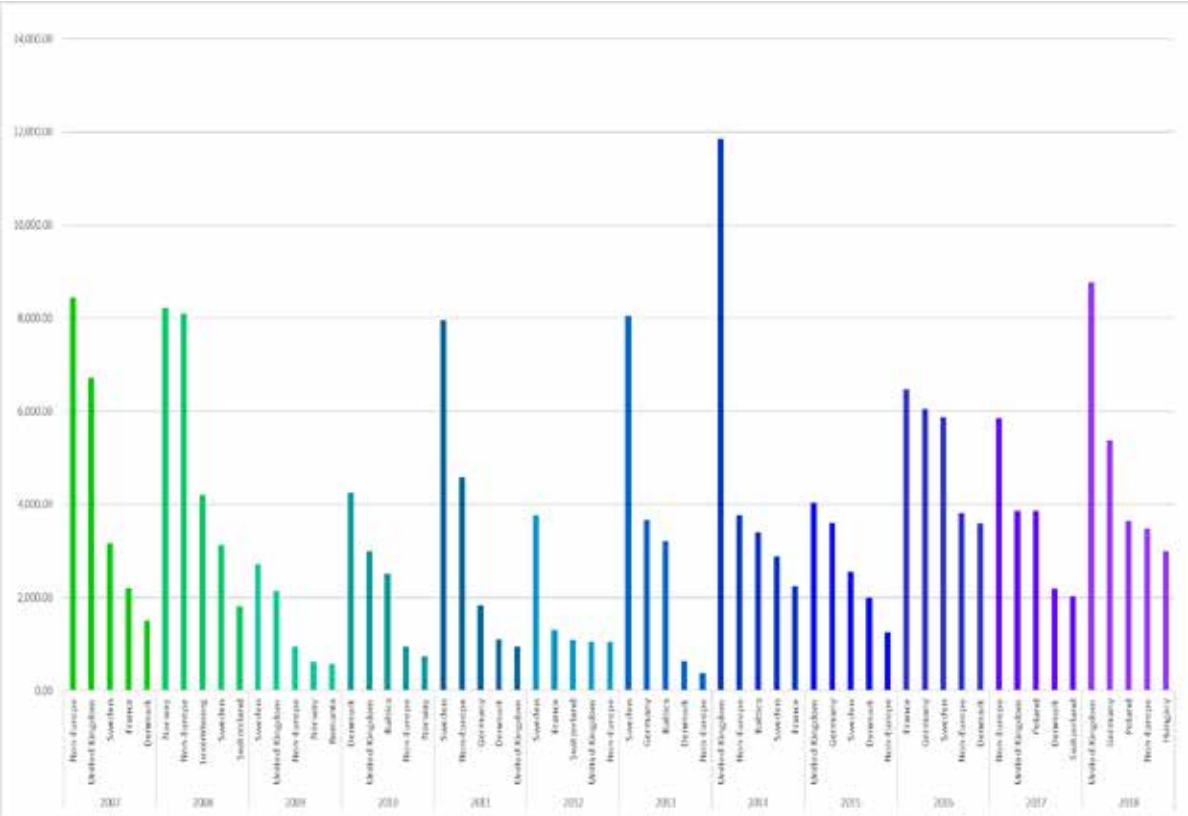
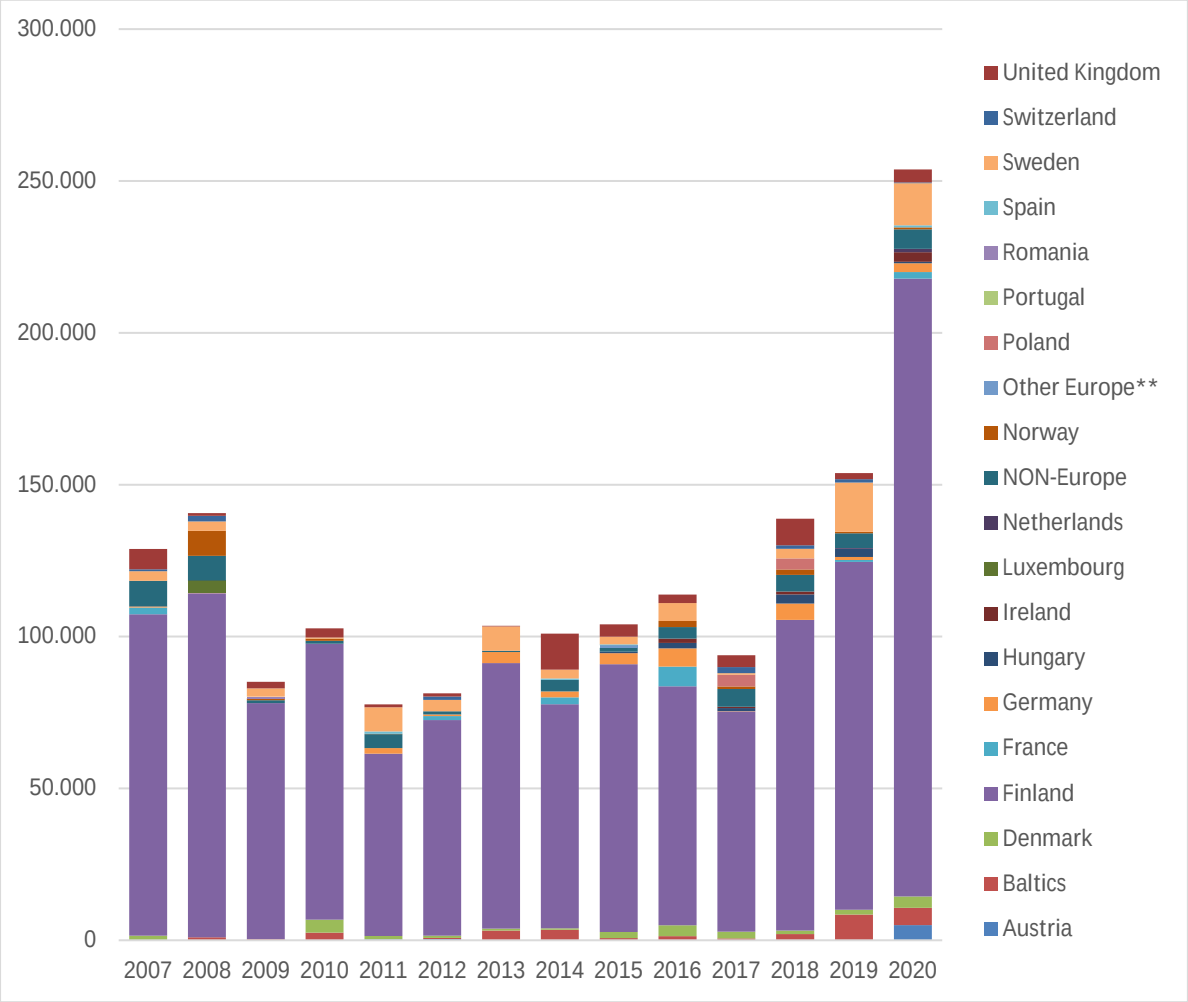


Table 7.3.2.5. **Geographical breakdown of flows from Finnish VC funds to portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.3.2.6. **Flows from PE/VC funds to Finnish portfolio companies (EUR million)**

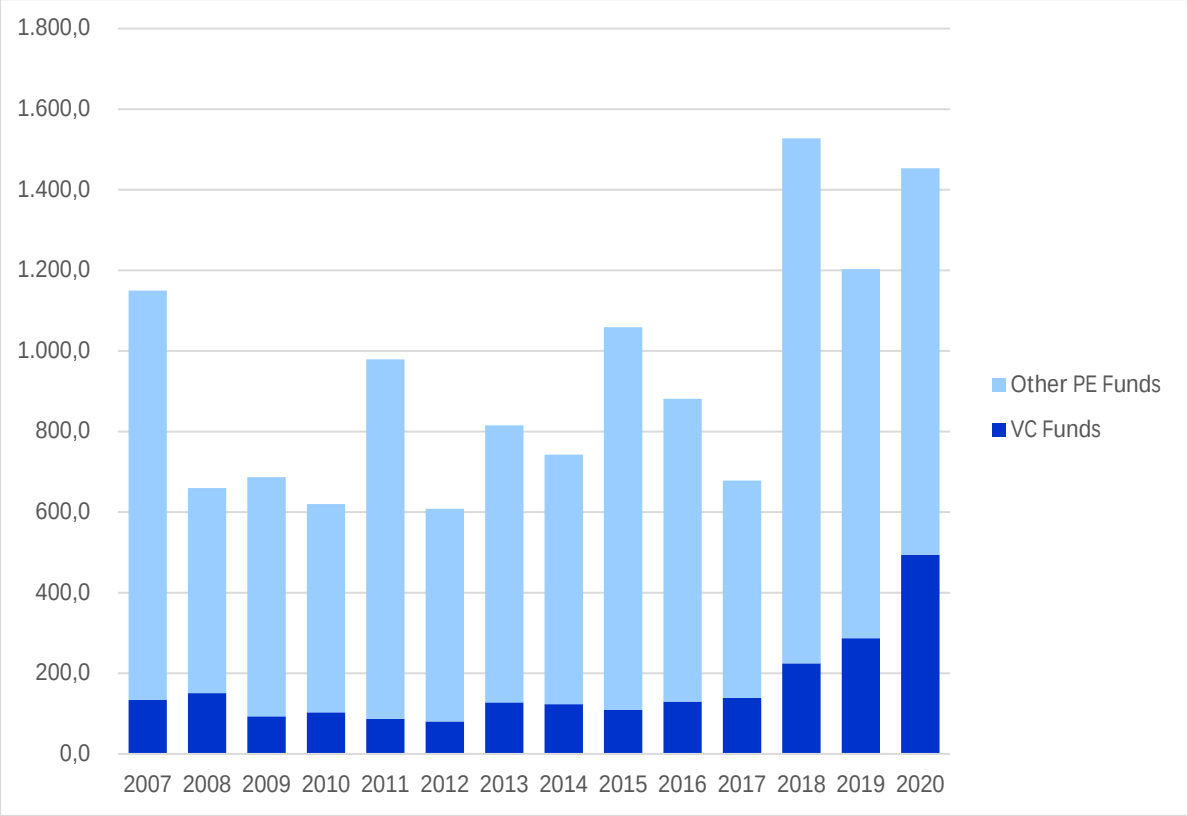


Table 7.3.2.7. Top 5 foreign VC investors **into Finnish portfolio companies (EUR thousands)**

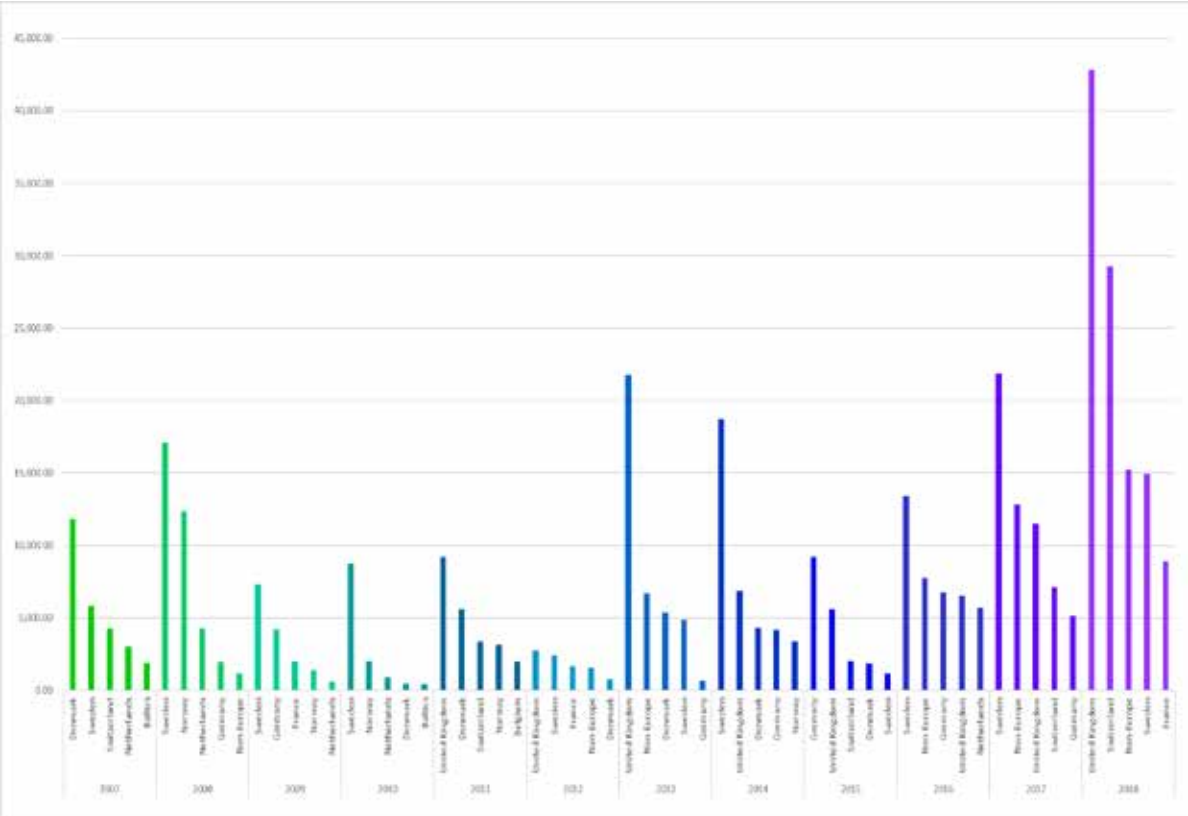
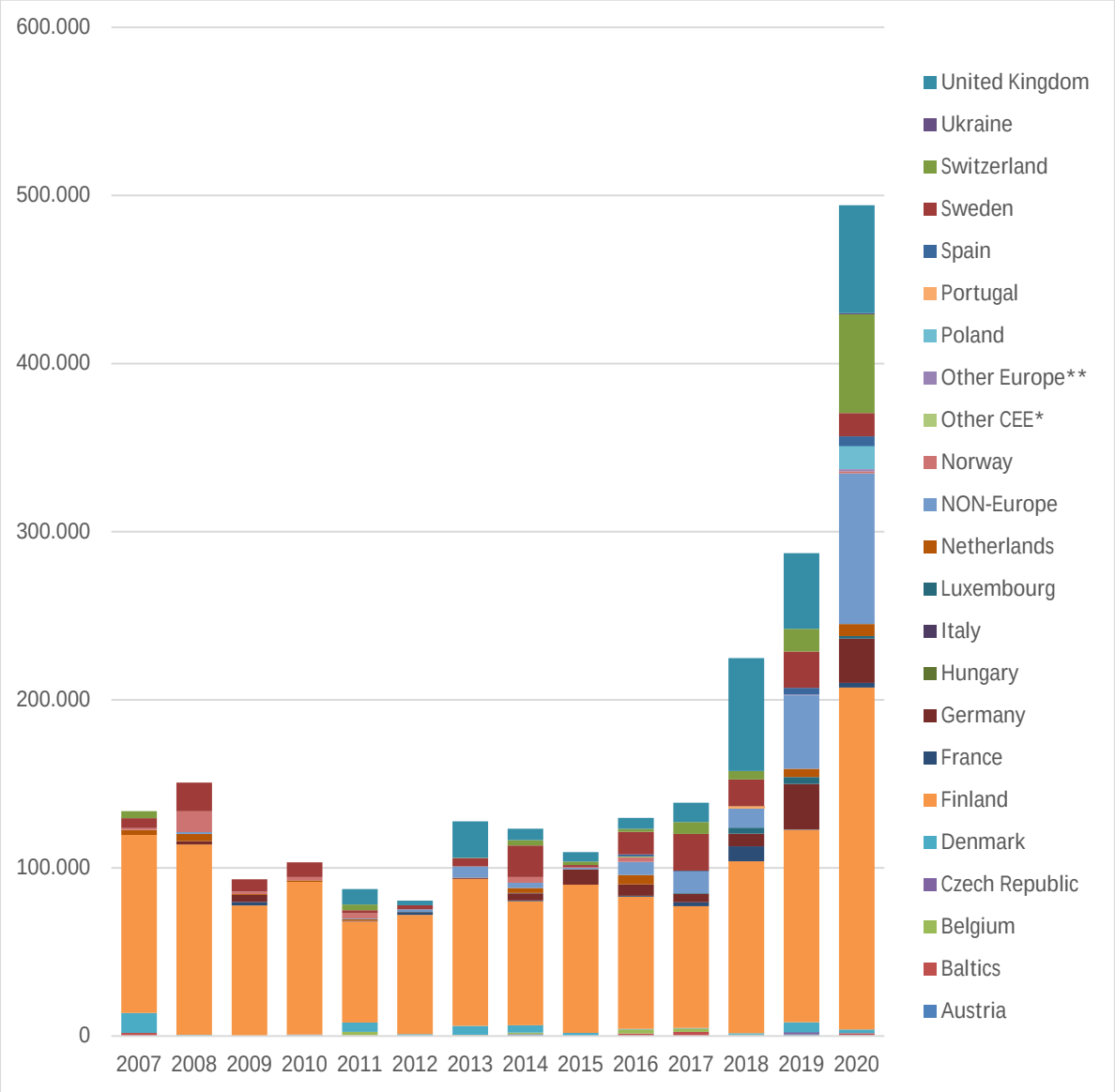
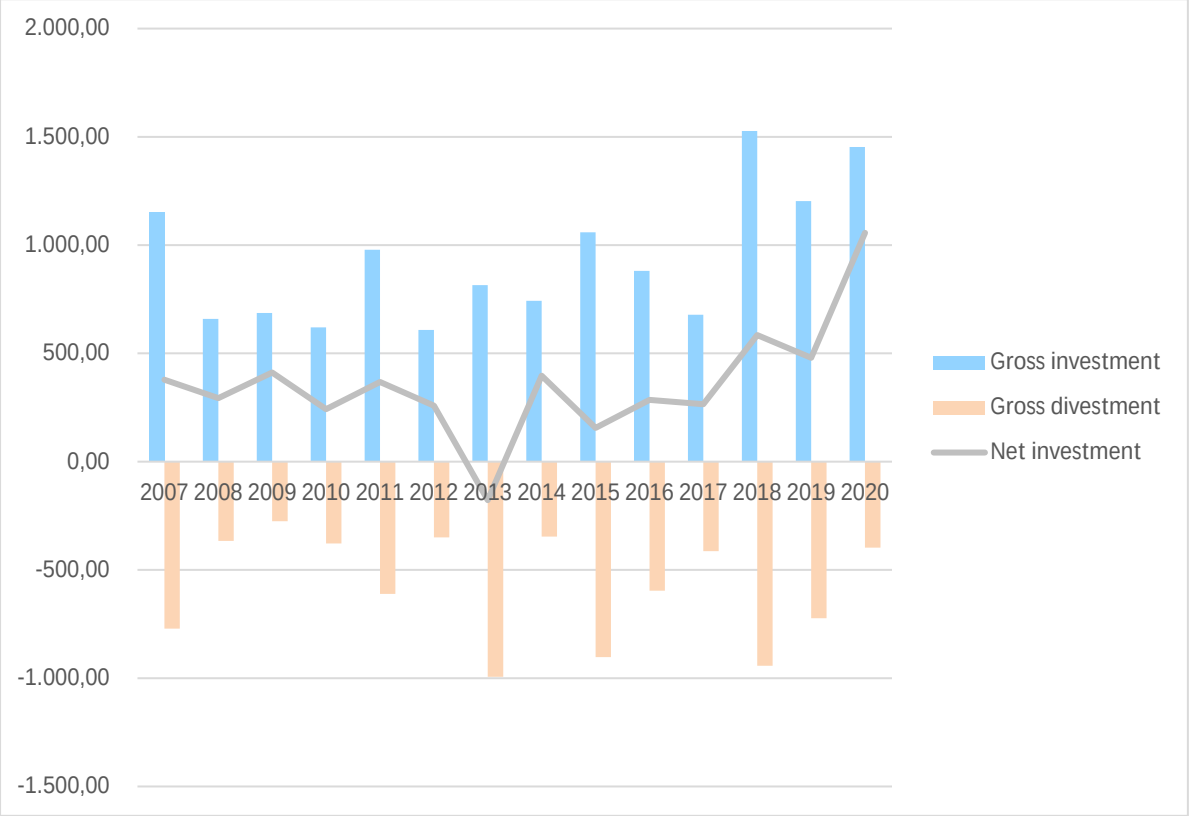


Table 7.3.2.8. **Geographical breakdown of flows from VC funds to Finnish portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.3.2.9. **Investments and divestments of Finnish PE funds (EUR million)**



7.3.3 Norway

Table 7.3.3.1. **Flows raised by Norwegian PE/VC funds (EUR thousands)**

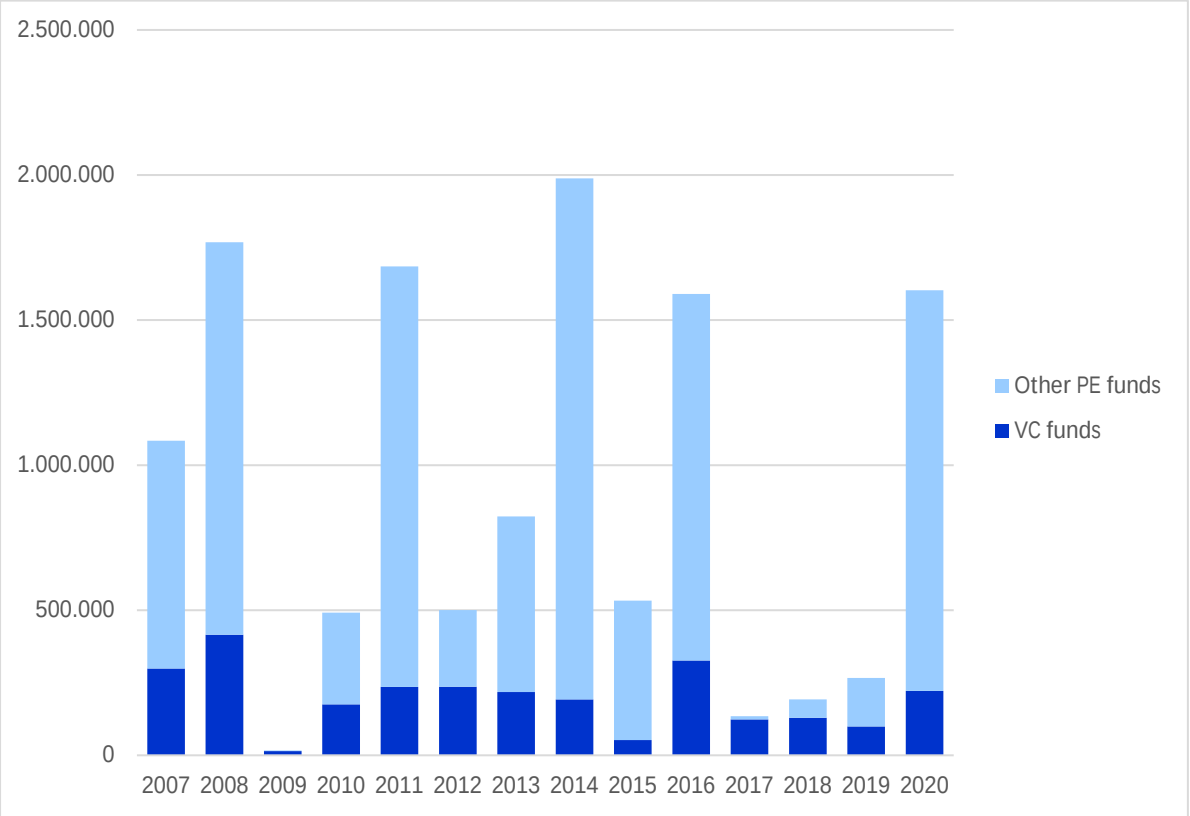


Table 7.3.3.2. **Geographical breakdown of Norwegian VC fundraising (EUR thousands)**

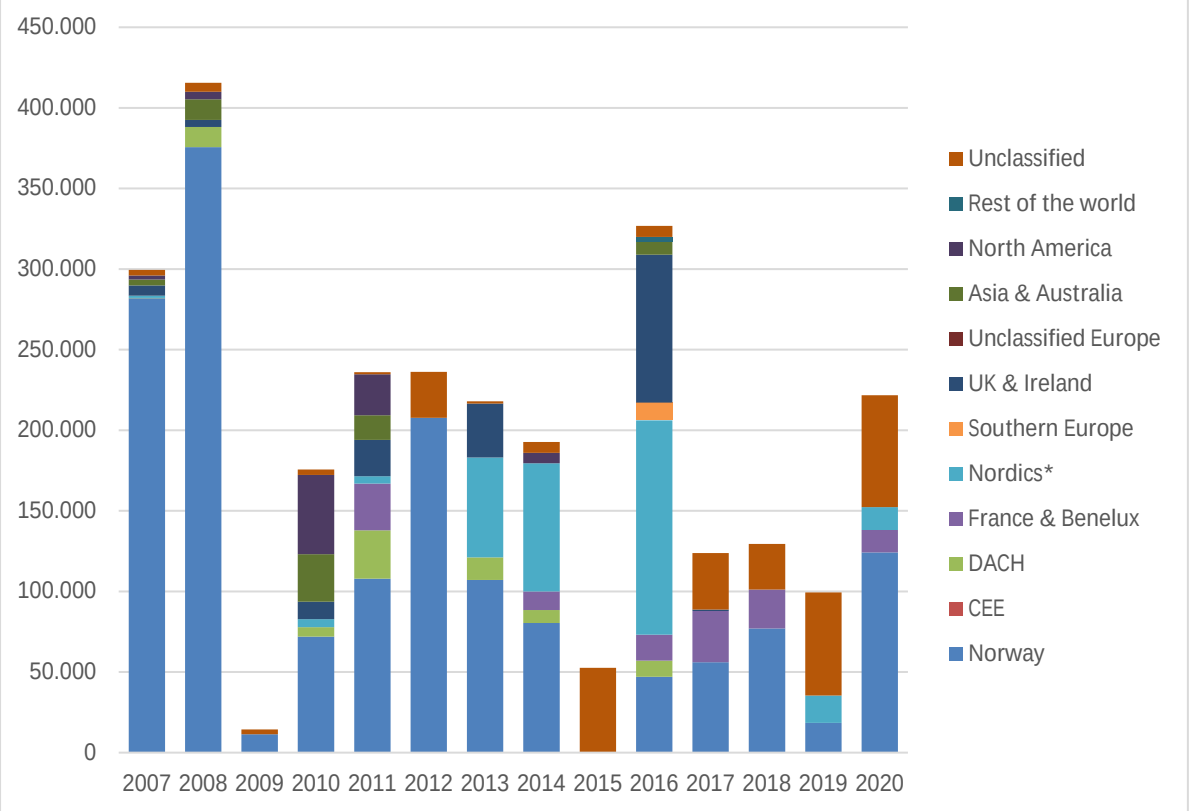


Table 7.3.3.3. **Flows from Norwegian PE/VC funds to portfolio companies (EUR thousands)**

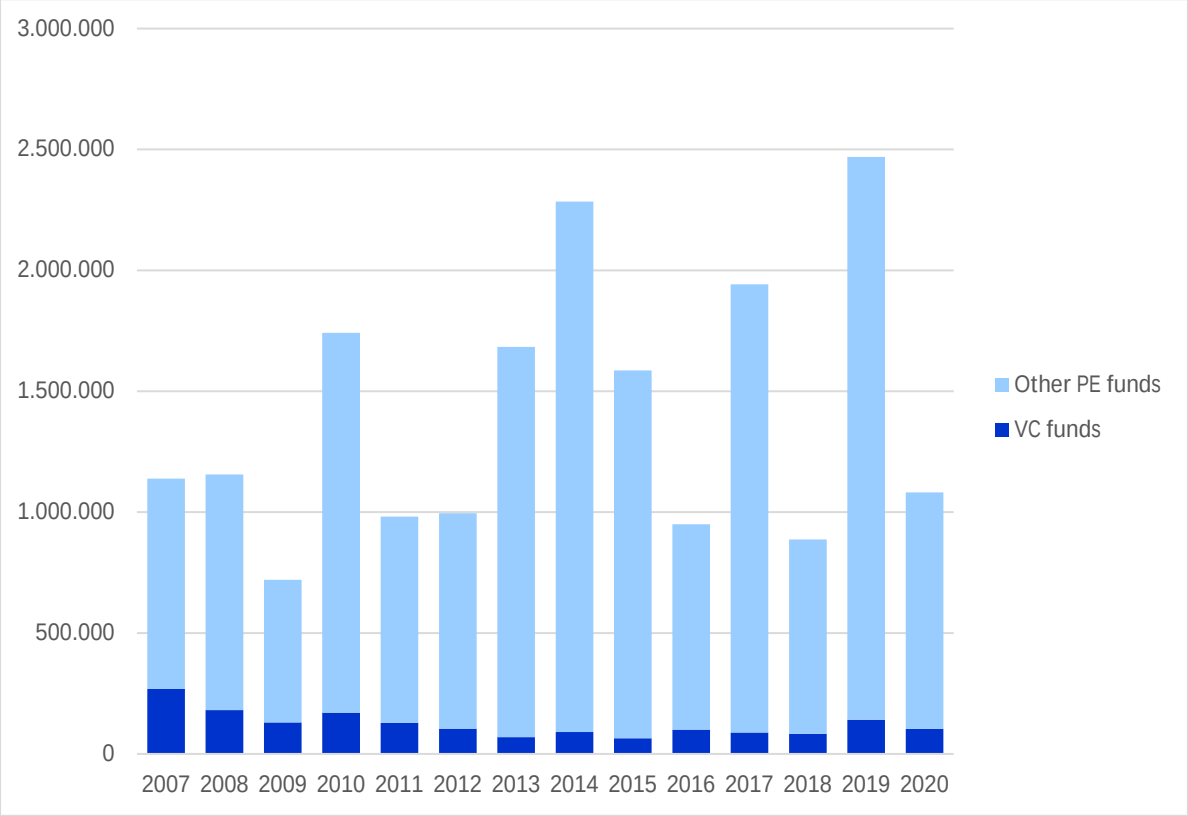


Table 7.3.3.4. **Top 5 foreign countries where Norwegian VC funds have invested (EUR thousands)**

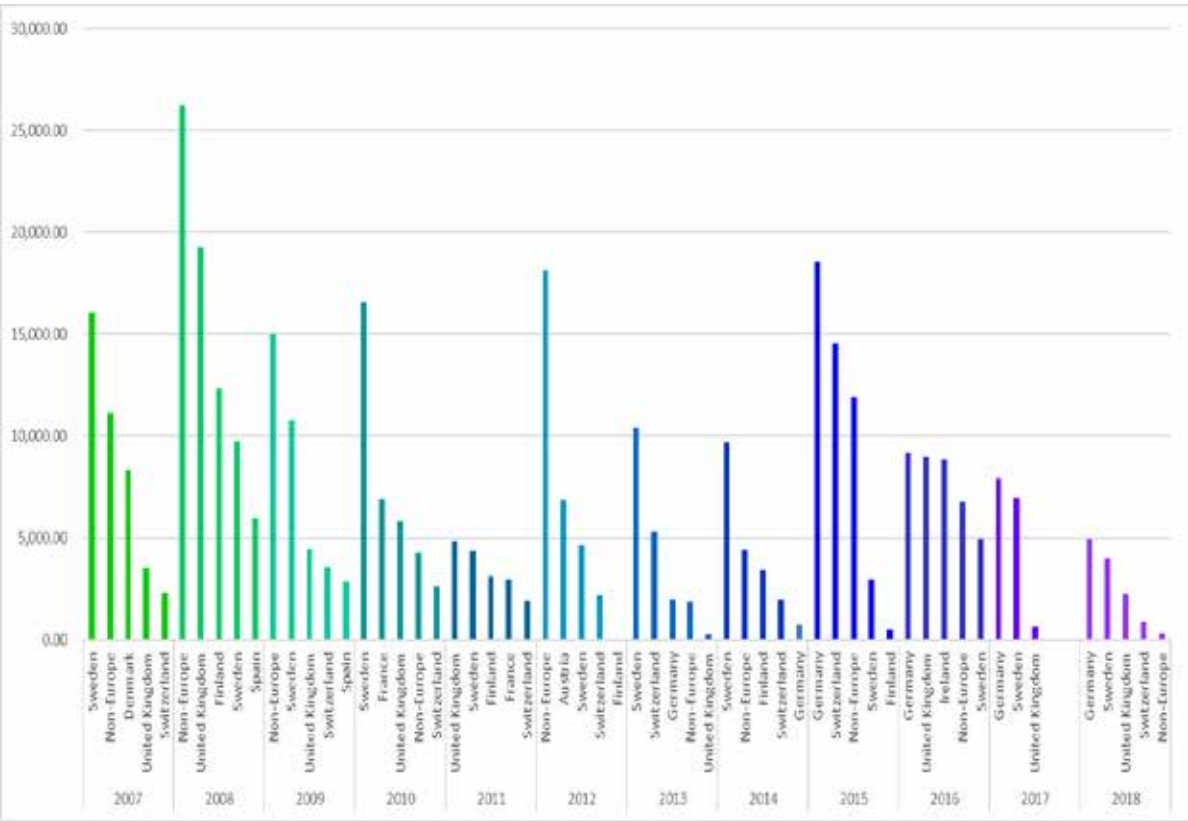


Table 7.3.3.5. **Geographical breakdown of flows from Norwegian VC funds to portfolio companies (EUR thousands)**

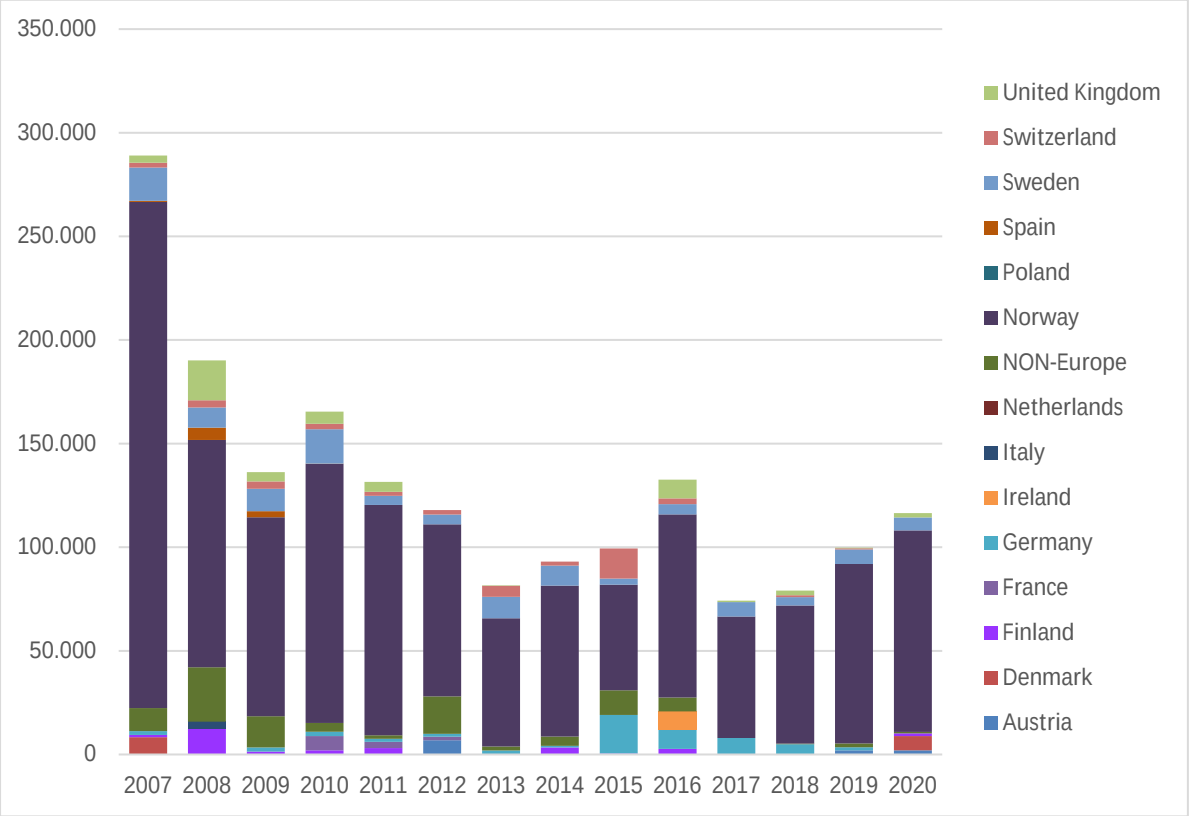


Table 7.3.3.6. **Flows from PE/VC funds to Norwegian portfolio companies (EUR thousands)**

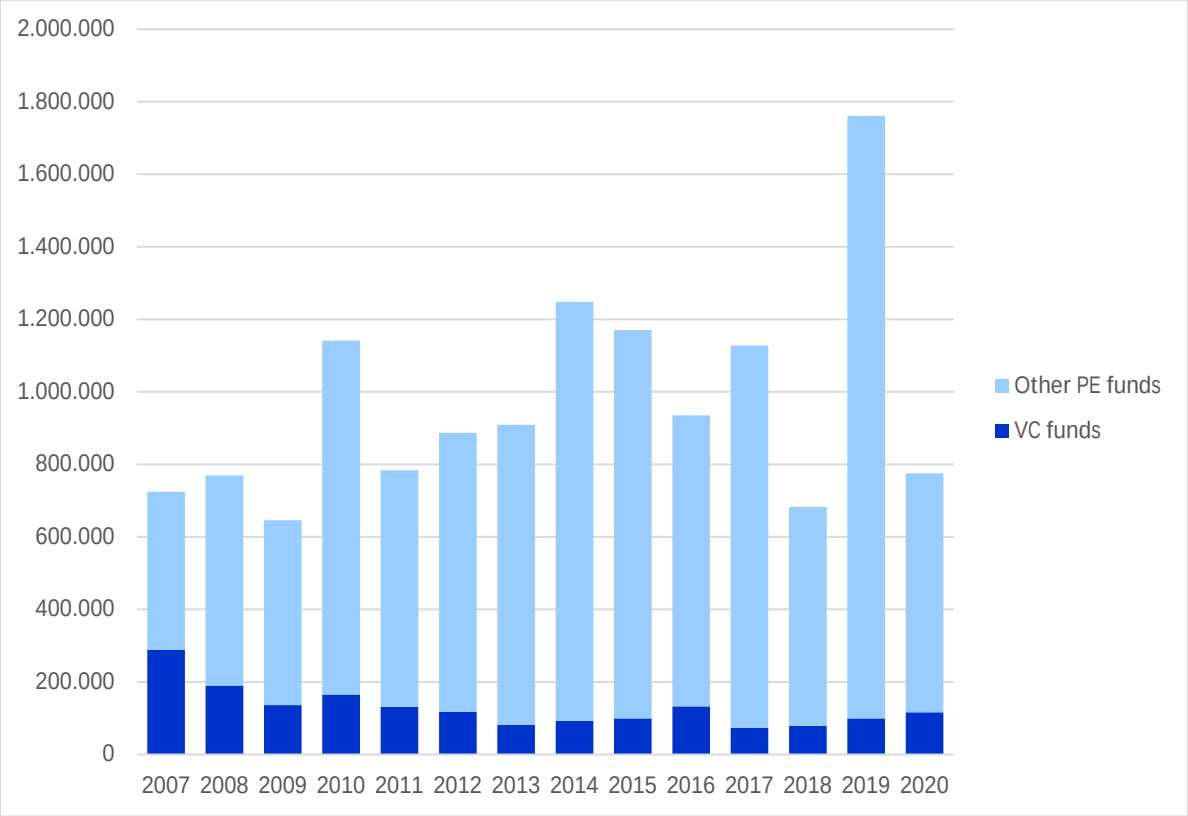


Table 7.3.3.7. **Top 5 foreign VC investors into Norwegian portfolio companies (EUR thousands)**

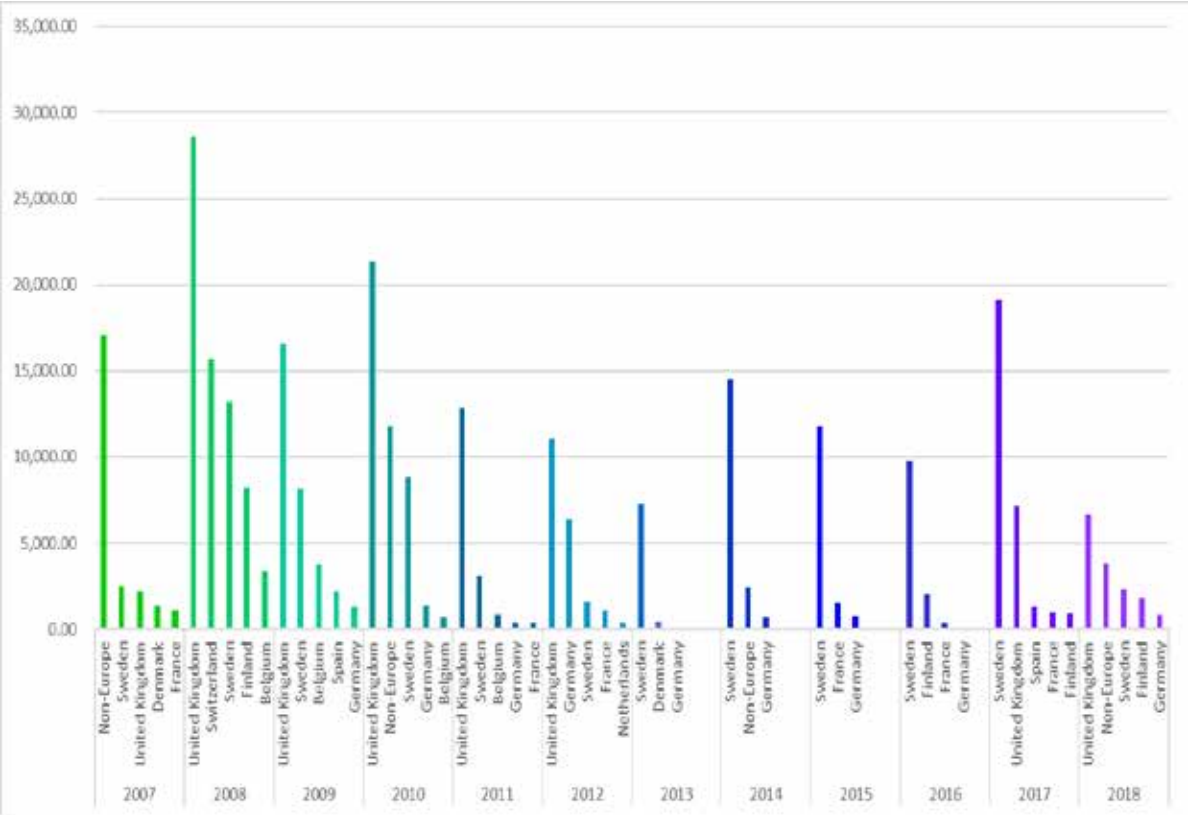


Table 7.3.3.8. **Geographical breakdown of flows from VC funds to Norwegian portfolio companies (EUR thousands)**

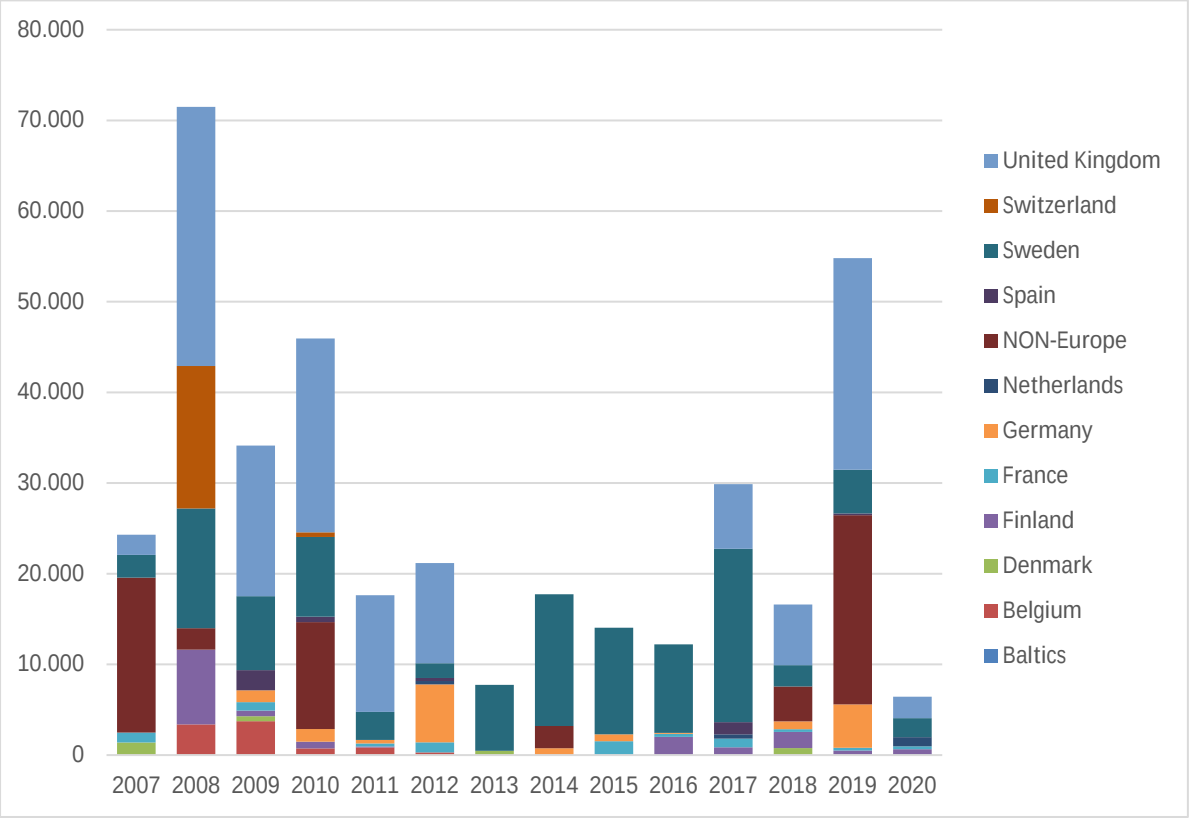
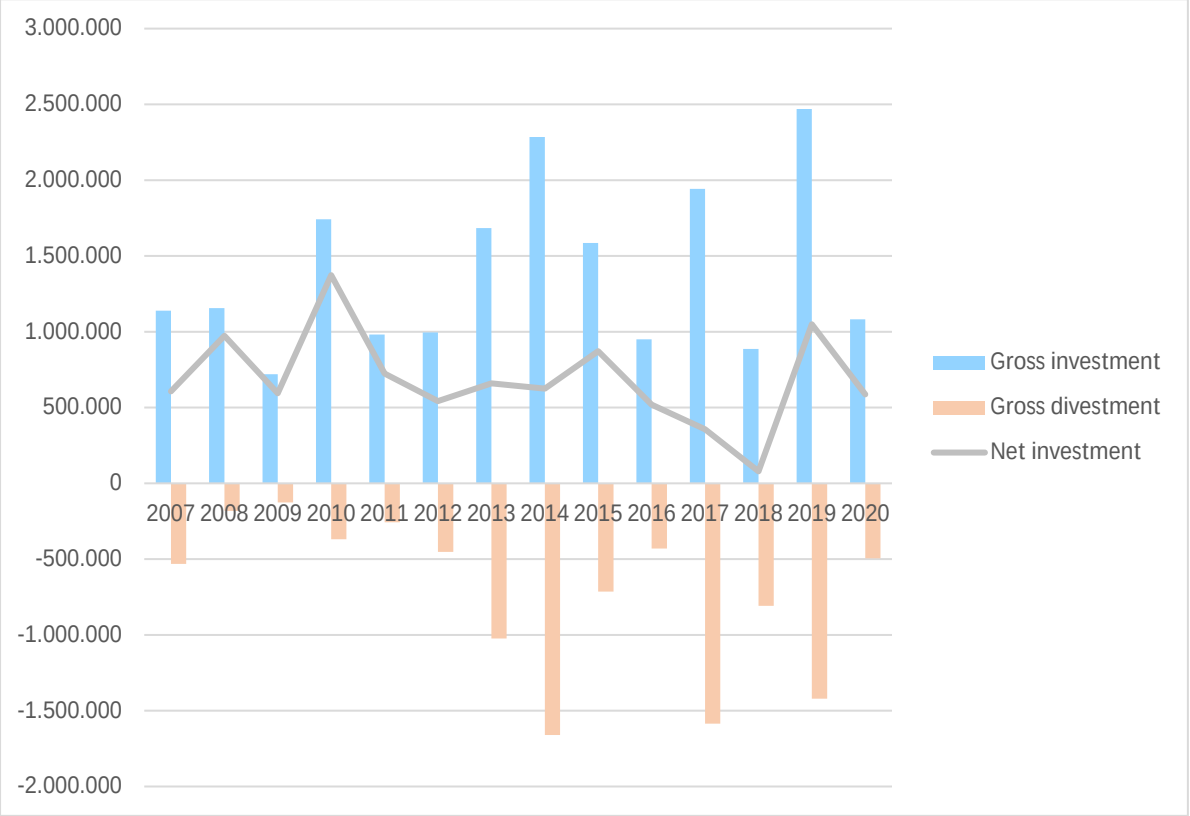


Table 7.3.3.9. **Investments and divestments of Norwegian PE funds (EUR thousands)**



7.3.4 Sweden

Table 7.3.4.1. **Flows raised by Swedish PE/VC funds (EUR million)**

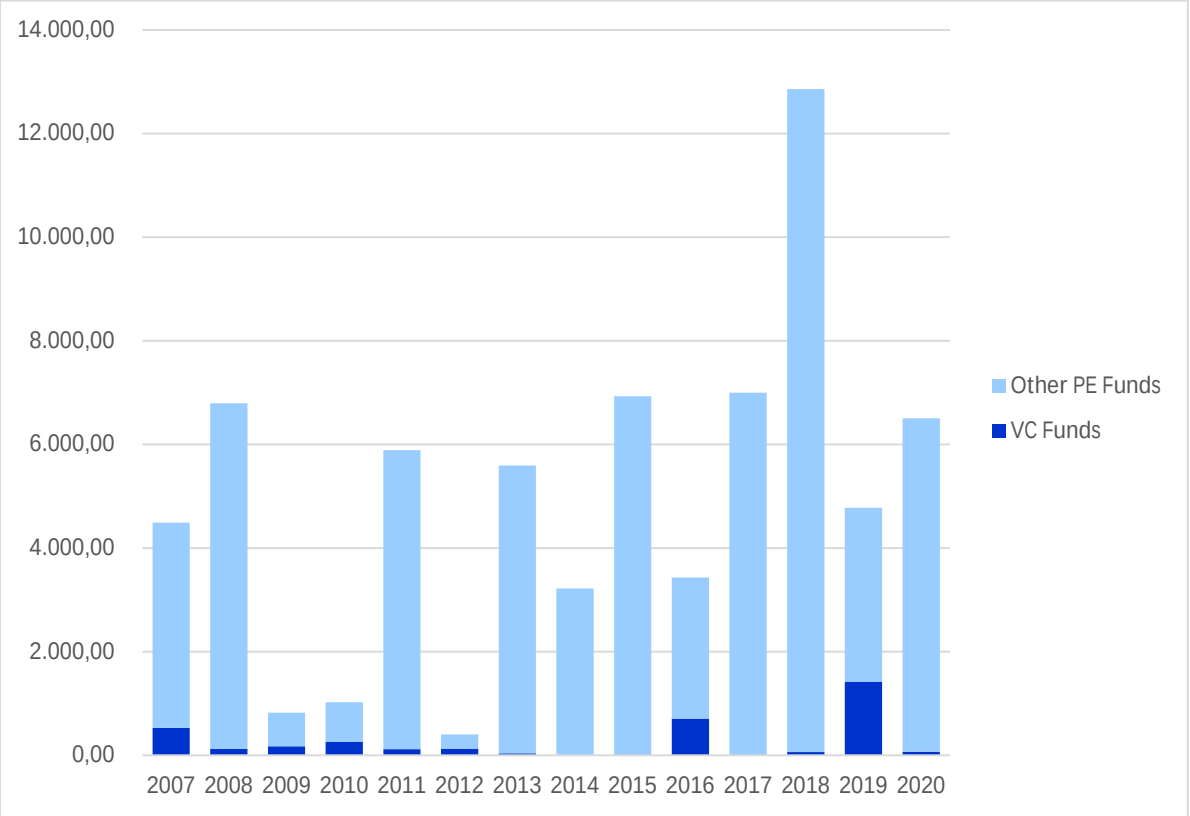
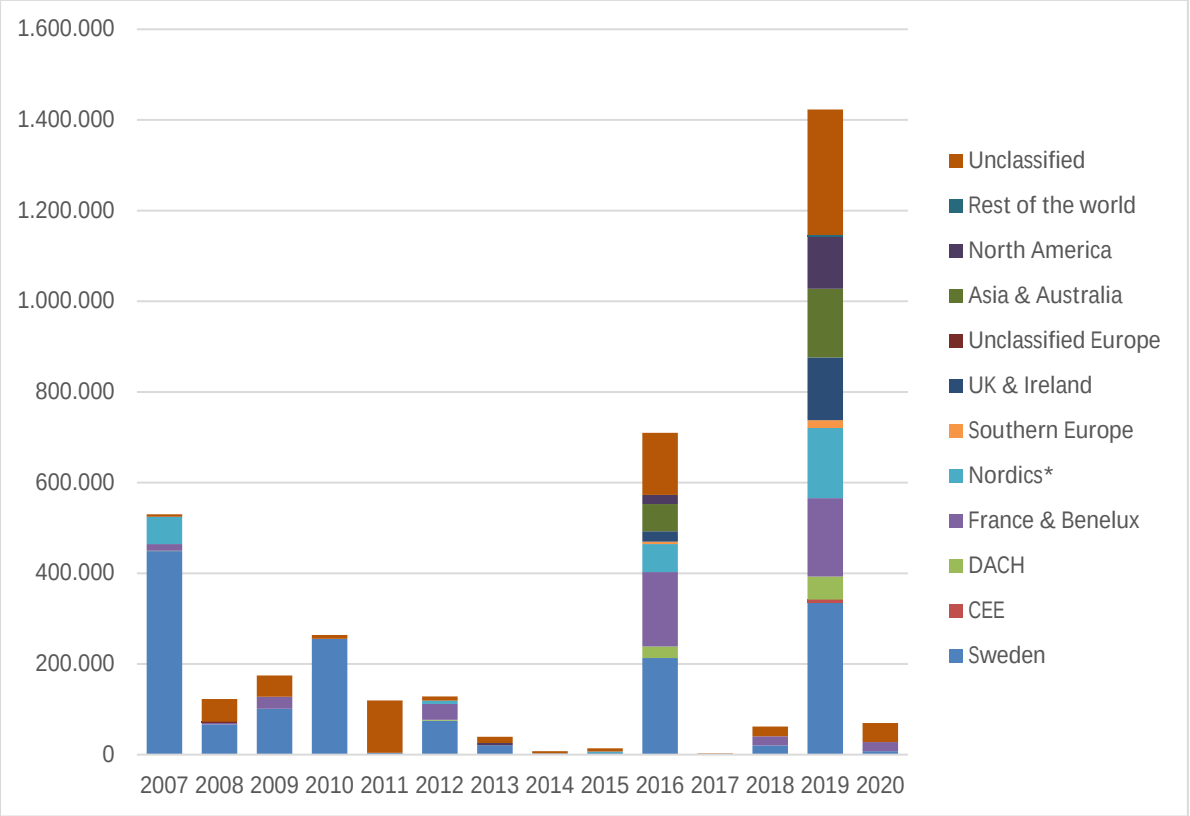


Table 7.3.4.2. **Geographical breakdown of Swedish VC fundraising (EUR thousands)**



Nordics* - excluding Sweden

Table 7.3.4.3. **Flows from Swedish PE/VC funds to portfolio companies (EUR million)**

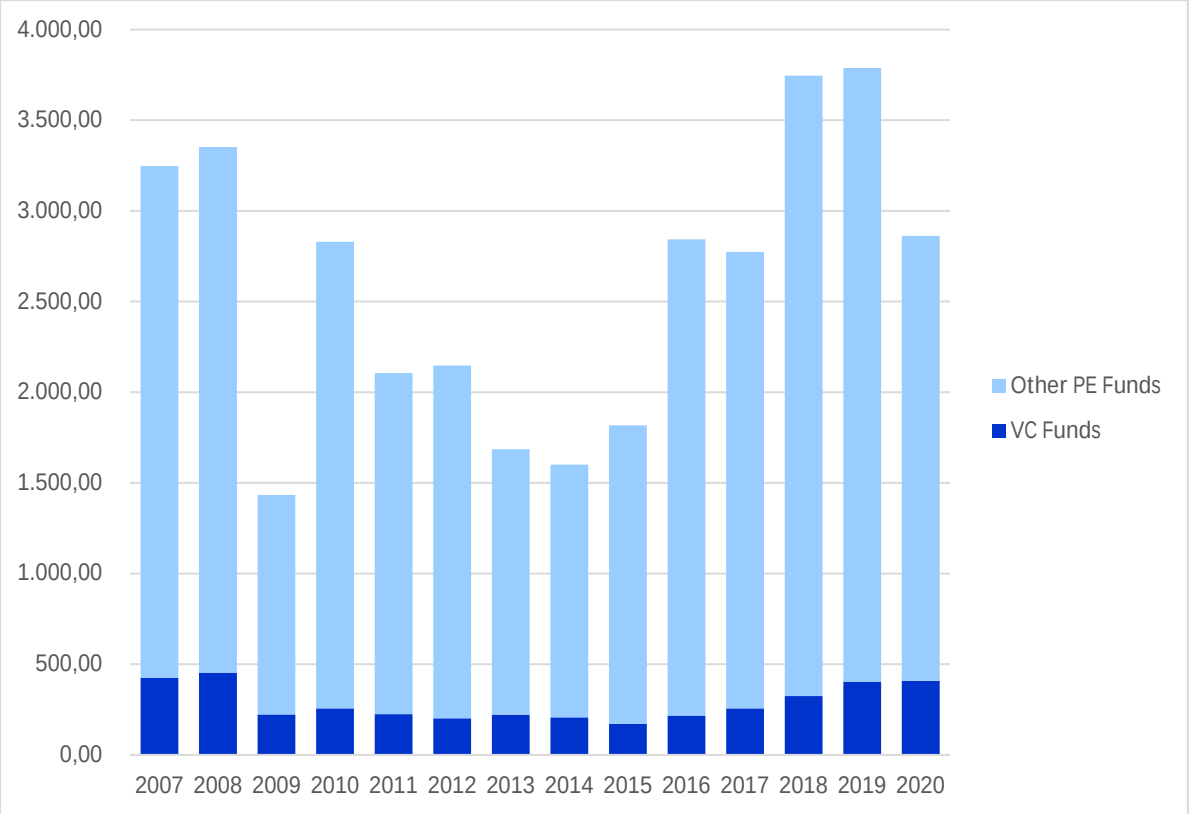


Table 7.3.4.4. **Top 5 foreign countries where Swedish VC funds have invested (EUR thousands)**

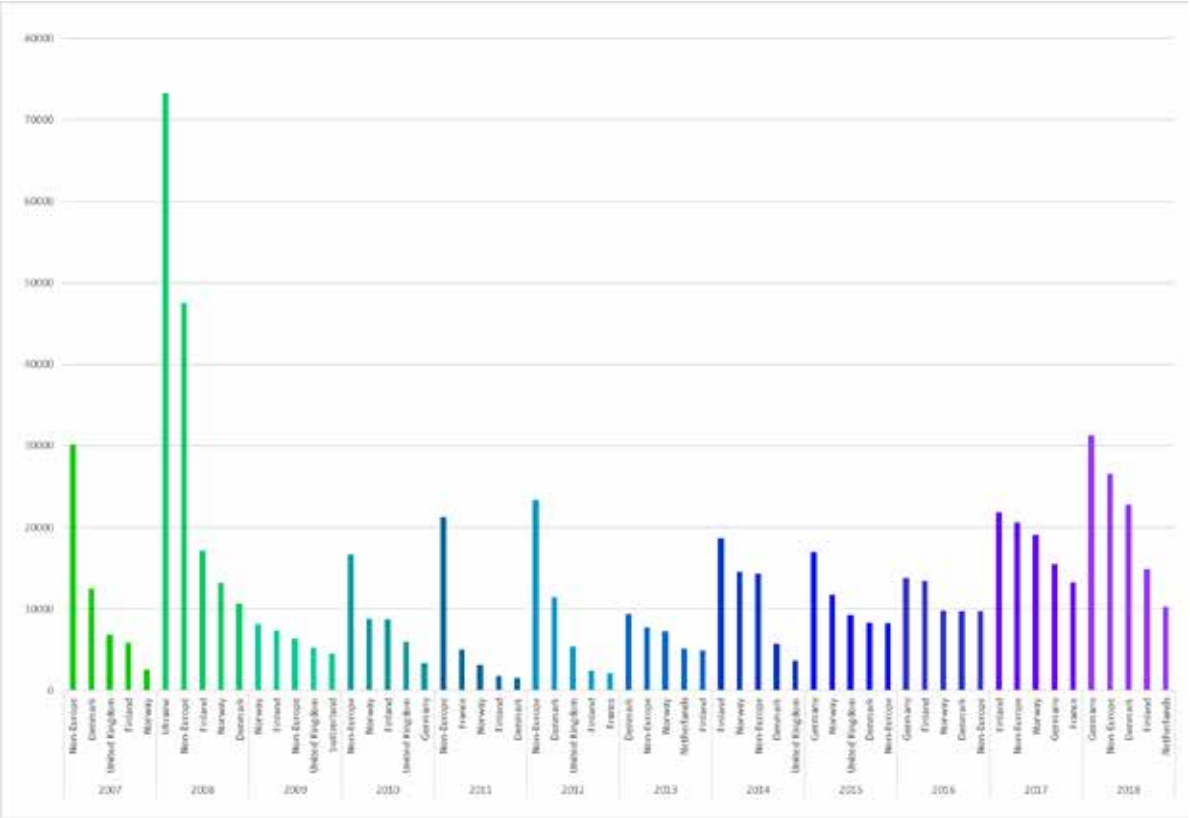
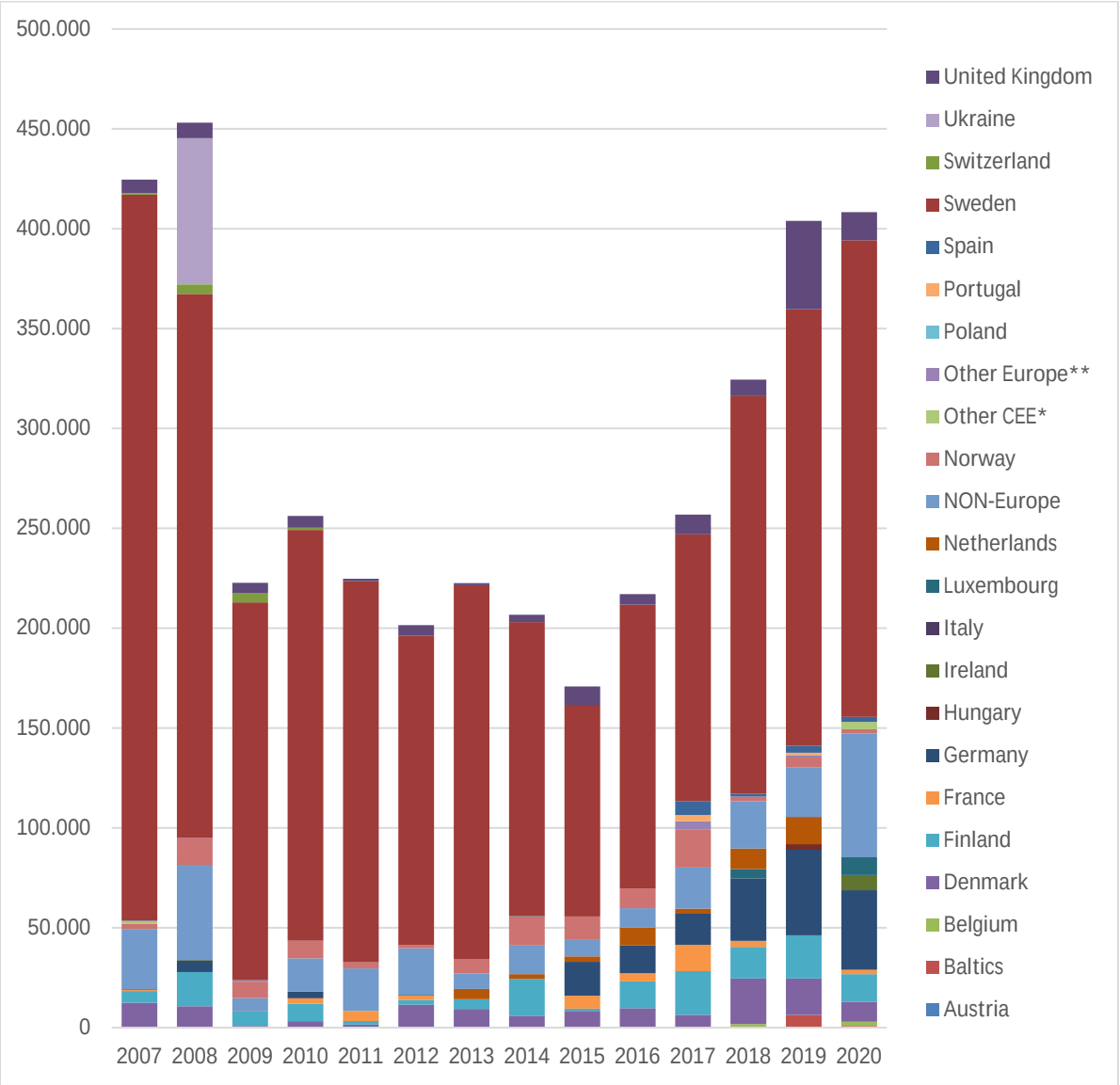


Table 7.3.4.5. **Geographical breakdown of flows from Swedish VC funds to portfolio companies** (EUR **thousands**)



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.3.4.6. **Flows from PE/VC funds to Swedish portfolio companies (EUR million)**

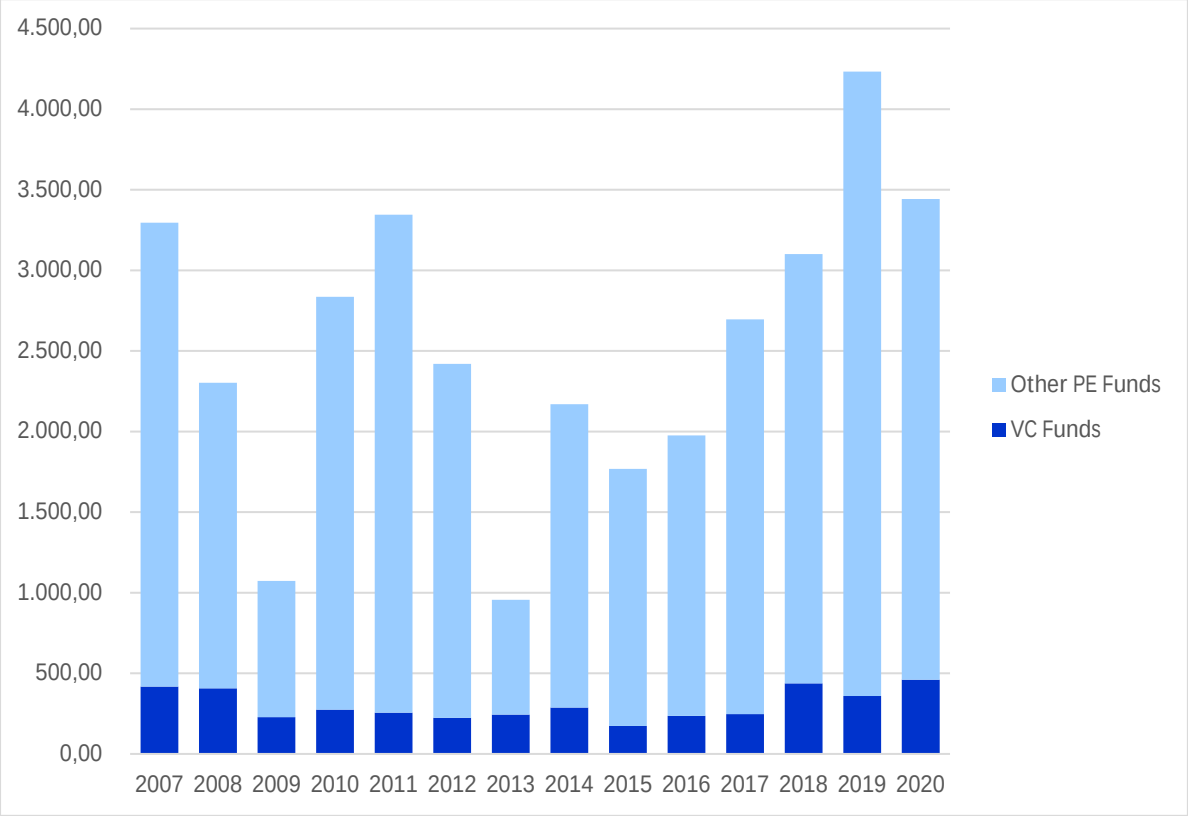


Table 7.3.4.7. **Top 5 foreign VC investors into Swedish portfolio companies (EUR thousands)**

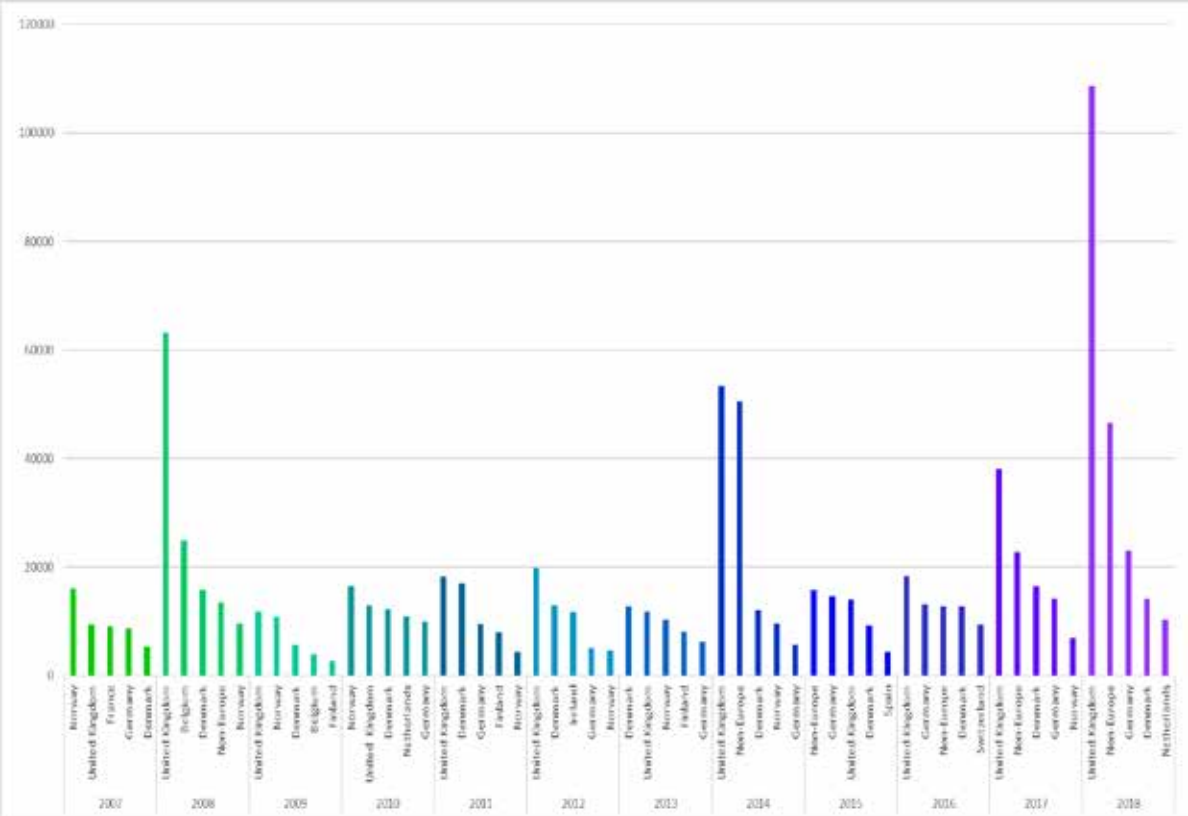
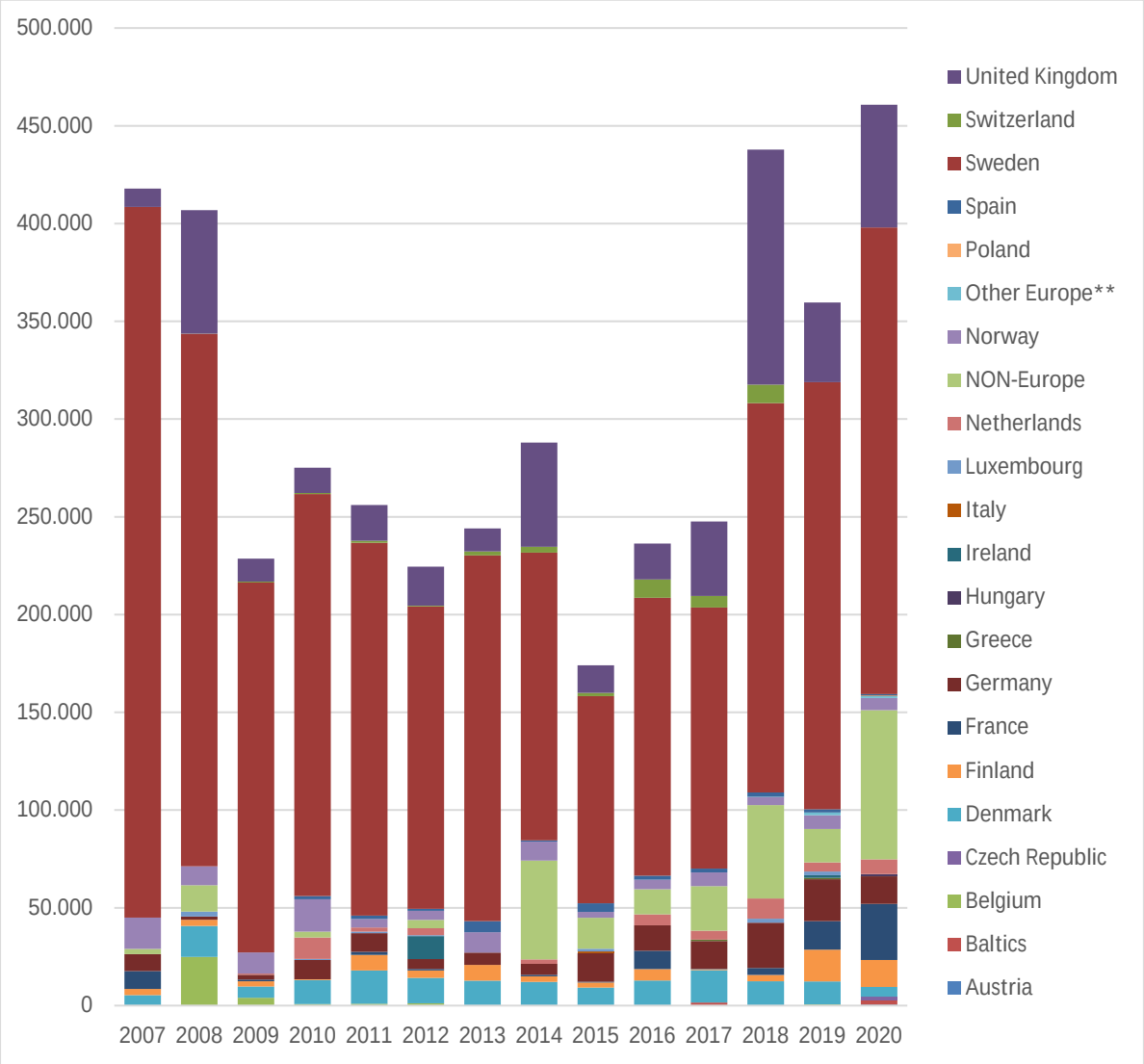
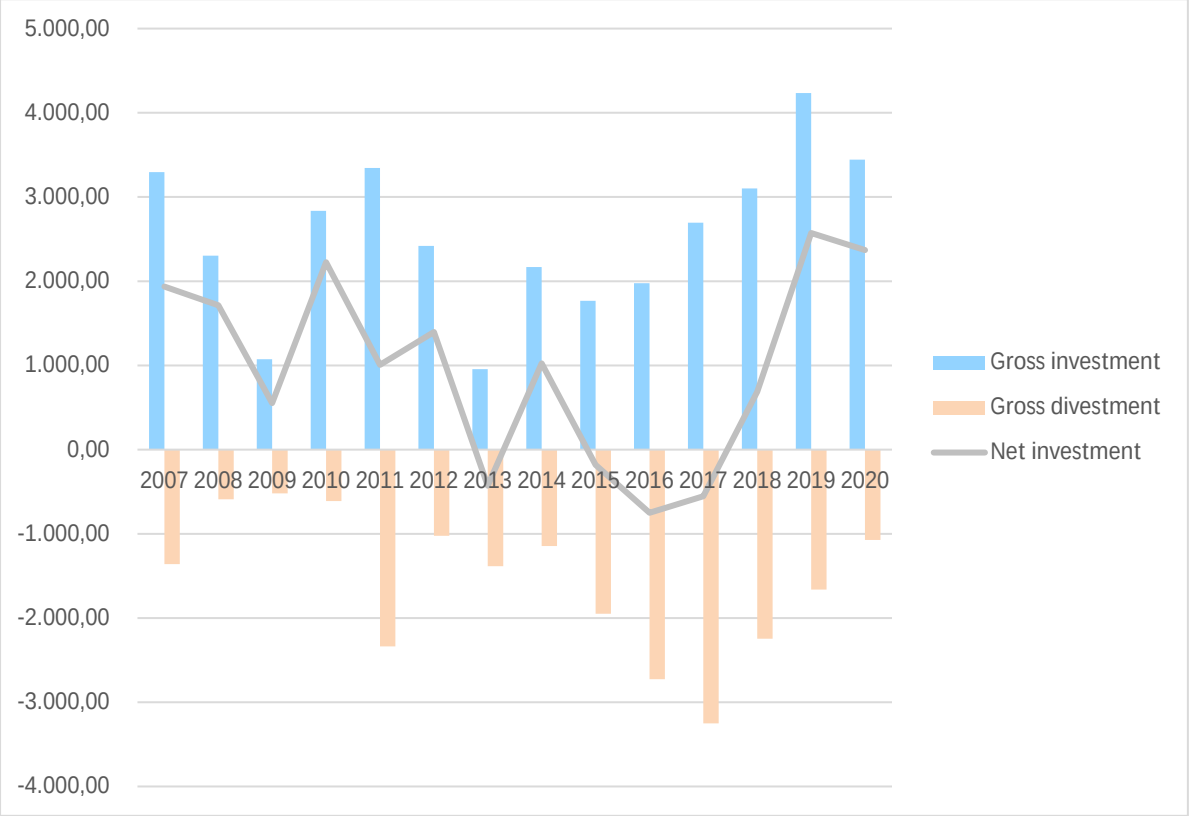


Table 7.3.4.8. **Geographical breakdown of flows from VC funds to Swedish portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.3.4.9. **Investments and divestments of Swedish PE funds (EUR million)**



7.4 FRANCE & BENELUX

7.4.1 Belgium

Table 7.4.1.1. **Flows raised by Belgian PE/VC funds (EUR million)**

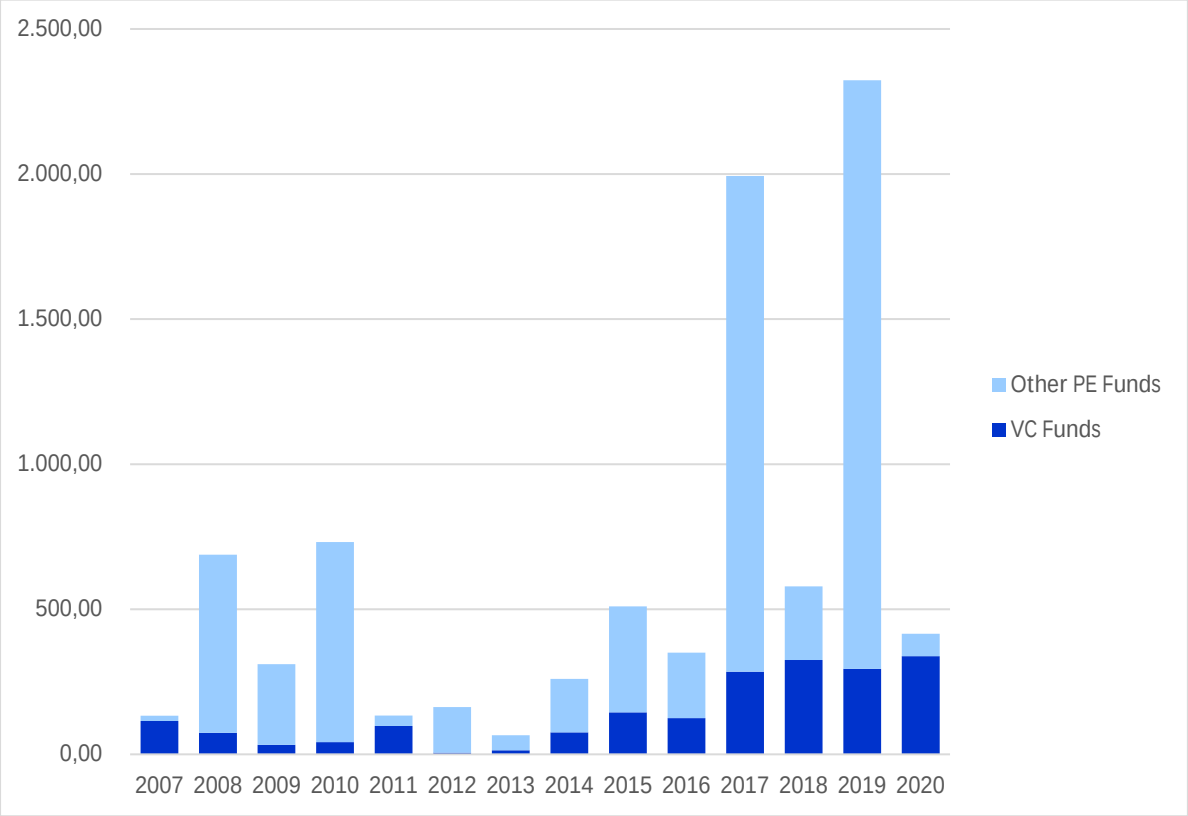
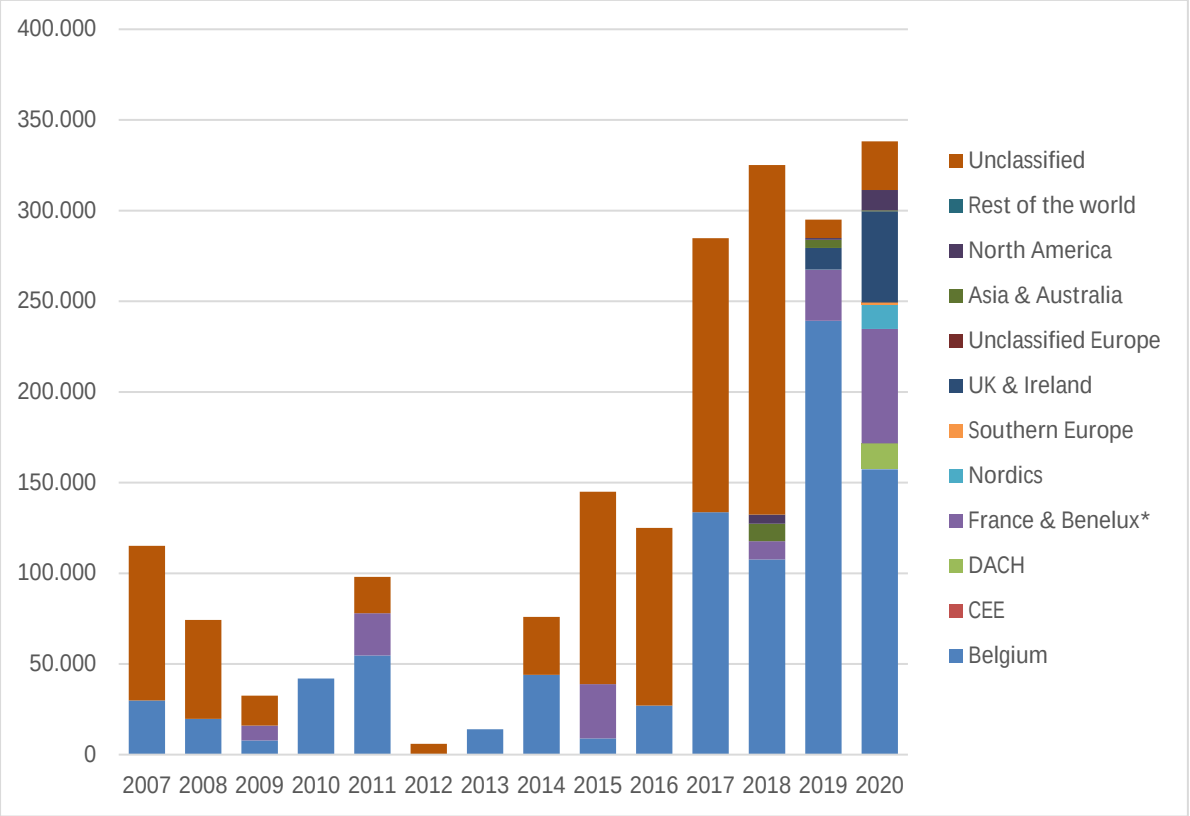


Table 7.4.1.2. **Geographical breakdown of Belgian VC fundraising (EUR thousands)**



France & Benelux* - excluding Belgium

Table 7.4.1.3. **Flows from Belgian PE/VC funds to portfolio companies (EUR million)**

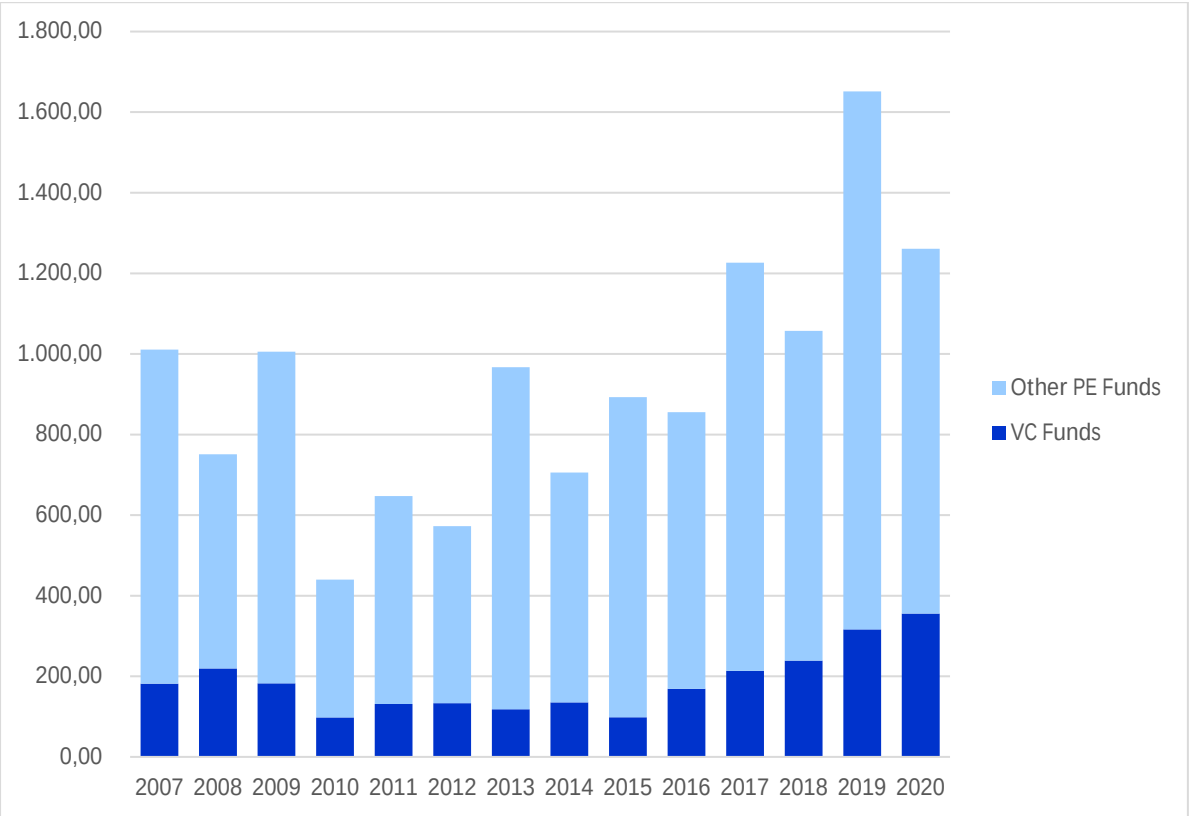


Table 7.4.1.4. **Top 5 foreign countries where Belgian VC funds have invested (EUR thousands)**

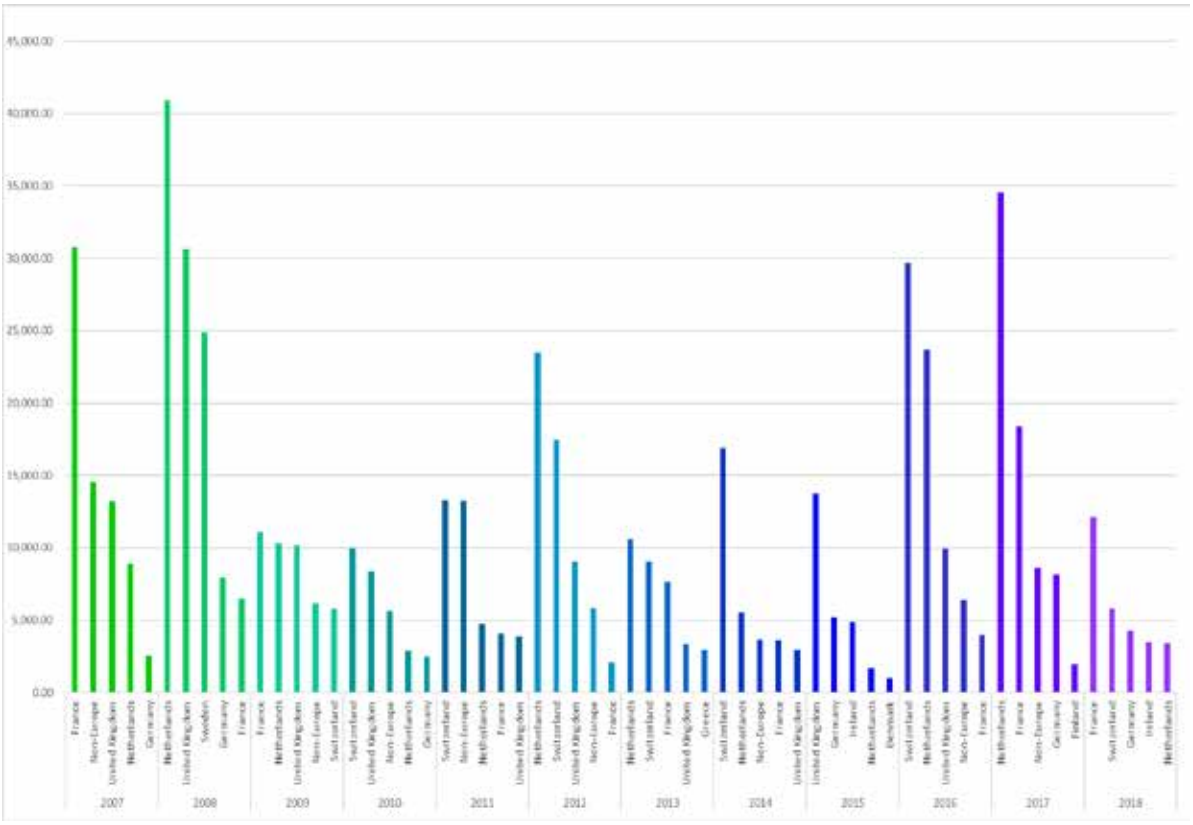
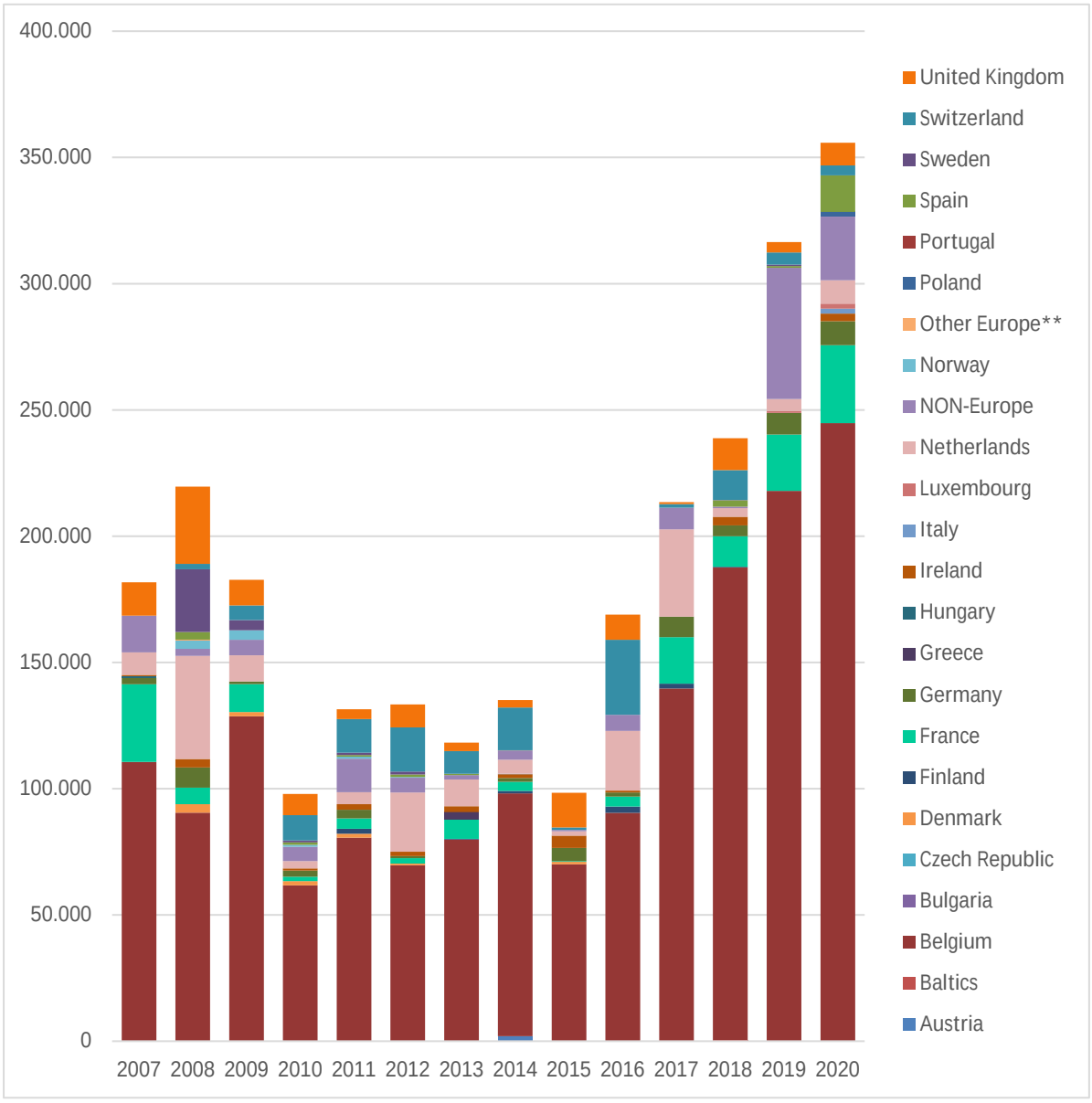


Table 7.4.1.5. **Geographical breakdown of flows from Belgian VC funds to portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.4.1.6. **Flows from PE/VC funds to Belgian portfolio companies (EUR million)**

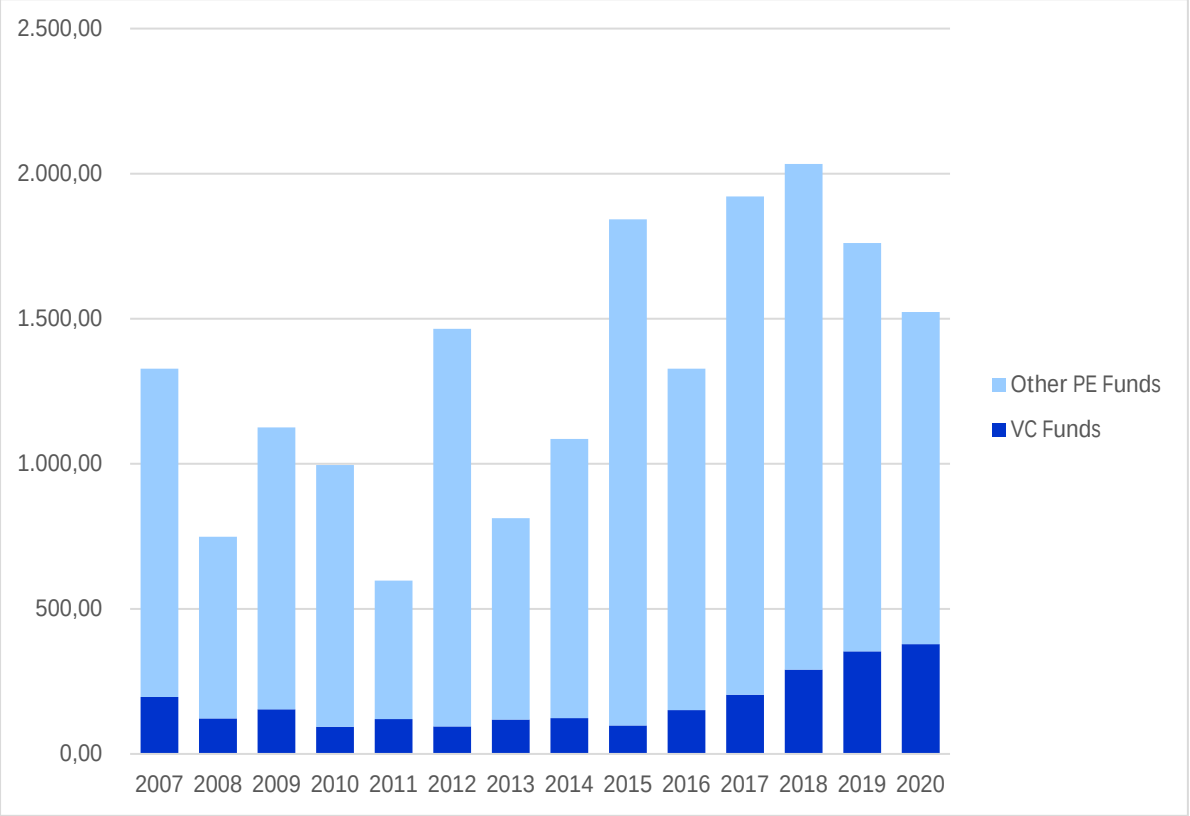


Table 7.4.1.7. **Top 5 foreign VC investors into Belgian portfolio companies (EUR thousands)**

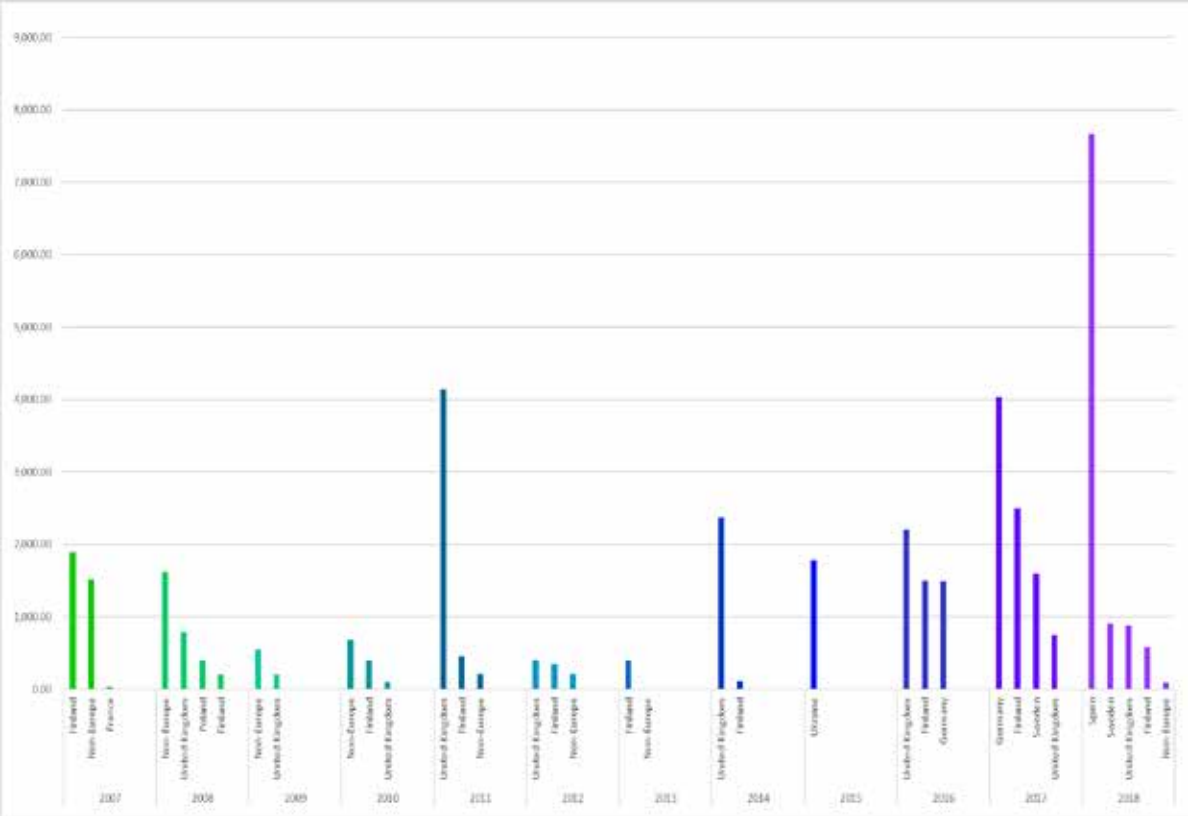


Table 7.4.1.8. **Geographical breakdown of flows from VC funds to Belgian portfolio companies (EUR thousands)**

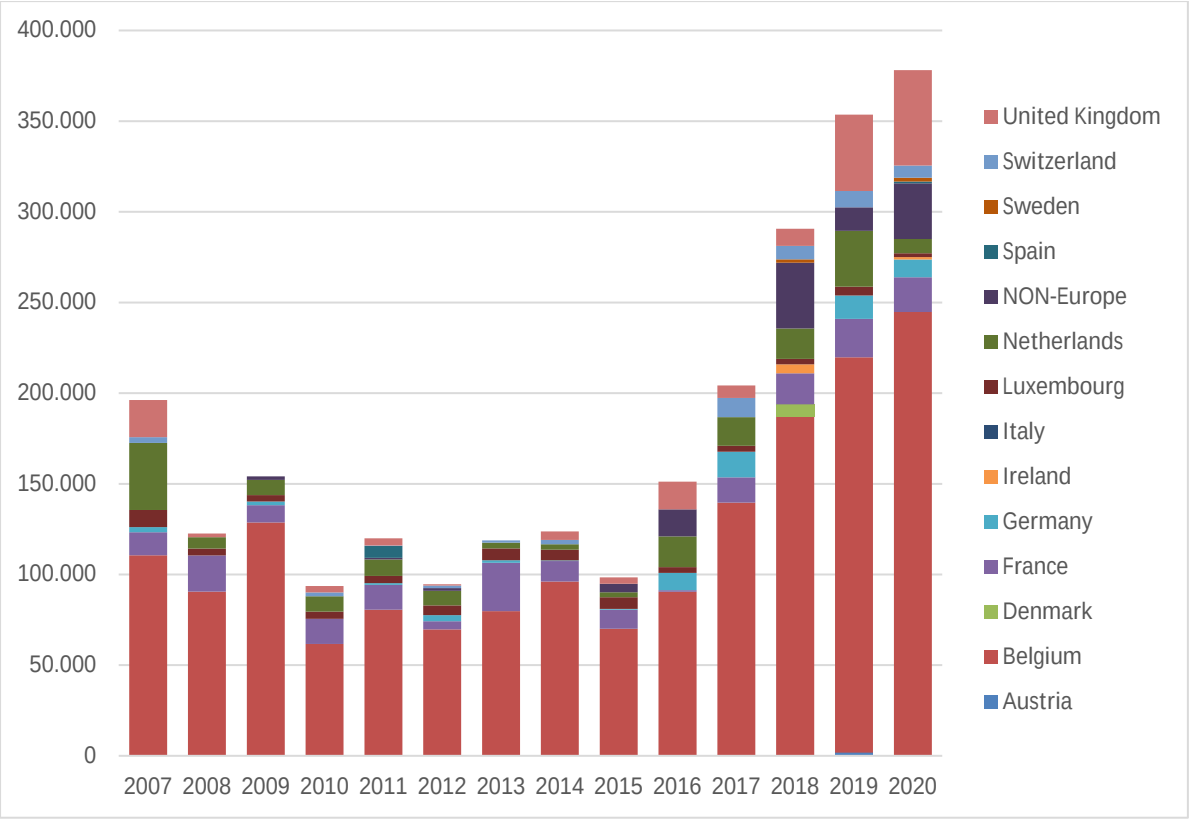
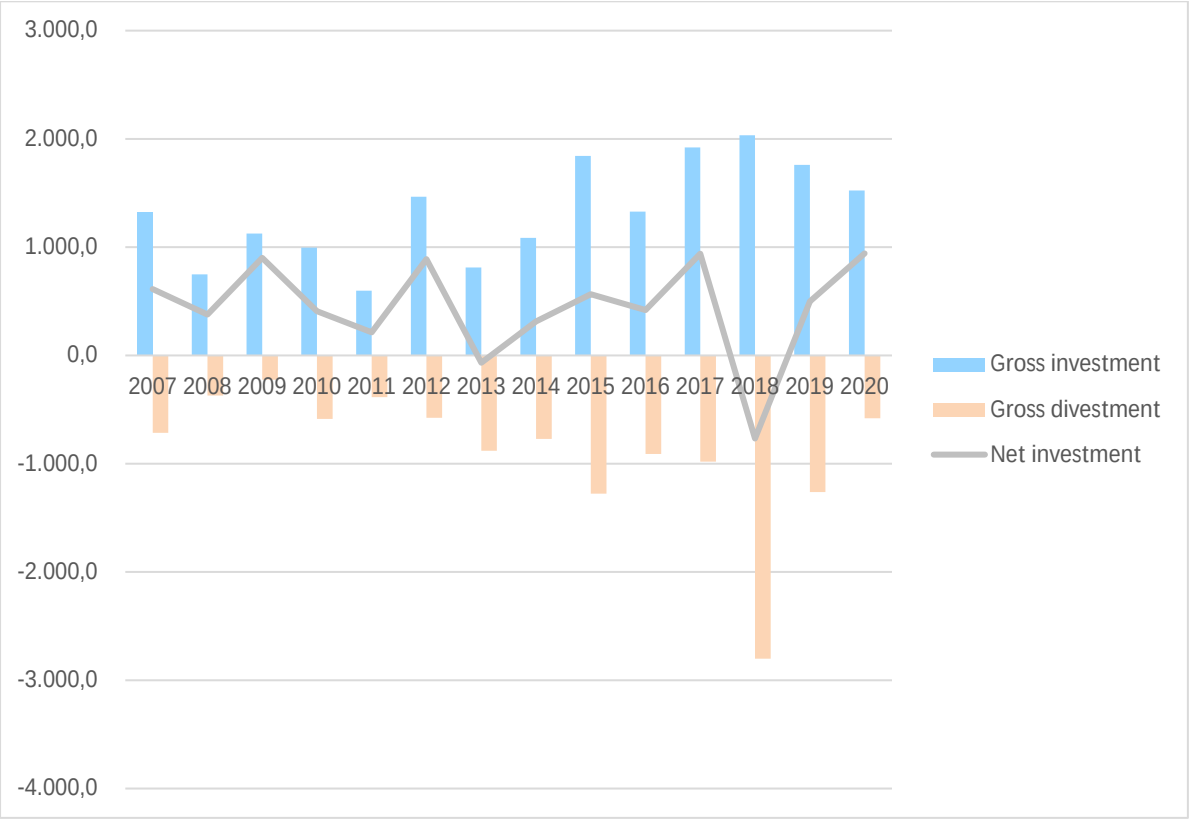


Table 7.4.1.9. **Investments and divestments of Belgian PE funds (EUR million)**



7.4.2 France

Table 7.4.2.1. **Flows raised by French PE/VC funds (EUR million)**

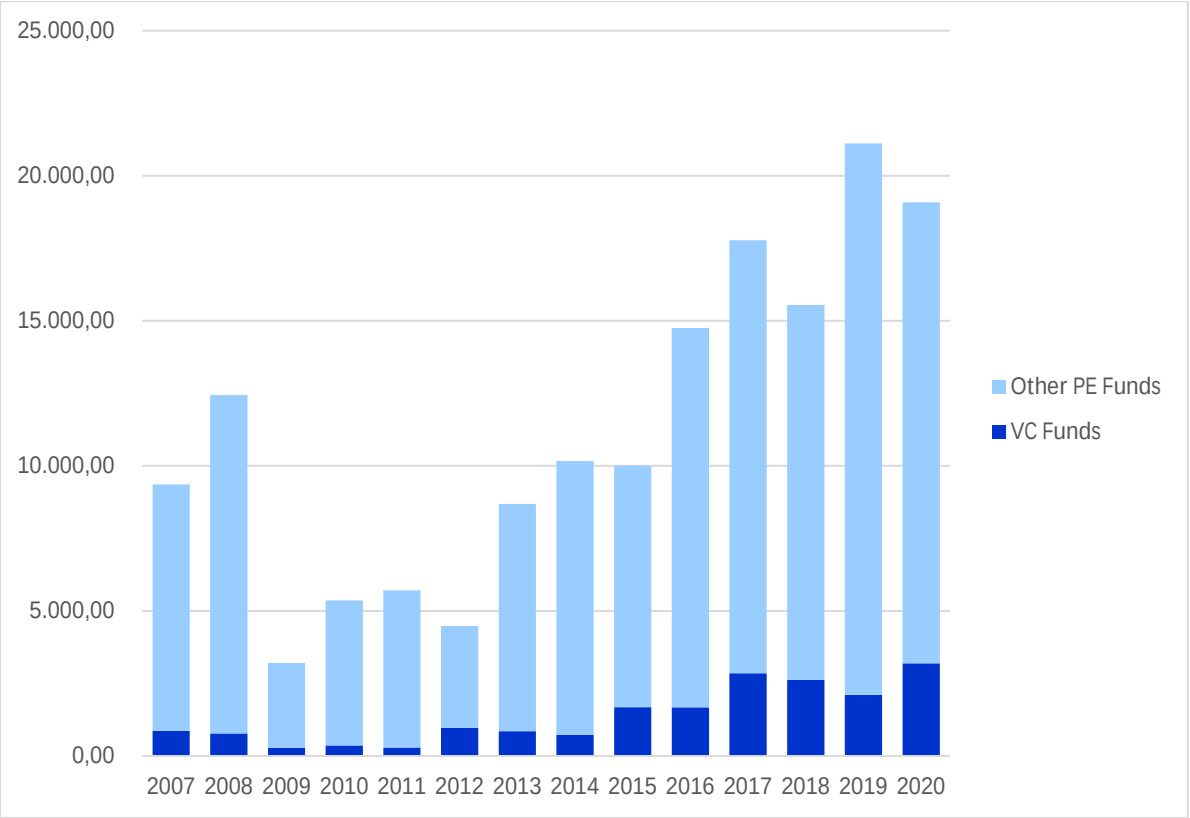
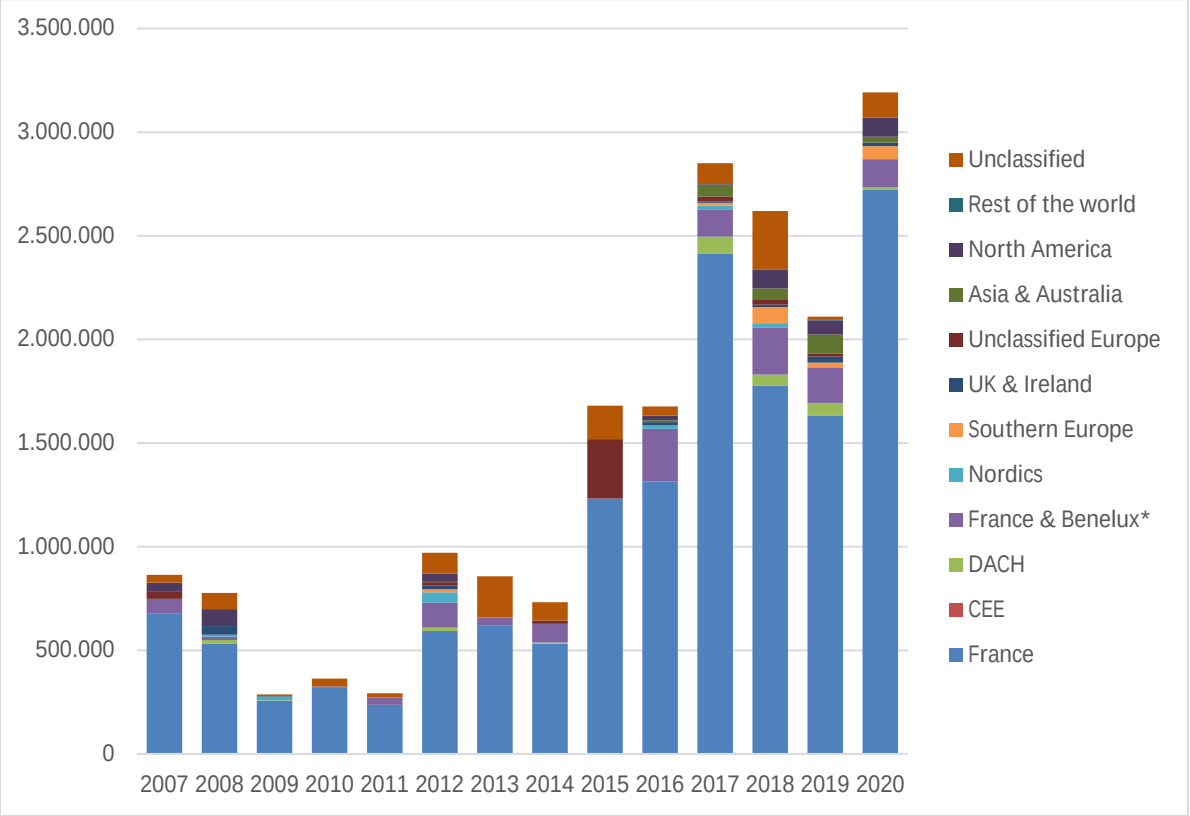


Table 7.4.2.2. **Geographical breakdown of French VC fundraising (EUR thousands)**



France & Benelux* - excluding France

Table 7.4.2.3. **Flows from French PE/VC funds to portfolio companies (EUR million)**

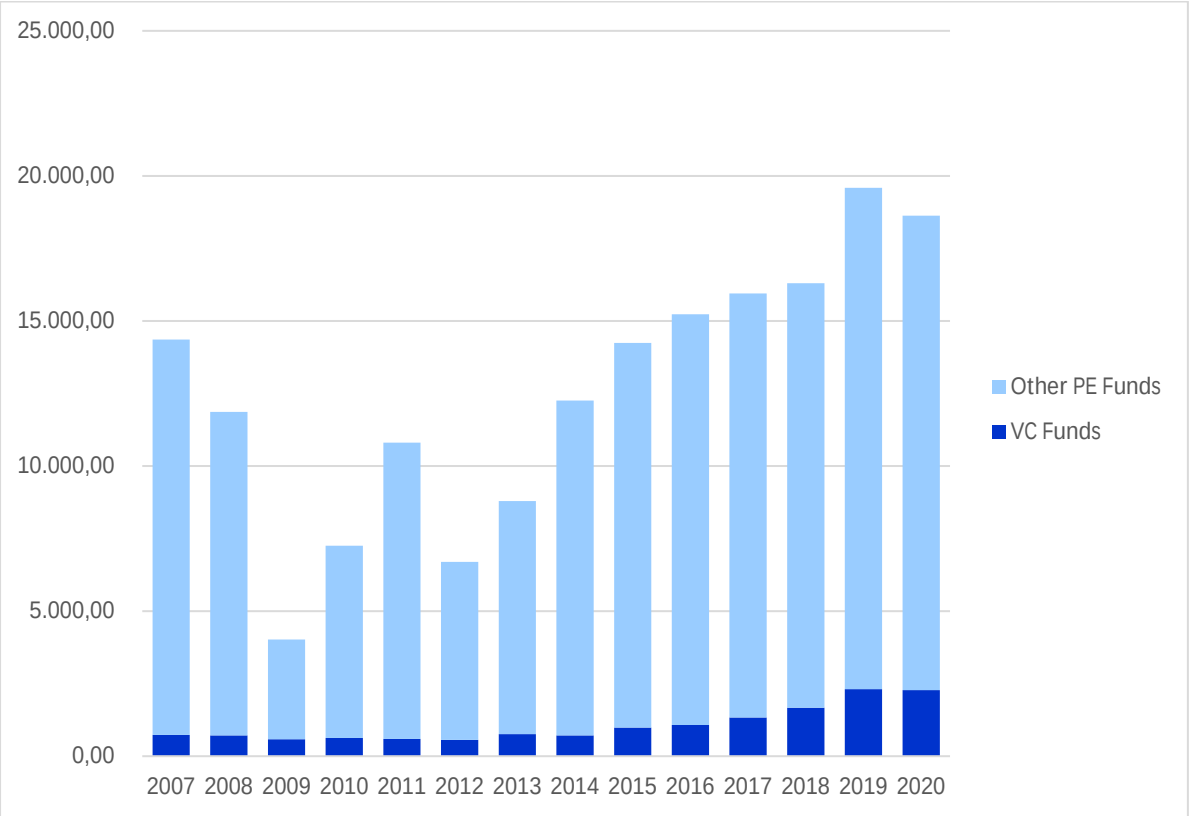


Table 7.4.2.4. **Top 5 foreign countries where French VC funds have invested (EUR thousands)**

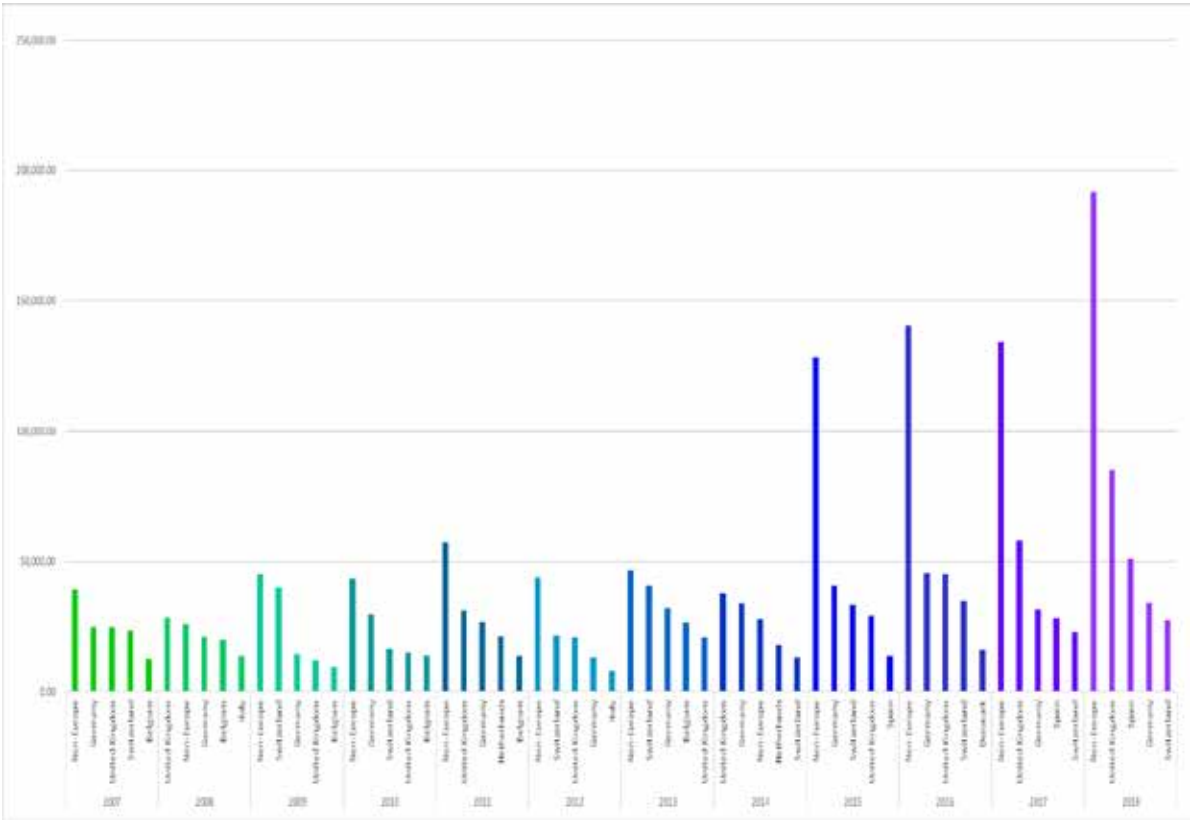
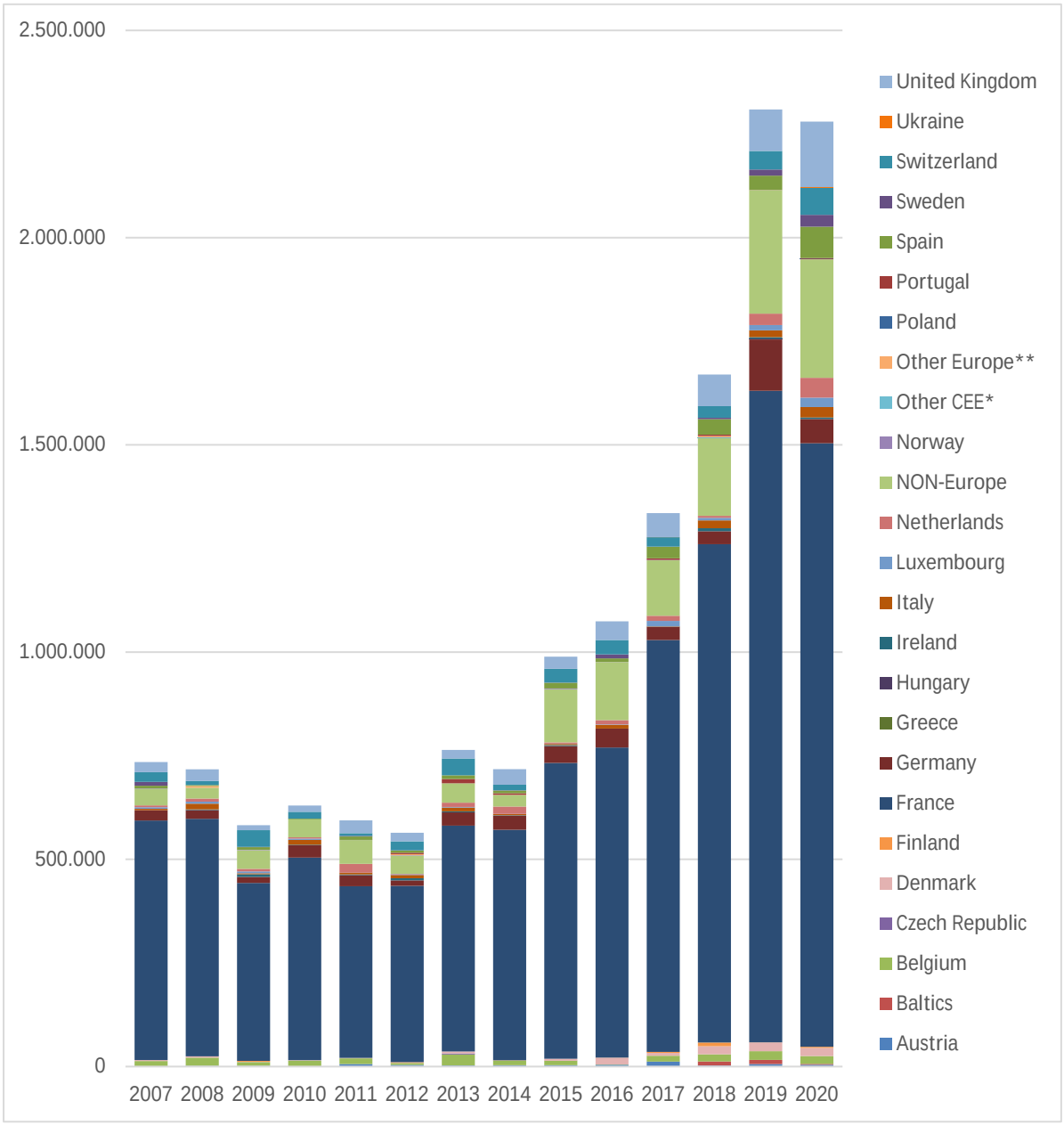


Table 7.4.2.5. **Geographical breakdown of flows from French VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.4.2.6. **Flows from PE/VC funds to French portfolio companies (EUR million)**

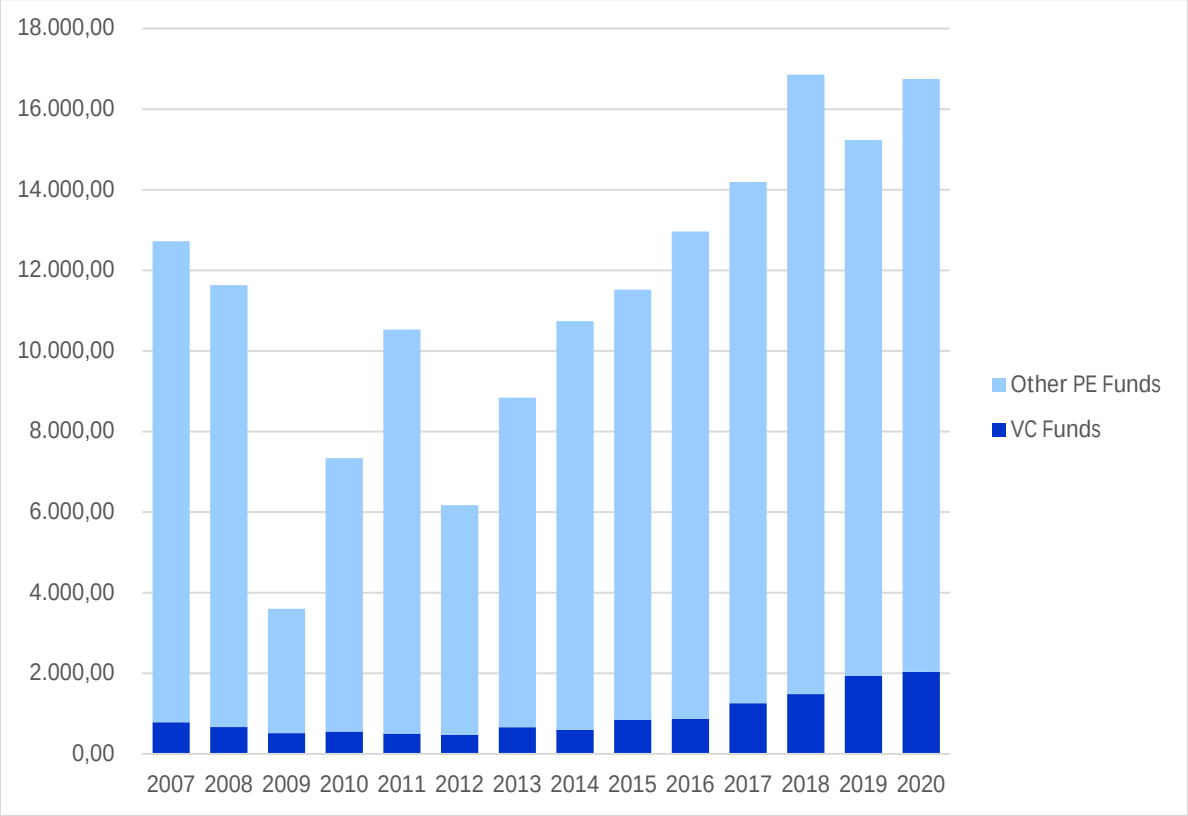


Table 7.4.2.7. **Top 5 foreign VC investors into French portfolio companies (EUR thousands)**

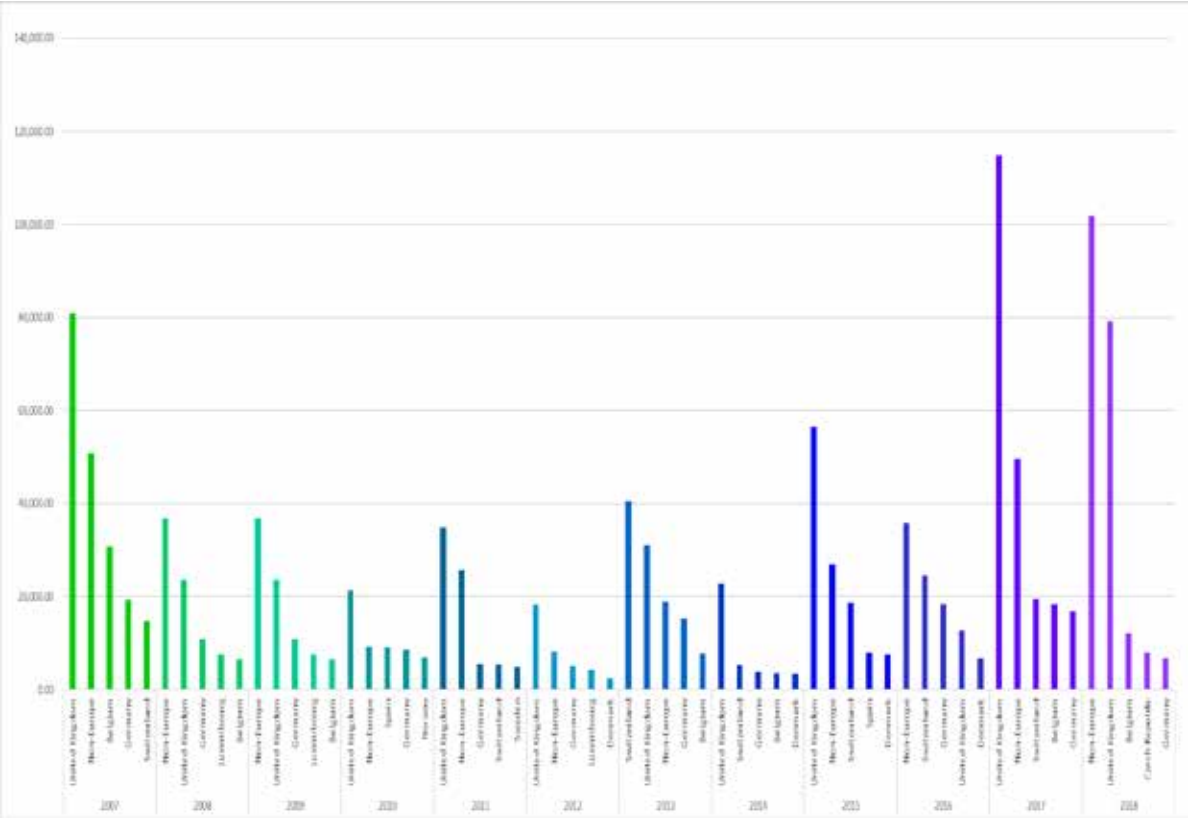


Table 7.4.2.8. **Geographical breakdown of flows from VC funds to French portfolio companies (EUR thousands)**

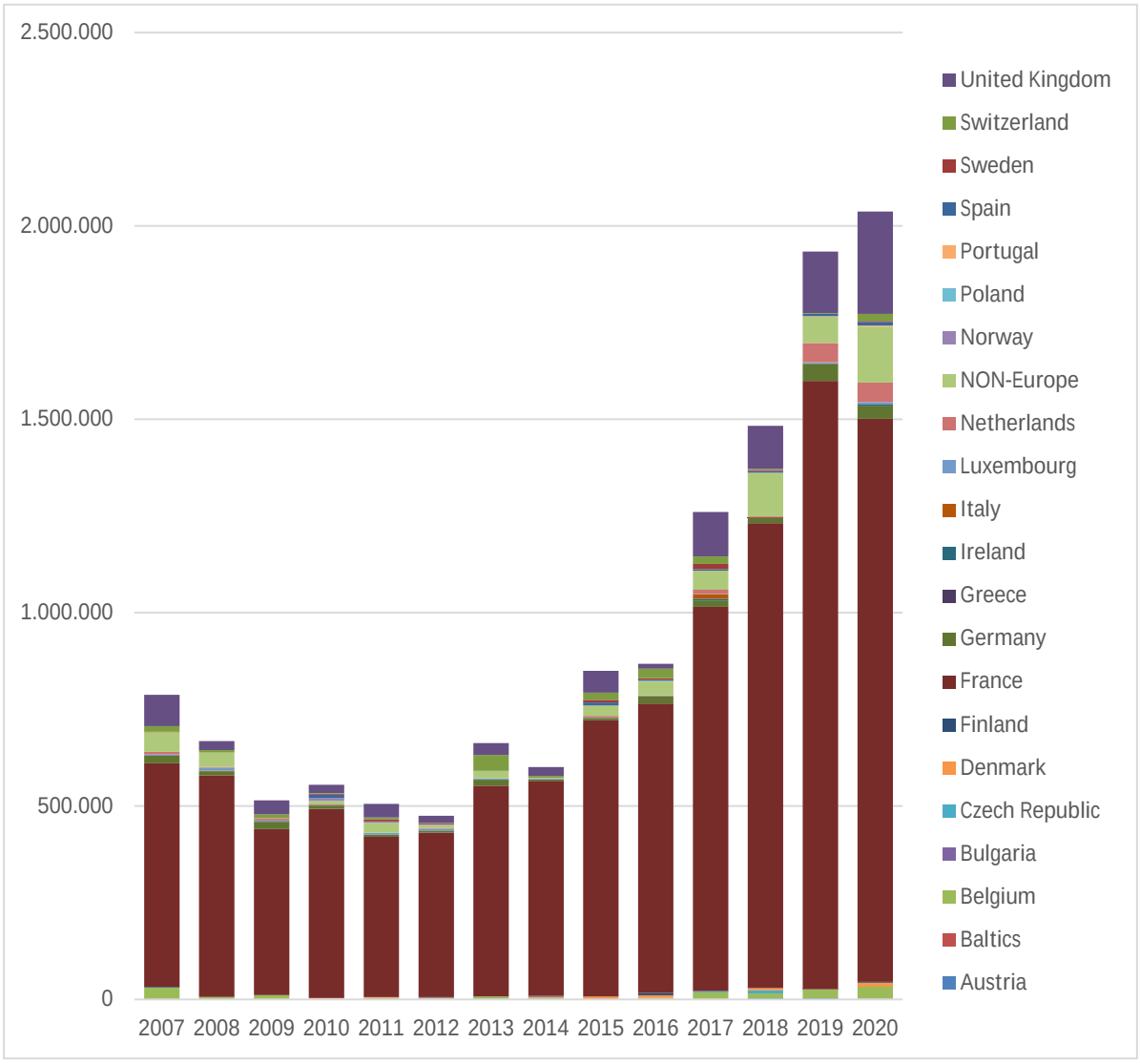
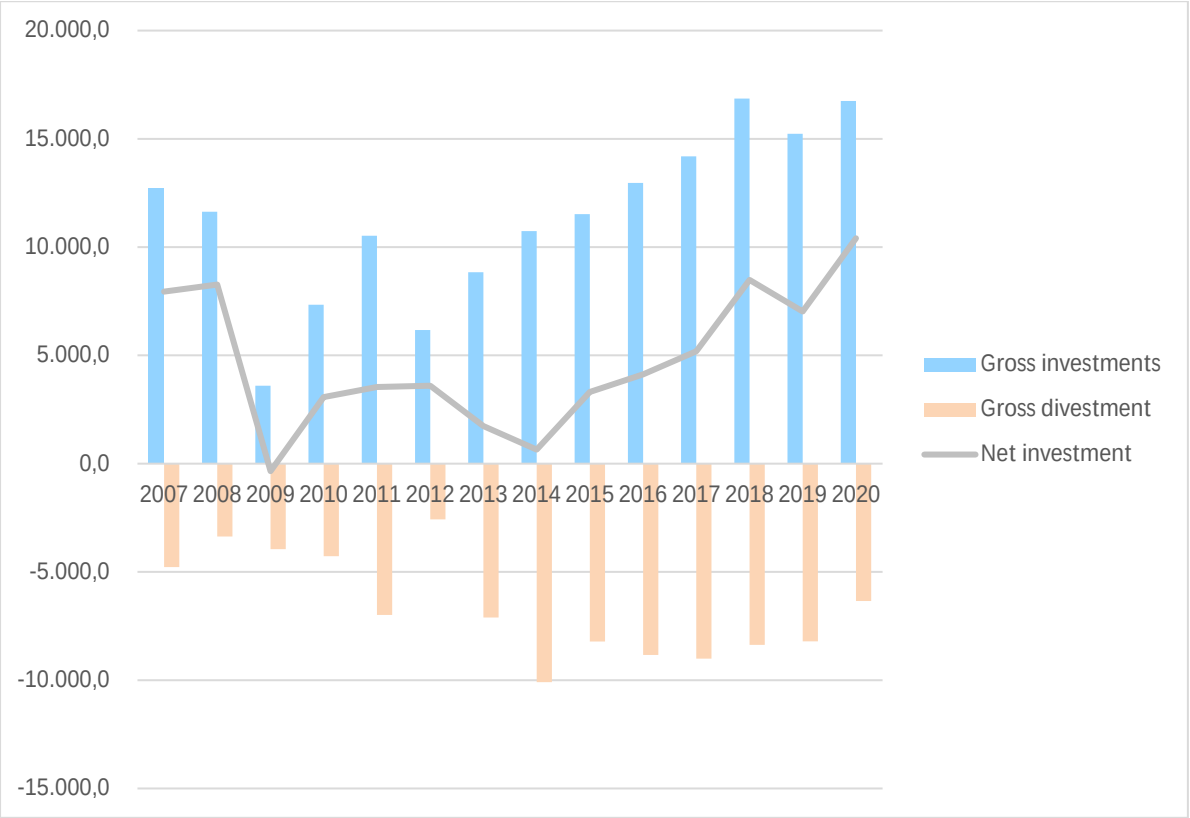


Table 7.4.2.9. **Investments and divestments of French PE funds (EUR million)**



7.4.3 Luxembourg

Table 7.4.3.1. **Flows raised by Luxembourgish PE/VC funds (EUR million)**

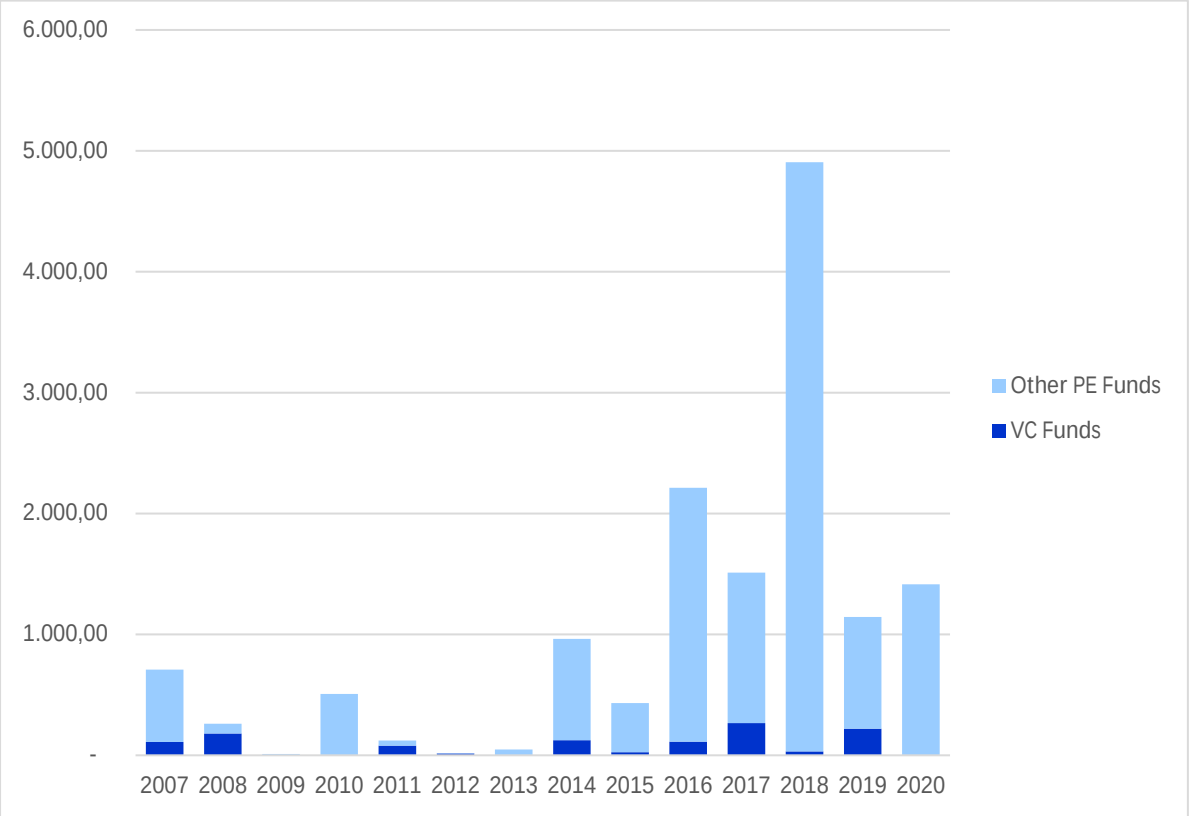
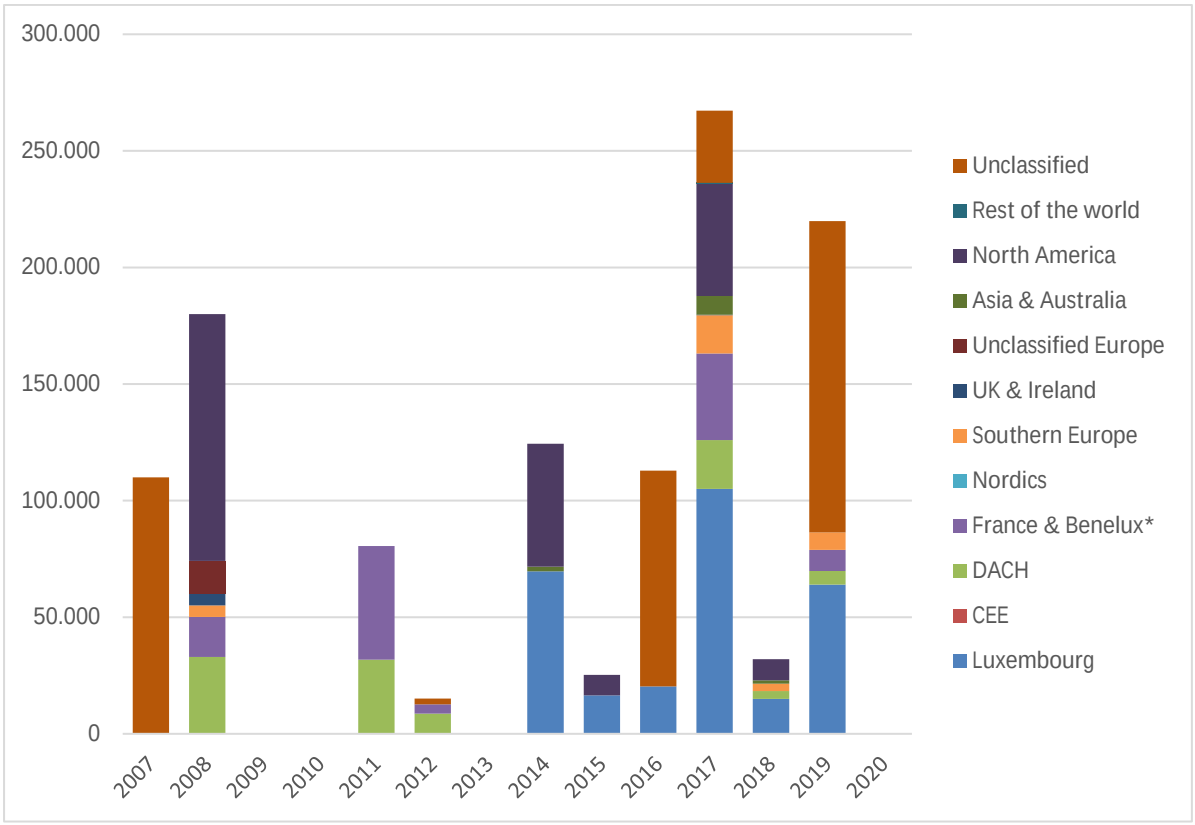


Table 7.4.3.2. **Geographical breakdown of Luxembourgish VC fundraising (EUR thousands)**



France & Benelux* - excluding Luxembourg

Table 7.4.3.3. **Flows from Luxembourgish PE/VC funds to portfolio companies (EUR million)**

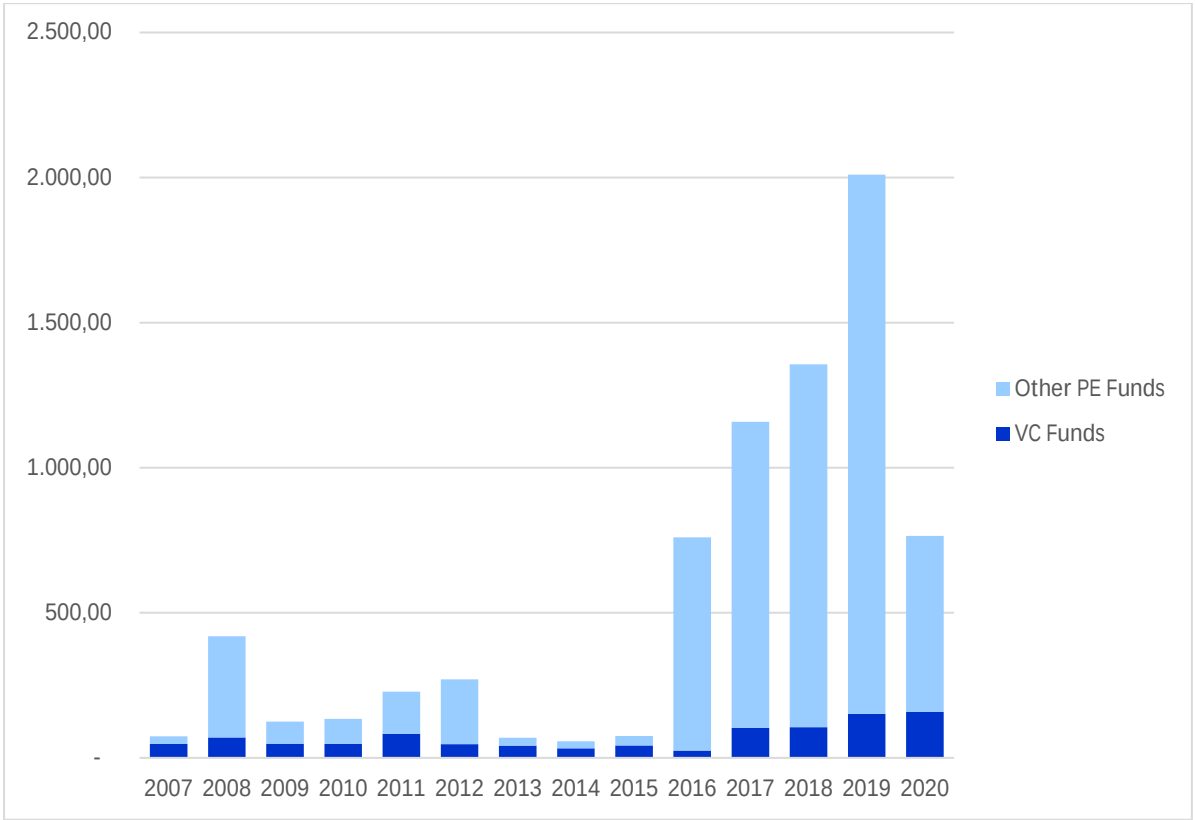


Table 7.4.3.4. **Top 5 foreign countries where Luxembourgish VC funds have invested (EUR thousands)**

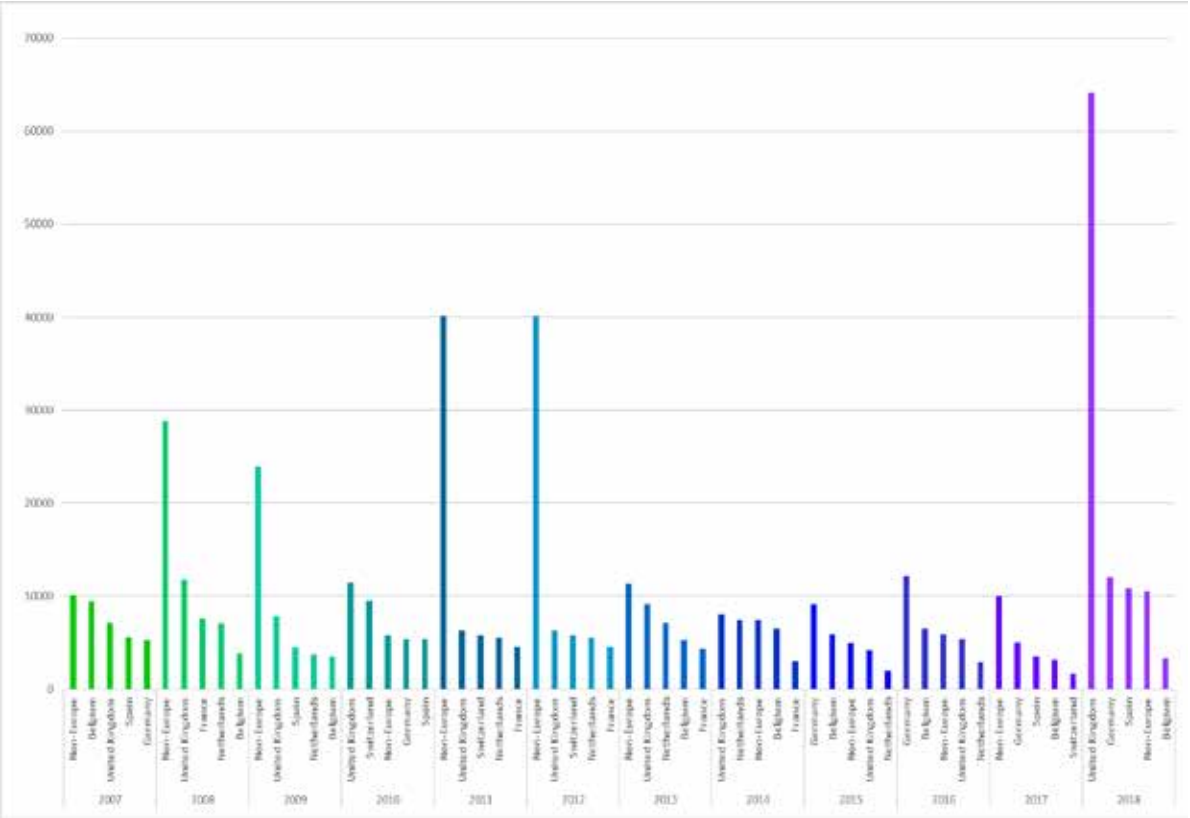
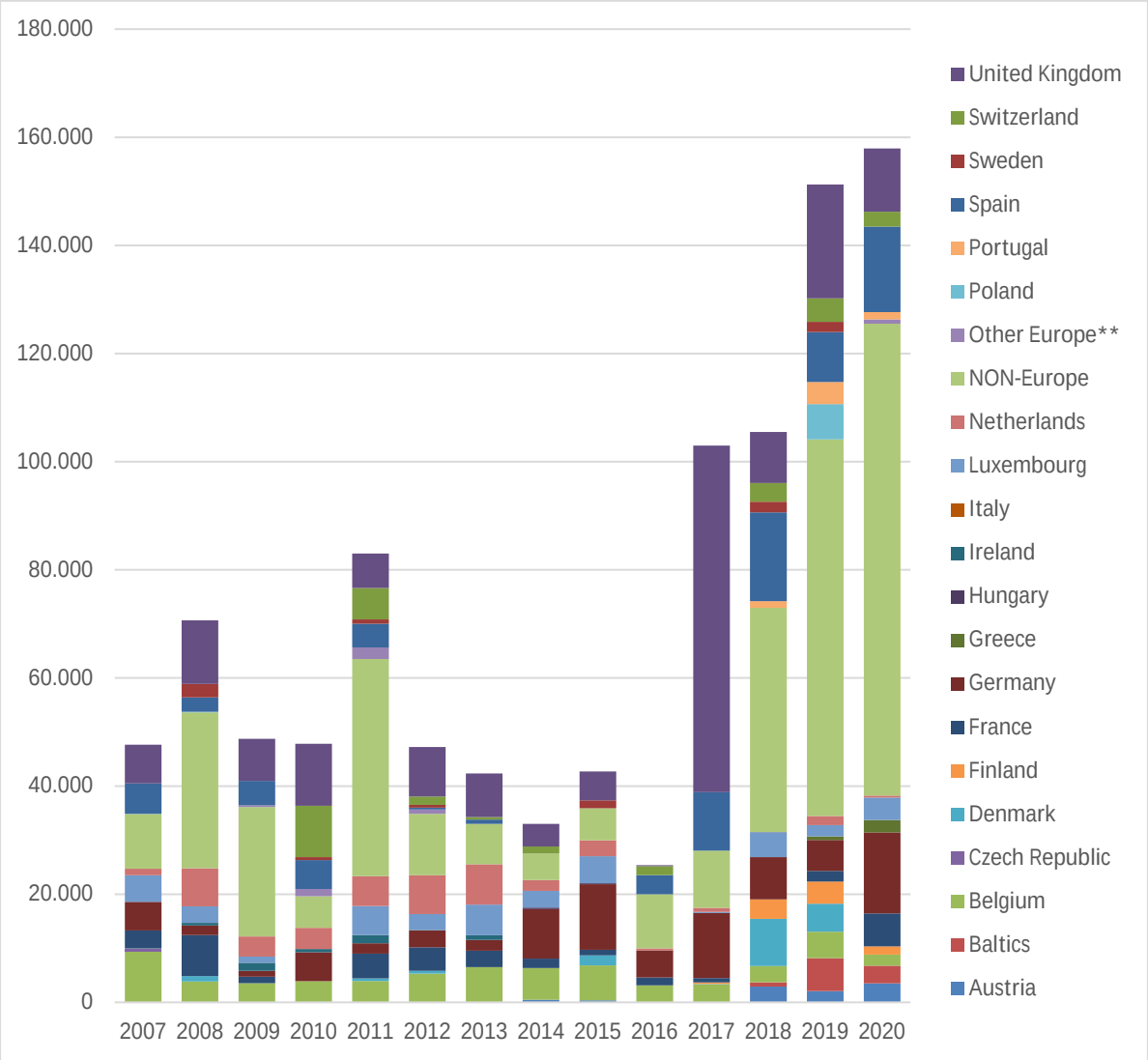


Table 7.4.3.5. **Geographical breakdown of flows from Luxembourgish VC funds to portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.4.3.6 **Flows from PE/VC funds to Luxembourgish portfolio companies (EUR million)**

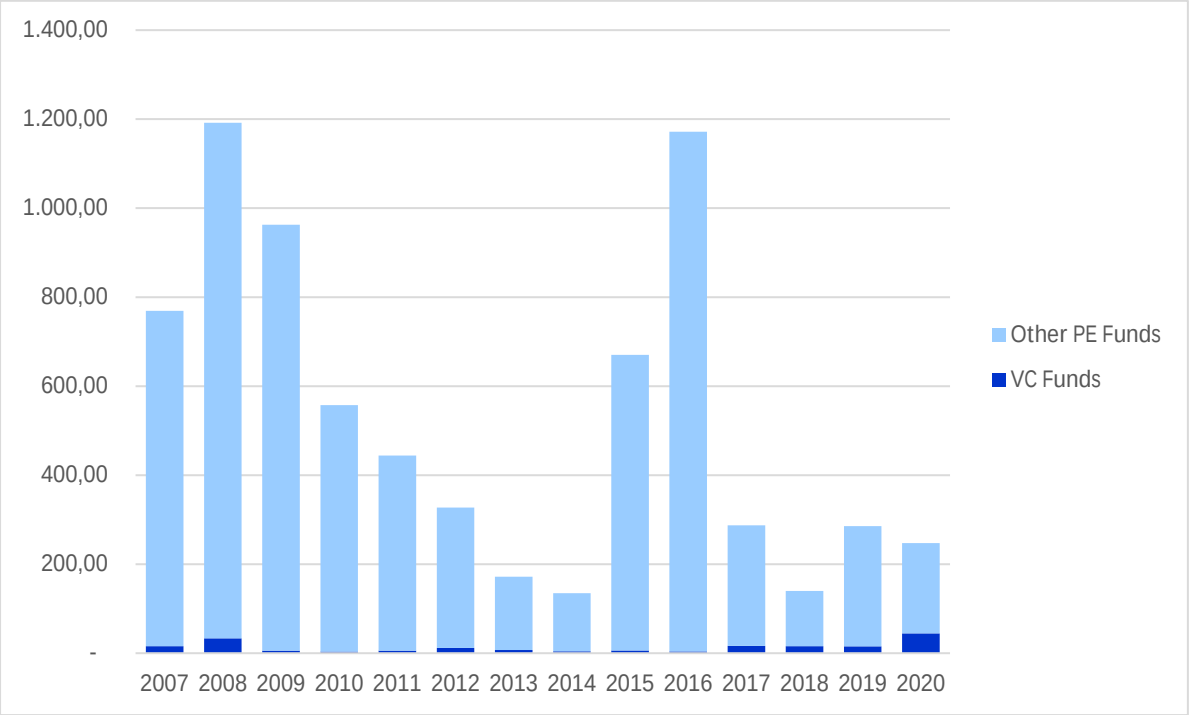


Table 7.4.3.7. **Top 5 foreign VC investors into Luxembourgish portfolio companies (EUR thousands)**

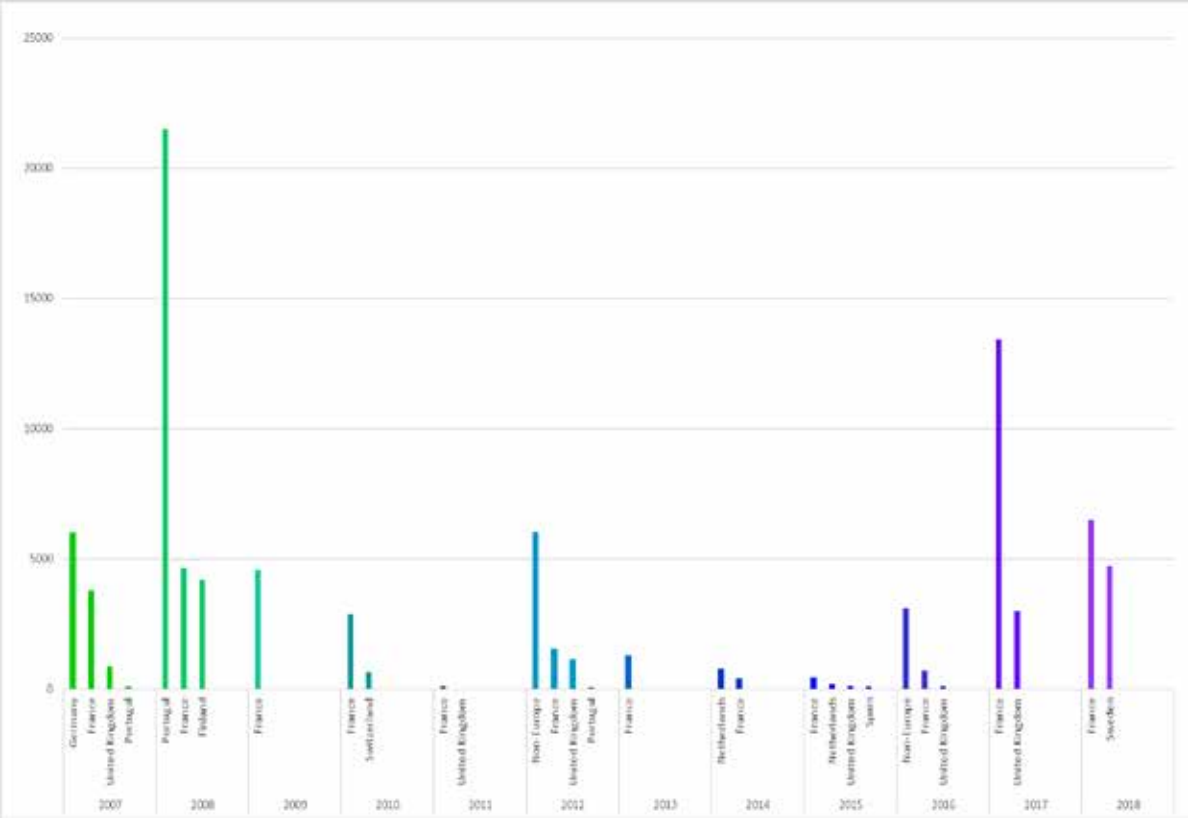
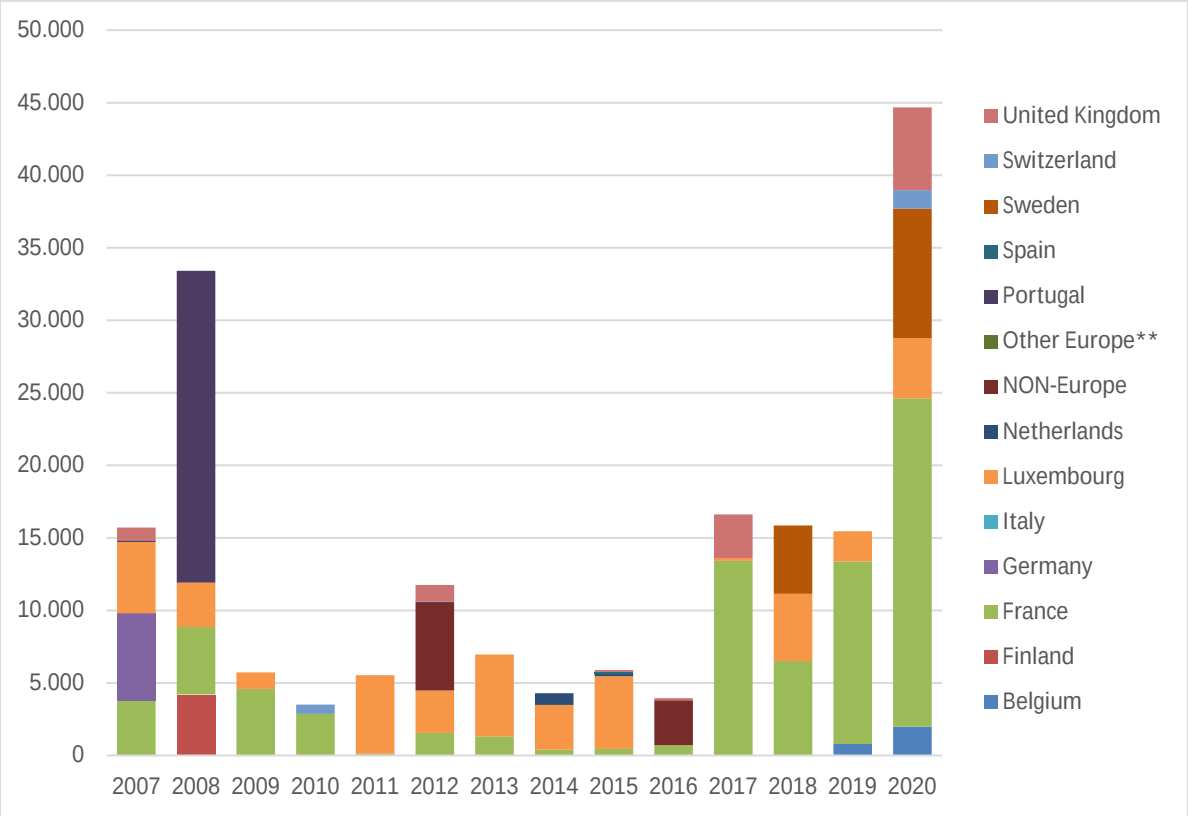
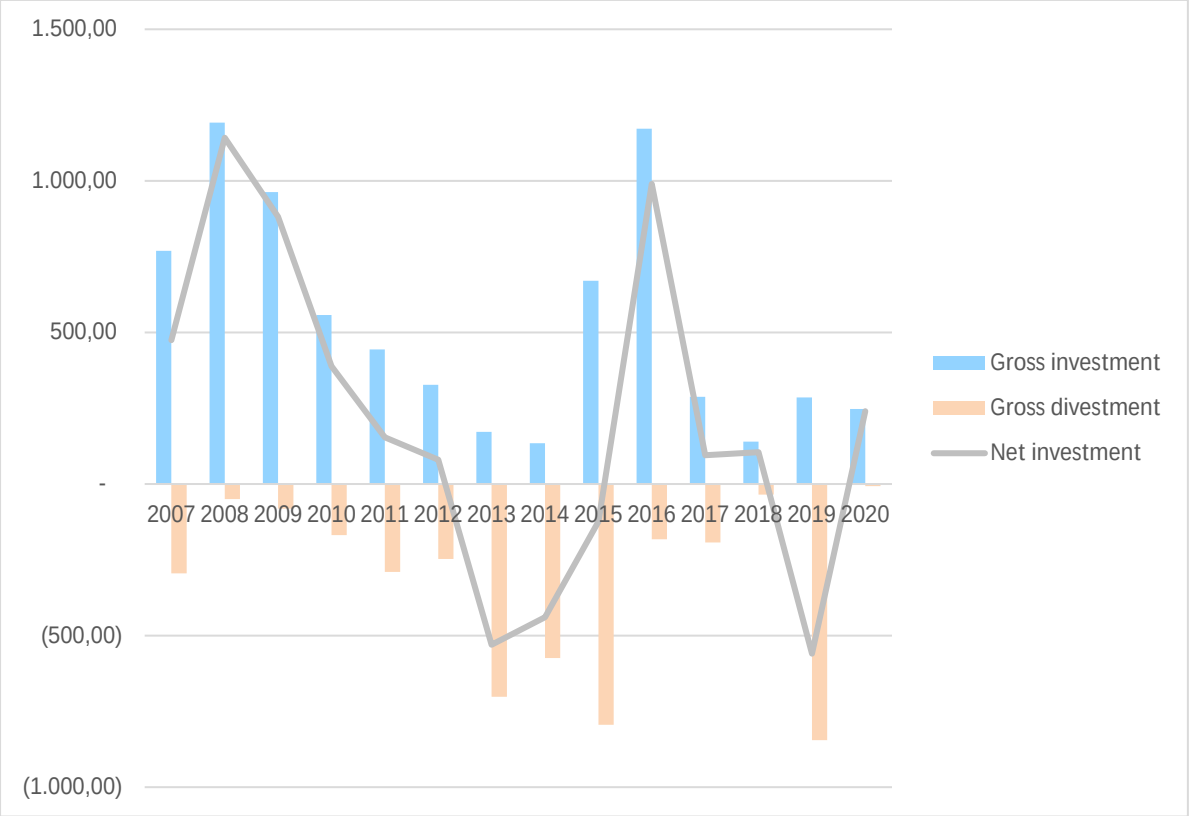


Table 7.4.3.8. **Geographical breakdown of flows from VC funds to Luxembourgish portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.4.3.9. **Investments and divestments of Luxembourgish PE funds (EUR million)**



7.4.4 Netherlands

Table 7.4.4.1. **Flows raised by Dutch PE/VC funds (EUR million)**

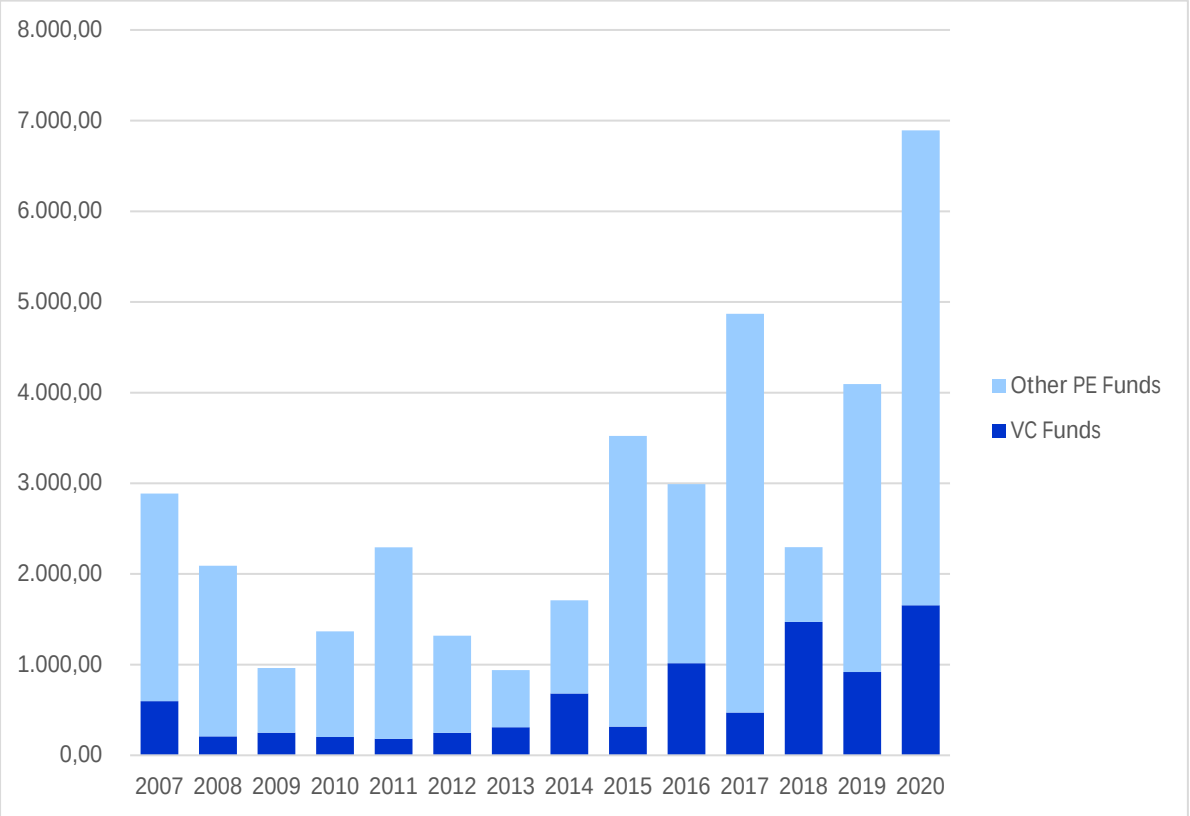
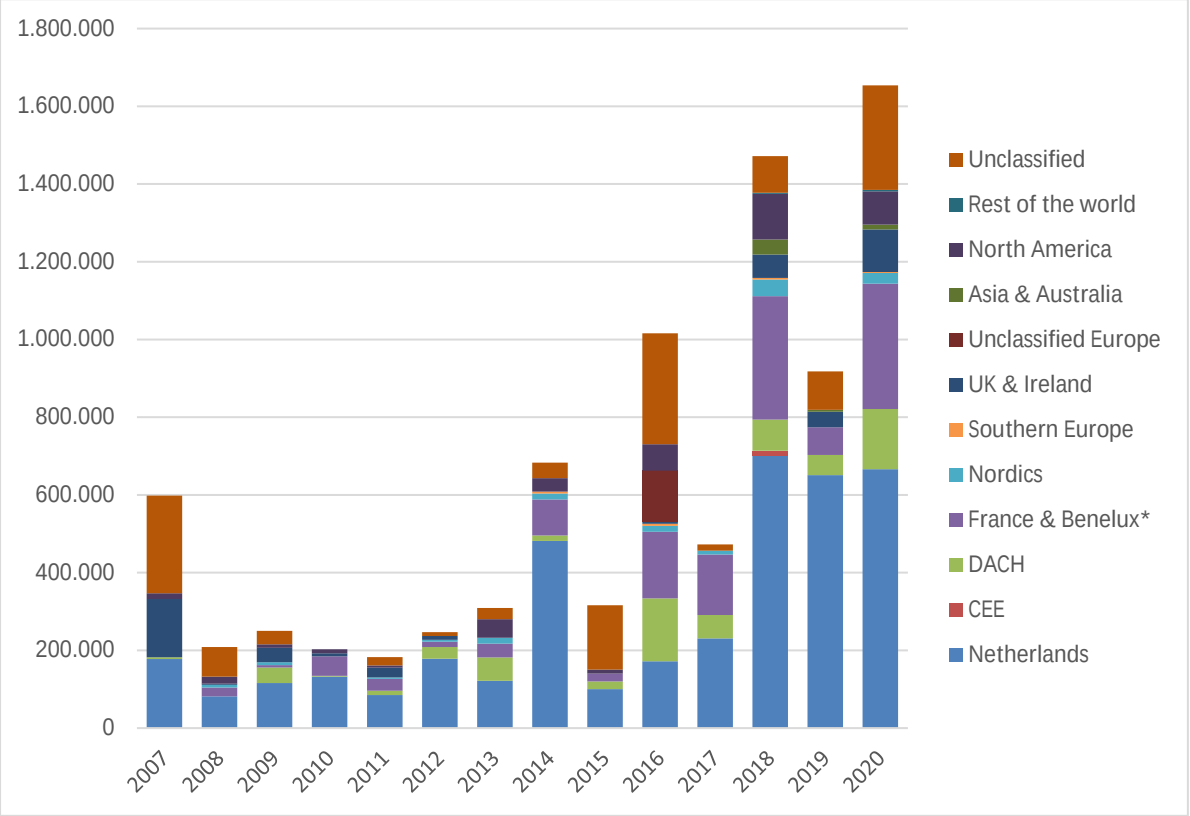


Table 7.4.4.2. **Geographical breakdown of Dutch VC fundraising (EUR thousands)**



France & Benelux* - excluding the Netherlands

Table 7.4.4.3. **Flows from Dutch PE/VC funds to portfolio companies (EUR million)**

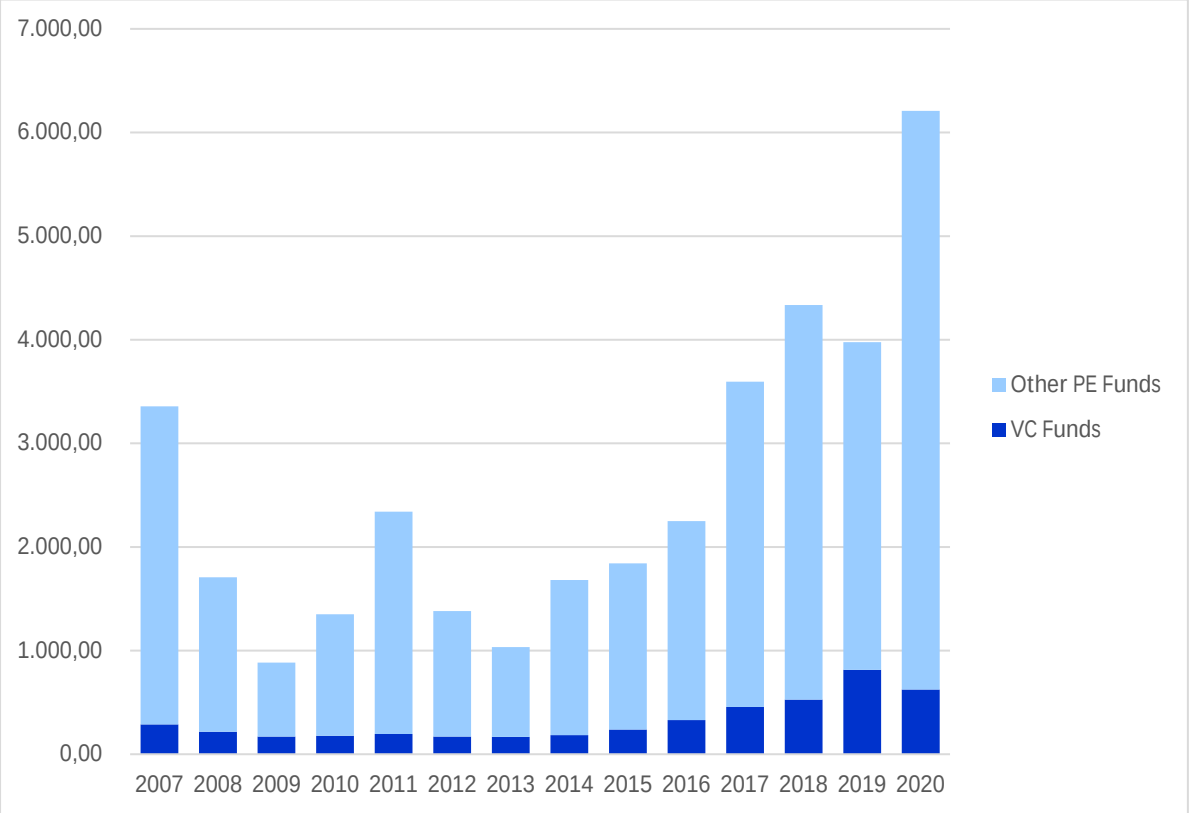


Table 7.4.4.4. **Top 5 foreign countries where Dutch VC funds have invested (EUR thousands)**

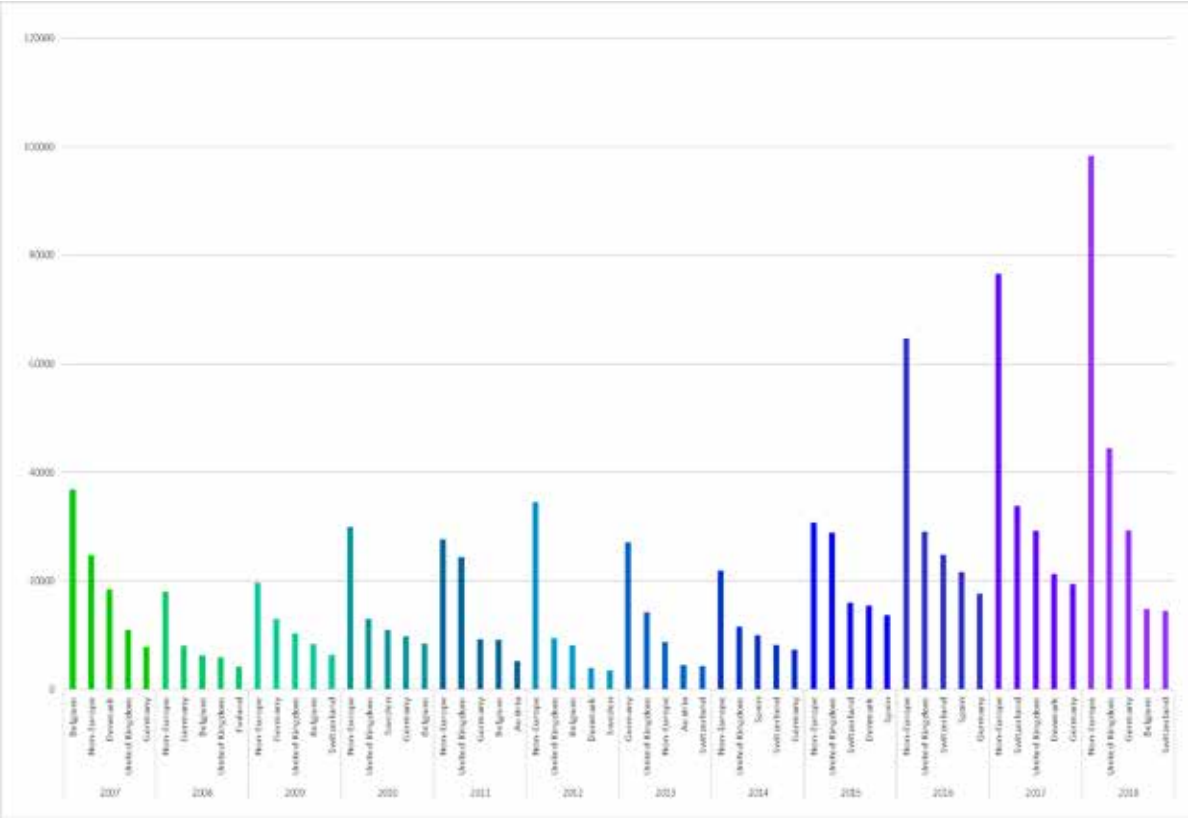
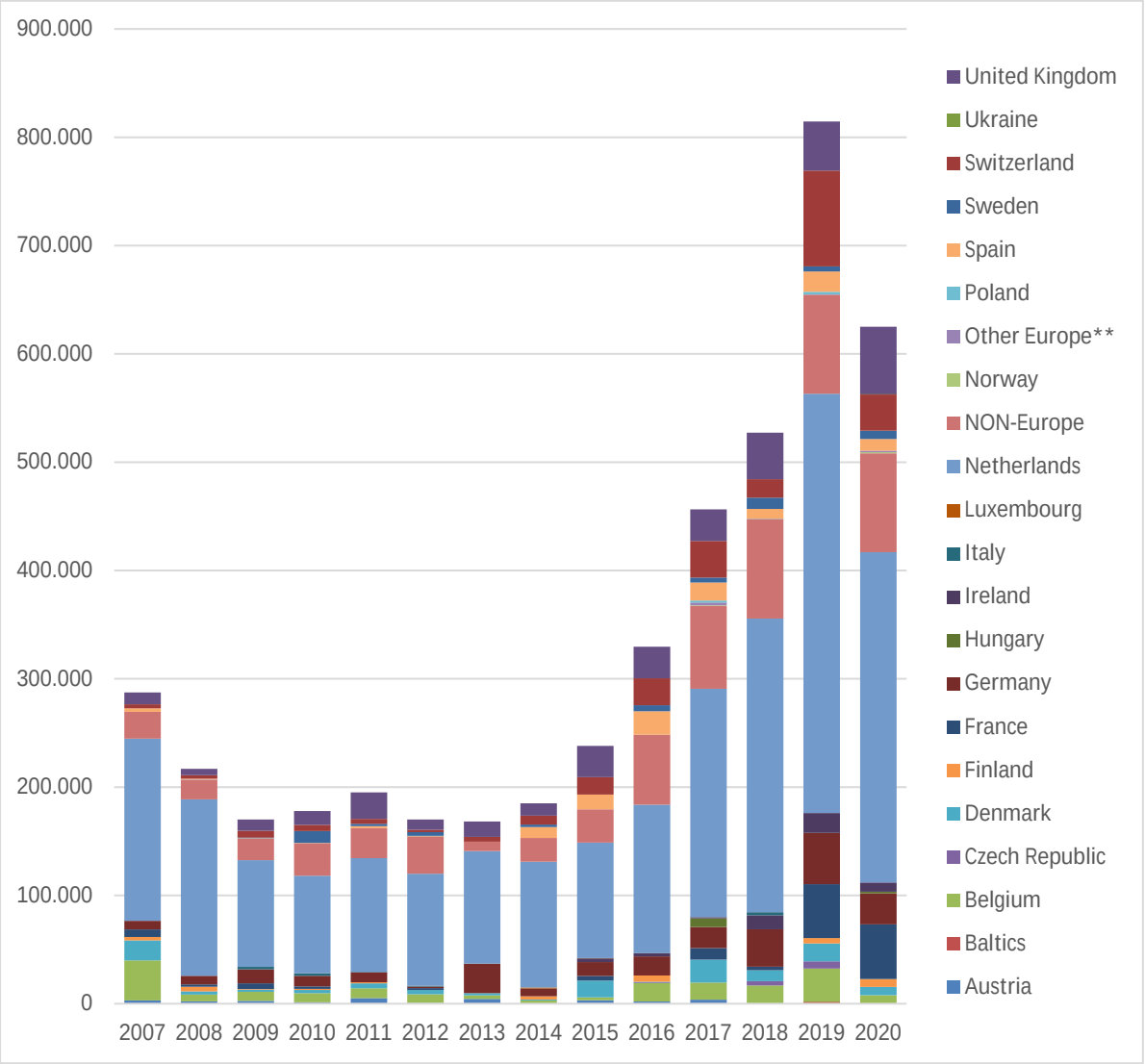


Table 7.4.4.5. **Geographical breakdown of flows from Dutch VC funds to portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.4.4.6. **Flows from PE/VC funds to Dutch portfolio companies (EUR million)**

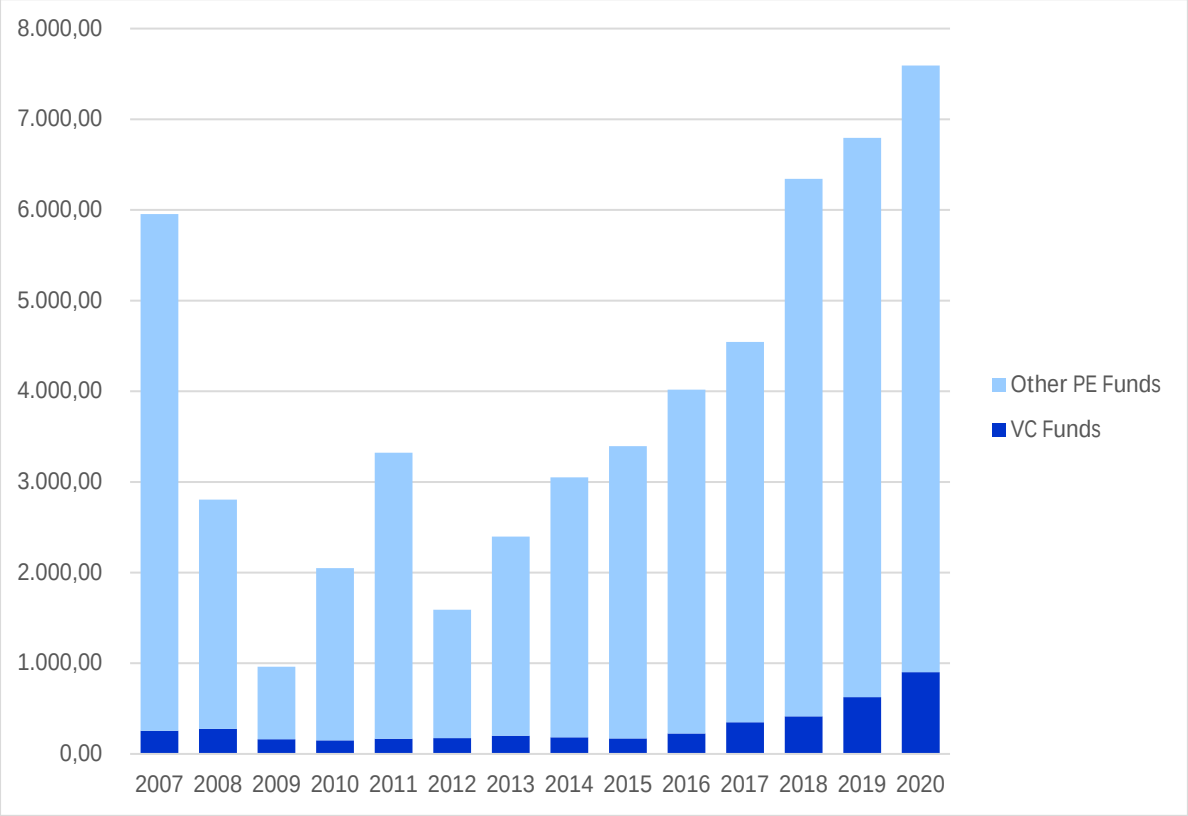


Table 7.4.4.7. **Top 5 foreign VC investors into Dutch portfolio companies (EUR thousands)**

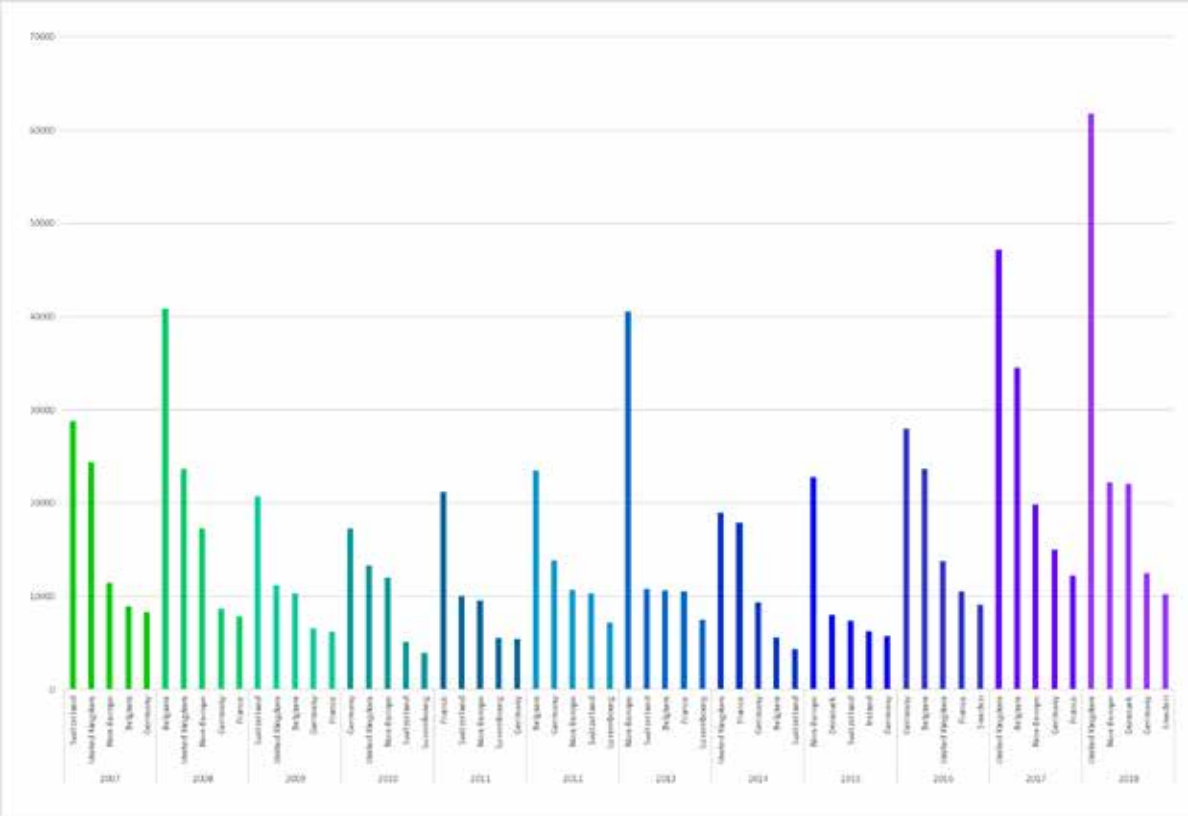
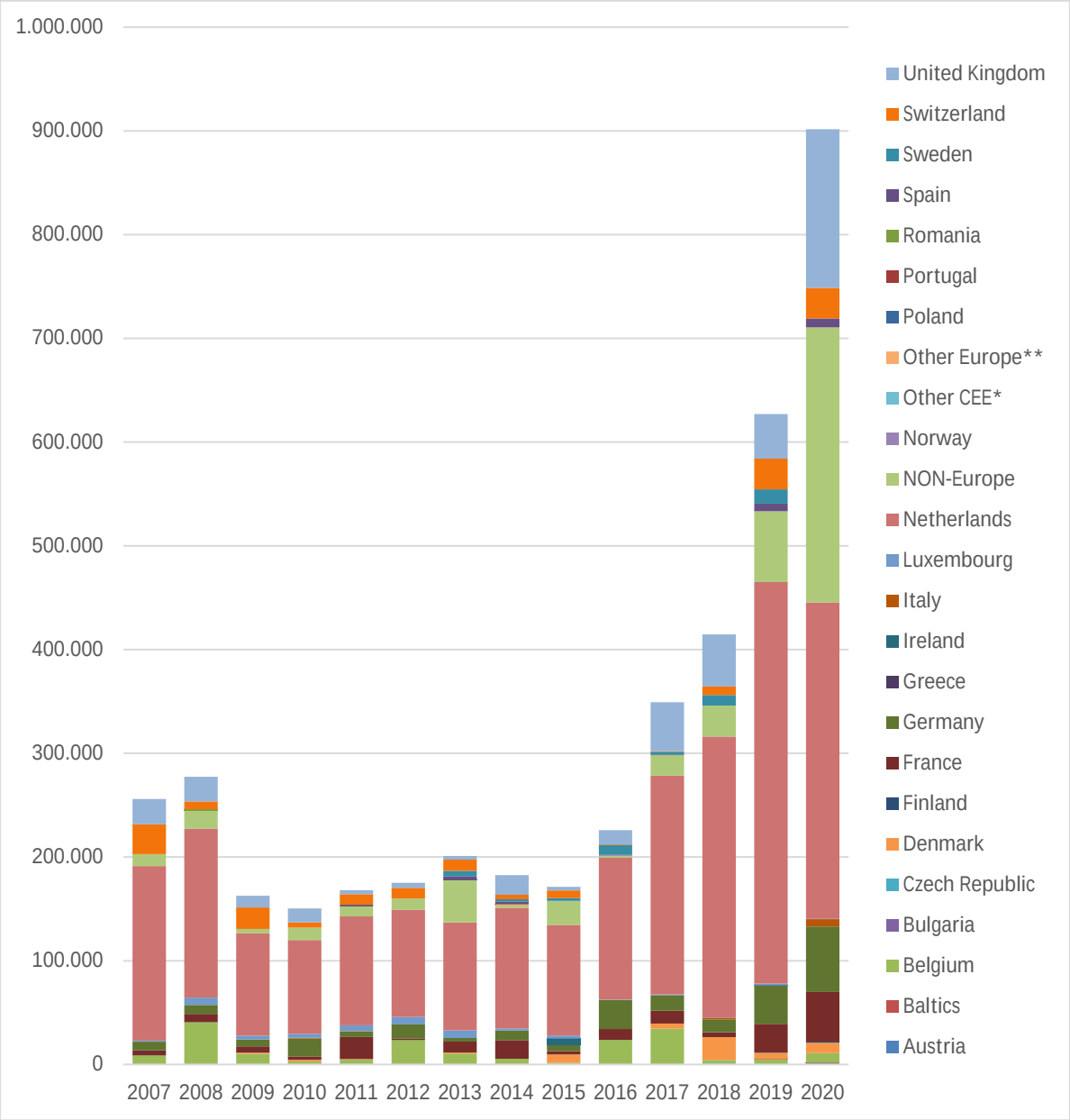
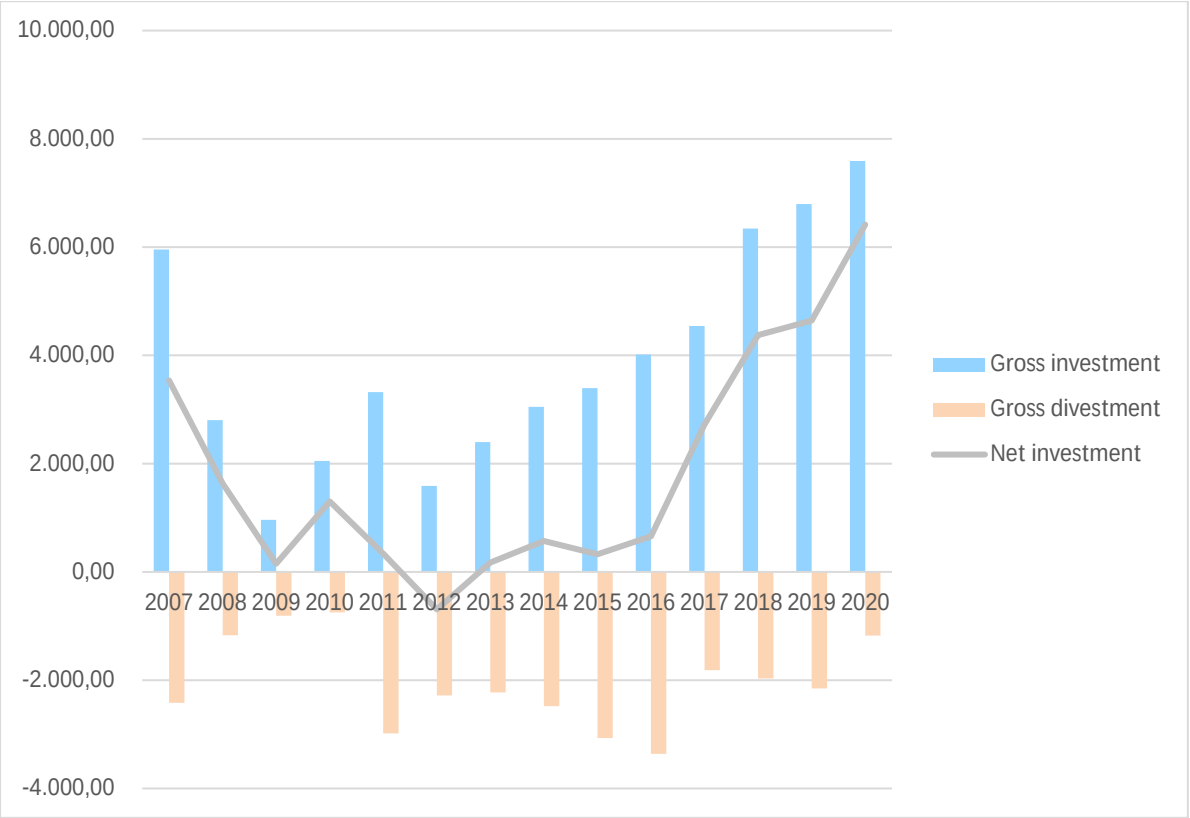


Table 7.4.4.8. **Geographical breakdown of flows from VC funds to Dutch portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.4.4.9. **Investments and divestments of Dutch PE funds (EUR million)**



7.5 UK AND IRELAND

7.5.1 Ireland

Table 7.5.1.1. **Flows raised by Irish PE/VC funds (EUR thousands)**

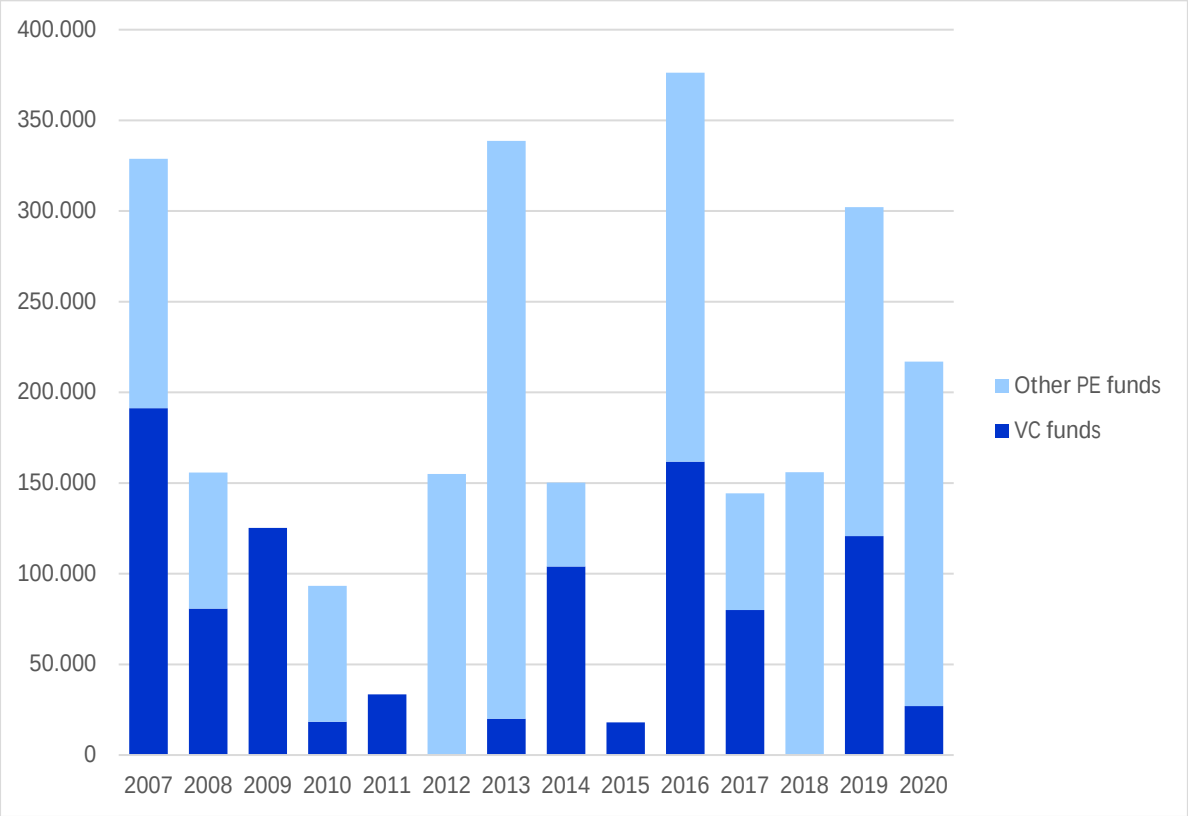
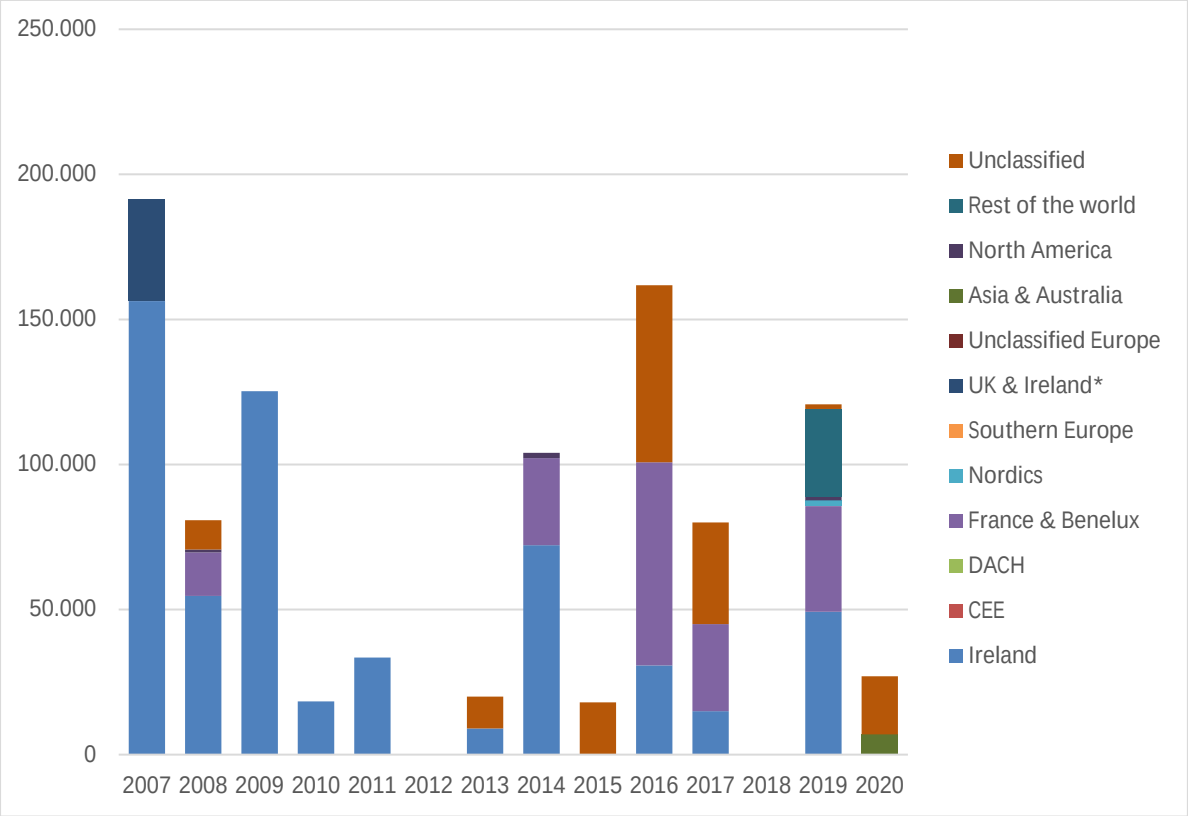


Table 7.5.1.2. **Geographical breakdown of Irish VC fundraising (EUR thousands)**



UK & Ireland* - excluding Ireland

Table 7.5.1.3. **Flows from Irish PE/VC funds to portfolio companies (EUR million)**

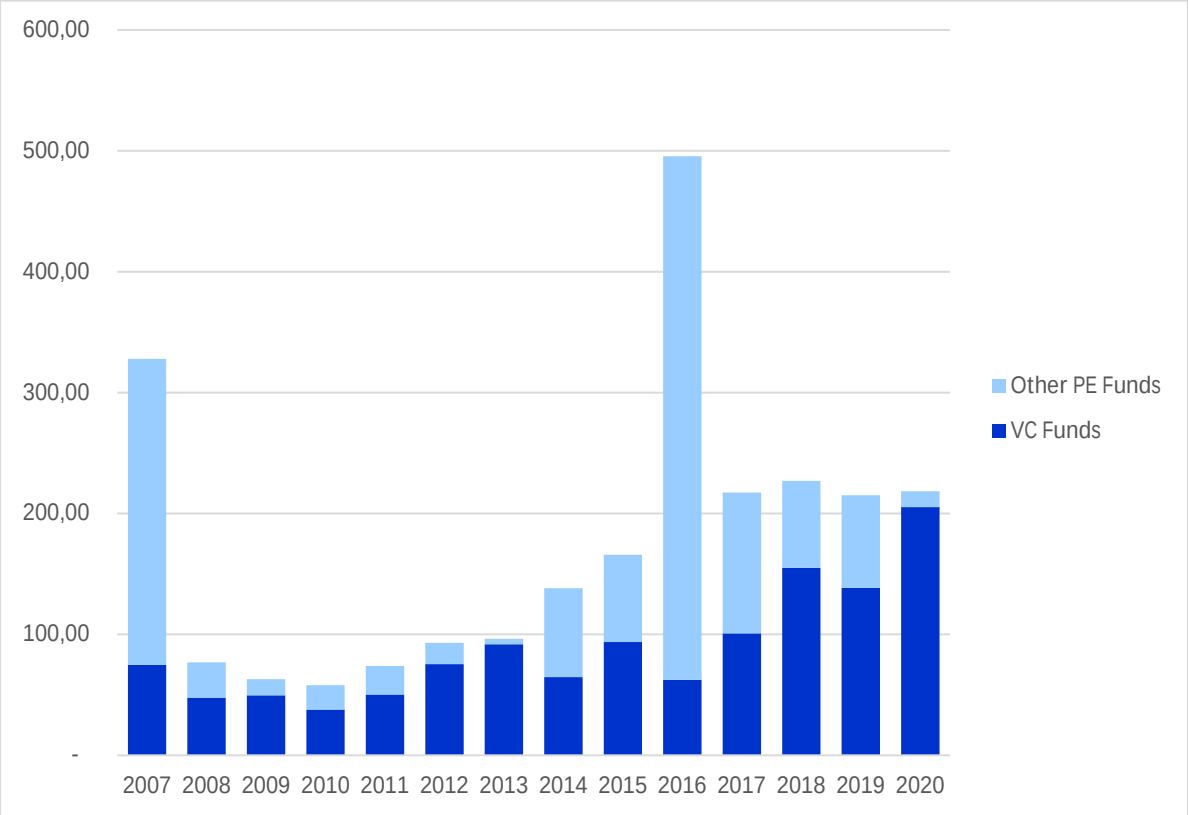


Table 7.5.1.4. **Top 5 foreign countries where Irish PE funds have invested (EUR million)**

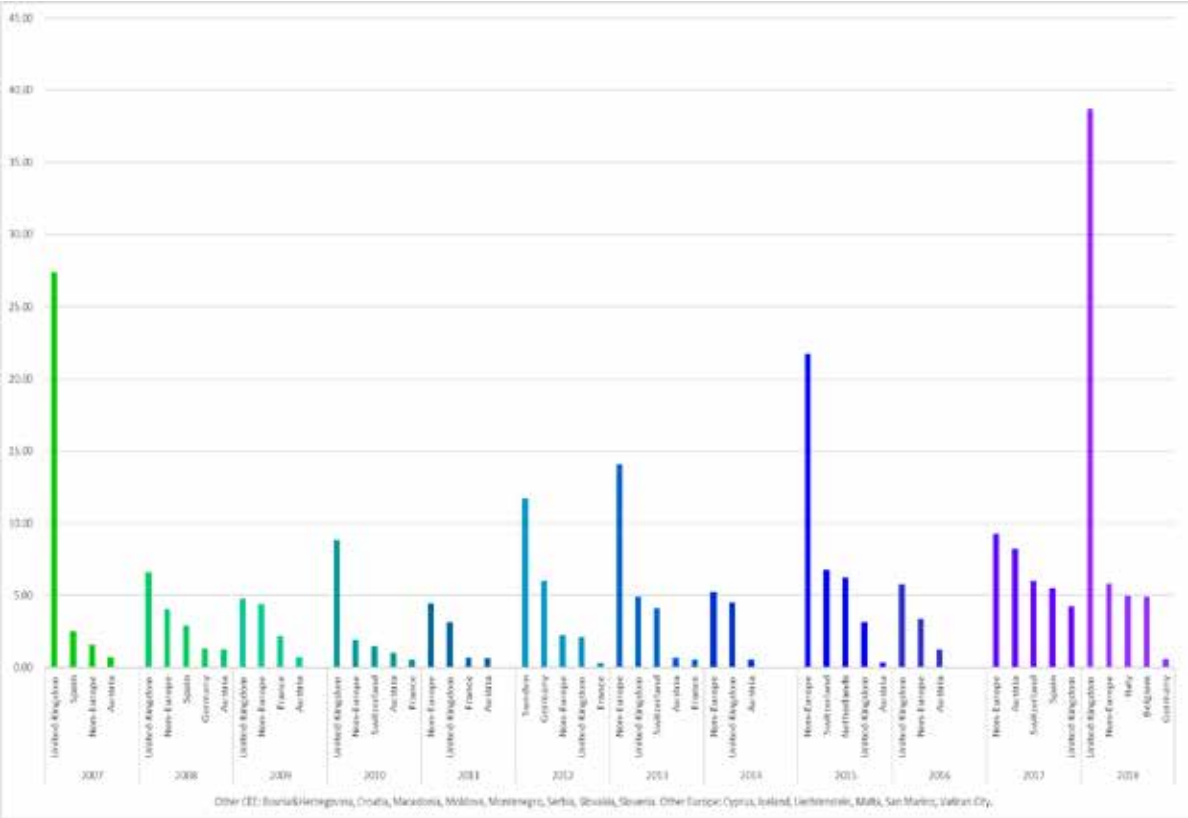


Table 7.5.1.5. **Geographical breakdown of flows from Irish VC funds to portfolio companies (EUR thousands)**

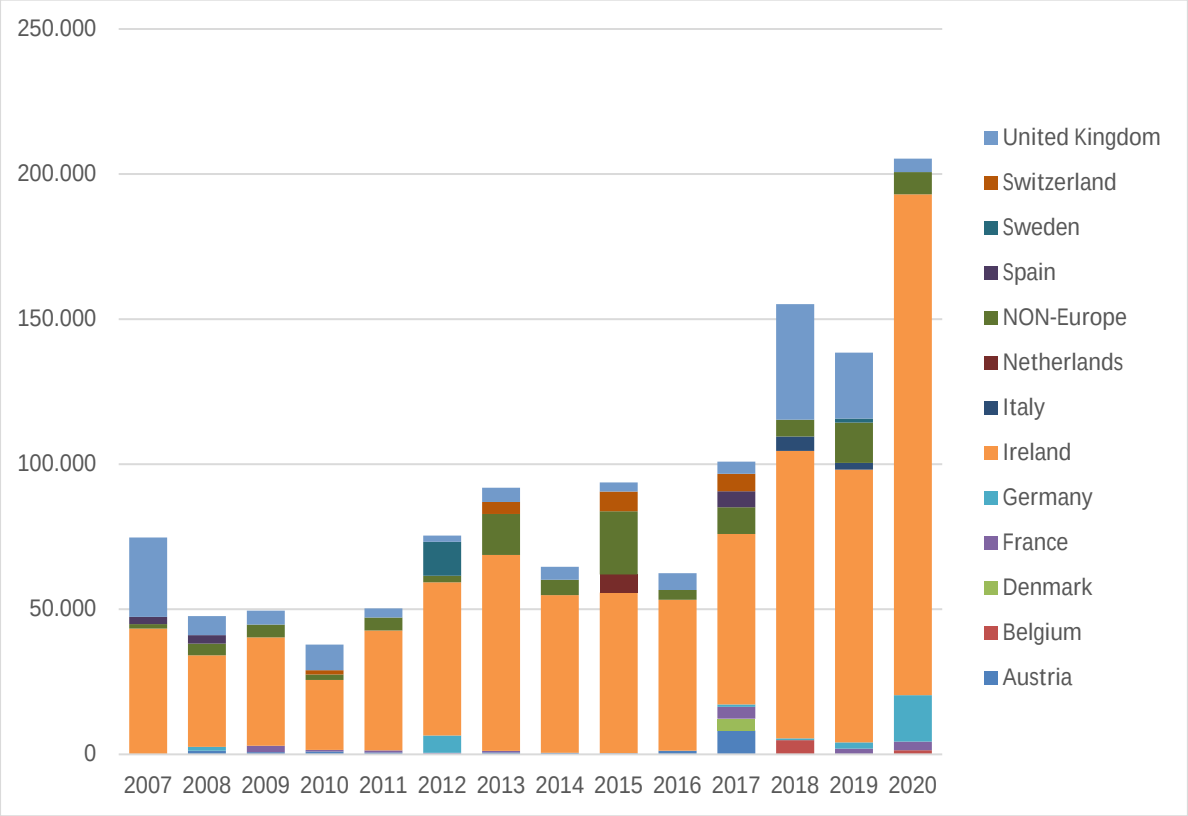


Table 7.5.1.6. **Flows from PE/VC funds to Irish portfolio companies (EUR million)**

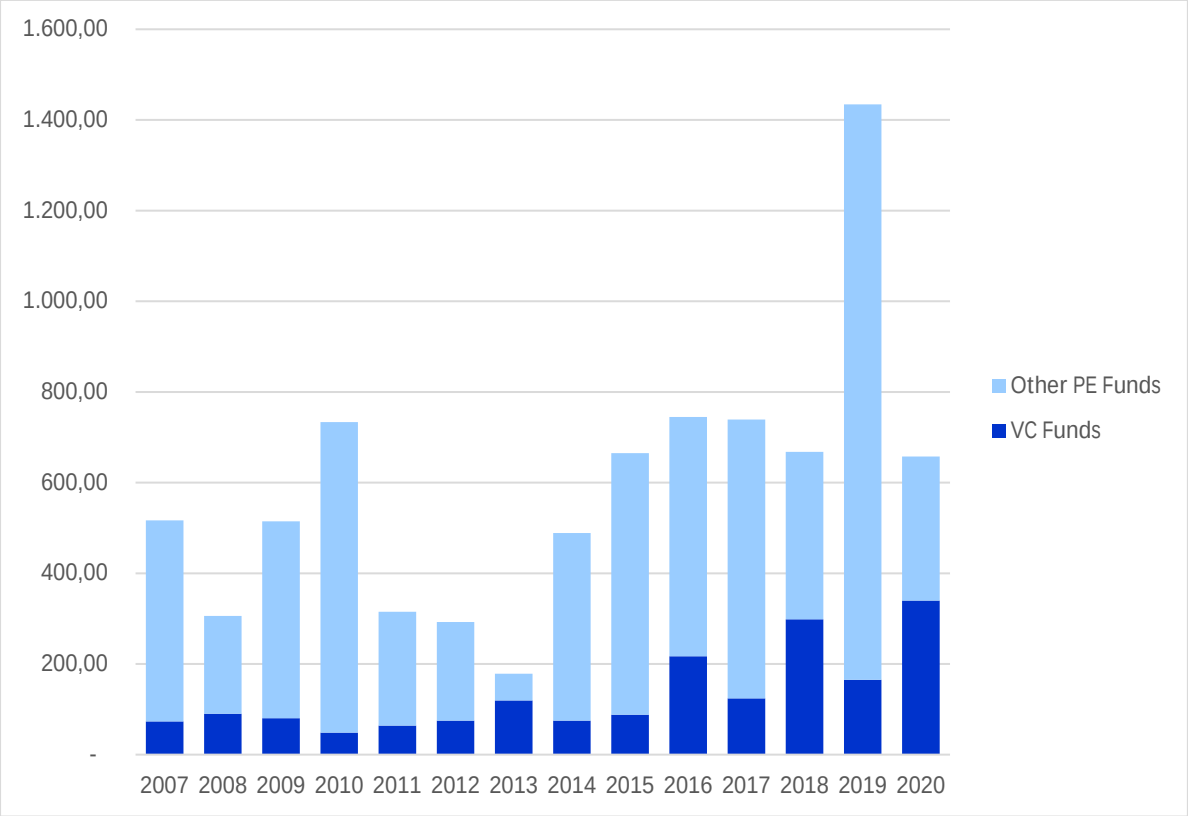


Table 7.5.1.7. **Top 5 foreign investors into Irish portfolio companies (EUR million)**

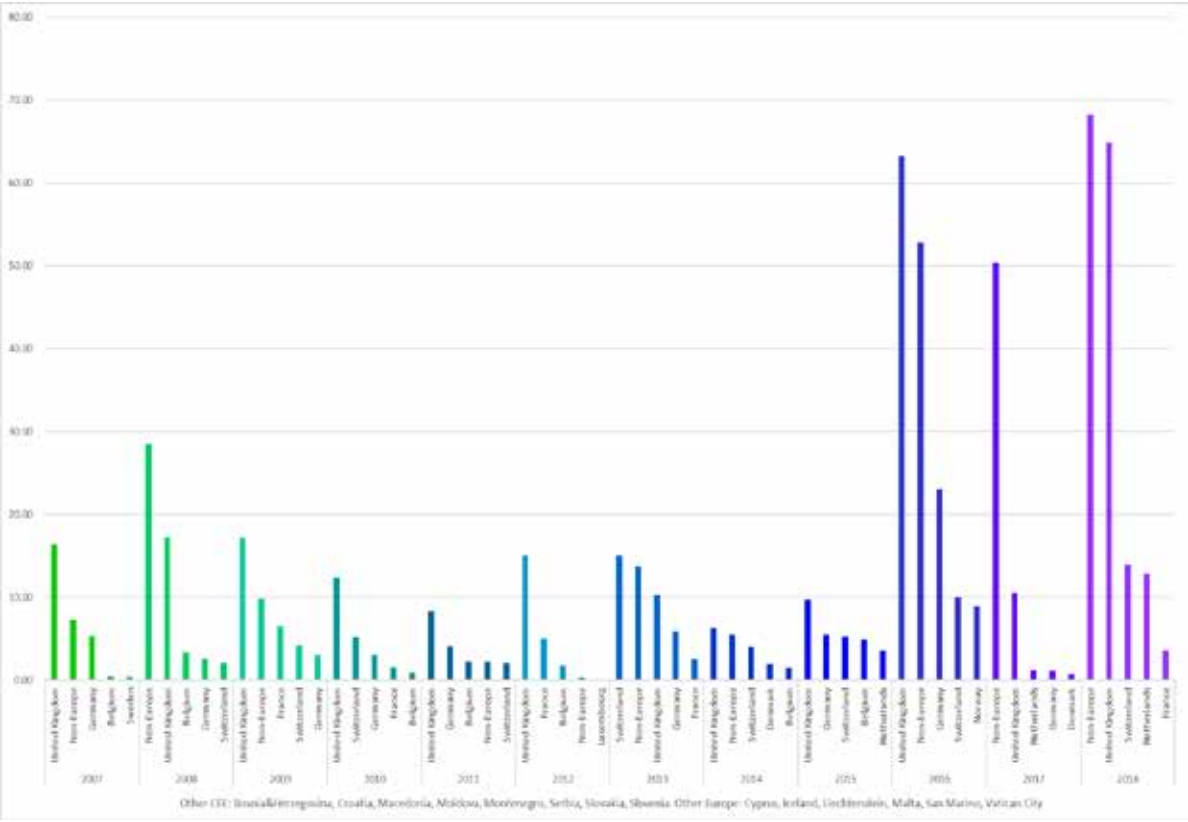


Table 7.5.1.8. **Geographical breakdown of flows from VC funds to Irish portfolio companies (EUR thousands)**

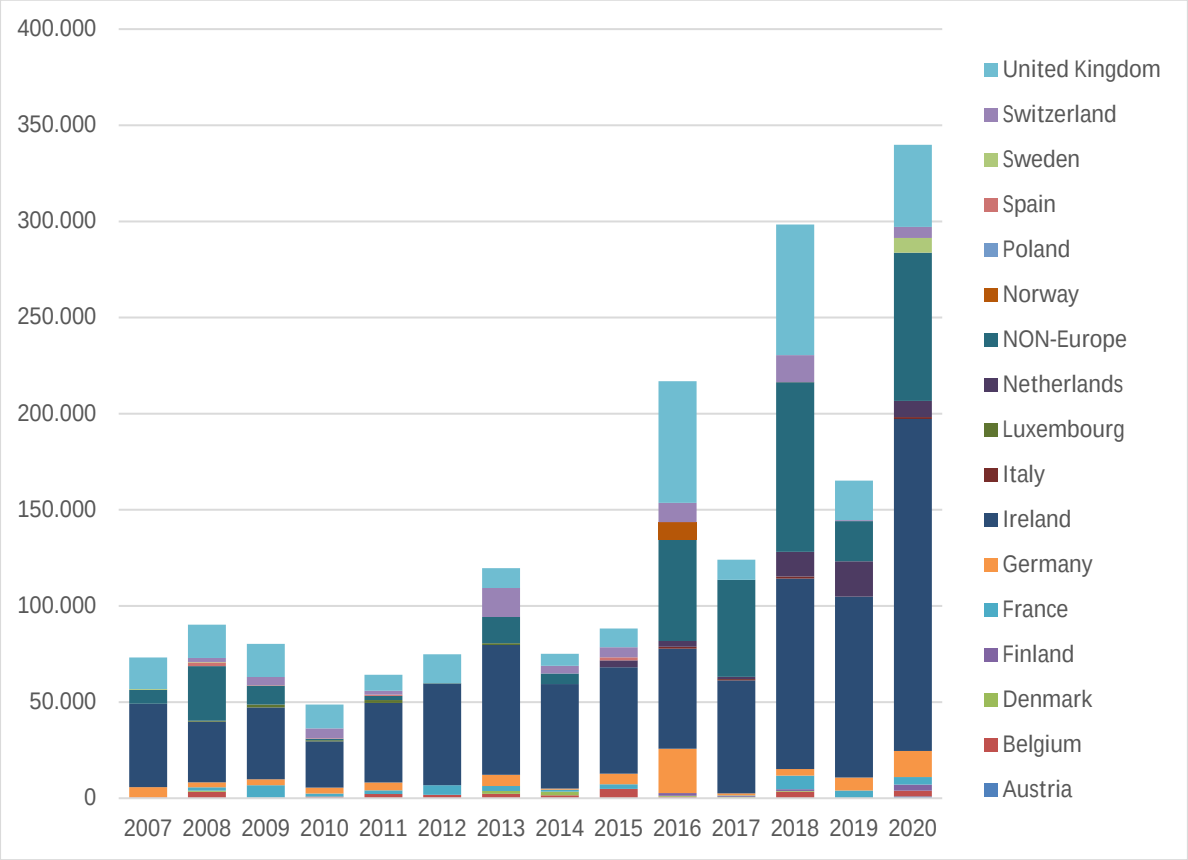
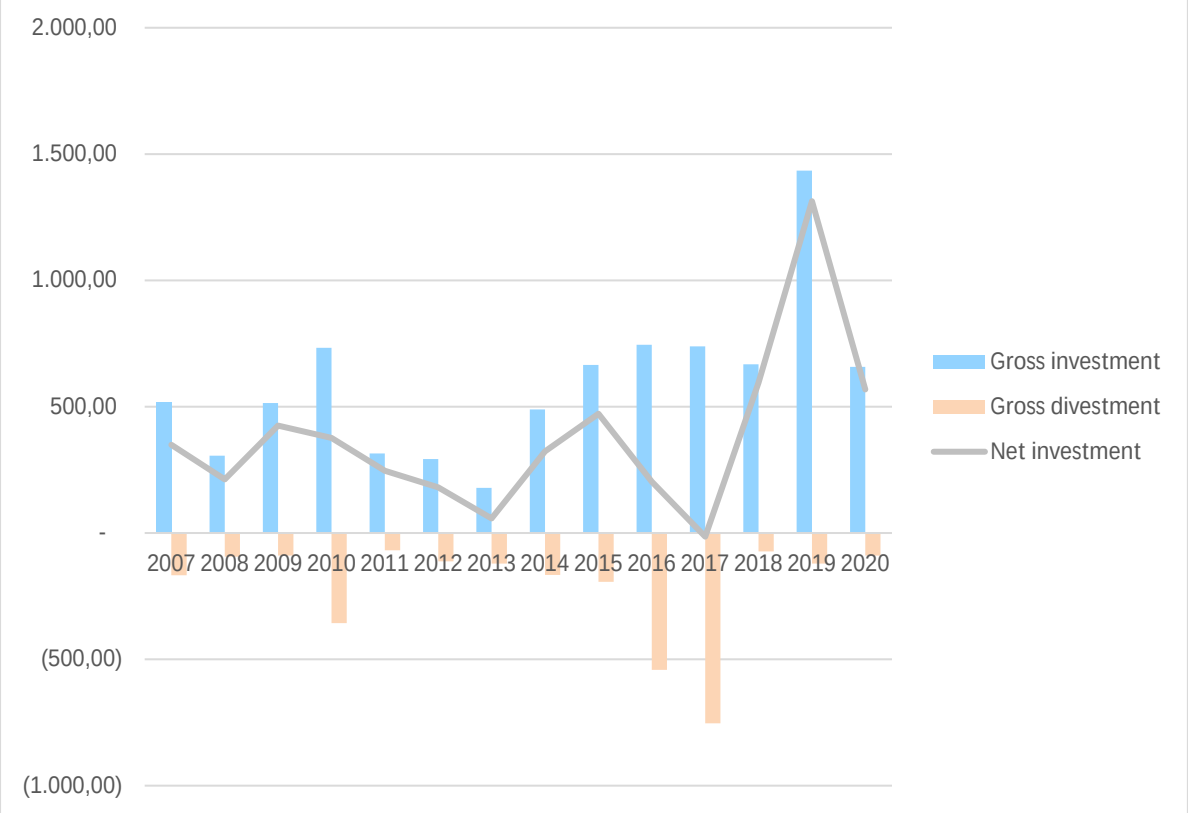


Table 7.5.1.9. **Investments and divestments of Irish PE funds (EUR million)**



7.5.2 United Kingdom

Table 7.5.2.1. **Flows raised by UK PE/VC funds (EUR million)**

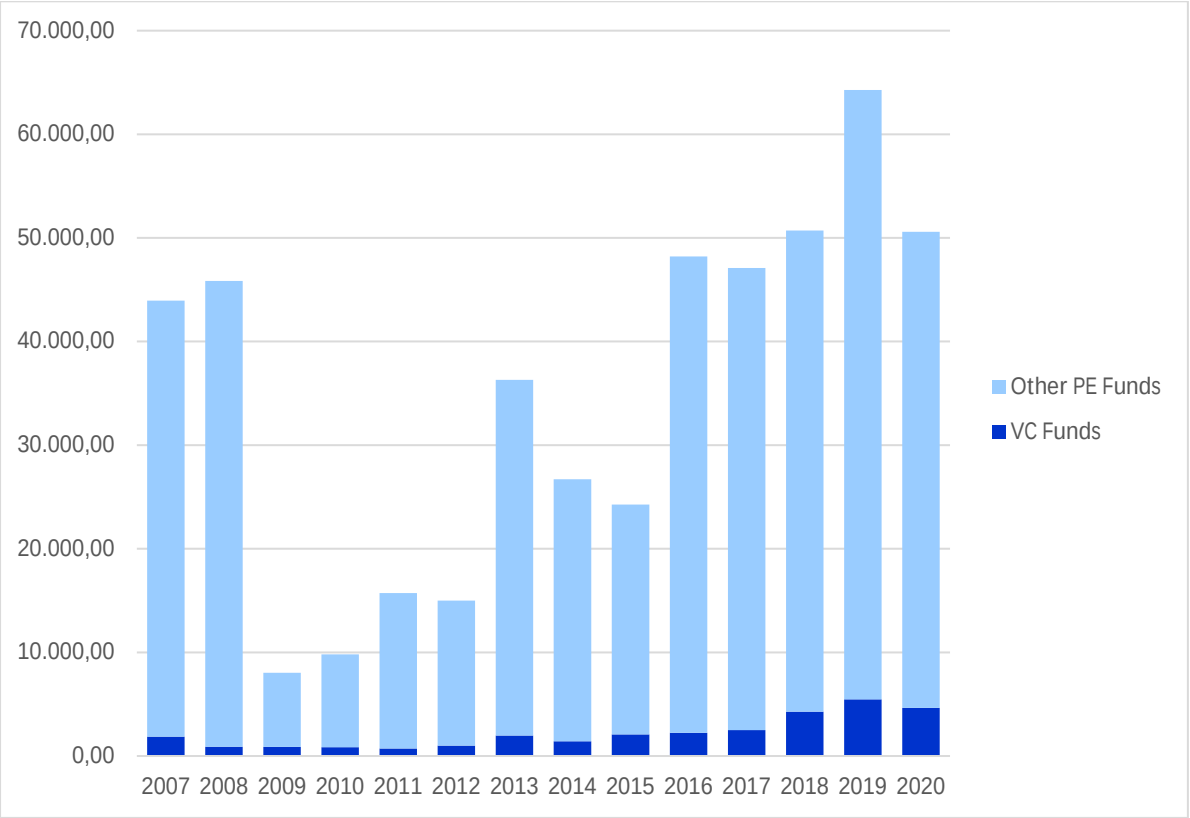
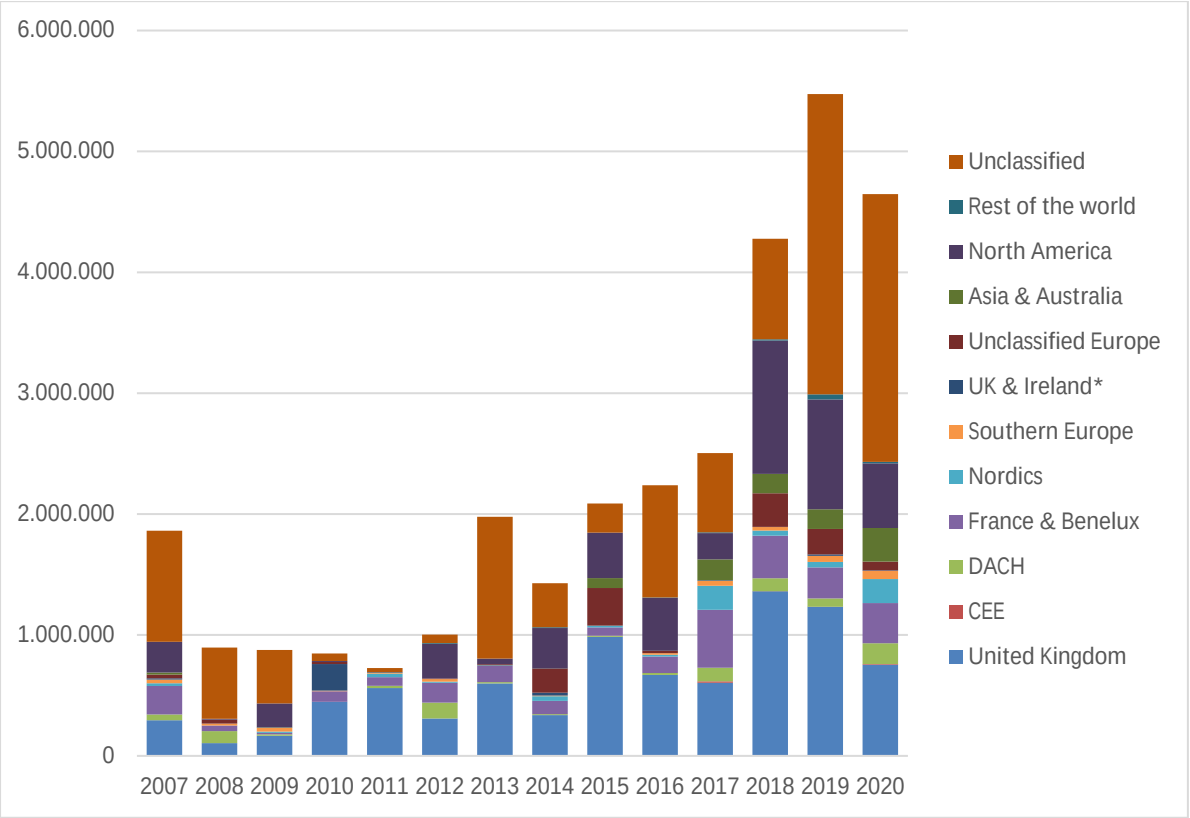


Table 7.5.2.2. **Geographical breakdown of UK VC fundraising (EUR thousands)**



UK & Ireland* - excluding the UK

Table 7.5.2.3. **Flows from UK PE/VC funds to portfolio companies (EUR million)**

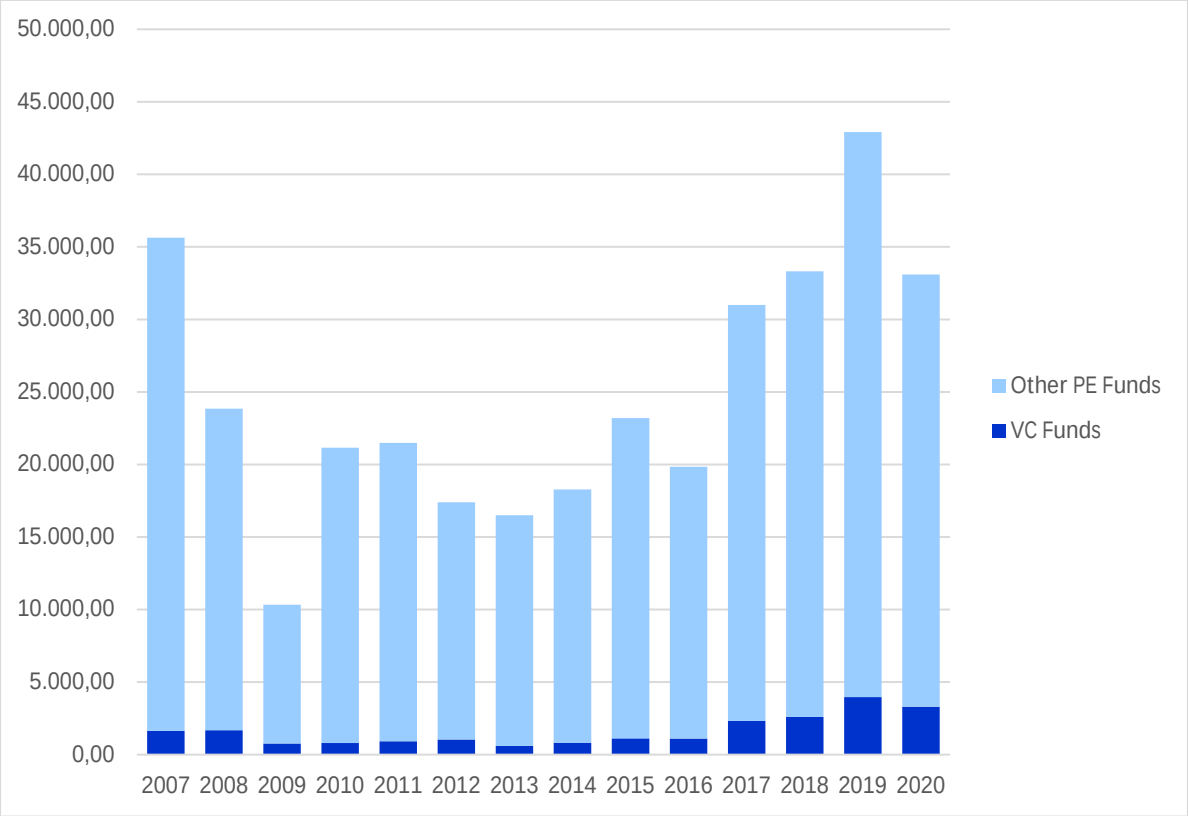


Table 7.5.2.4 **Top 5 foreign countries where UK PE funds have invested (EUR thousands)**

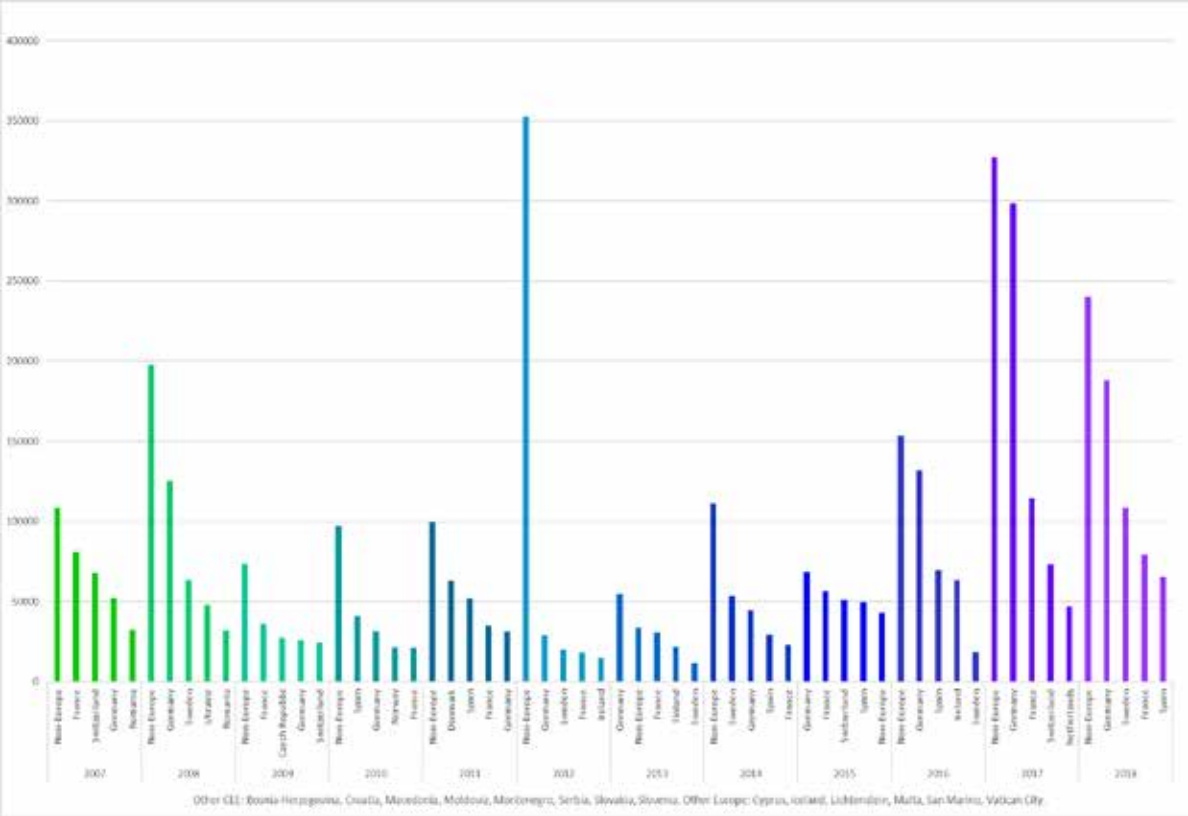
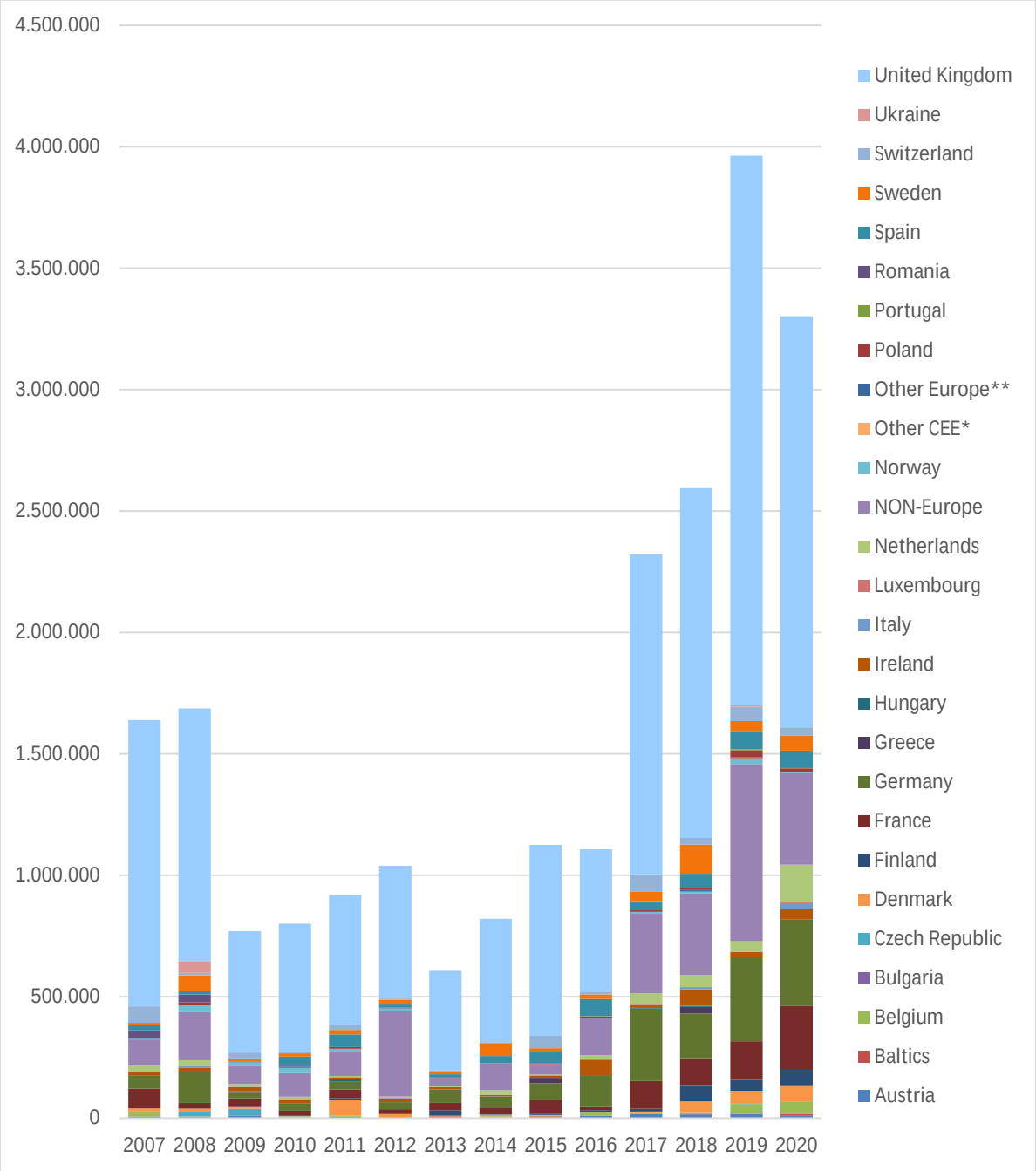


Table 7.5.2.5. **Geographical breakdown of flows from UK VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.5.2.6. **Flows from PE/VC funds to UK portfolio companies (EUR million)**

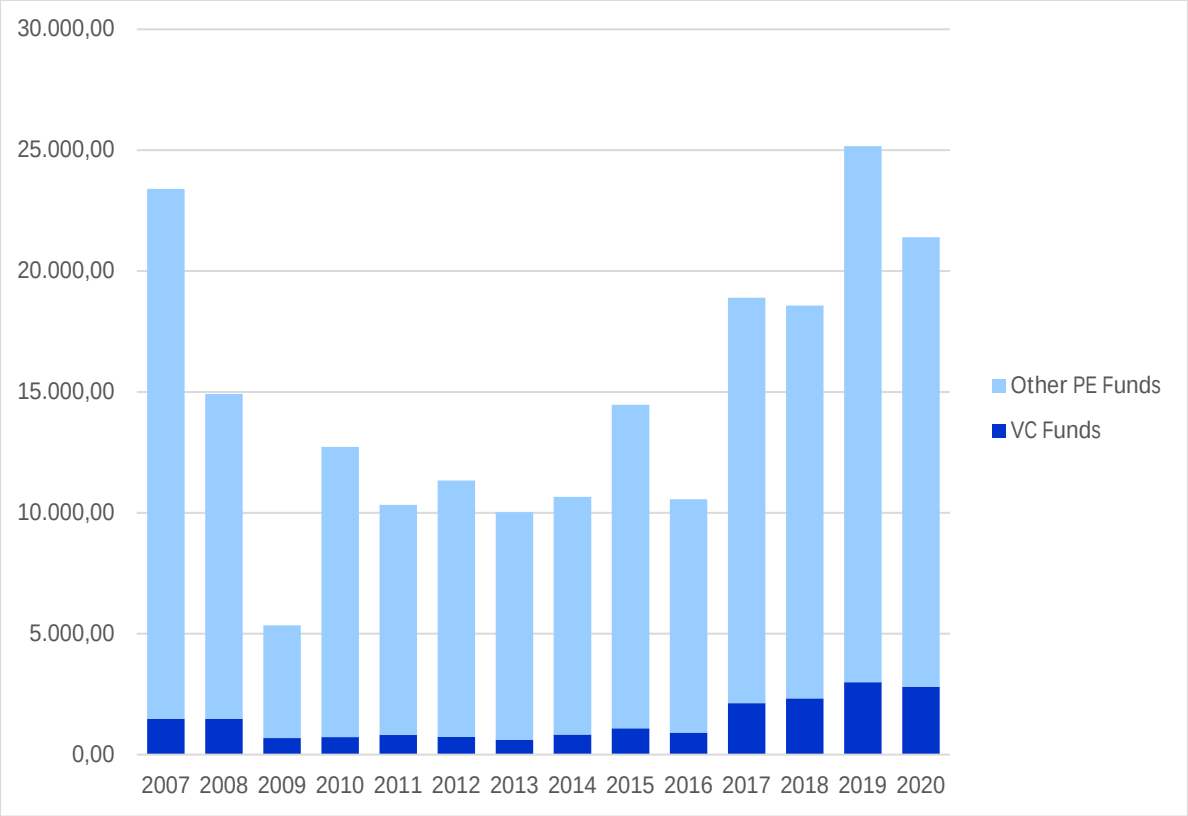


Table 7.5.2.7. **Top 5 foreign investors into UK portfolio companies (EUR million)**

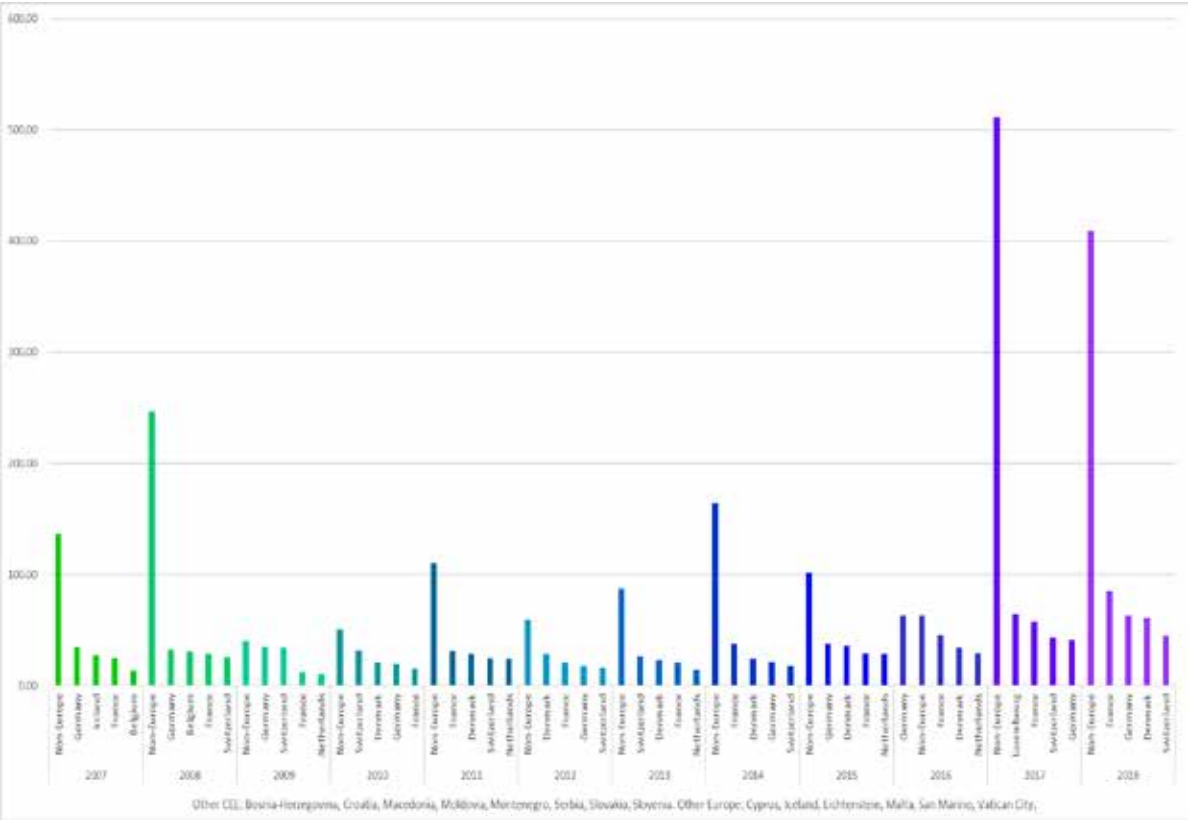
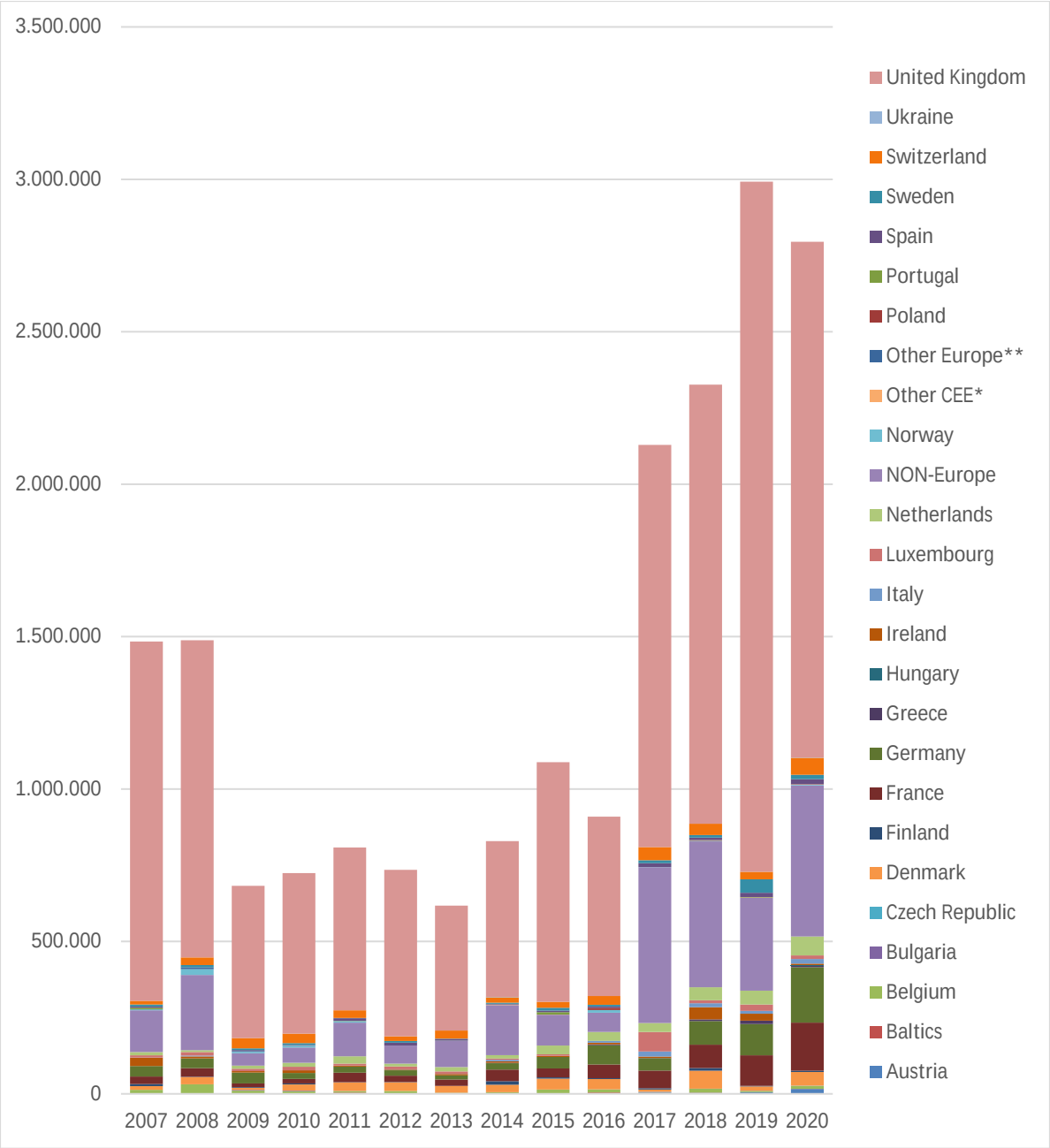
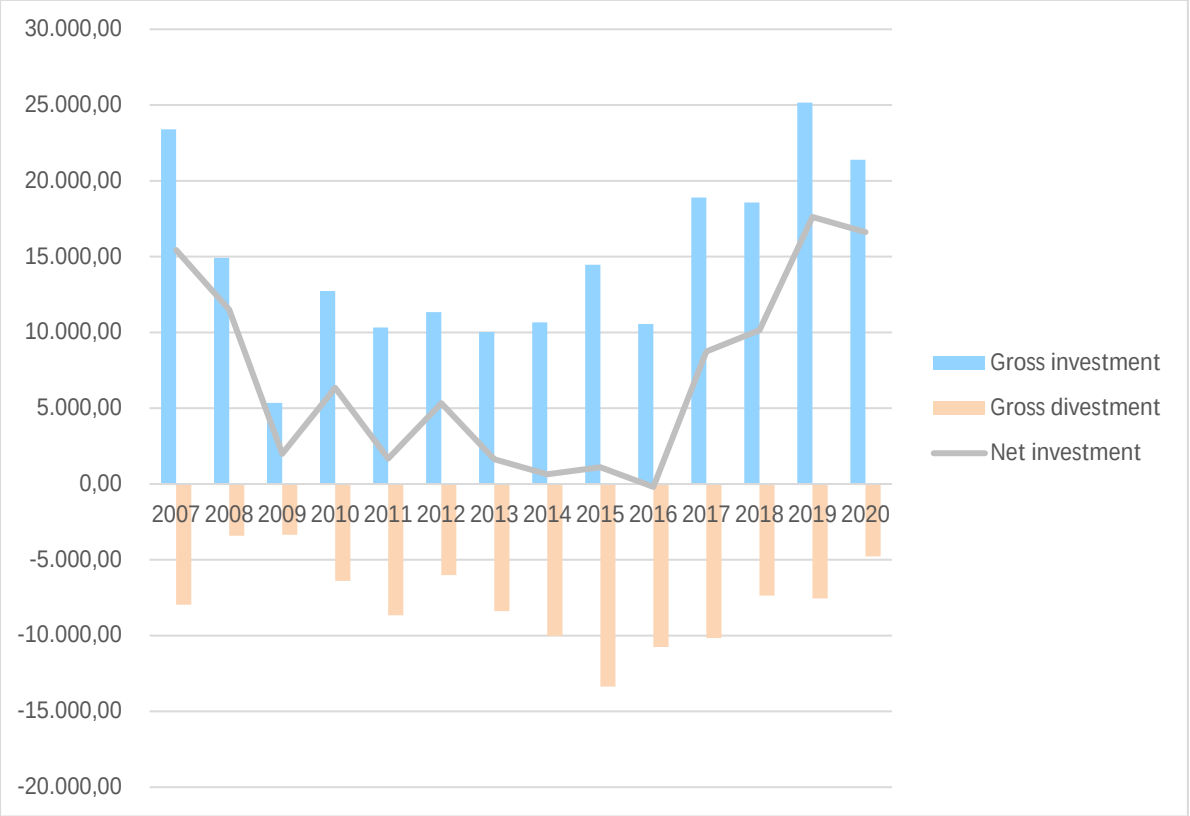


Table 7.5.2.8. **Geographical breakdown of flows** from VC funds to **UK** portfolio companies **(EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.5.2.9. **Investments and divestments of British PE funds (EUR million)**



7.6 CENTRAL AND EASTERN EUROPE

7.6.1 The Baltics

Table 7.6.1.1. **Flows raised by Baltics PE/VC funds (EUR million)**

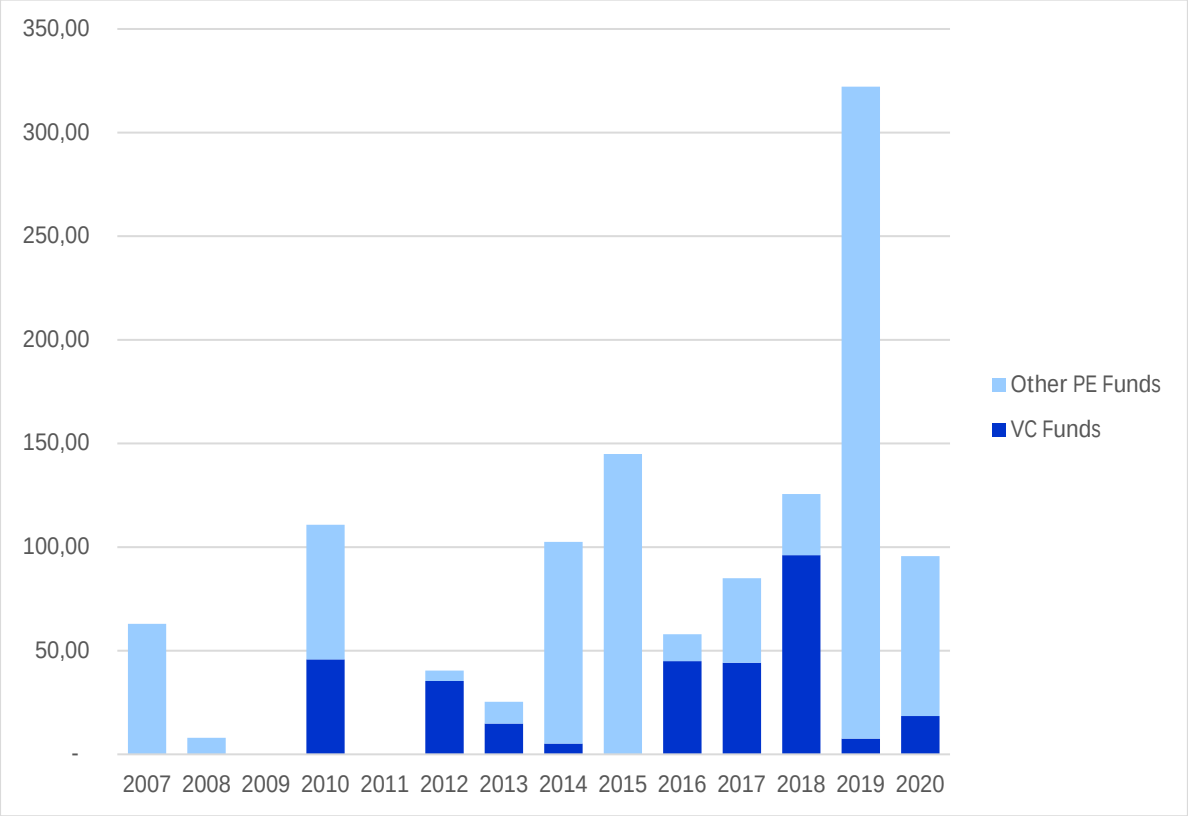
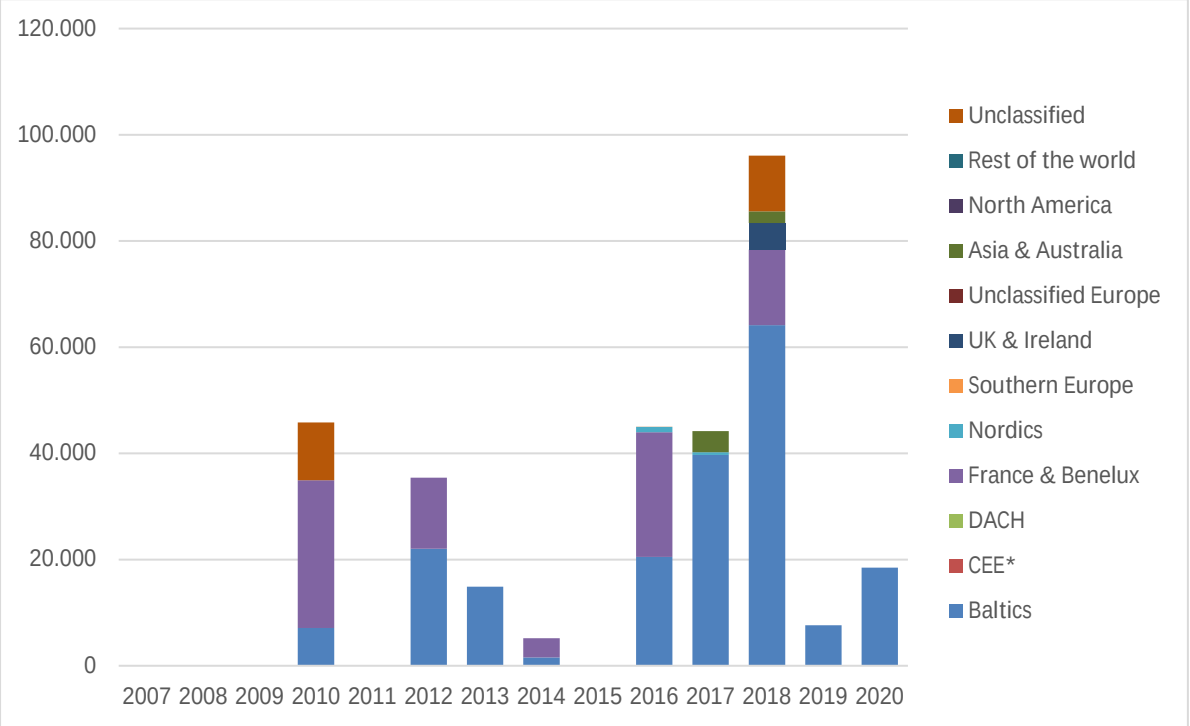


Table 7.6.1.2. **Geographical breakdown of Baltics VC fundraising (EUR thousands)**



CEE* - excluding the Baltics

Table 7.6.1.3. **Flows from Baltics PE/VC funds to portfolio companies (EUR million)**

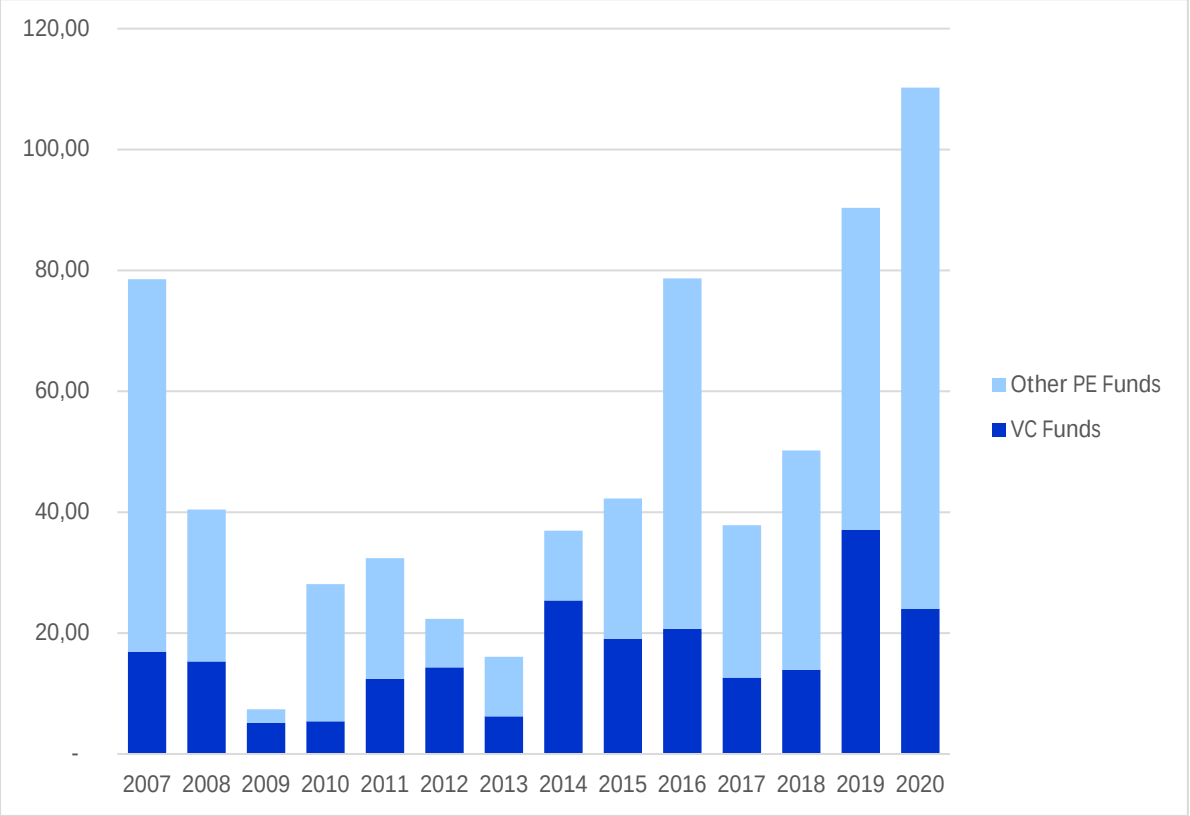


Table 7.6.1.4. **Top 5 foreign countries where Baltic VC funds have invested (EUR thousands)**

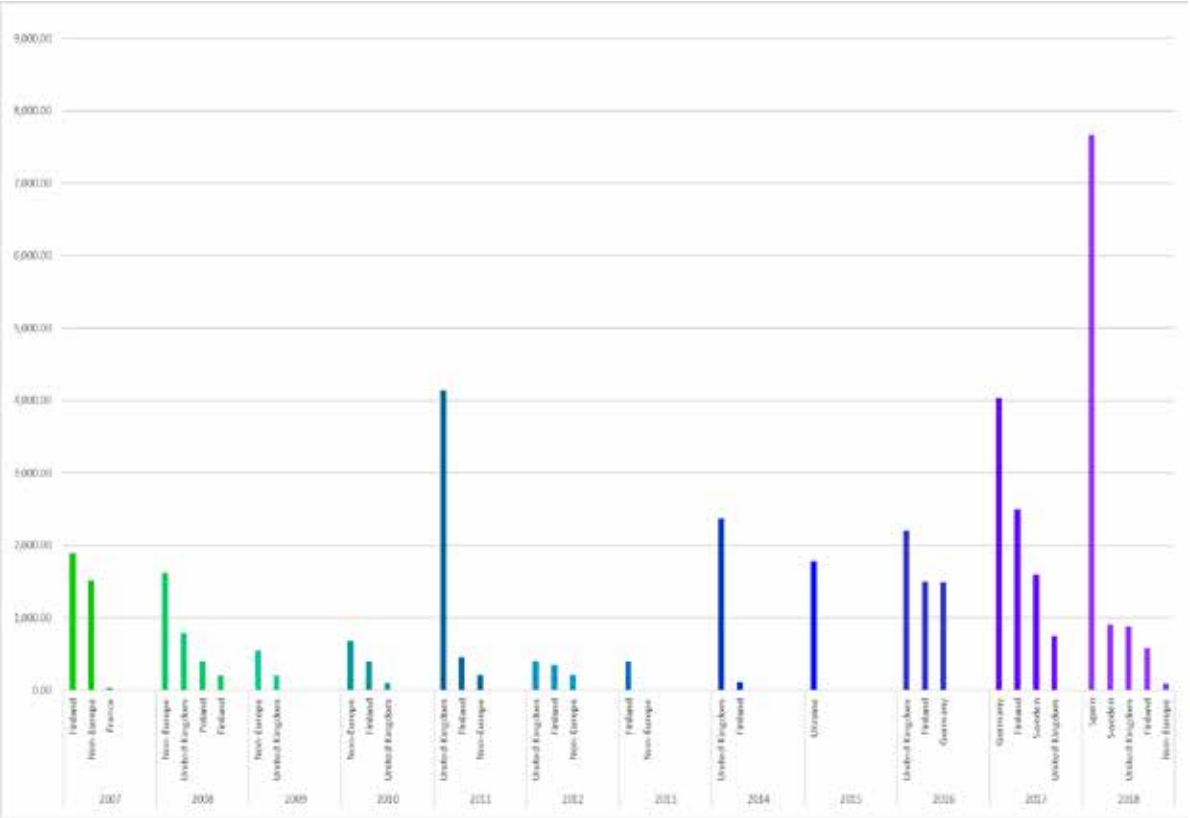
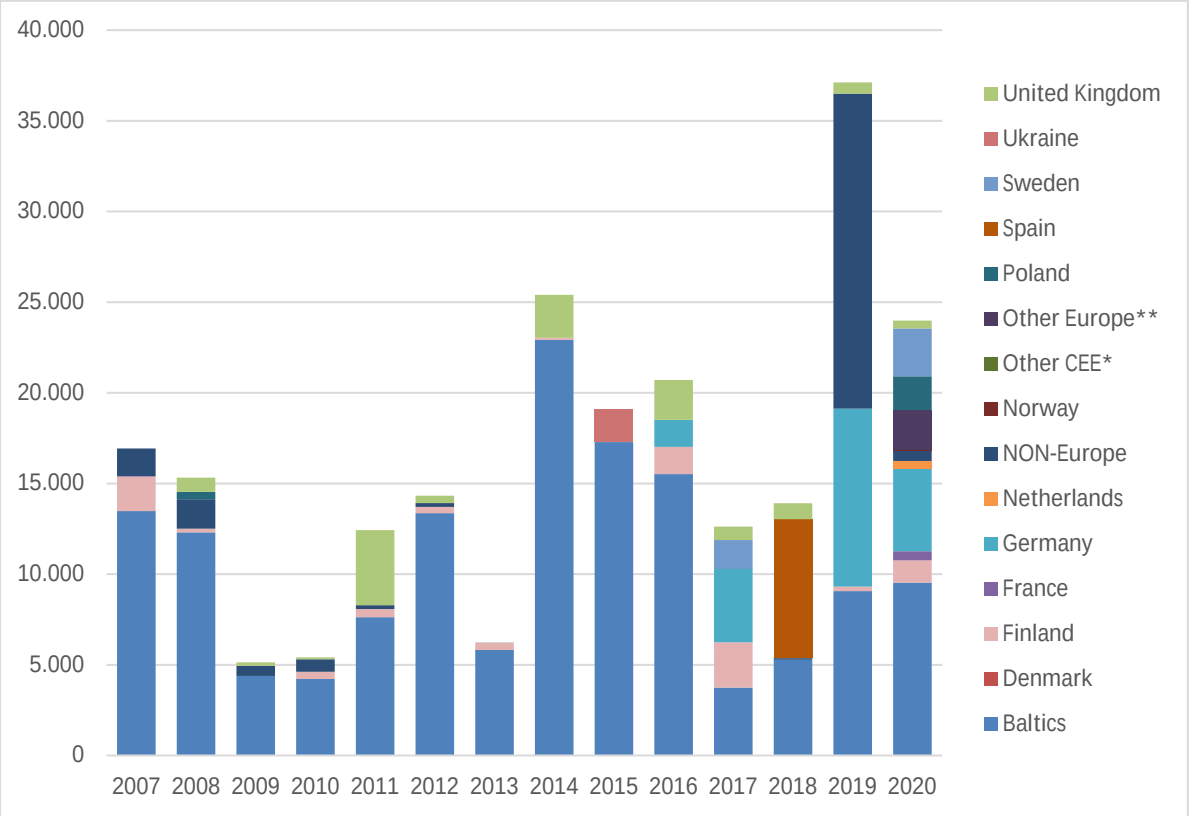


Table 7.6.1.5. **Geographical breakdown of flows from Baltic VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.6.1.6. **Flows from PE/VC funds to Baltic portfolio companies (EUR million)**

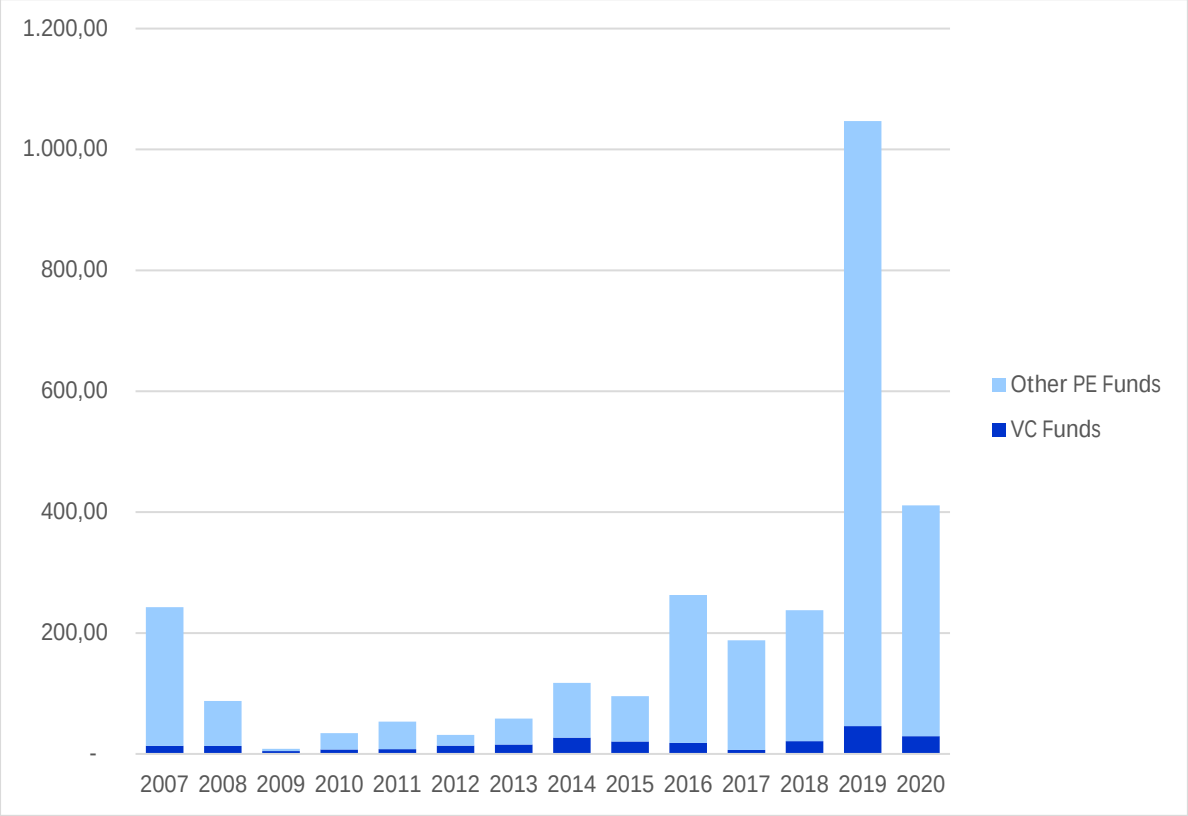


Table 7.6.1.7. **Top 5 foreign VC investors into Baltics portfolio companies (EUR thousands)**

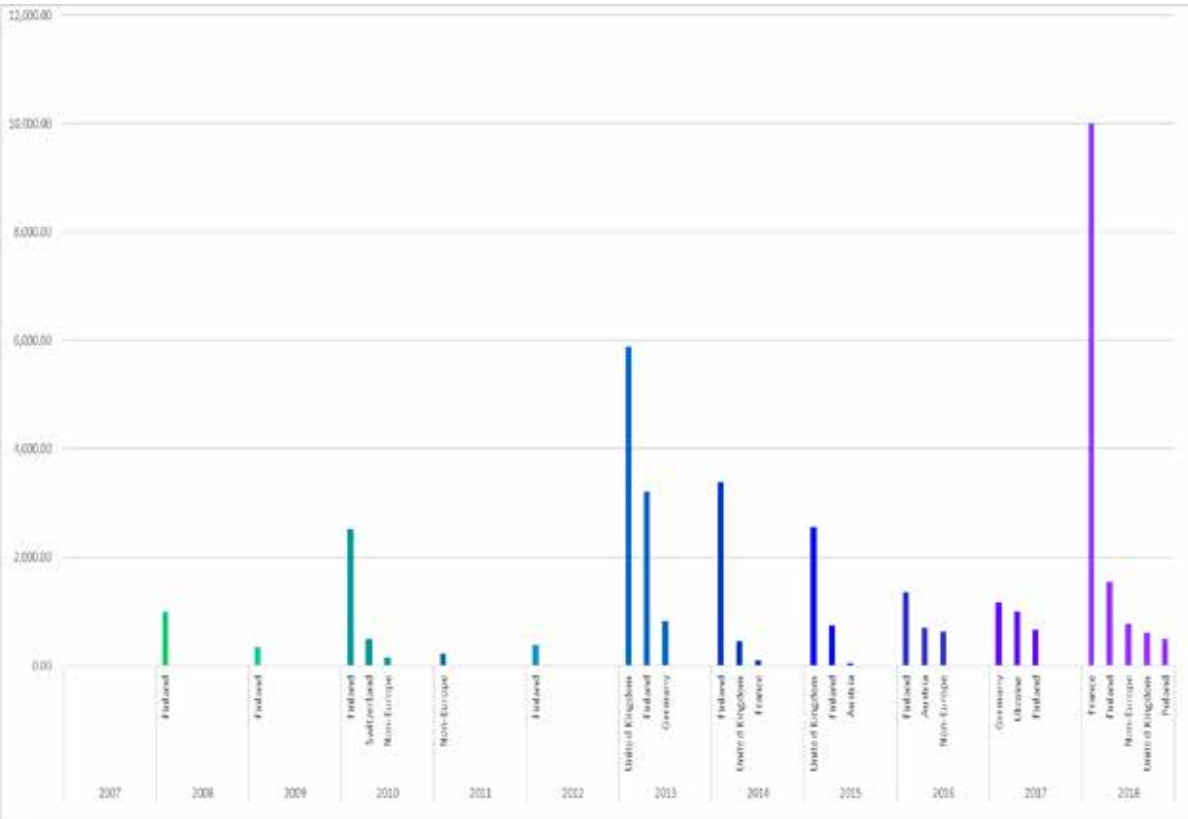


Table 7.6.1.8. **Geographical breakdown of flows from VC funds to Baltic portfolio companies (EUR thousands)**

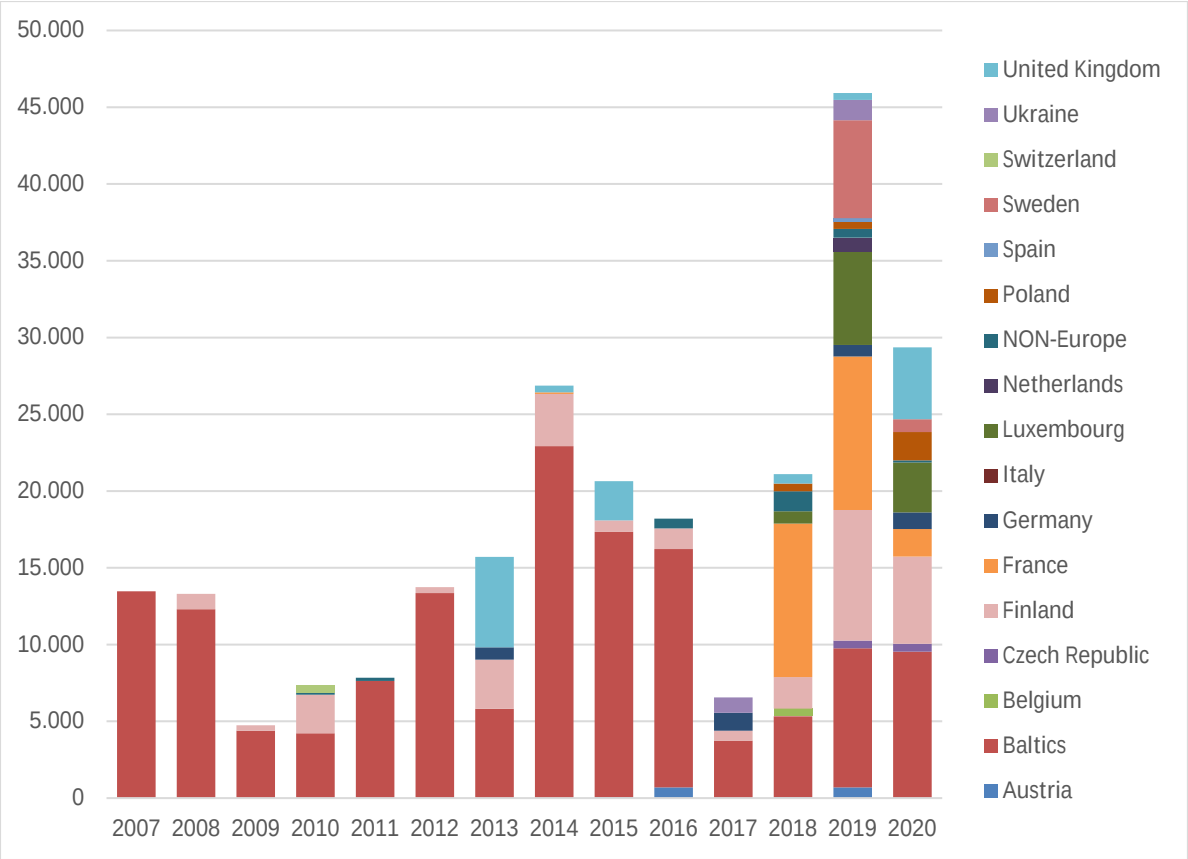
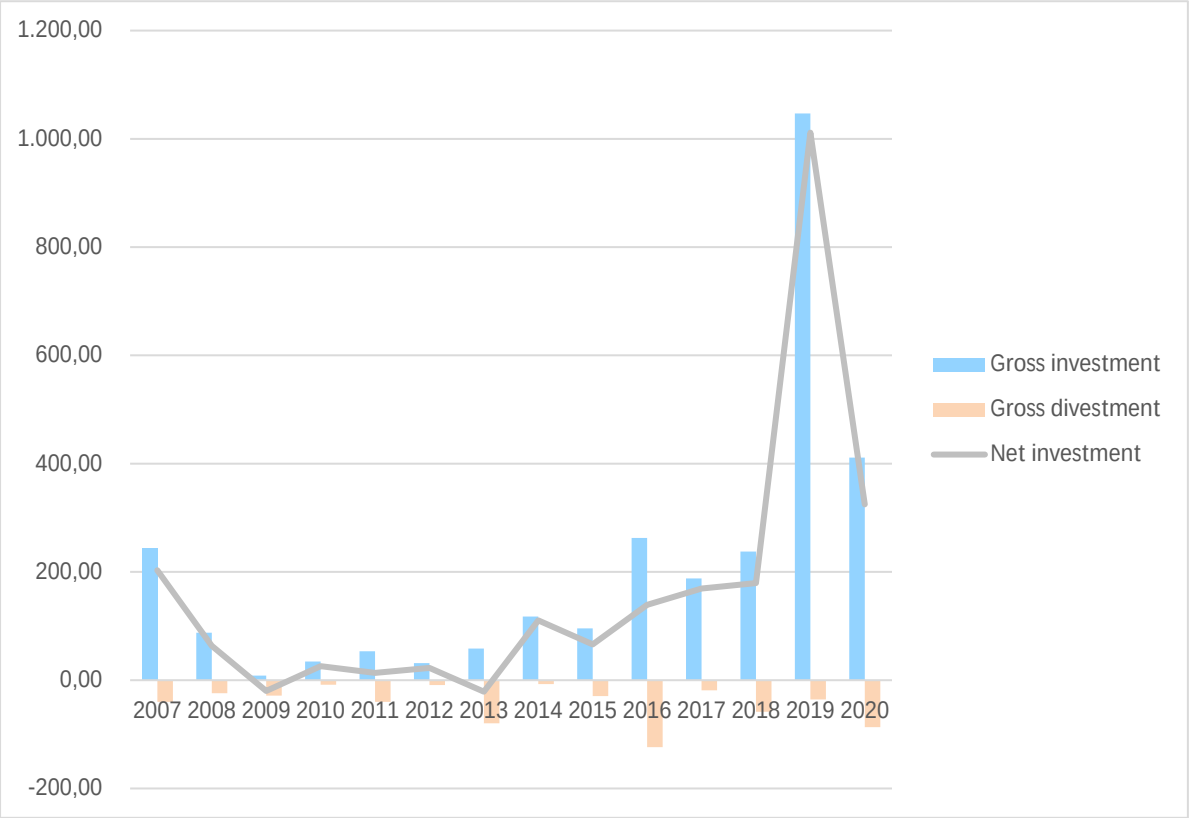


Table 7.6.1.9. **Investments and divestments of Baltic PE funds (EUR million)**



7.6.2 Bulgaria

Table 7.6.2.1. **Flows raised by Bulgarian PE/VC funds (EUR million)**

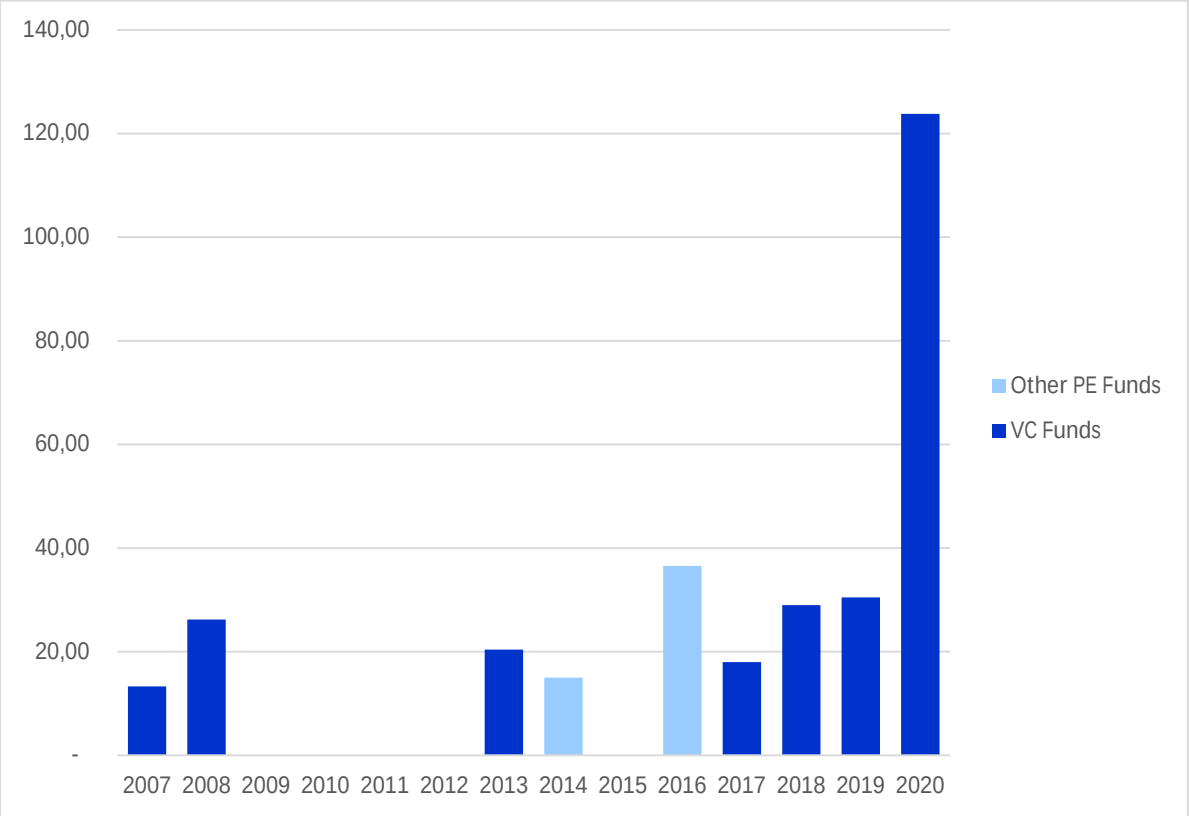
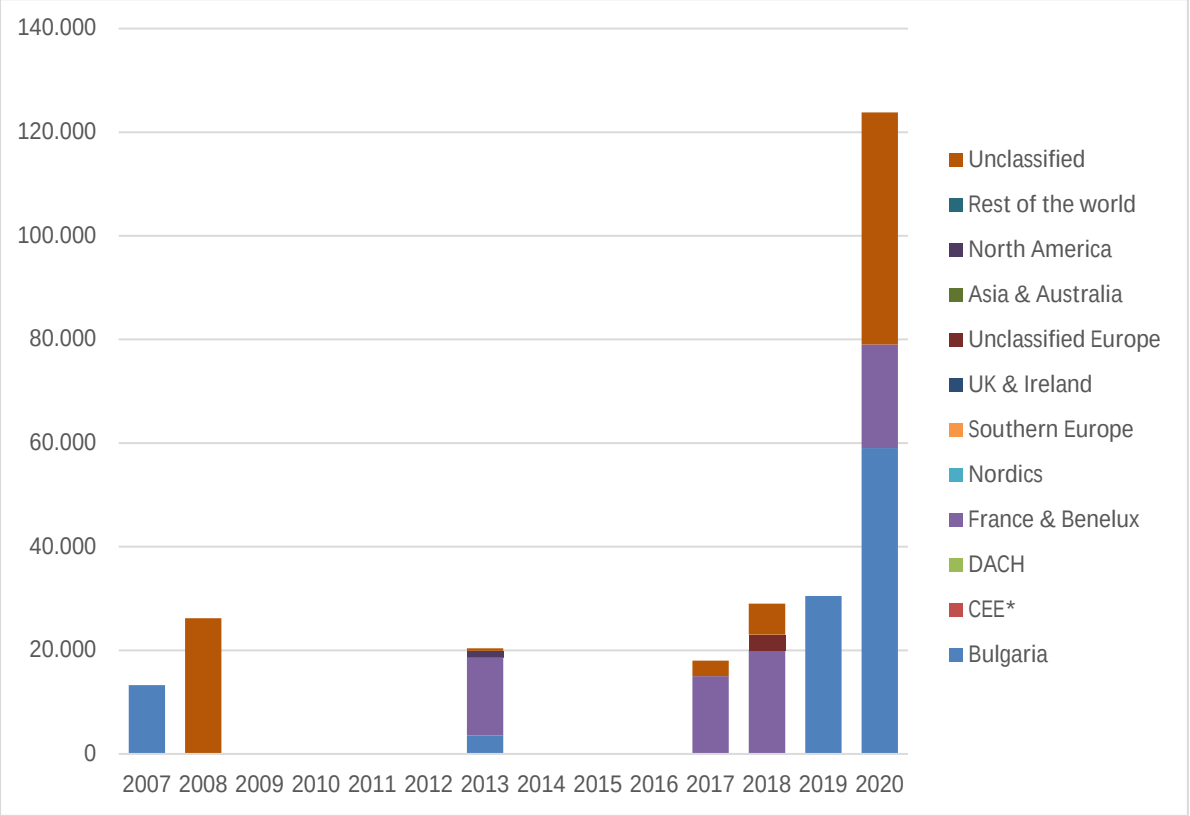


Table 7.6.2.2. **Geographical breakdown of Bulgarian VC fundraising (EUR thousands)**



CEE* - excluding the Bulgaria

Table 7.6.2.3. **Flows from Bulgarian PE/VC funds to portfolio companies (EUR million)**

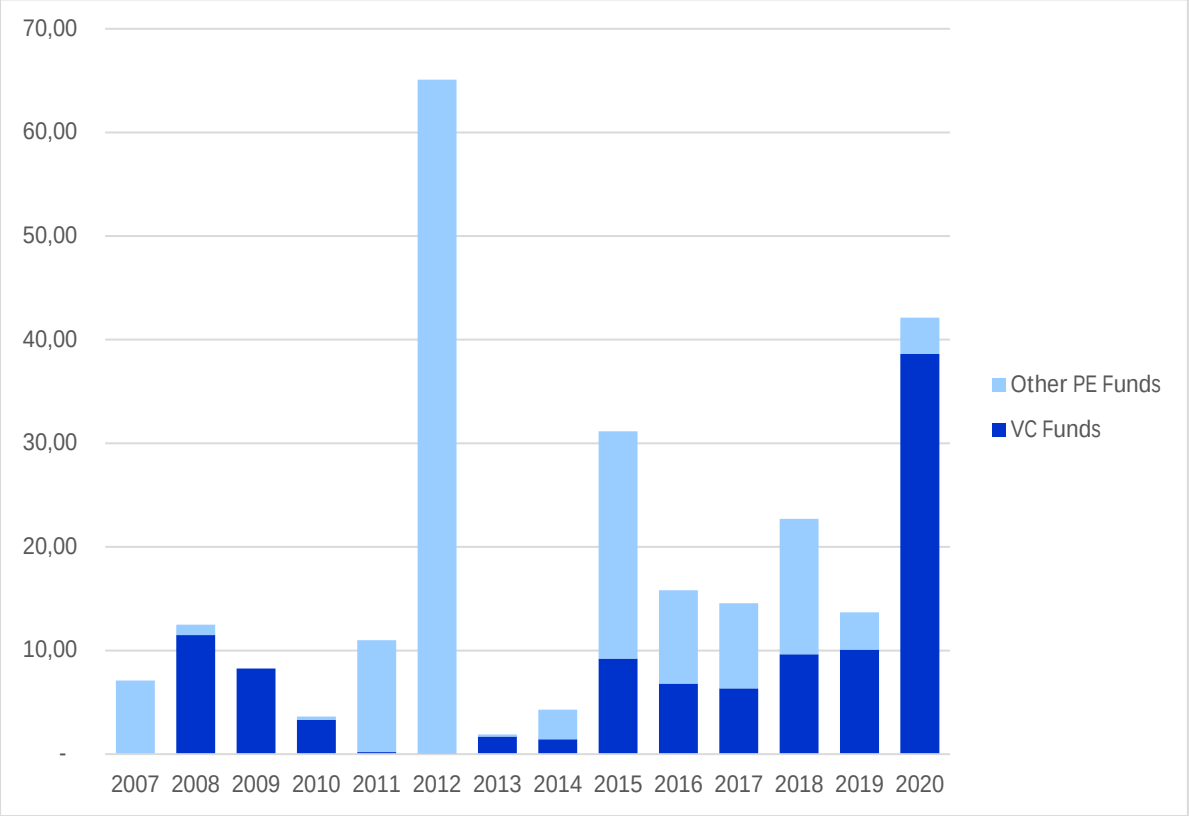
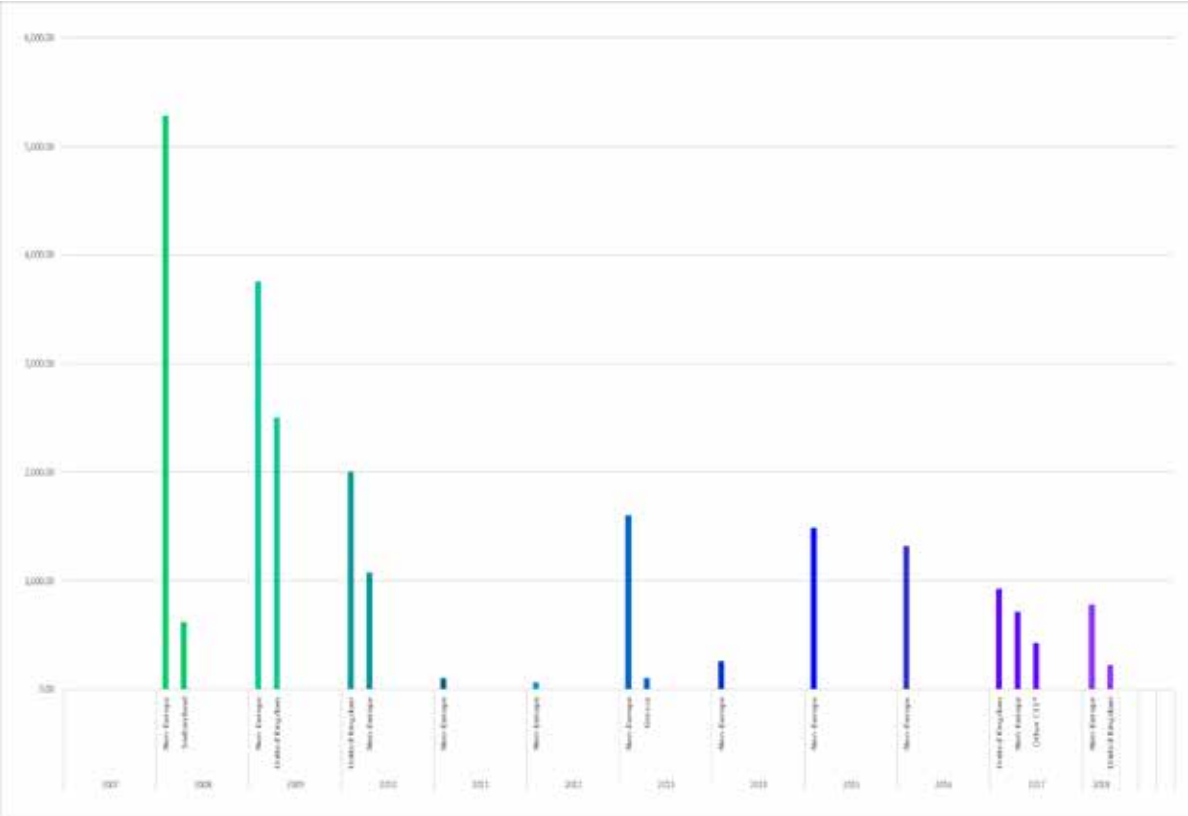
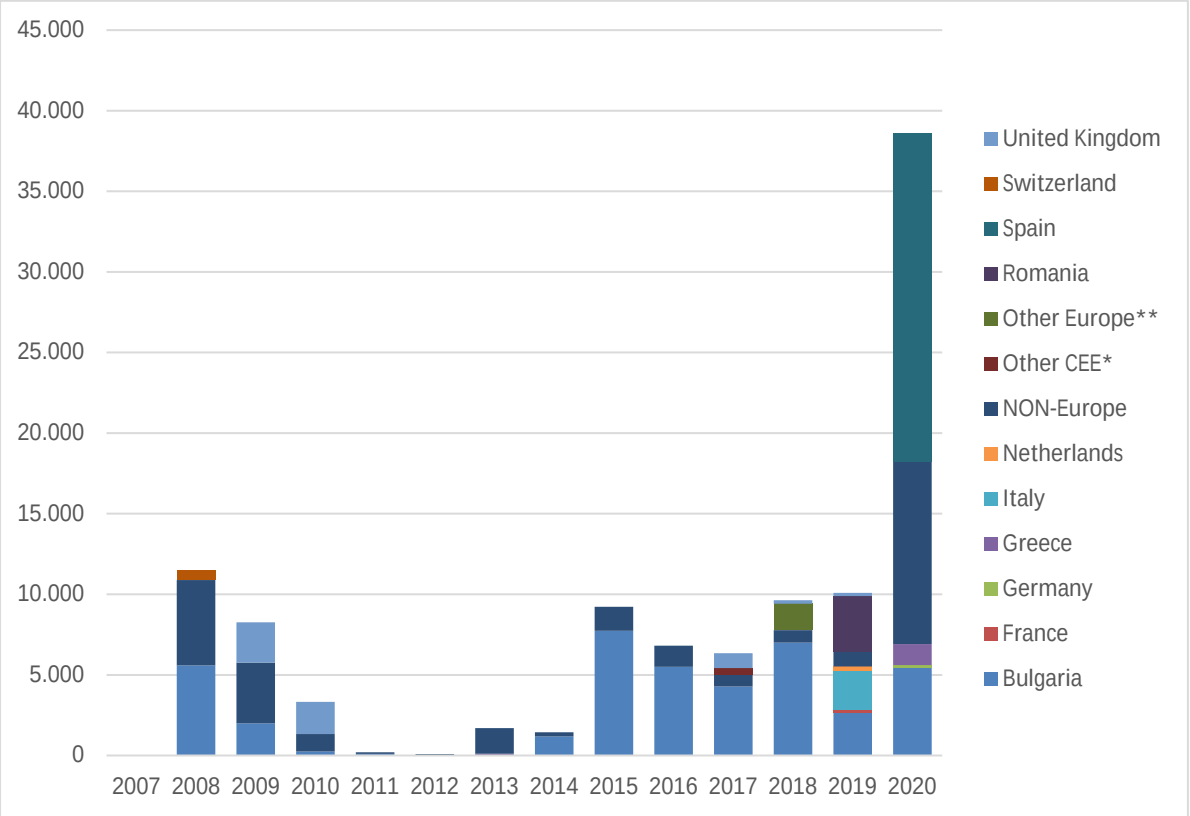


Table 7.6.2.4. **Top 5 foreign countries where Bulgarian VC funds have invested (EUR thousands)**



Other CEE* - Bosnia-Herzegovina, Croatia, Macedonia, Moldovia, Montenegro, Serbia, Slovakia, Slovenia.

Table 7.6.2.5. **Geographical breakdown of flows from Bulgarian VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.6.2.6. **Flows from PE/VC funds to Bulgarian portfolio companies (EUR million)**

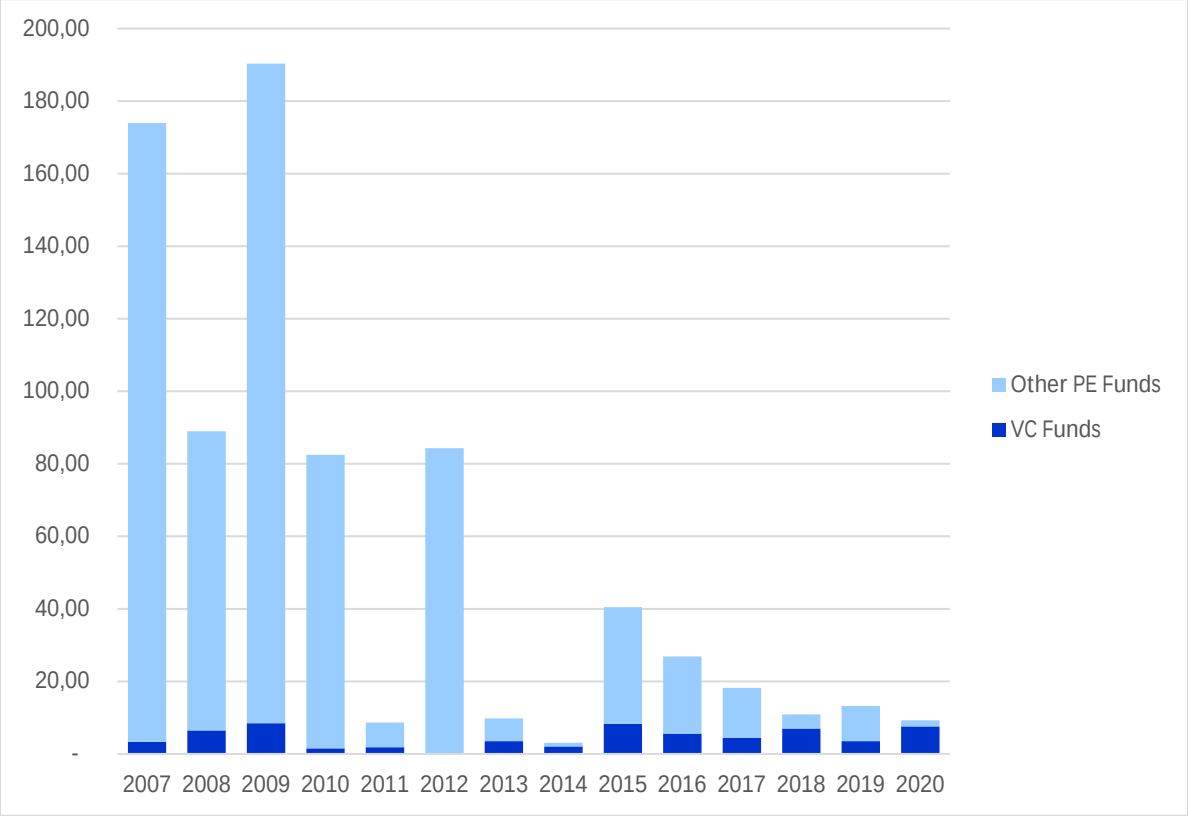


Table 7.6.2.7. **Top 5 foreign VC investors into Bulgarian portfolio companies (EUR thousands)**

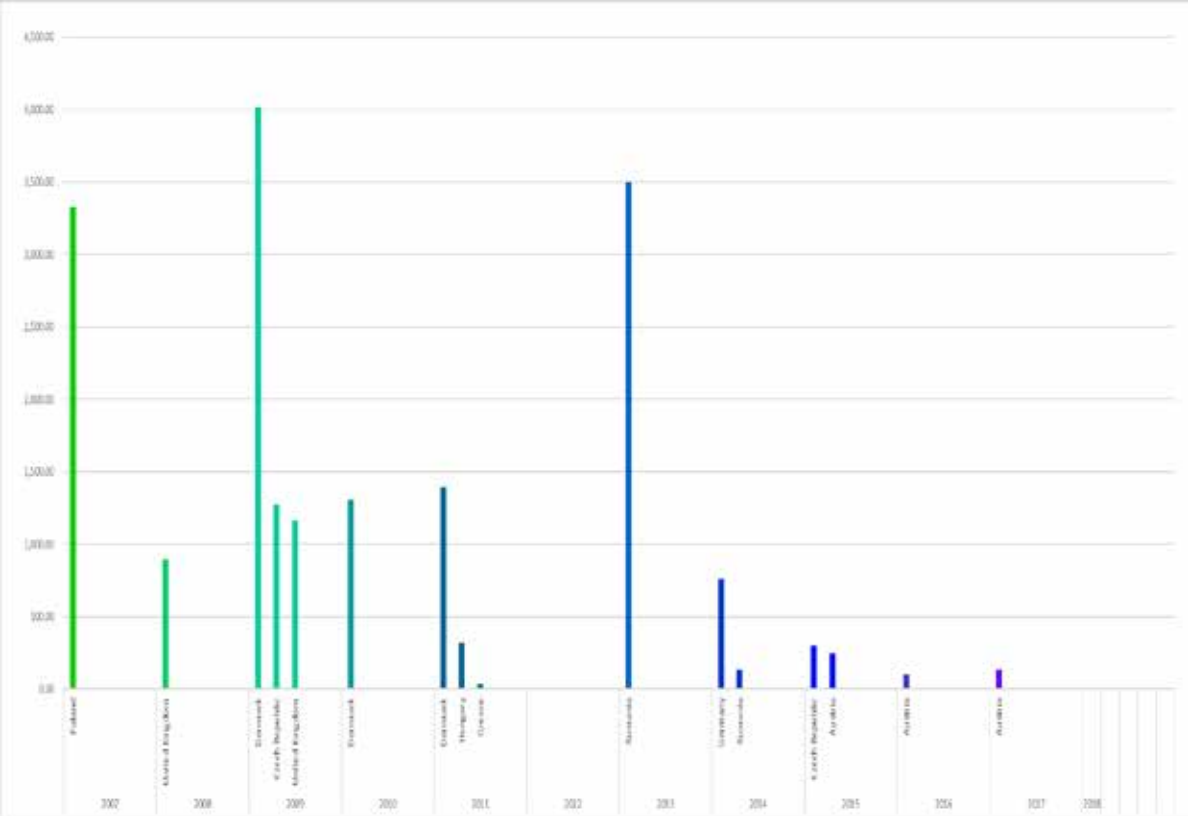


Table 7.6.2.8. **Geographical breakdown of flows from VC funds to Bulgarian portfolio companies (EUR thousands)**

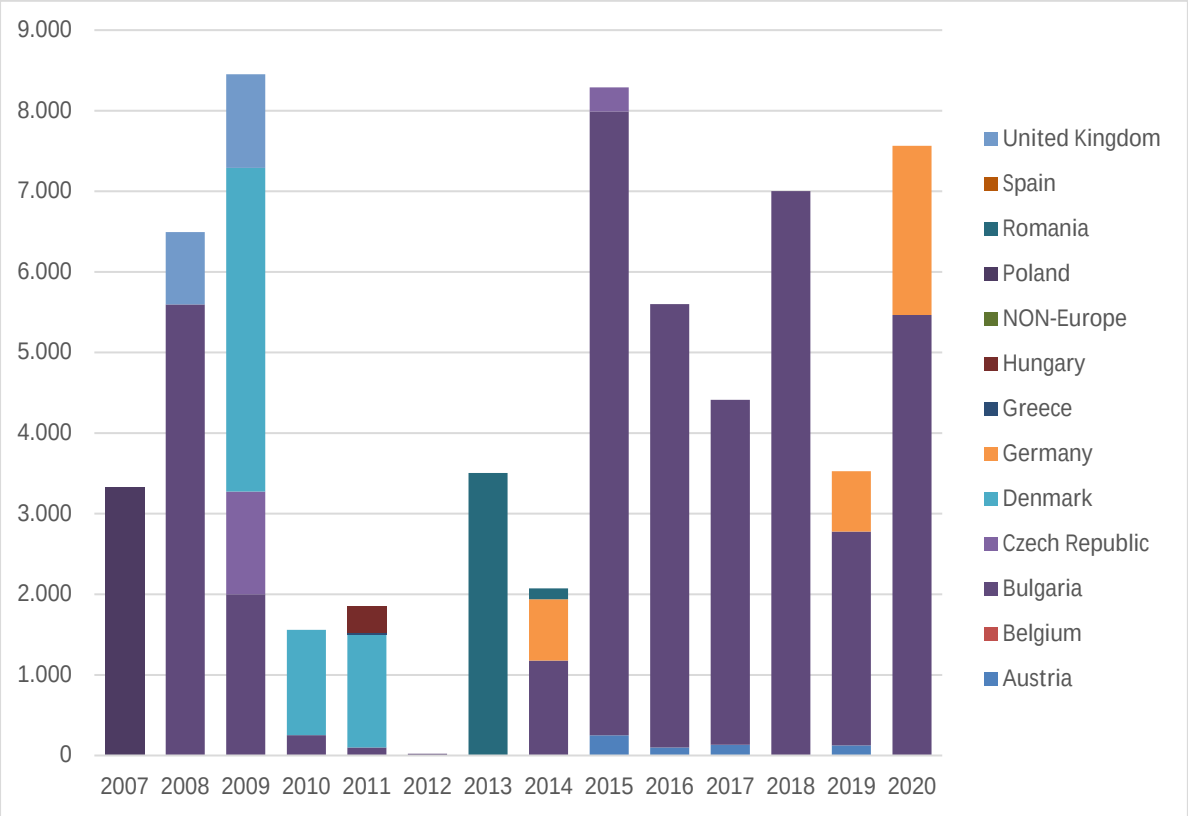
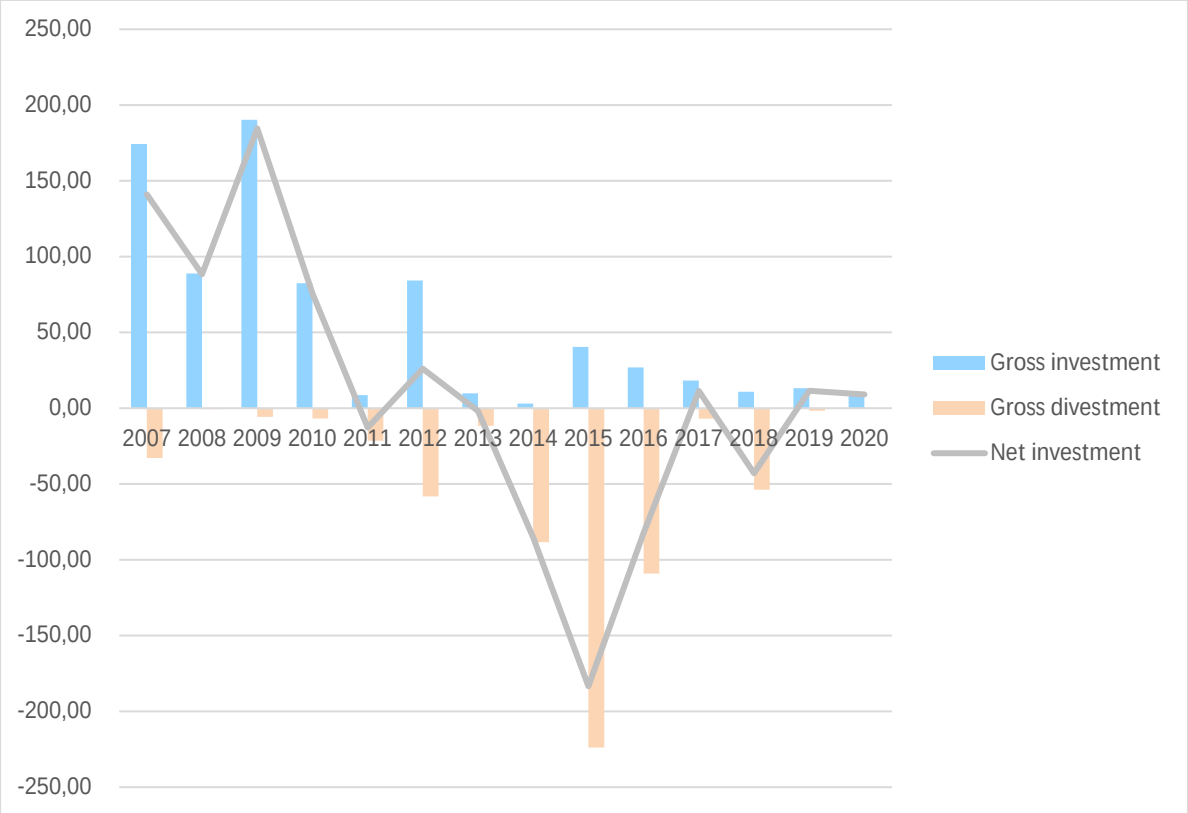


Table 7.6.2.9. **Investments and divestments of Bulgarian PE funds (EUR million)**



7.6.3 Czechia

Table 7.6.3.1. **Flows raised by Czech PE/VC funds (EUR million)**

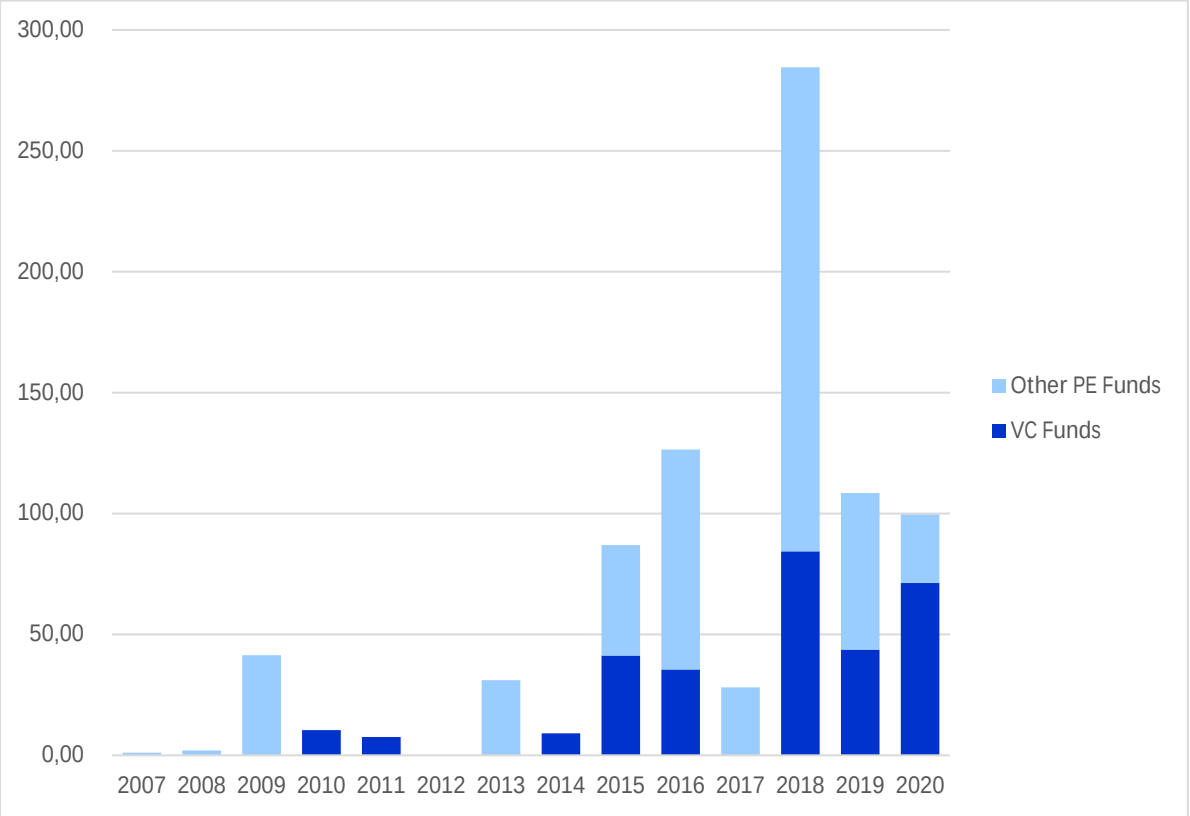
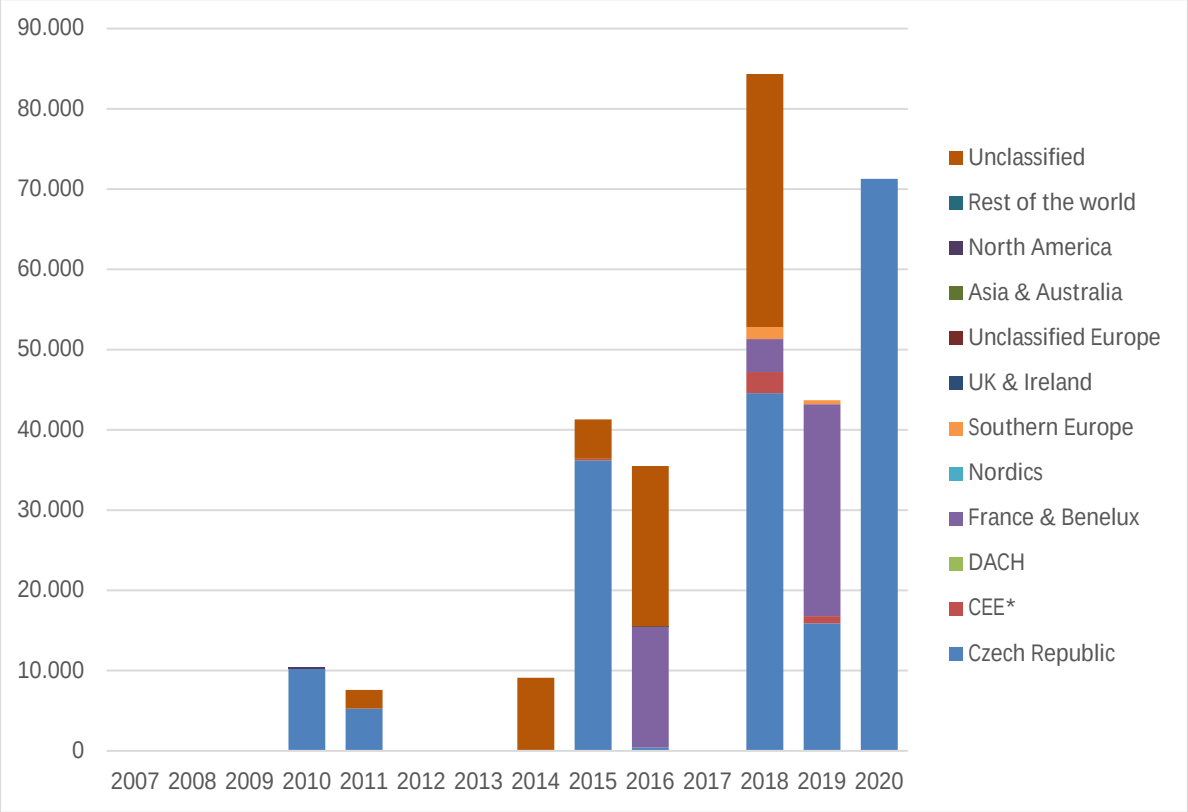


Table 7.6.3.2. **Geographical breakdown of Czech VC fundraising (EUR thousands)**



CEE* - excluding Czechia

Table 7.6.3.3. **Flows from Czech PE/VC funds to portfolio companies (EUR million)**

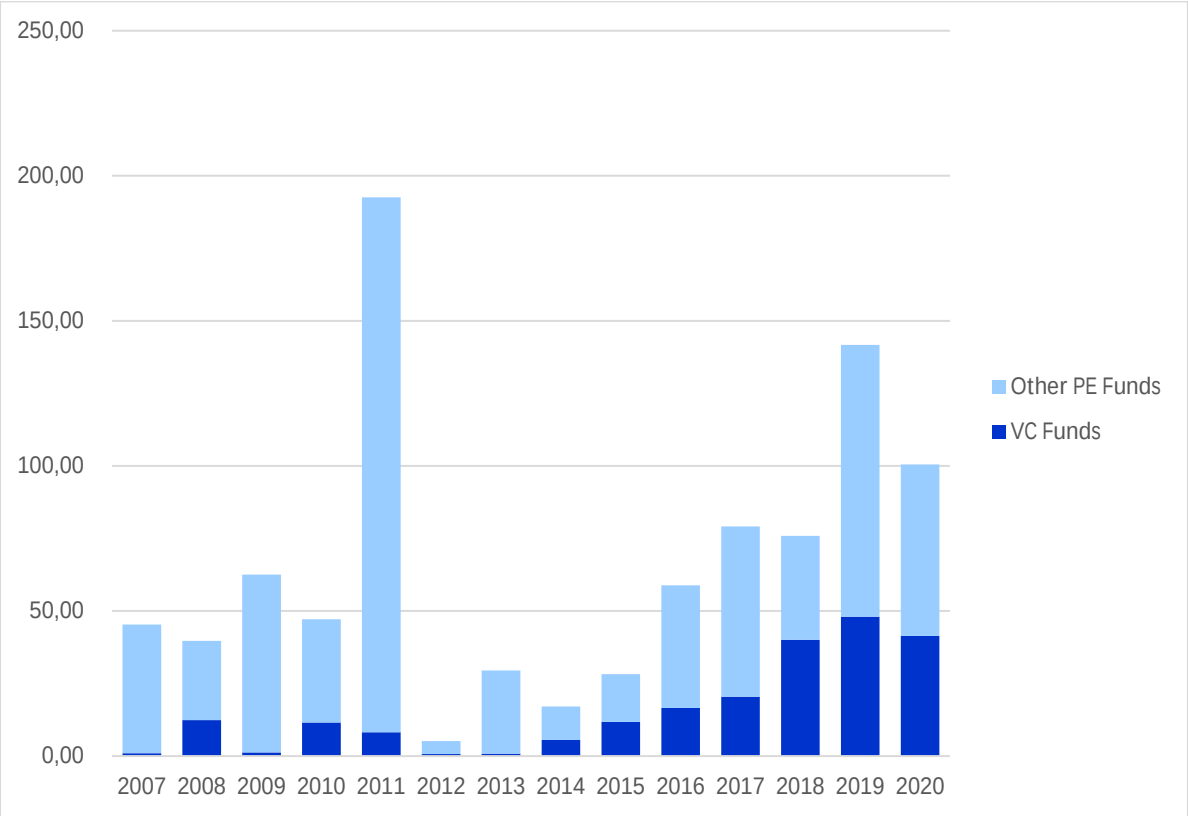
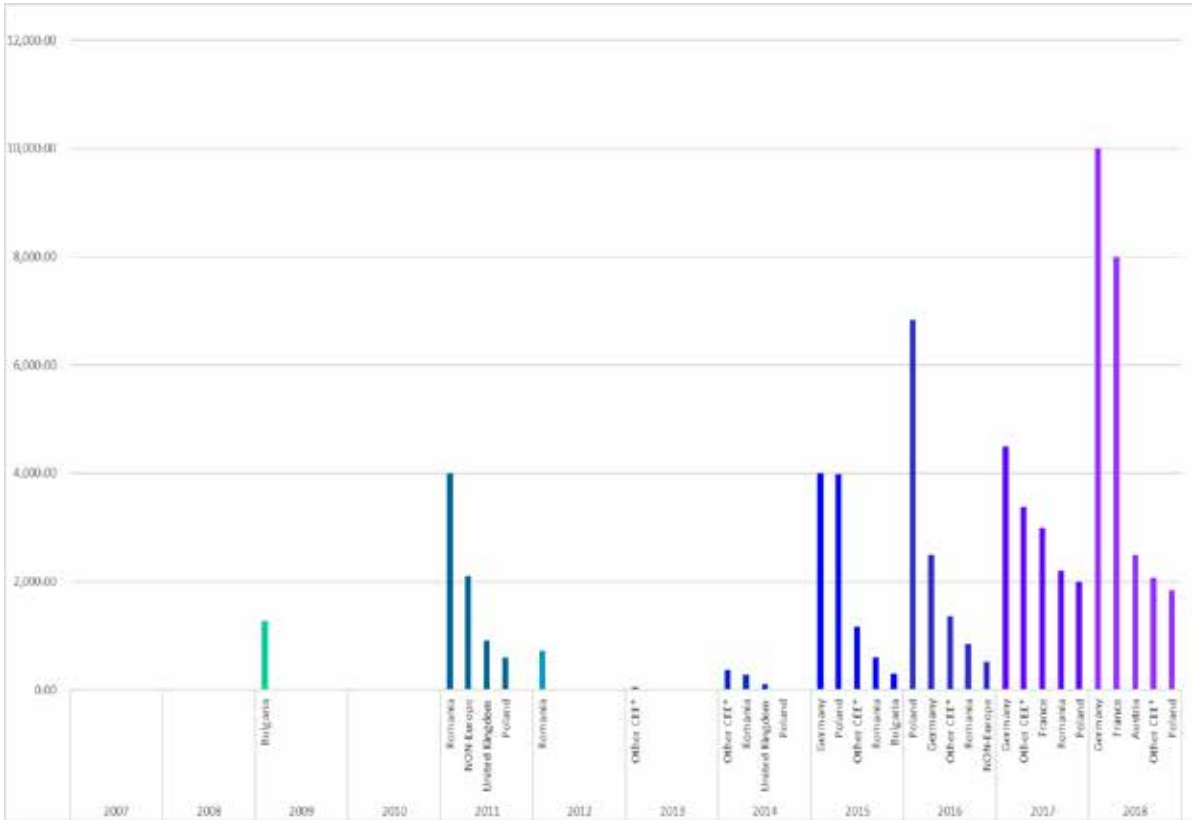
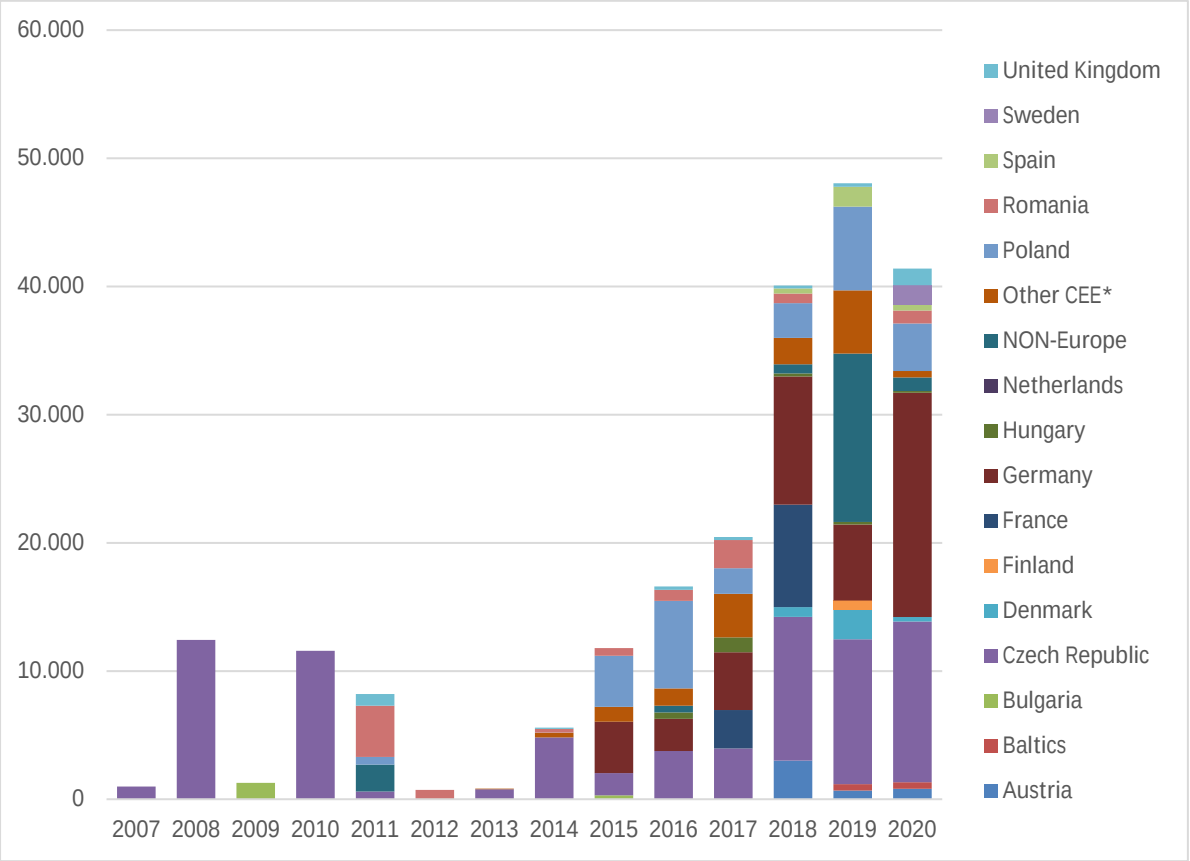


Table 7.6.3.4. **Top 5 foreign countries where Czech VC funds have invested (EUR thousands)**



Other CEE* - Bosnia-Herzegovina, Croatia, Macedonia, Moldovia, Montenegro, Serbia, Slovakia, Slovenia.

Table 7.6.3.5. **Geographical breakdown of flows from Czech VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

Table 7.6.3.6. **Flows from PE/VC funds to Czech portfolio companies (EUR million)**

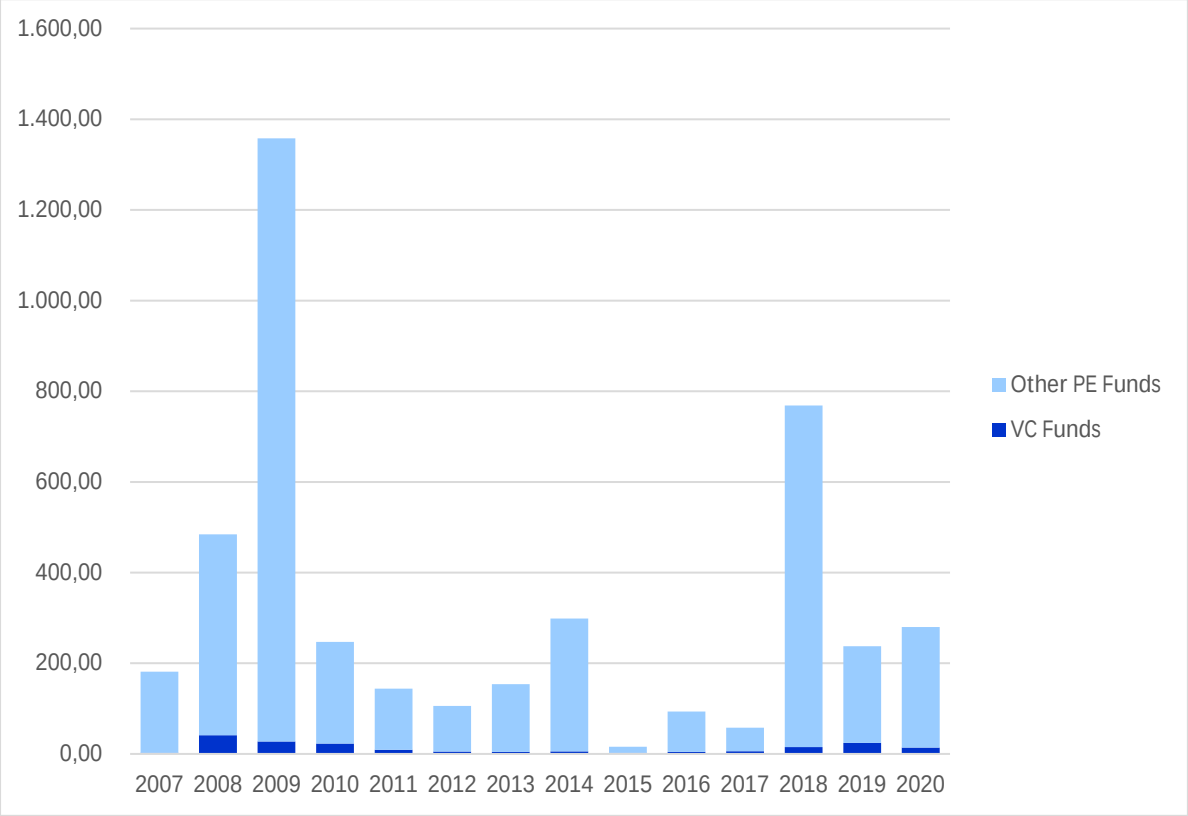


Table 7.6.3.7. **Top 5 foreign VC investors into Czech portfolio companies (EUR thousands)**

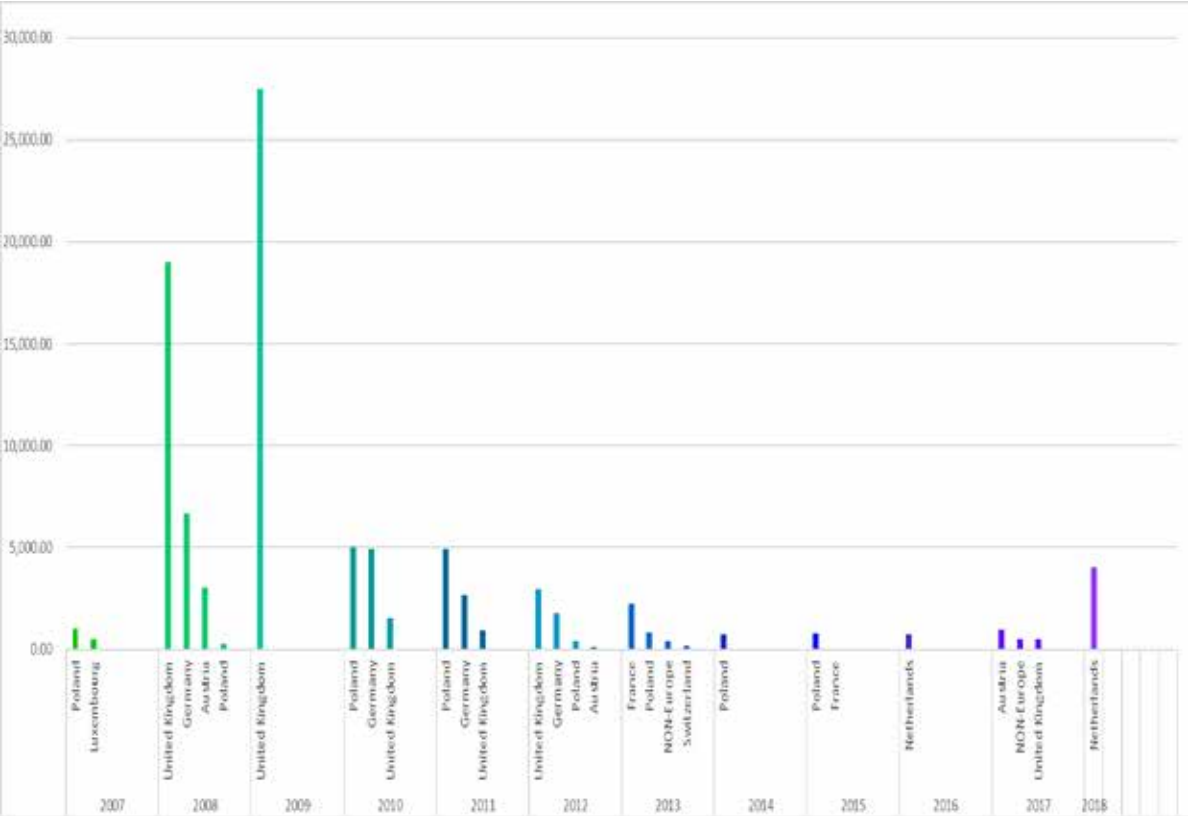


Table 7.6.3.8. **Geographical breakdown of flows from VC funds to Czech portfolio companies (EUR thousands)**

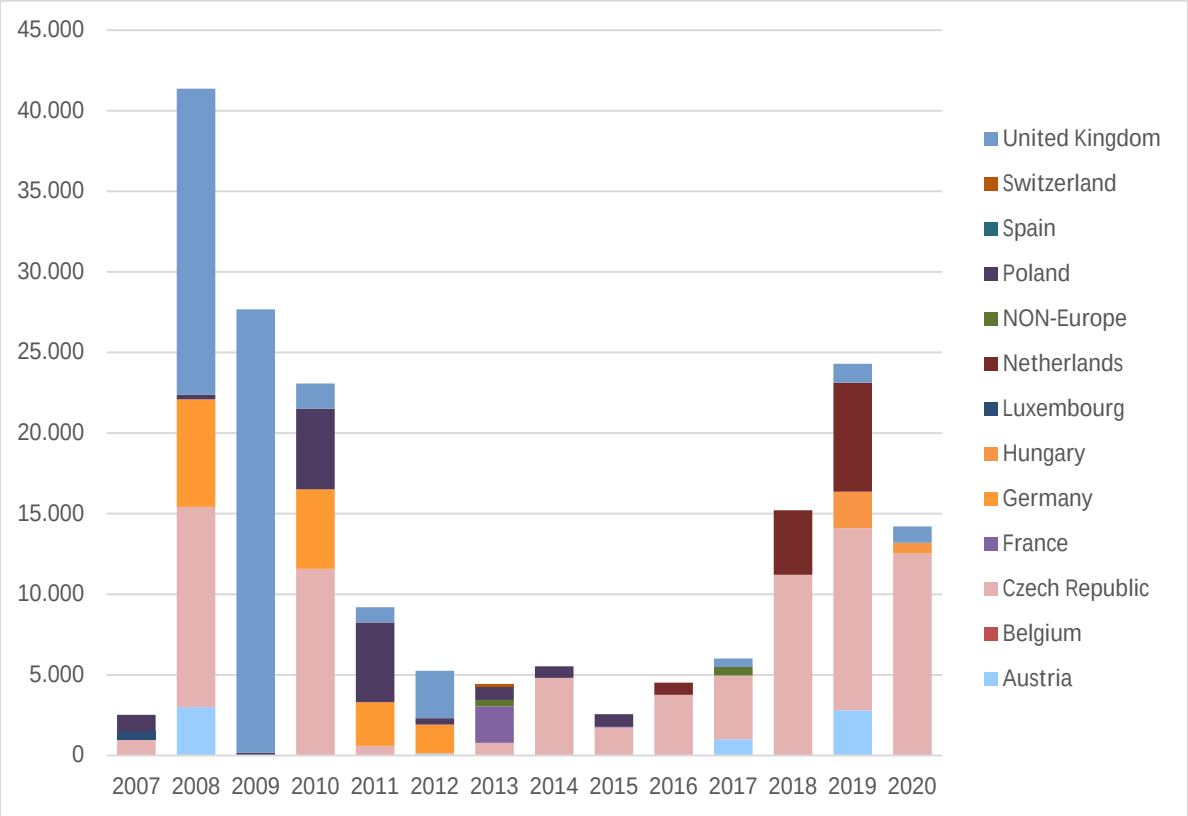
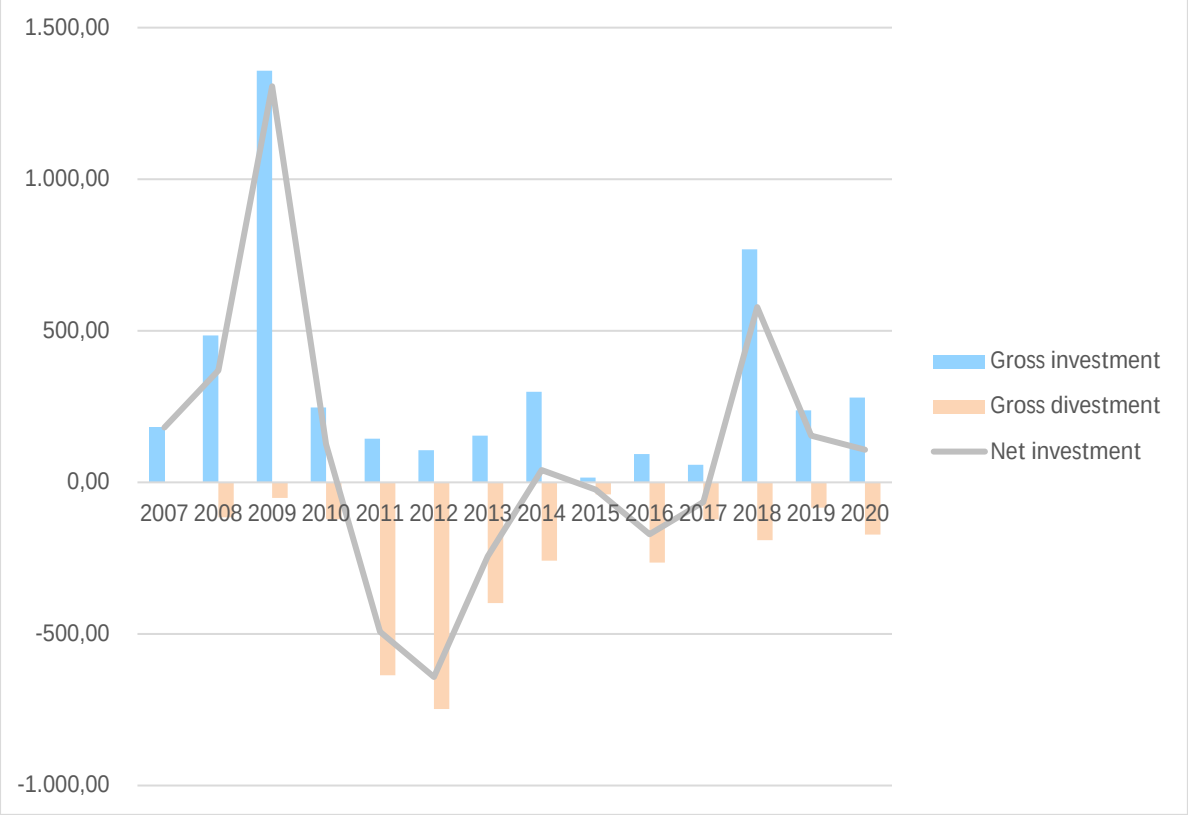


Table 7.6.3.9. **Investments and divestments of Czech PE funds (EUR million)**



7.6.4 Hungary

Table 7.6.4.1. **Flows raised by Hungarian PE/VC funds (EUR million)**

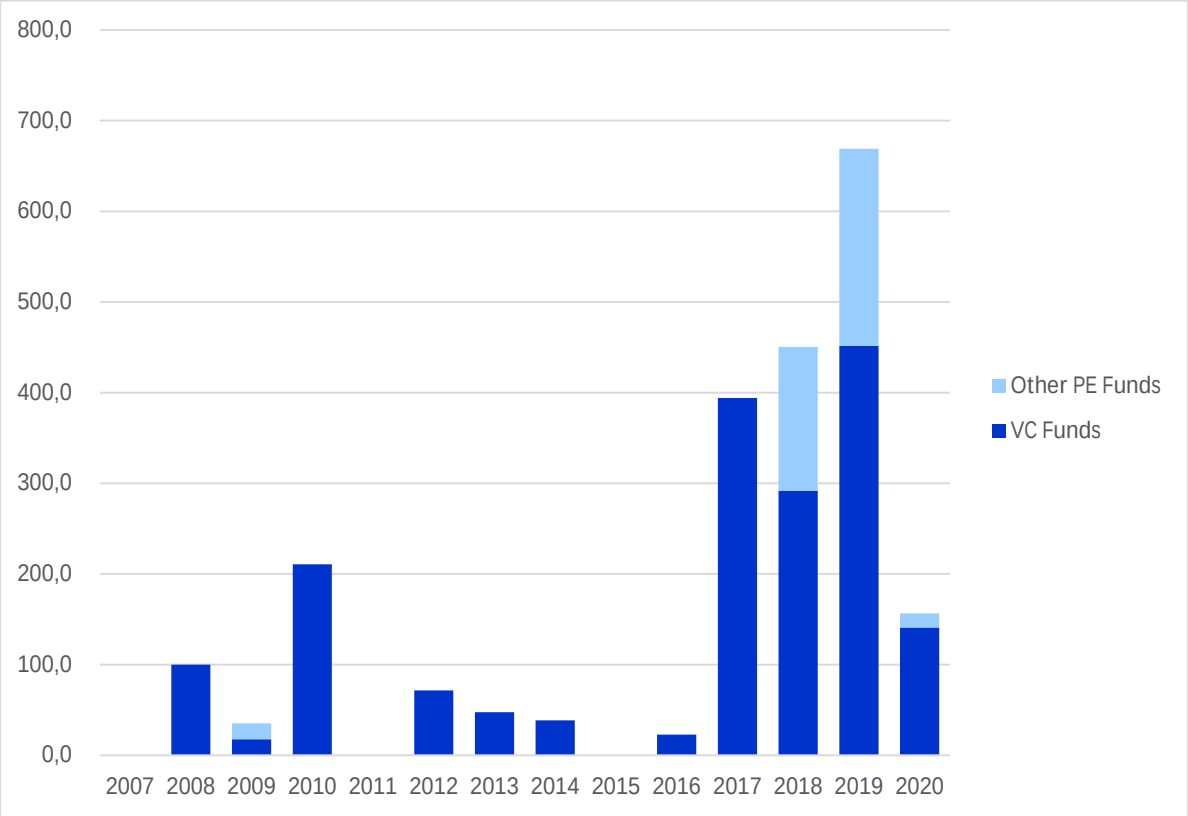
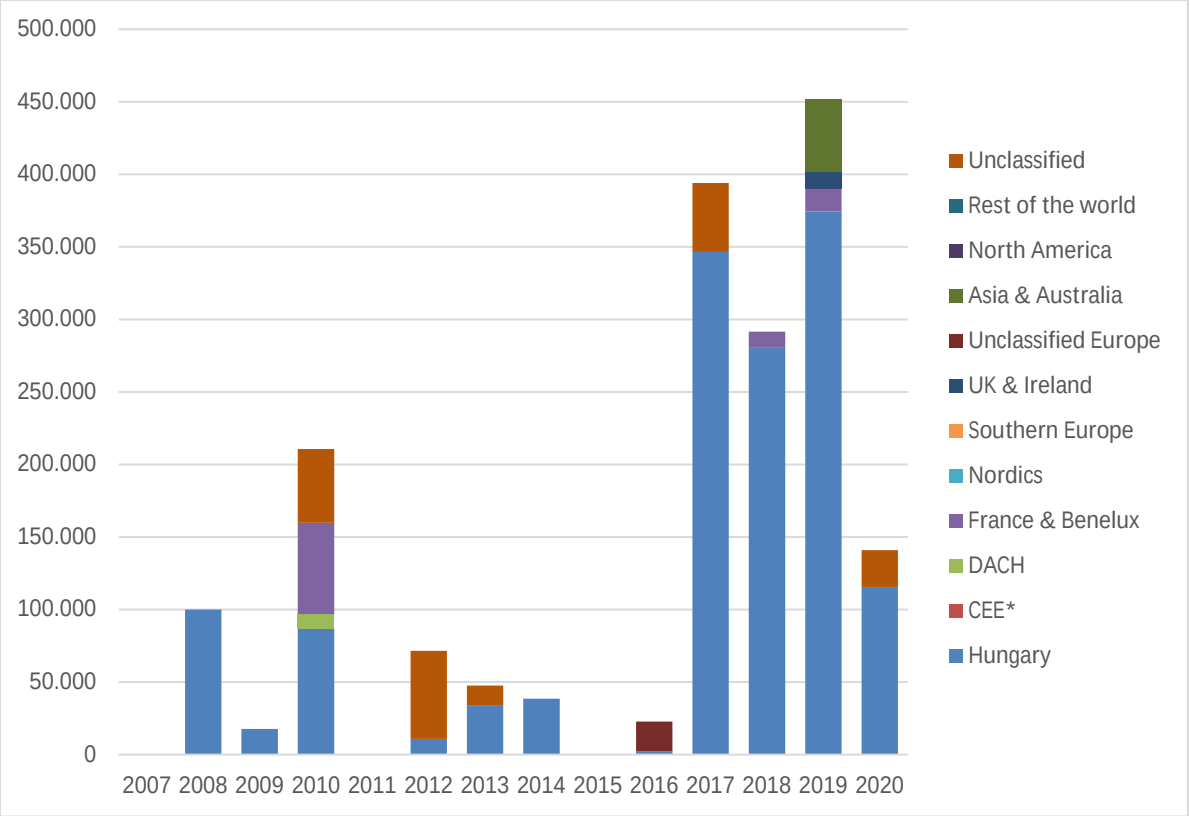


Table 7.6.4.2. **Geographical breakdown of Hungarian VC fundraising (EUR thousands)**



CEE* - excluding Hungary

Table 7.6.4.3. **Flows from Hungarian PE/VC funds to portfolio companies (EUR million)**

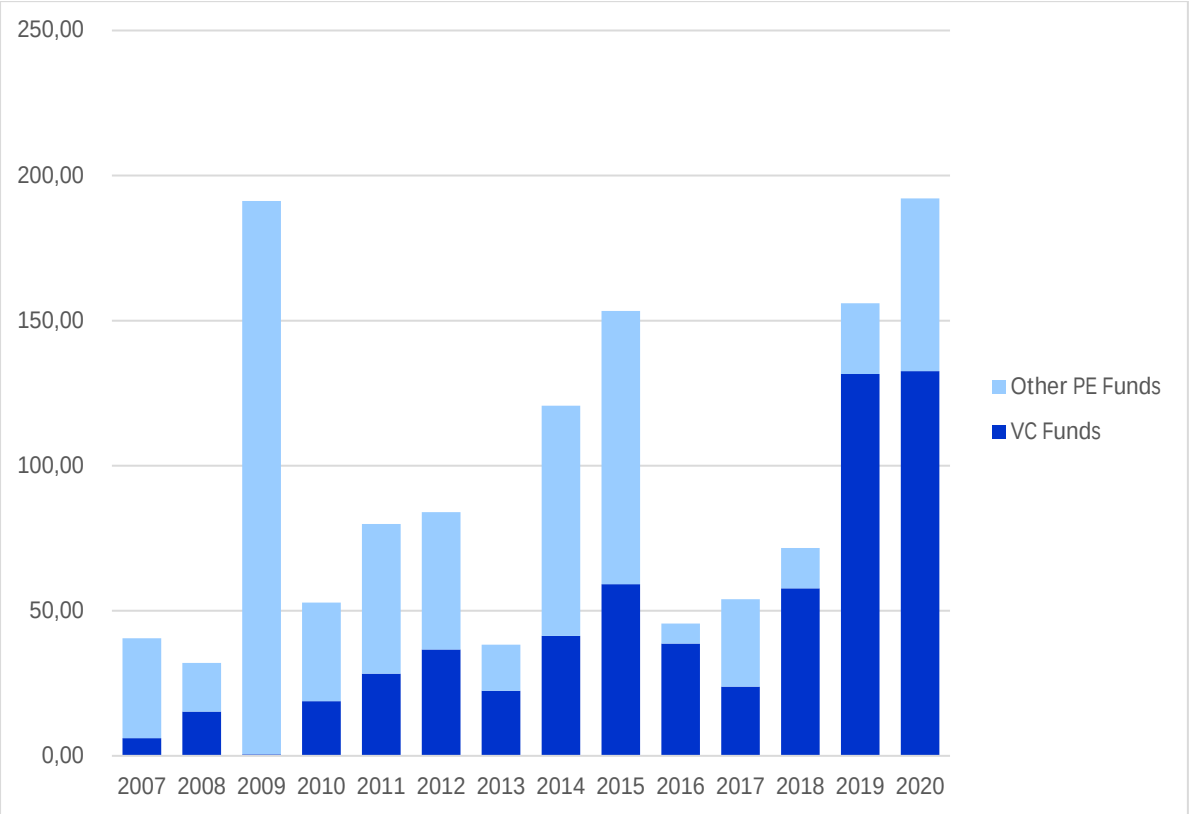
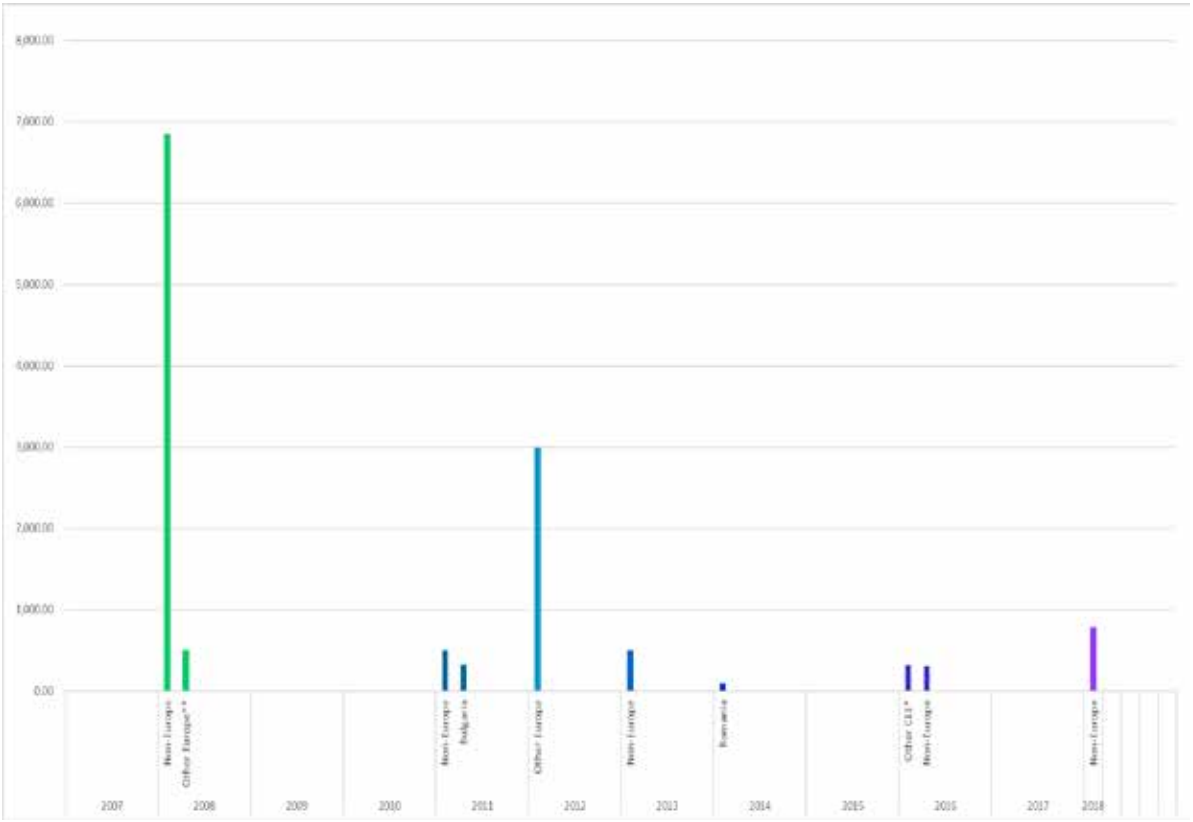
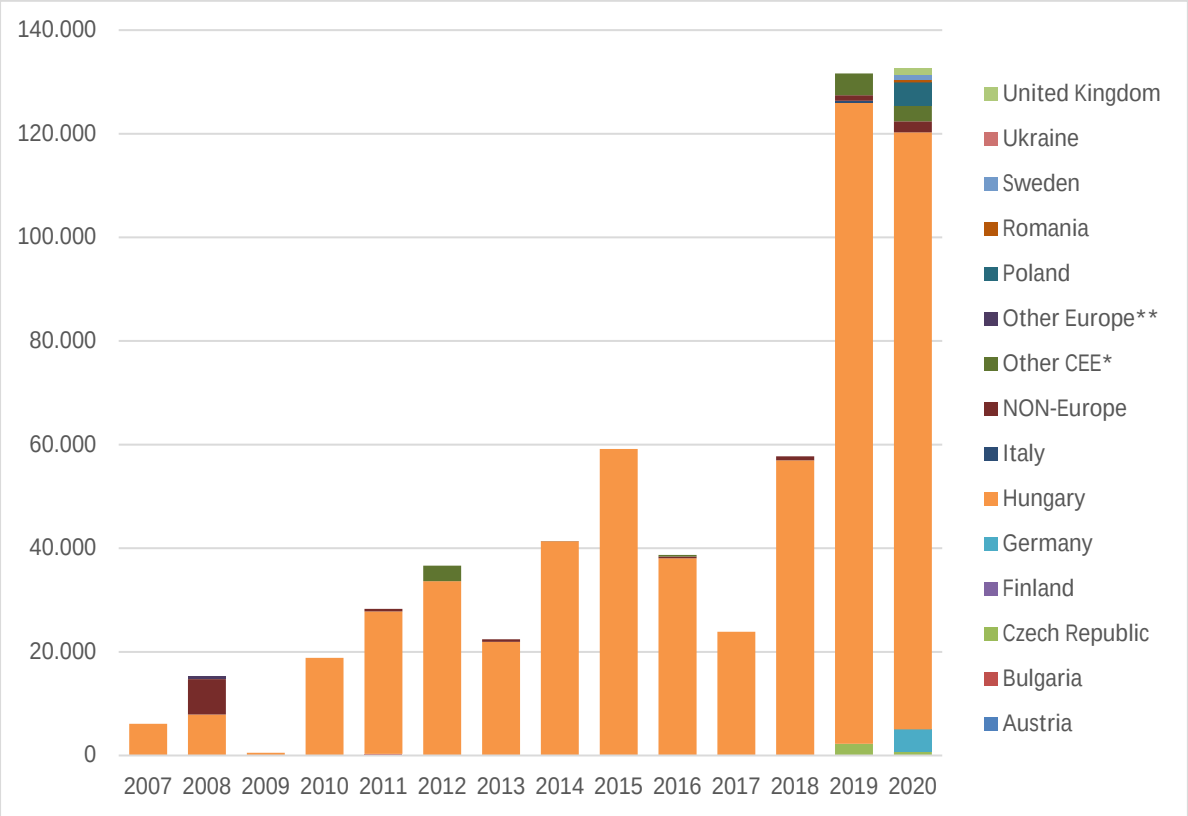


Table 7.6.4.4. **Top 5 foreign countries where Hungarian VC funds have invested (EUR thousands)**



Other CEE* - Bosnia-Herzegovina, Croatia, Macedonia, Moldovia, Montenegro, Serbia, Slovakia, Slovenia.
Other Europe** - Cyprus, Iceland, Lichtenstein, Malta, San Marino, Vatican City.

Table 7.6.4.5. **Geographical breakdown of flows from Hungarian VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.6.4.6. **Flows from PE/VC funds to Hungarian portfolio companies (EUR million)**

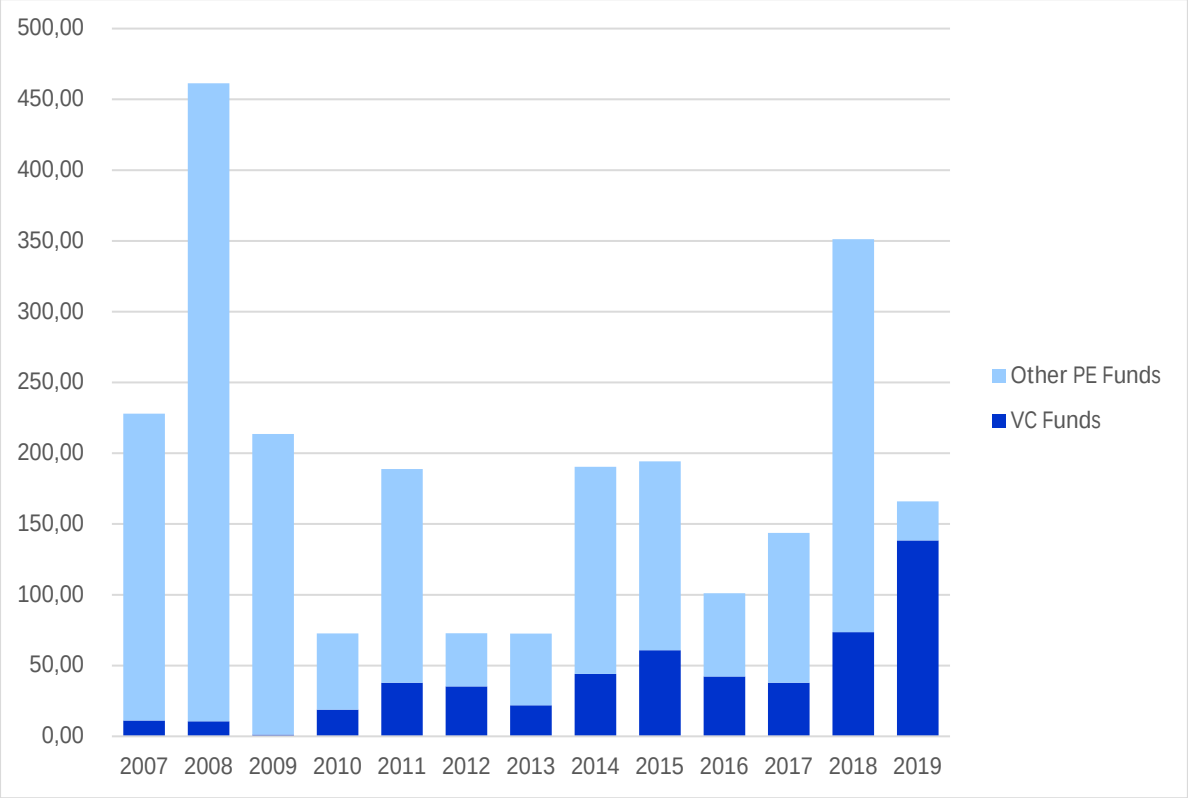
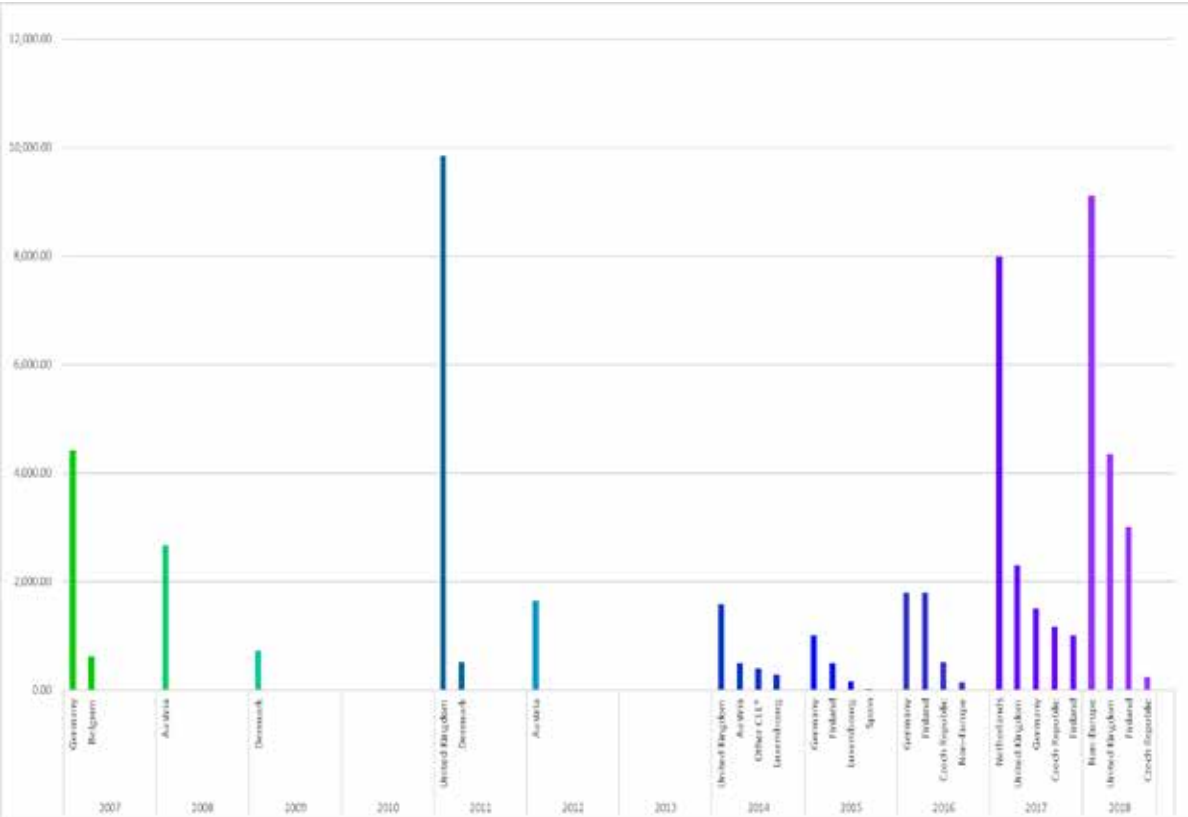
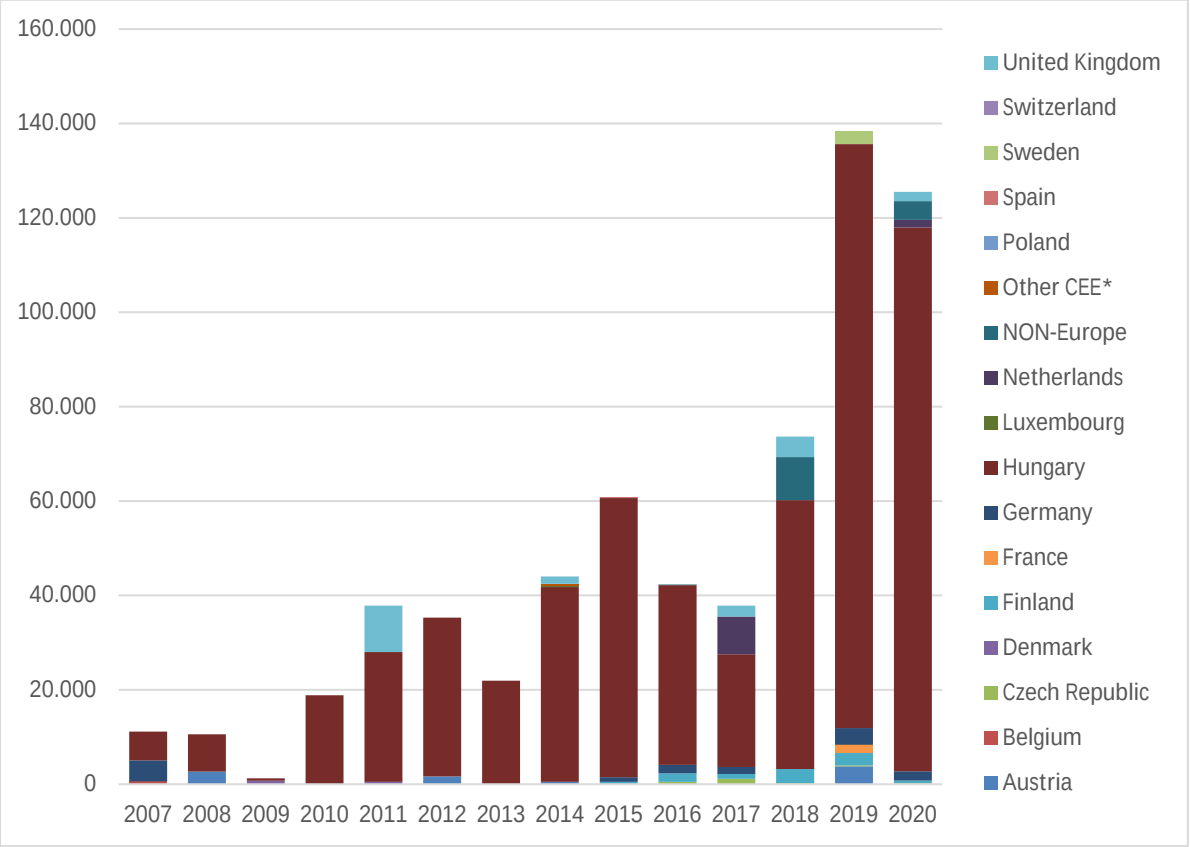


Table 7.6.4.7. **Top 5 foreign VC investors into Hungarian portfolio companies (EUR thousands)**



Other CEE* - Bosnia-Herzegovina, Croatia, Macedonia, Moldovia, Montenegro, Serbia, Slovakia, Slovenia

Table 7.6.4.8. **Geographical breakdown of flows from VC funds to Hungarian portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

Table 7.6.4.9. **Investments and divestments of Hungarian PE funds (EUR million)**

7.6.5 Other Central and Eastern Europe

Table 7.6.5.1. **Flows raised by Other CEE PE/VC funds (EUR thousands)**

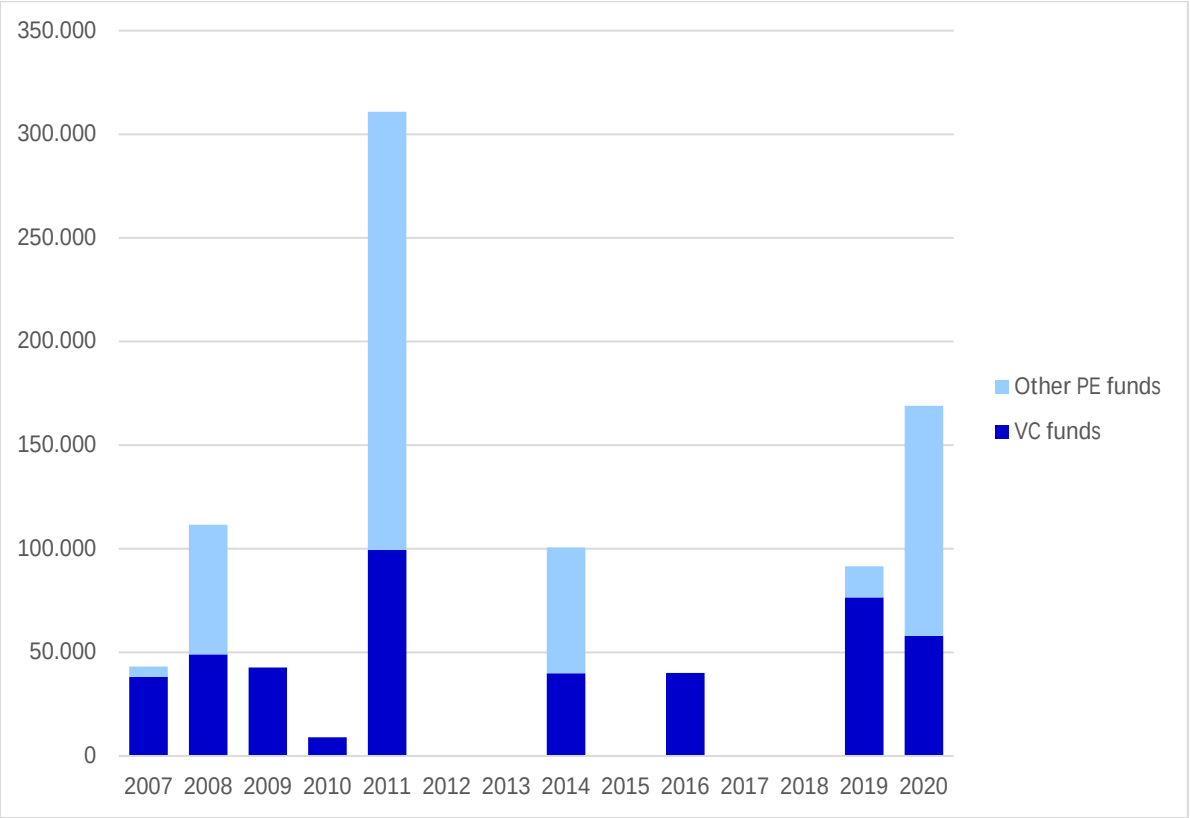


Table 7.6.5.2. **Geographical breakdown of Other CEE VC fundraising (EUR thousands)**

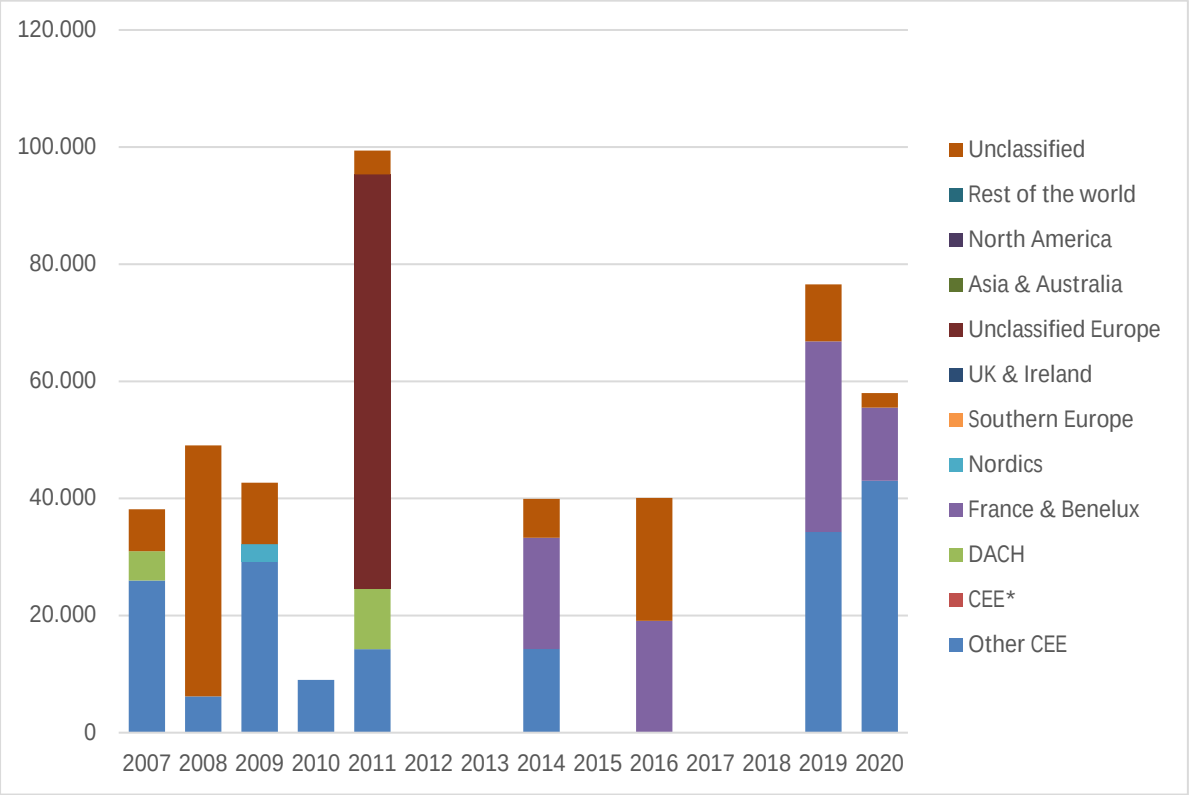


Table 7.6.5.3. **Flows from Other CEE PE/VC funds to portfolio companies (EUR thousands)**

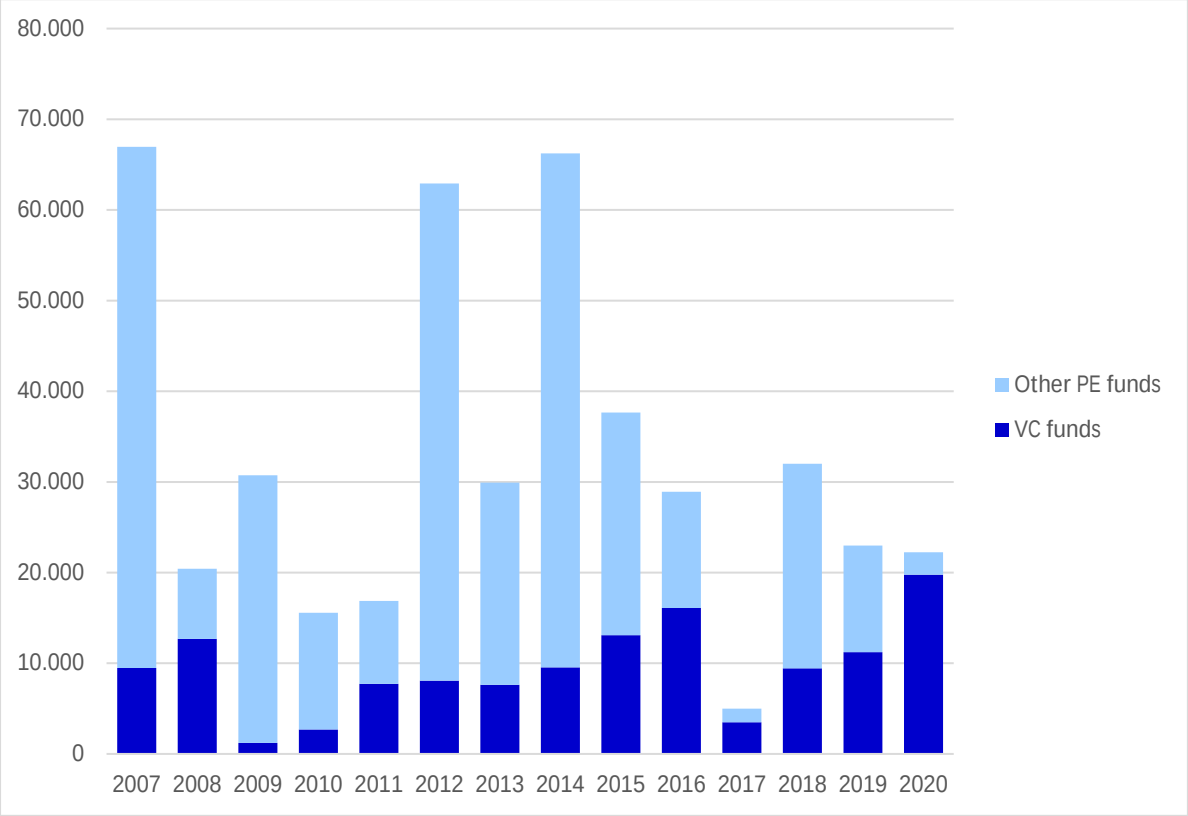


Table 7.6.5.4. **Top 5 foreign countries where Other CEE VC funds have invested (EUR millions)**

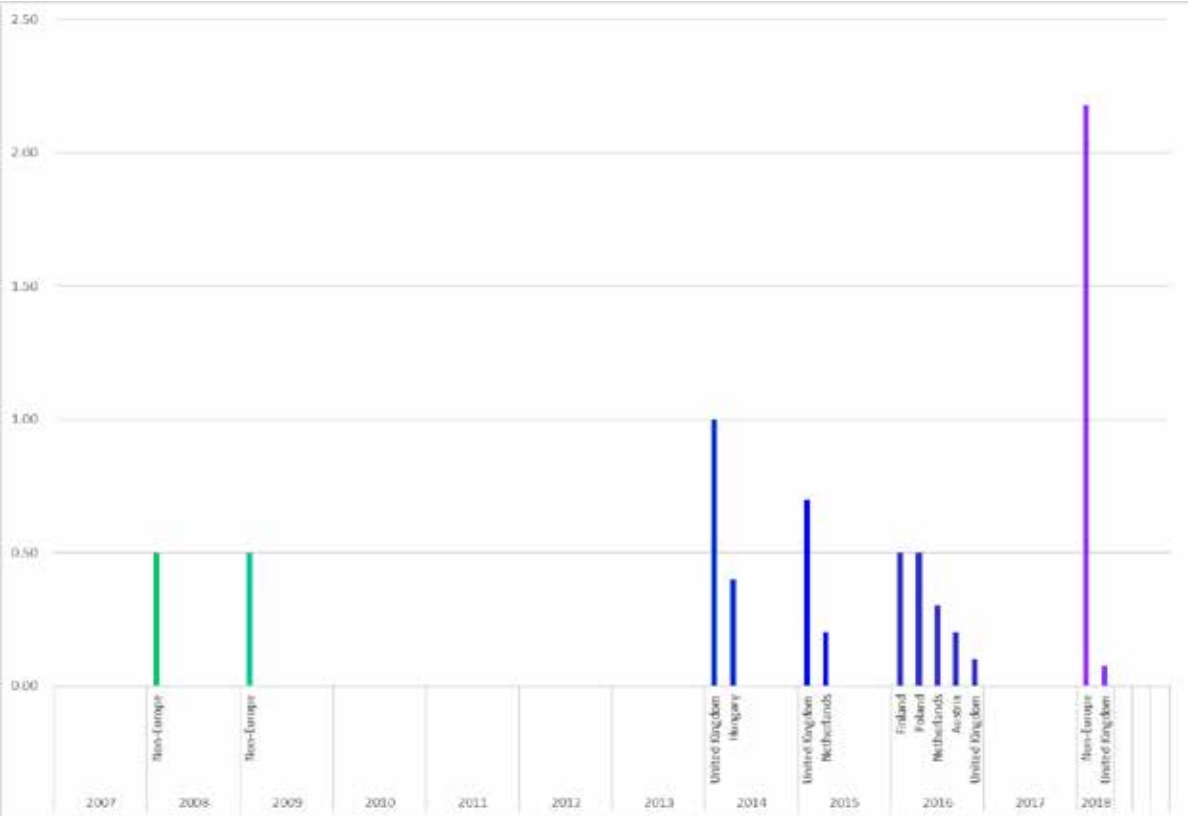
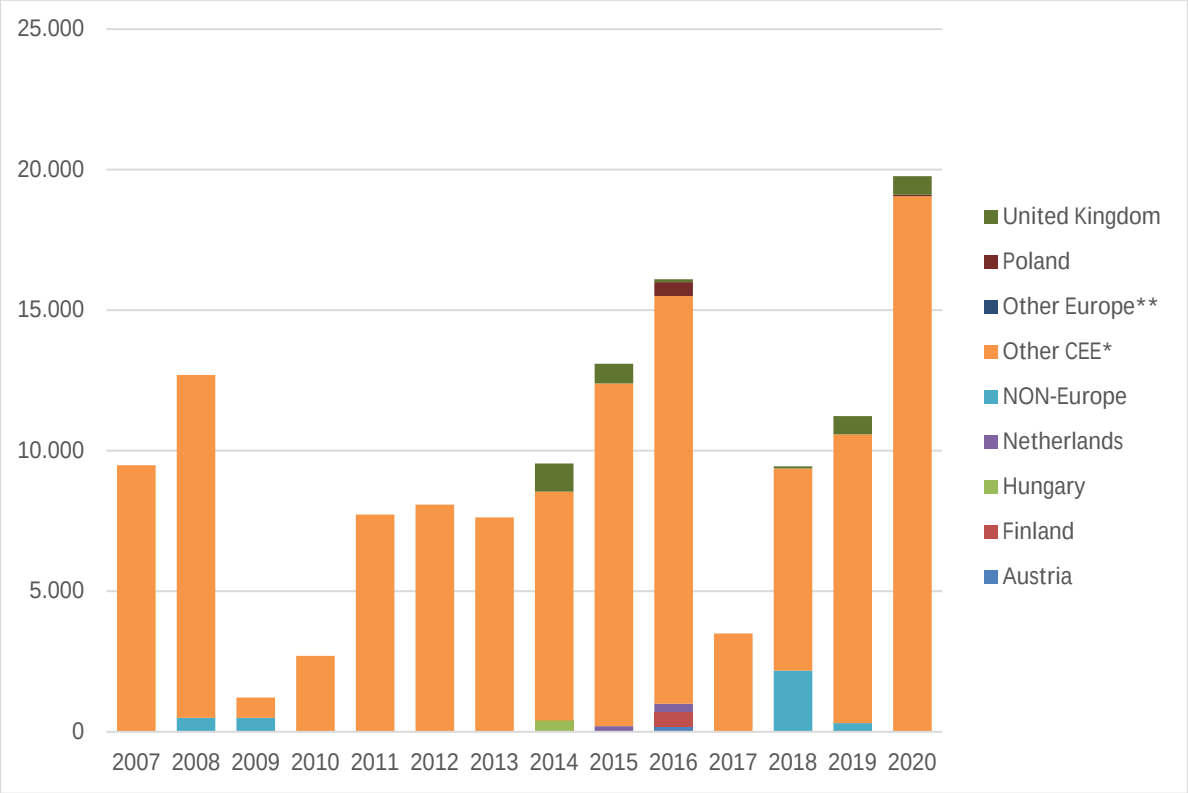


Table 7.6.5.5. **Geographical breakdown of flows from Other CEE VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.6.5.6. **Flows from PE/VC funds to Other CEE portfolio companies (EUR thousands)**

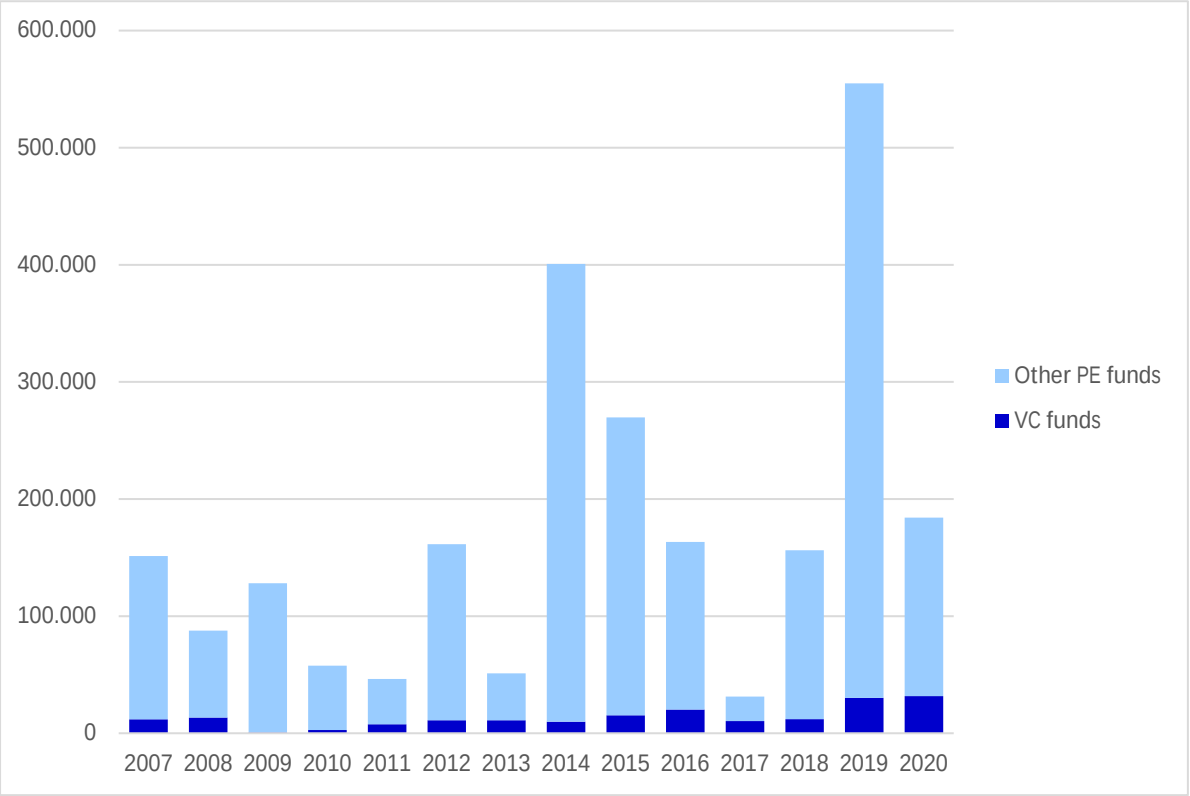


Table 7.6.5.7. **Top 5 foreign VC investors into Other CEE portfolio companies (EUR million)**

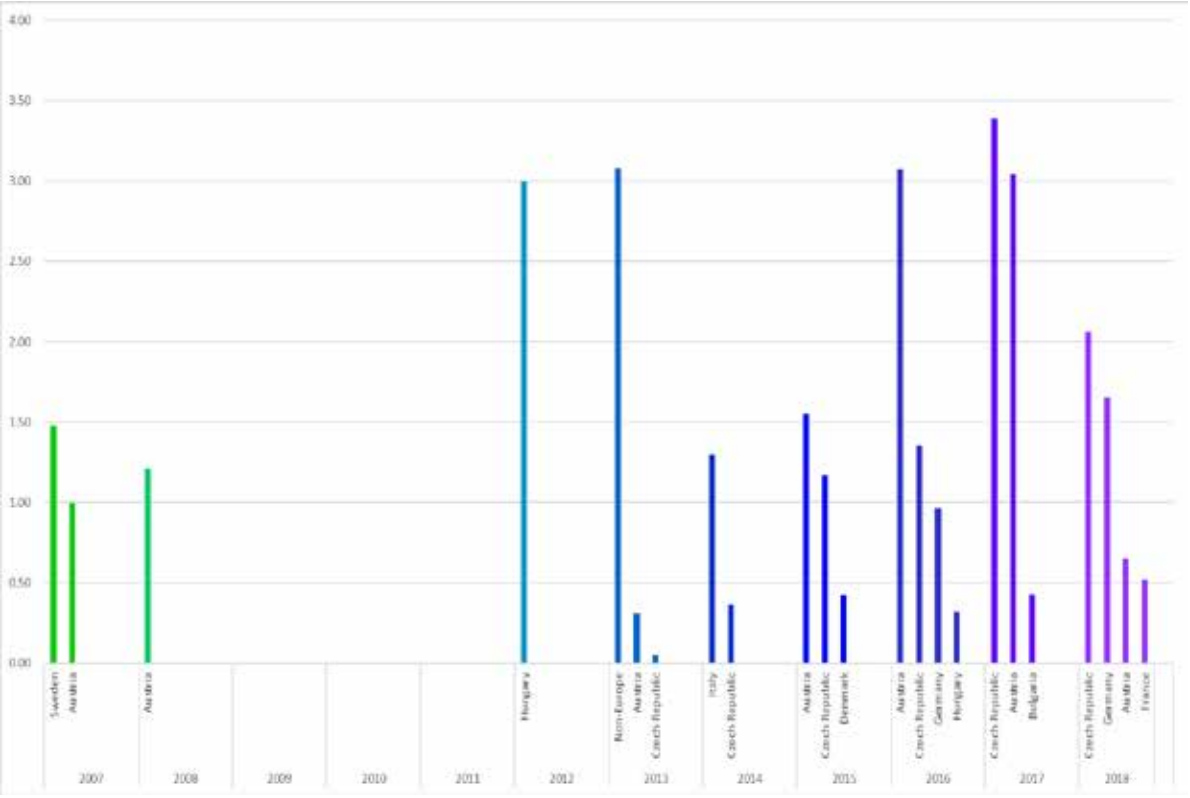
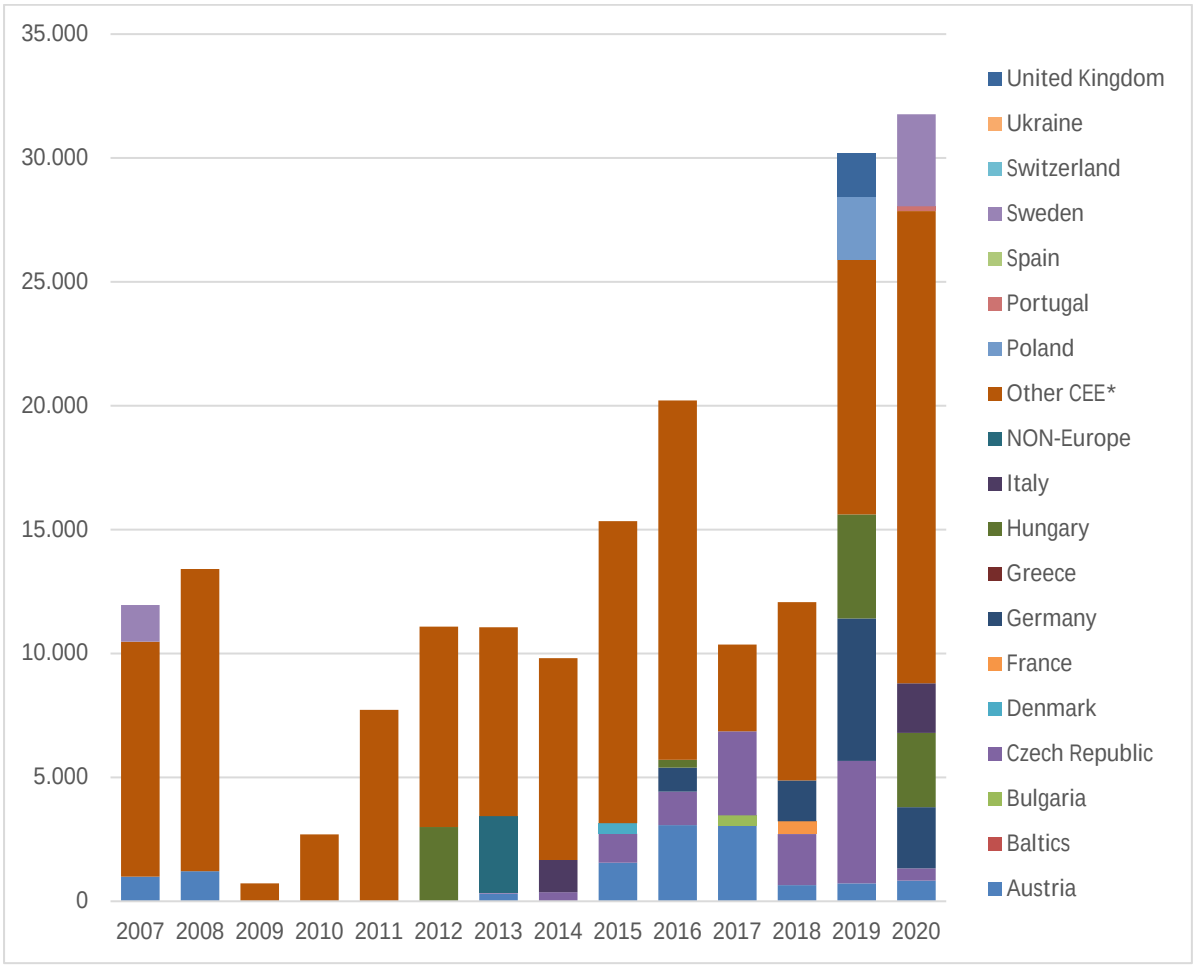
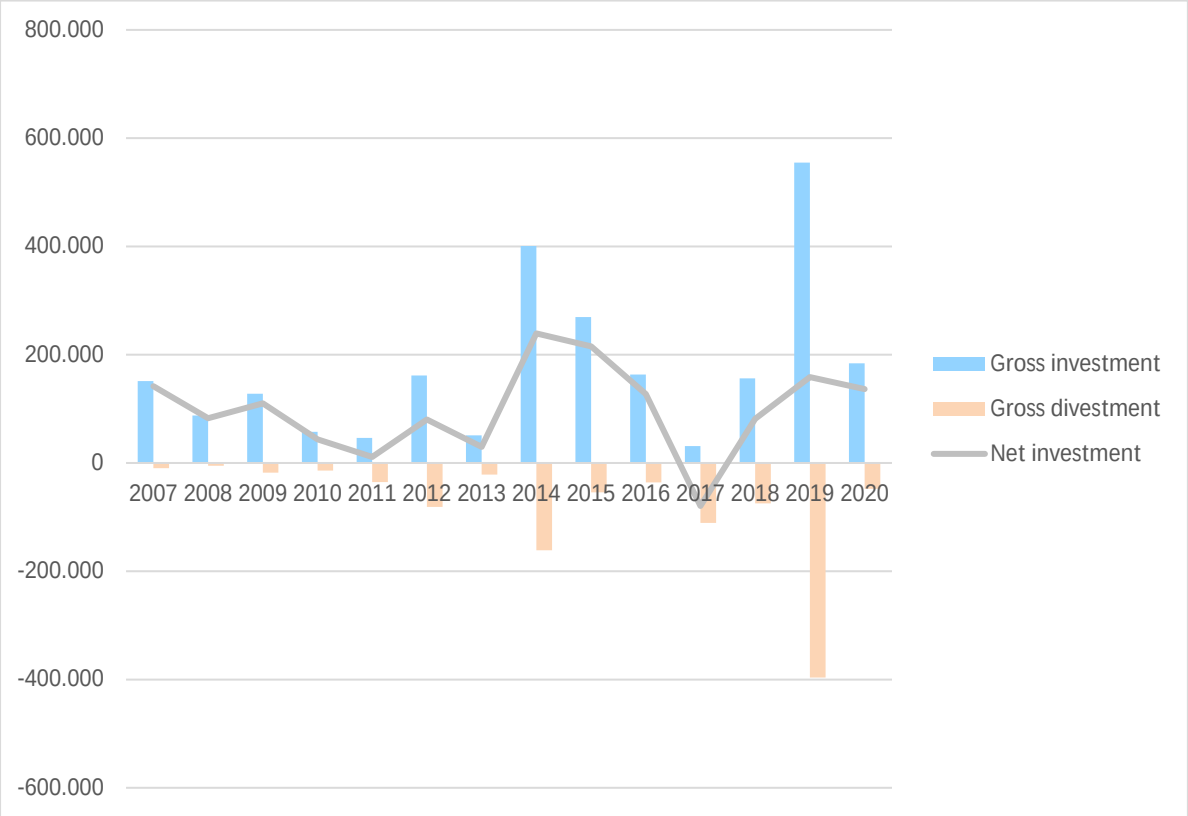


Table 7.6.5.8. **Geographical breakdown of flows from VC funds to Other CEE portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

Table 7.6.5.9. **Investments and divestments of Other CEE PE funds (EUR thousands)**



7.6.6 Poland

Table 7.6.6.1. **Flows raised by Polish PE/VC funds (EUR million)**

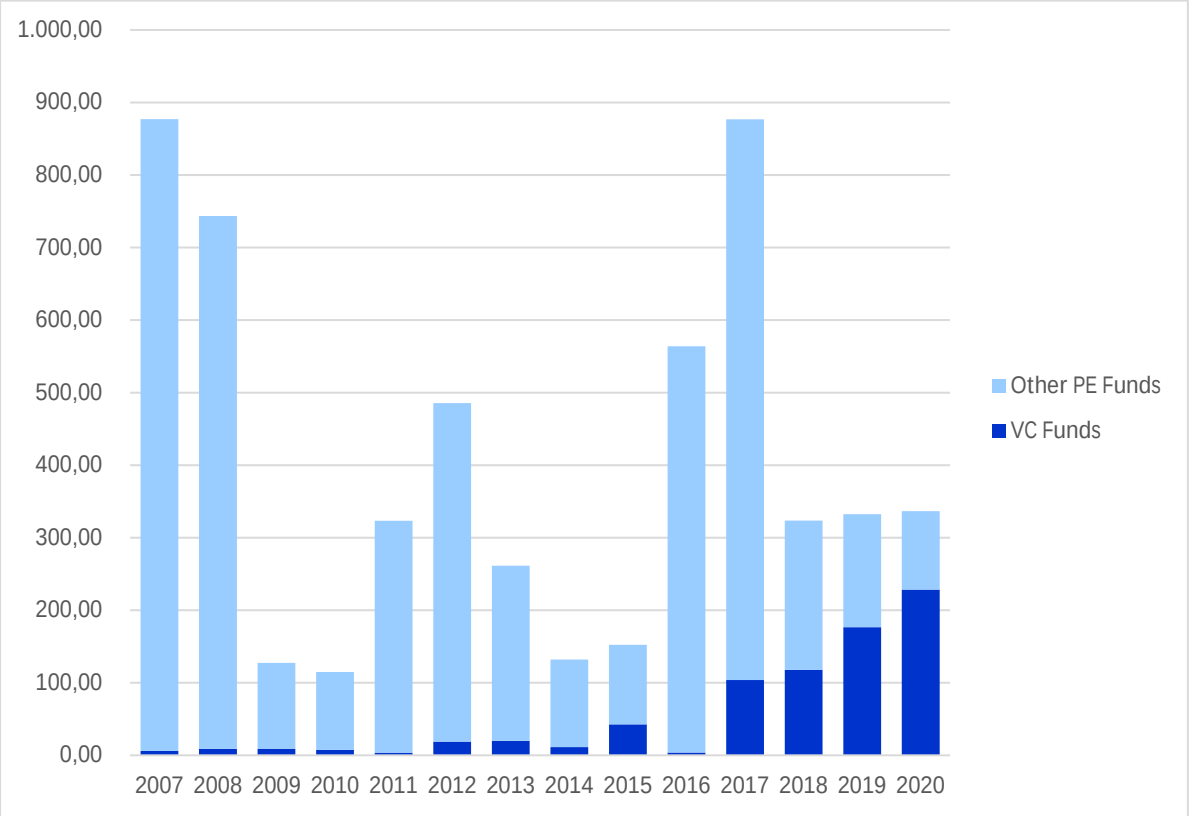
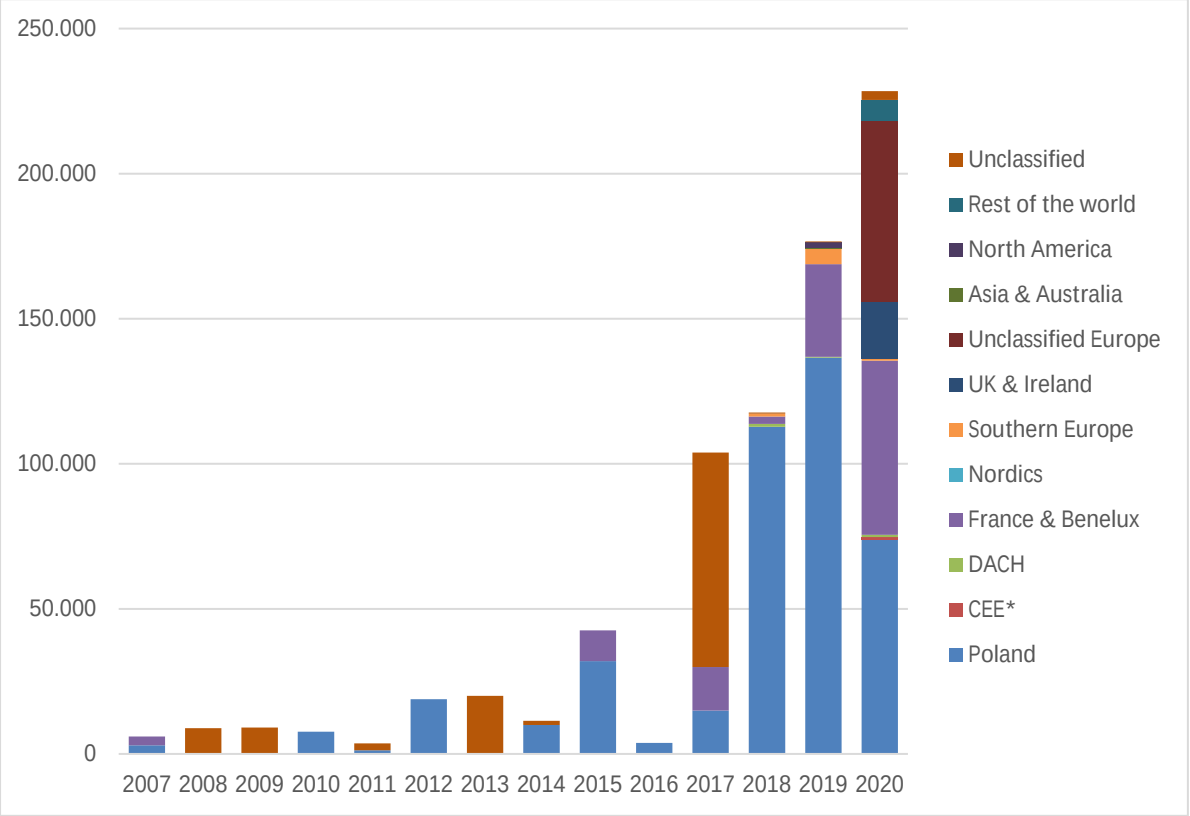


Table 7.6.6.2. **Geographical breakdown of Polish VC fundraising (EUR thousands)**



CEE* - excluding Poland

Table 7.6.6.3. **Flows from Polish PE/VC funds to portfolio companies (EUR million)**

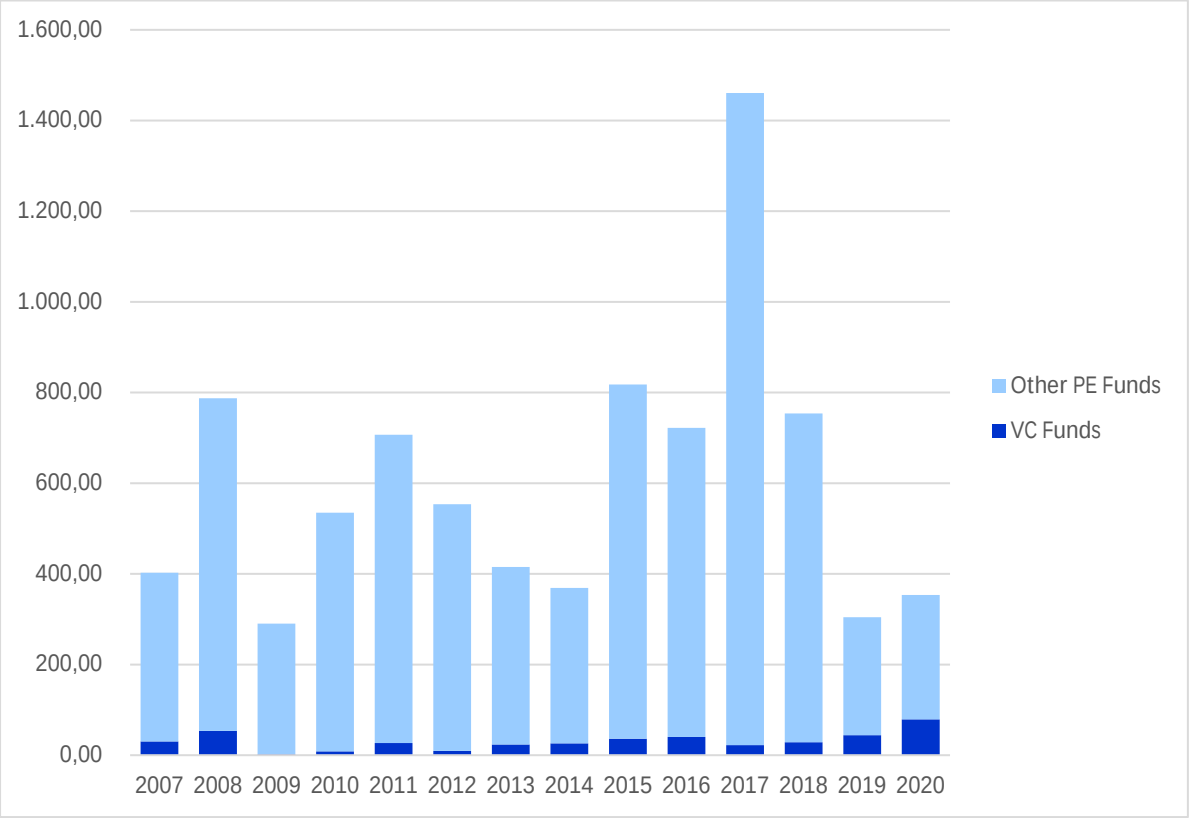


Table 7.6.6.4. **Top 5 foreign countries where Polish VC funds have invested (EUR thousands)**

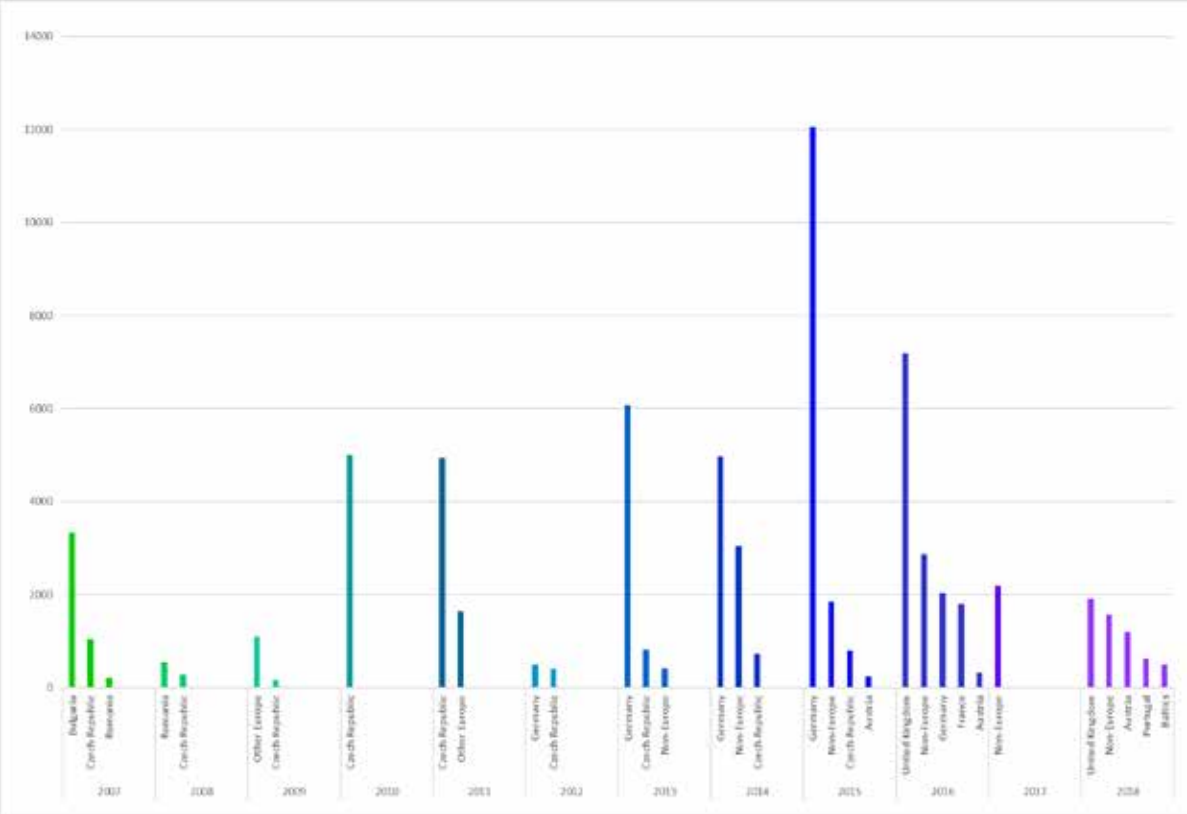
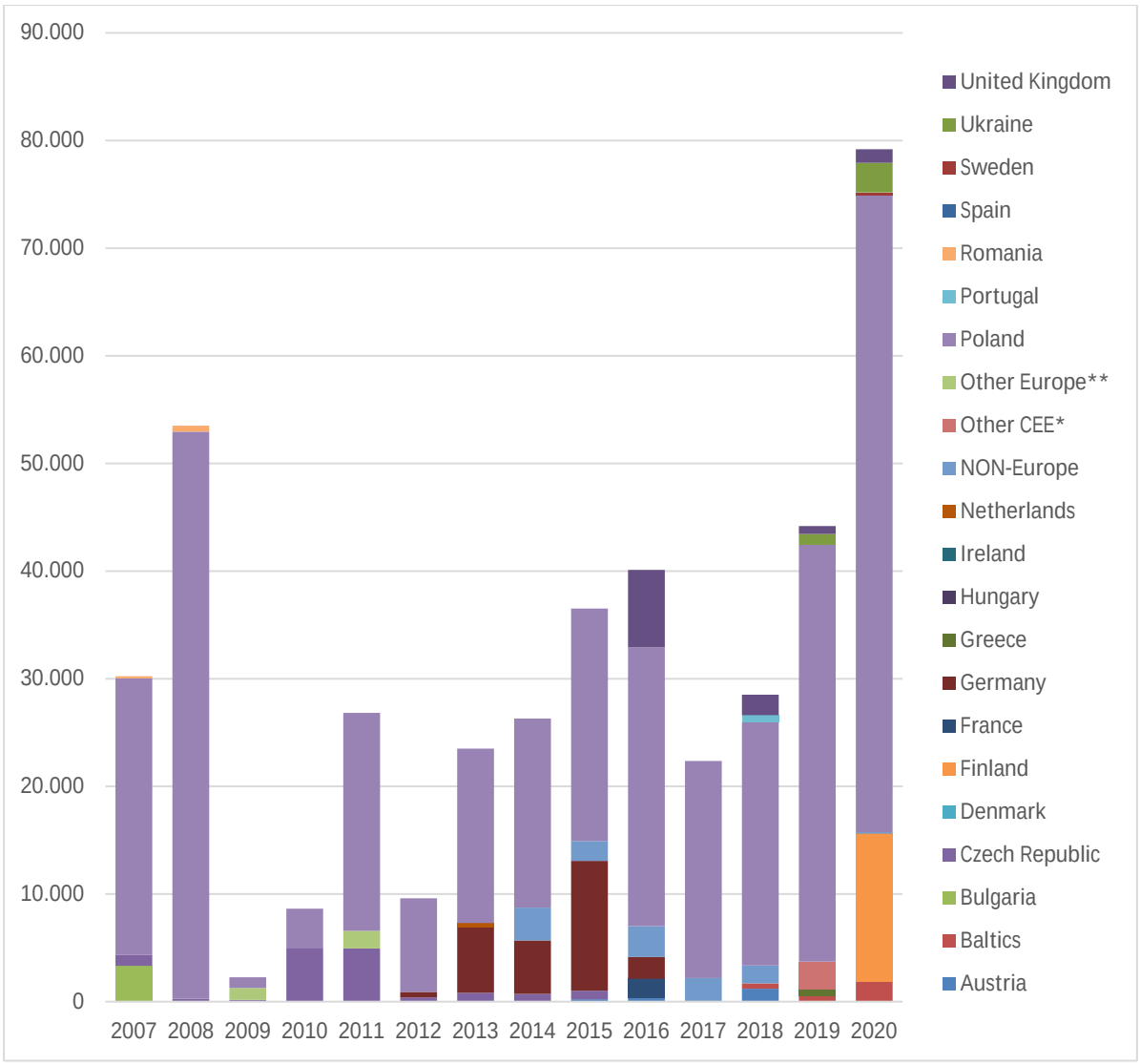


Table 7.6.6.5. **Geographical breakdown of flows from Polish VC funds to portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia
Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.6.6.6. **Flows from PE/VC funds to Polish portfolio companies (EUR million)**

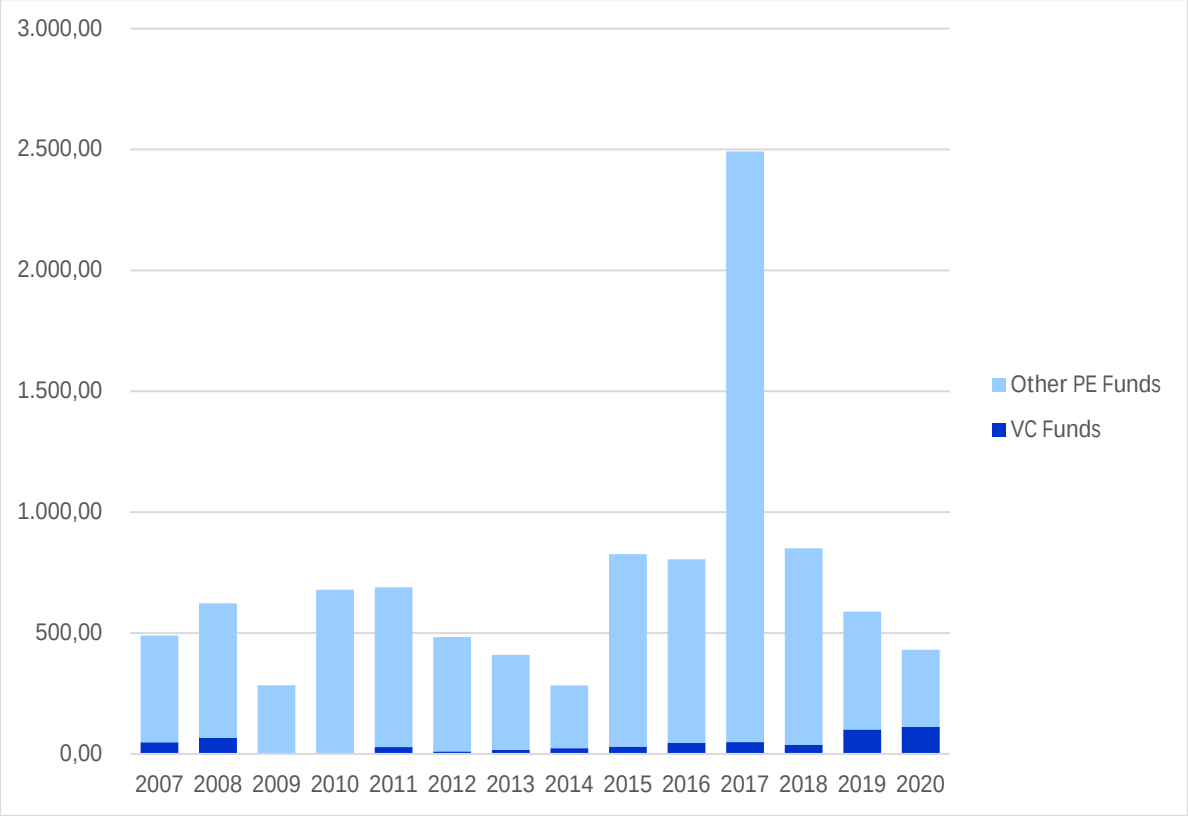
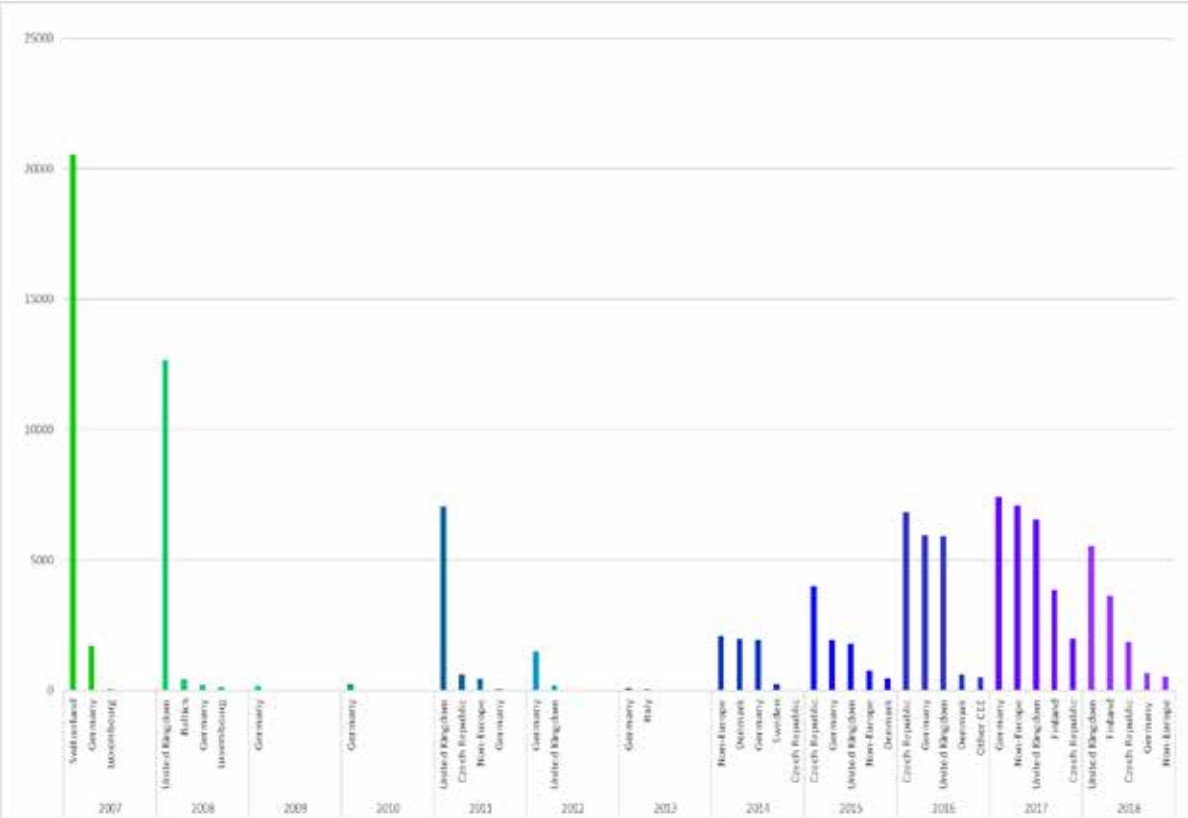
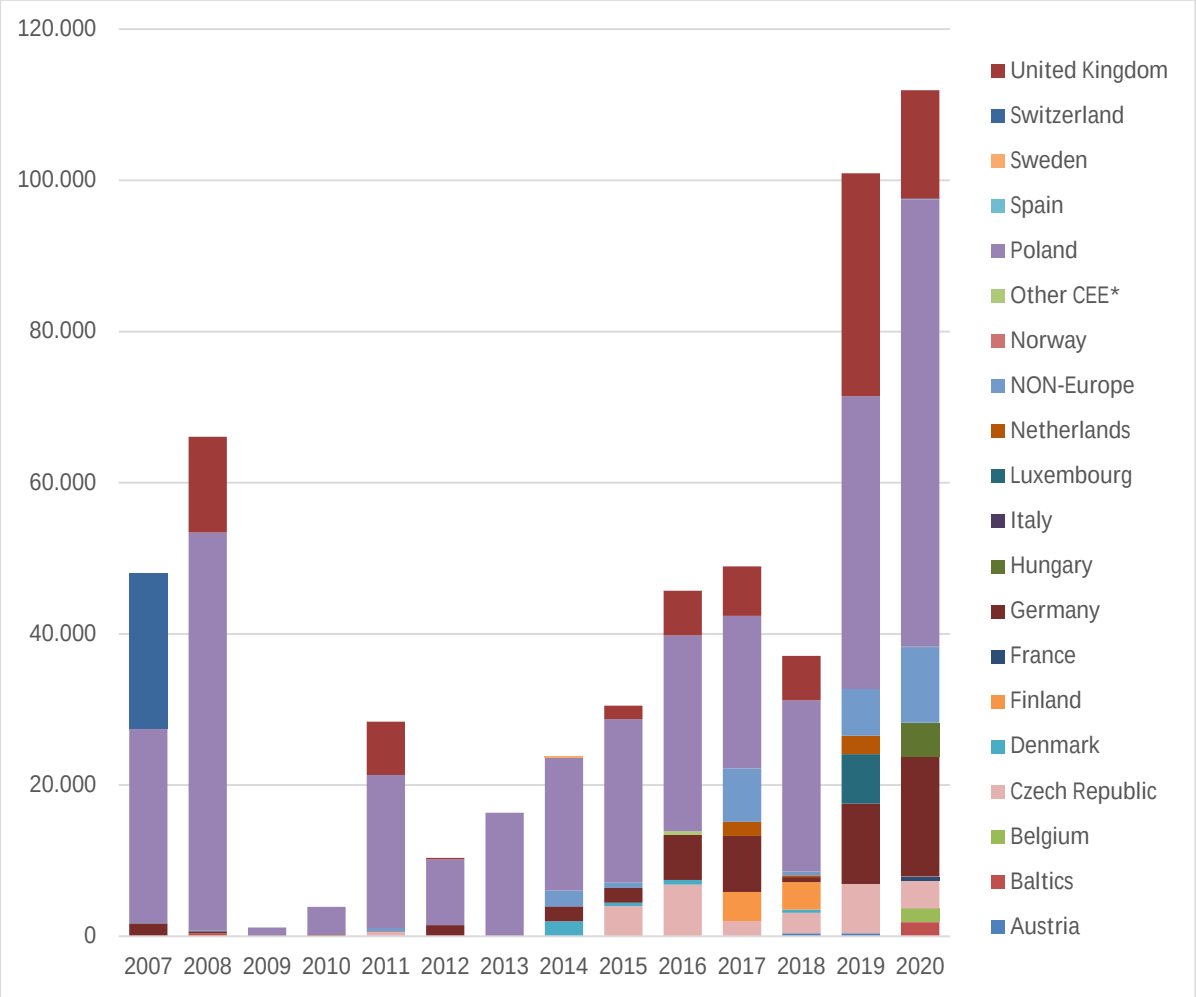


Table 7.6.6.7. **Top 5 foreign investors into Polish portfolio companies (EUR thousands)**



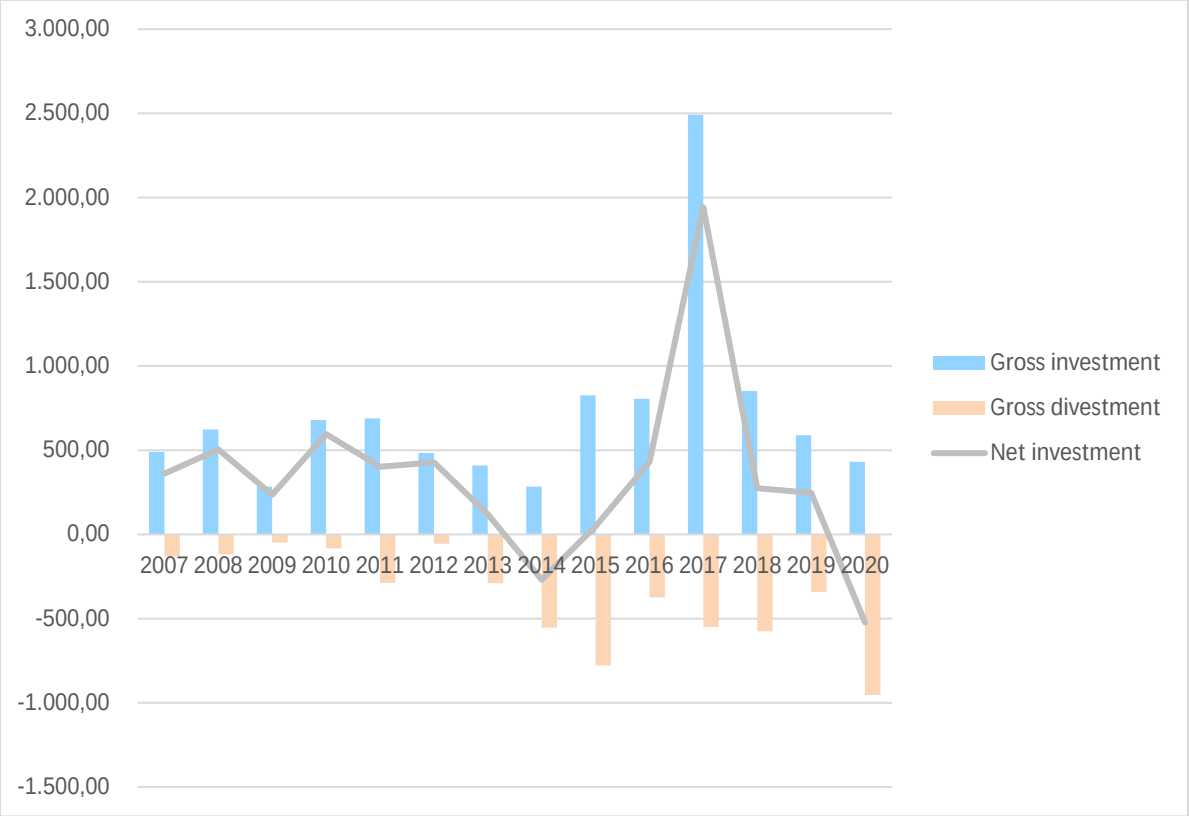
Other CEE* - Bosnia-Herzegovina, Croatia, Macedonia, Moldovia, Montenegro, Serbia, Slovakia, Slovenia.

Table 7.6.6.8. **Geographical breakdown of flows from VC funds to Polish portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

Table 7.6.6.9. **Investments and divestments of** Polish **PE funds (EUR million)**



7.6.7 Romania

Table 7.6.7.1. **Flows raised by Romanian PE/VC funds (EUR million)**

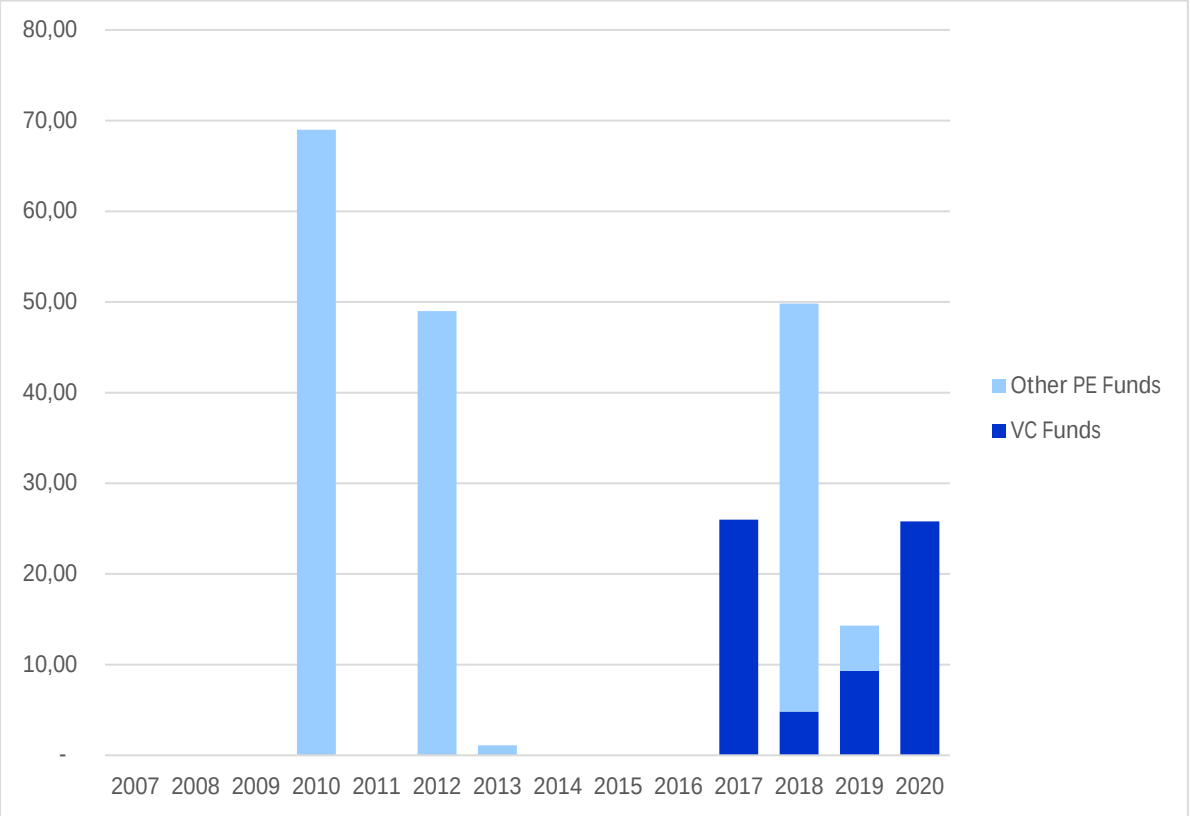
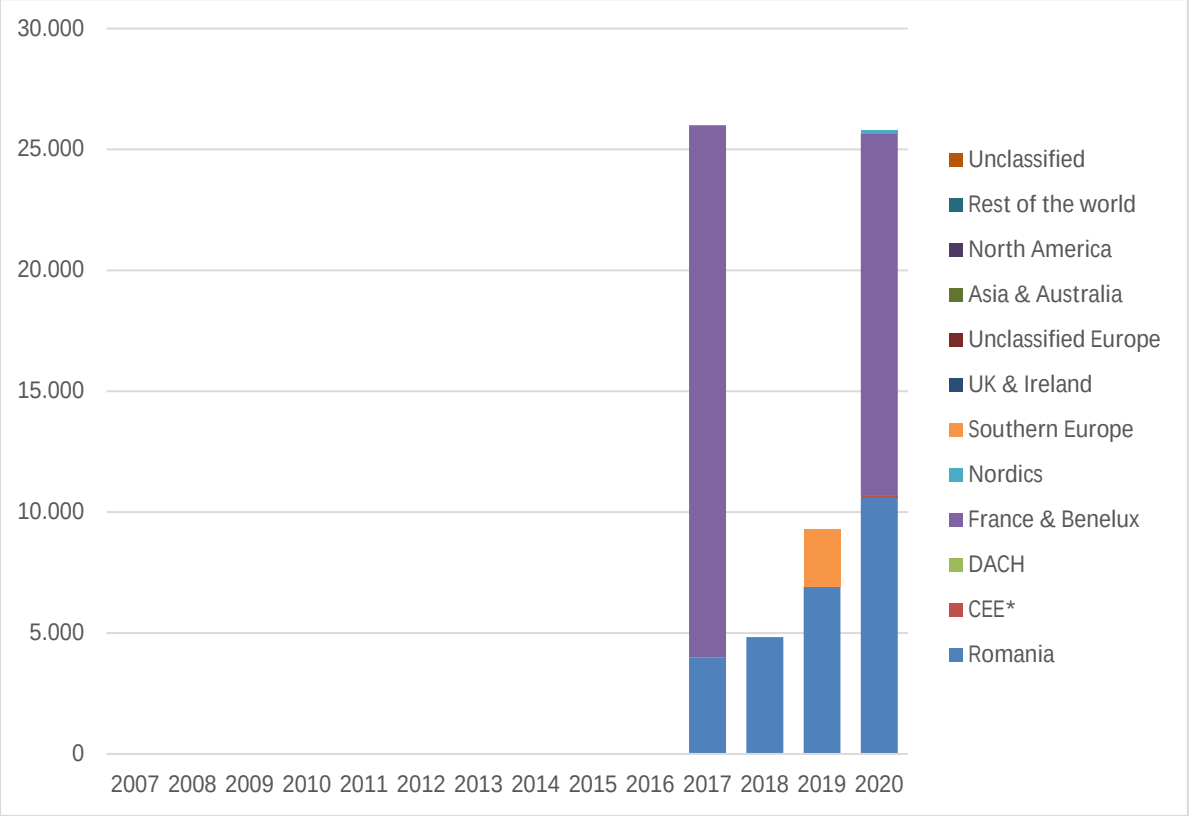


Table 7.6.7.2. **Geographical breakdown of Romanian VC fundraising (EUR thousands)**



CEE* - excluding Romania

Table 7.6.7.3. **Flows from Romanian PE/VC funds to portfolio companies (EUR million)**

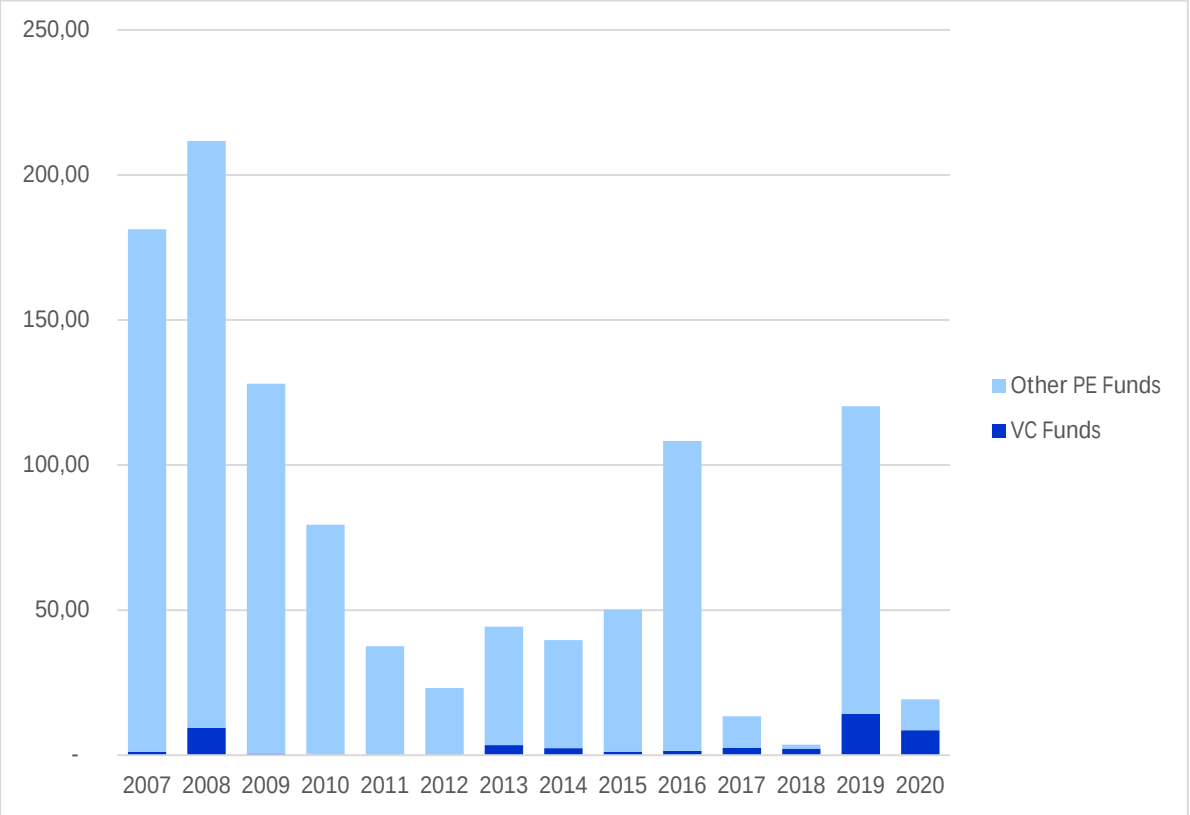


Table 7.6.7.4. **Top 5 foreign countries where Romanian VC funds have invested (EUR thousands)**

Table 7.6.7.5. **Geographical breakdown of flows from Romanian VC funds to portfolio companies (EUR thousands)**

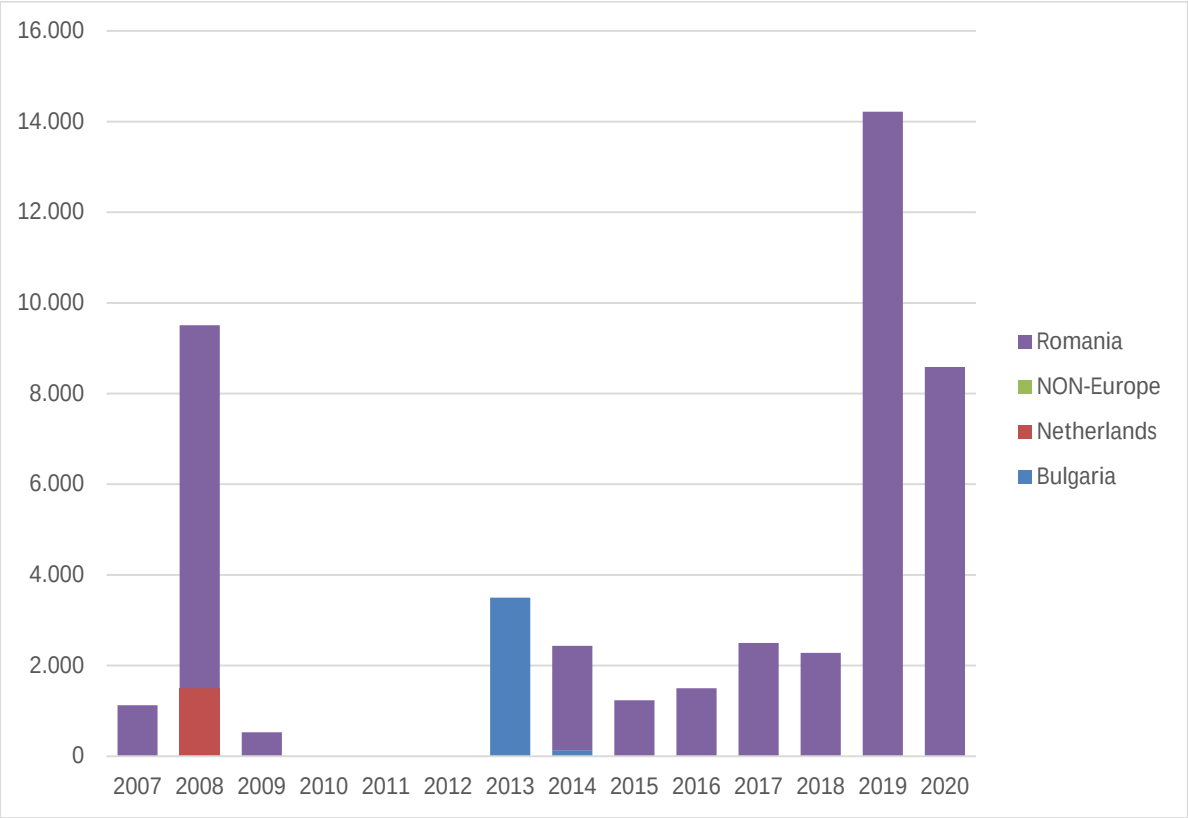


Table 7.6.7.6. **Flows from PE/VC funds to Romanian portfolio companies (EUR million)**

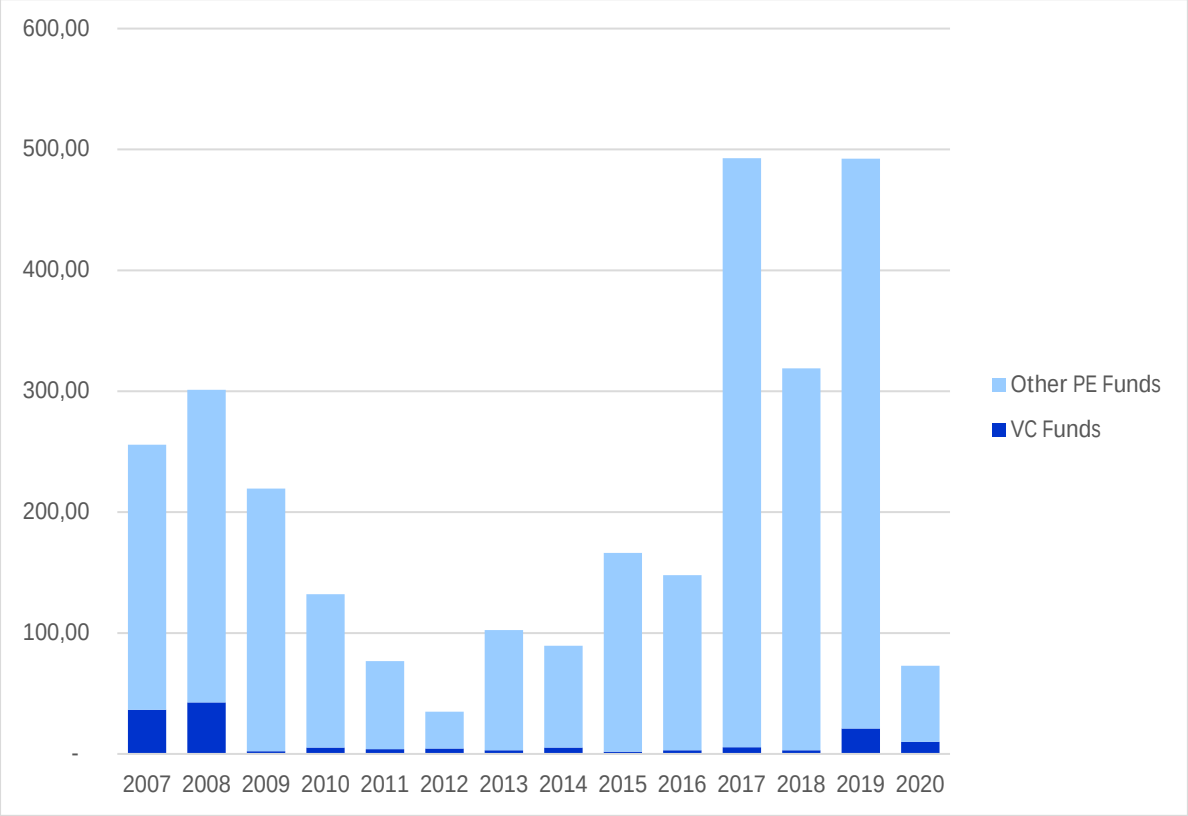


Table 7.6.7.7. **Top 5 foreign VC investors into Romanian portfolio companies (EUR thousands)**

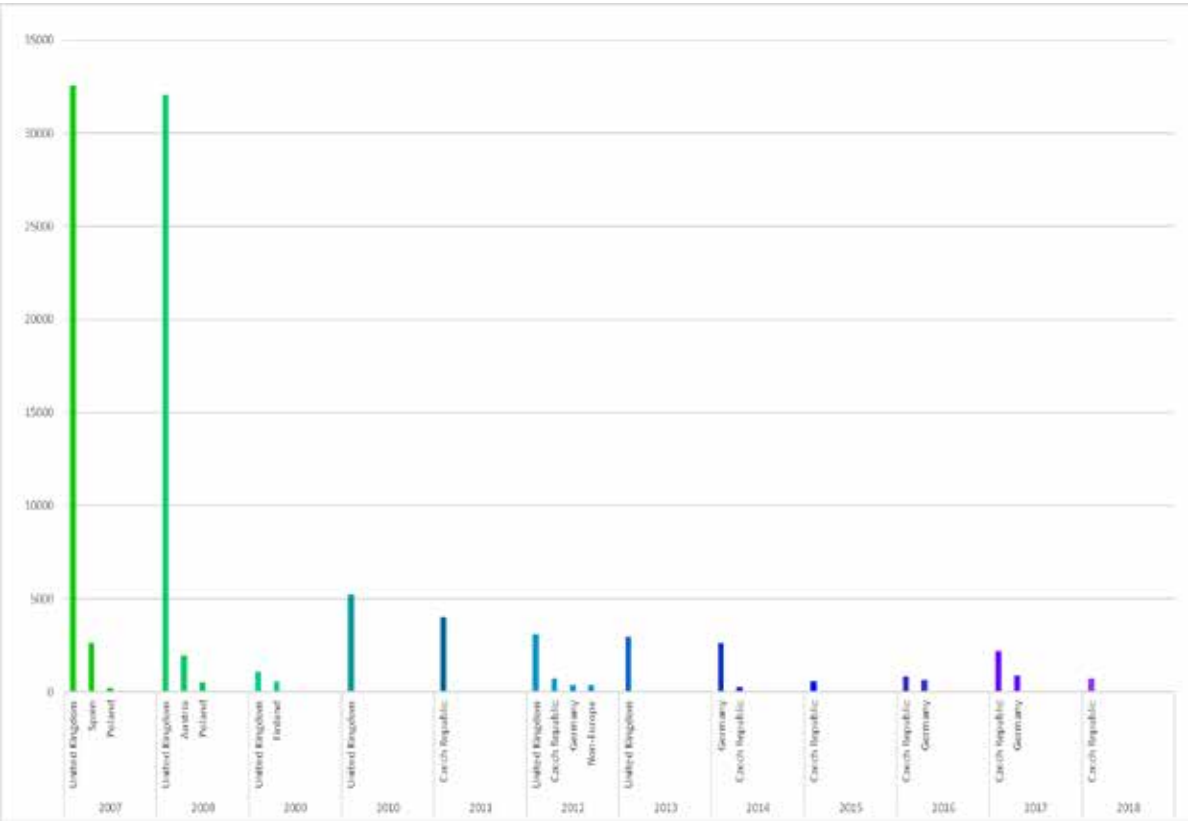


Table 7.6.7.8. **Geographical breakdown of flows from VC funds to Romanian portfolio companies (EUR thousands)**

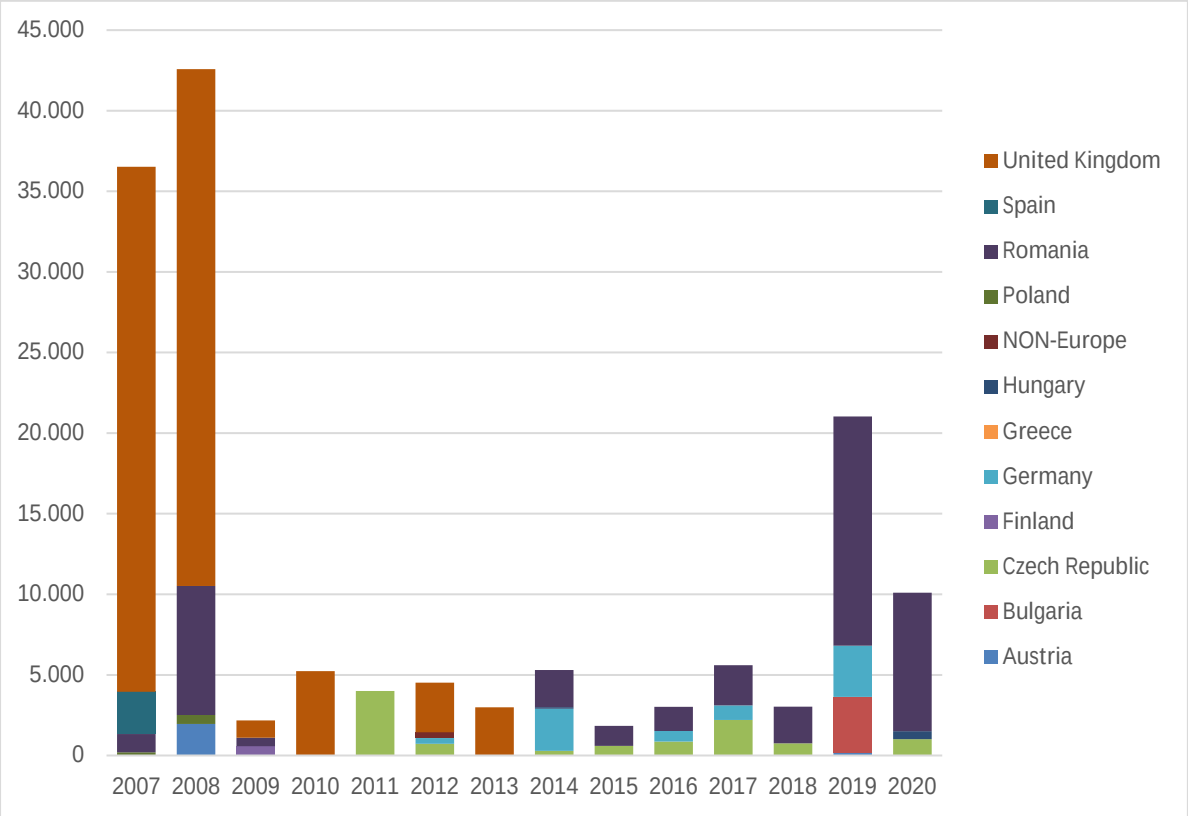
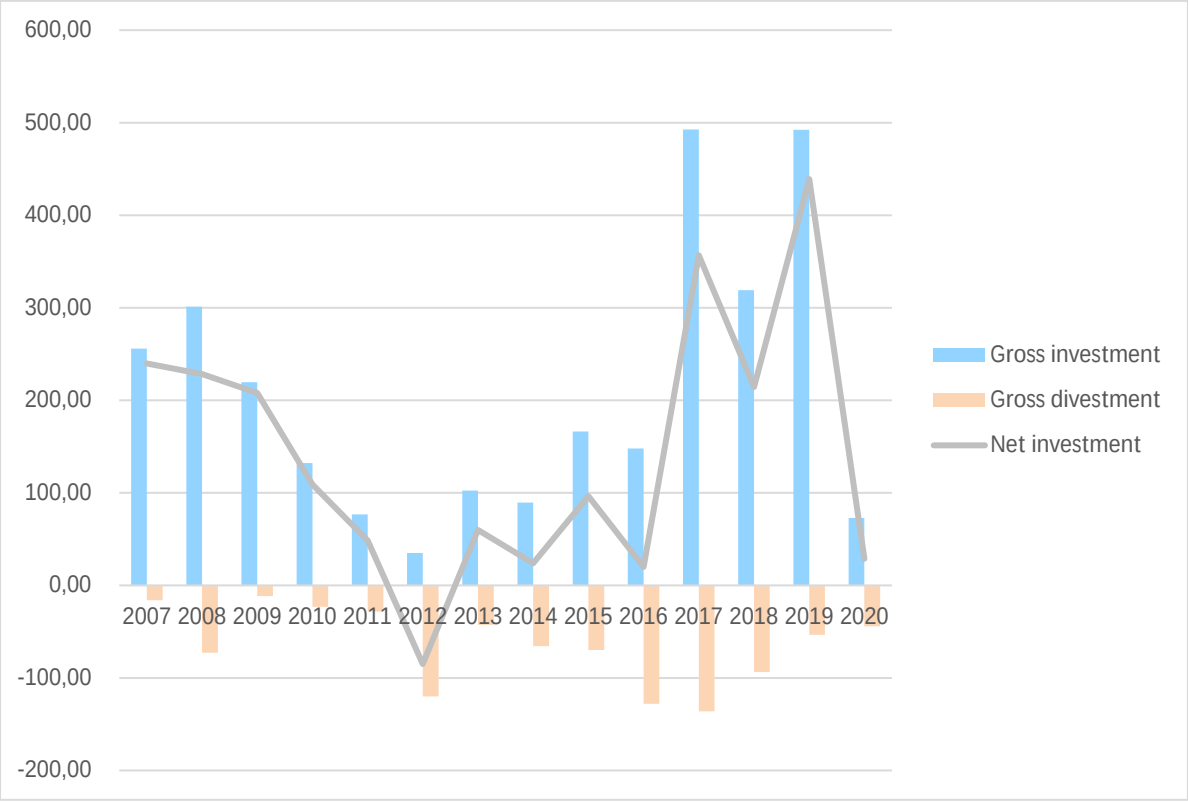


Table 7.6.7.9. **Investments and divestments of** Romanian **PE funds (EUR million)**



7.7 OTHER EUROPE

Table 7.7.1. **Flows from Other European PE/VC funds to portfolio companies (EUR thousands)**

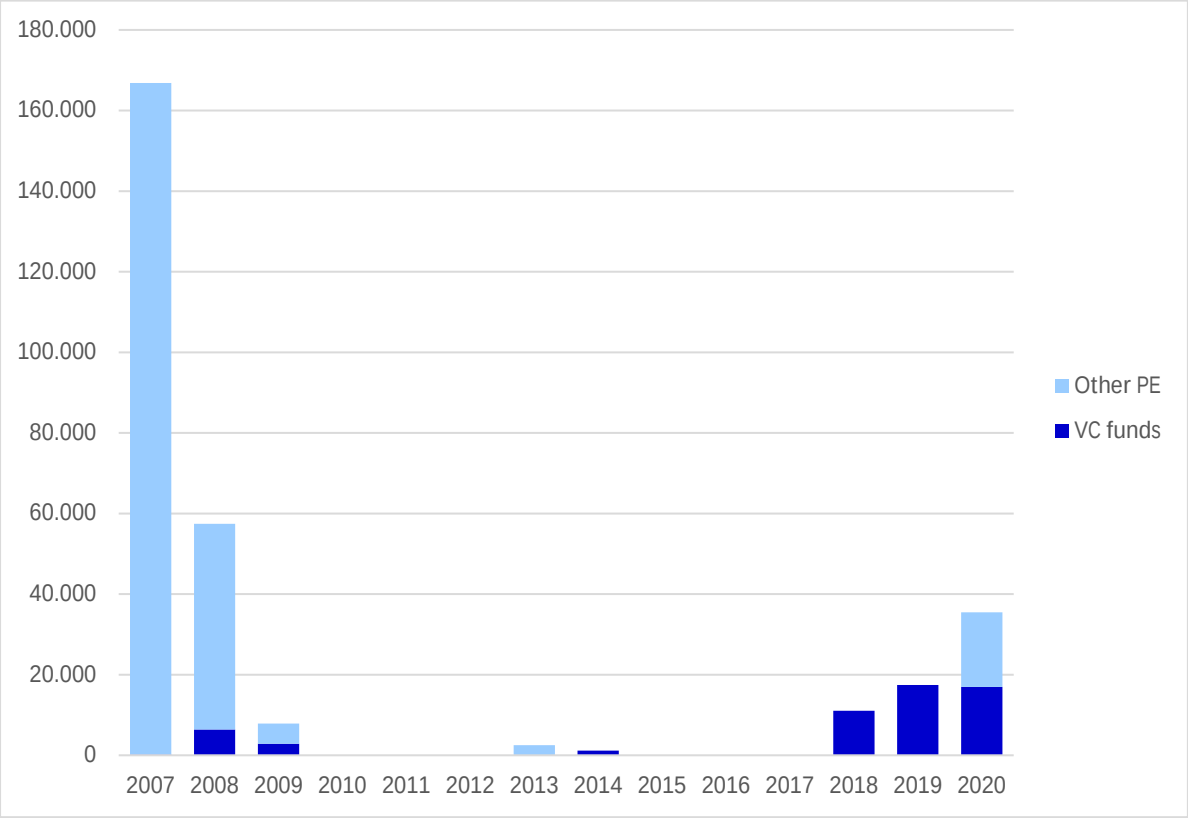


Table 7.7.2. **Top 5 foreign countries where Other European VC funds have invested (EUR thousands)**

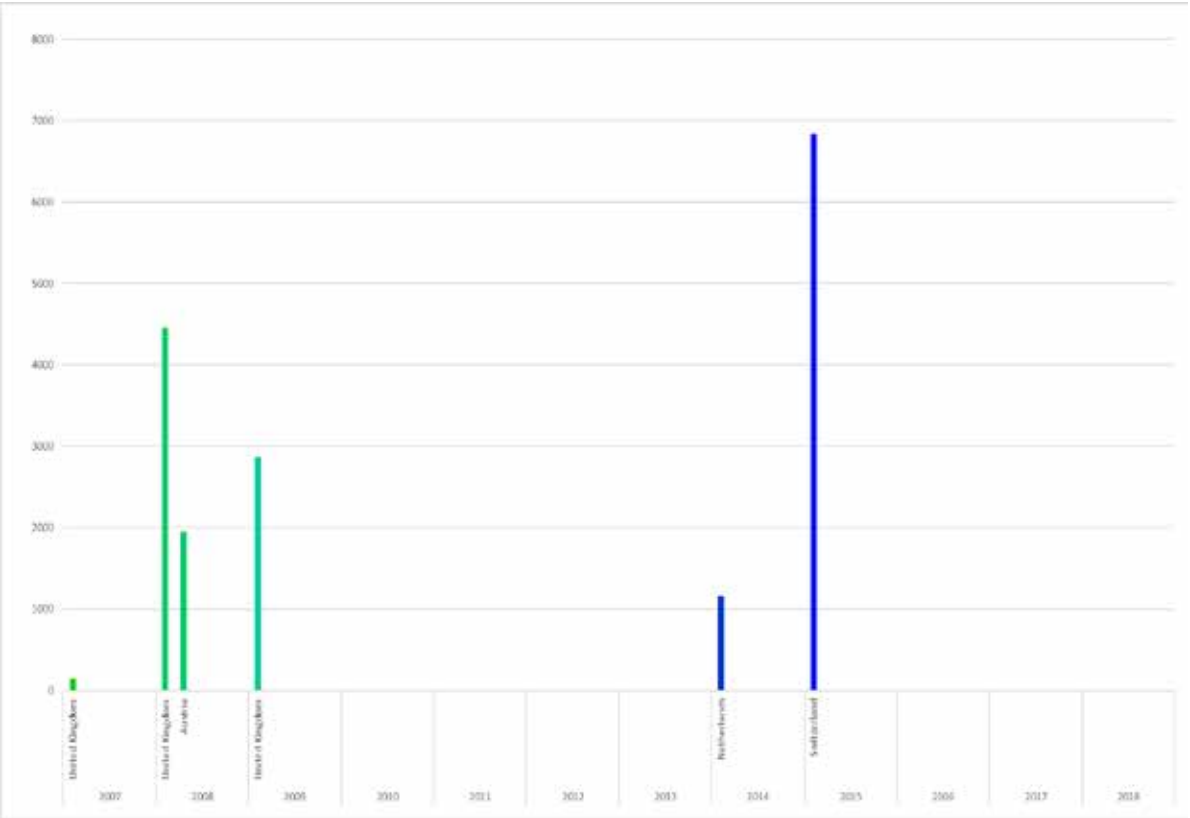
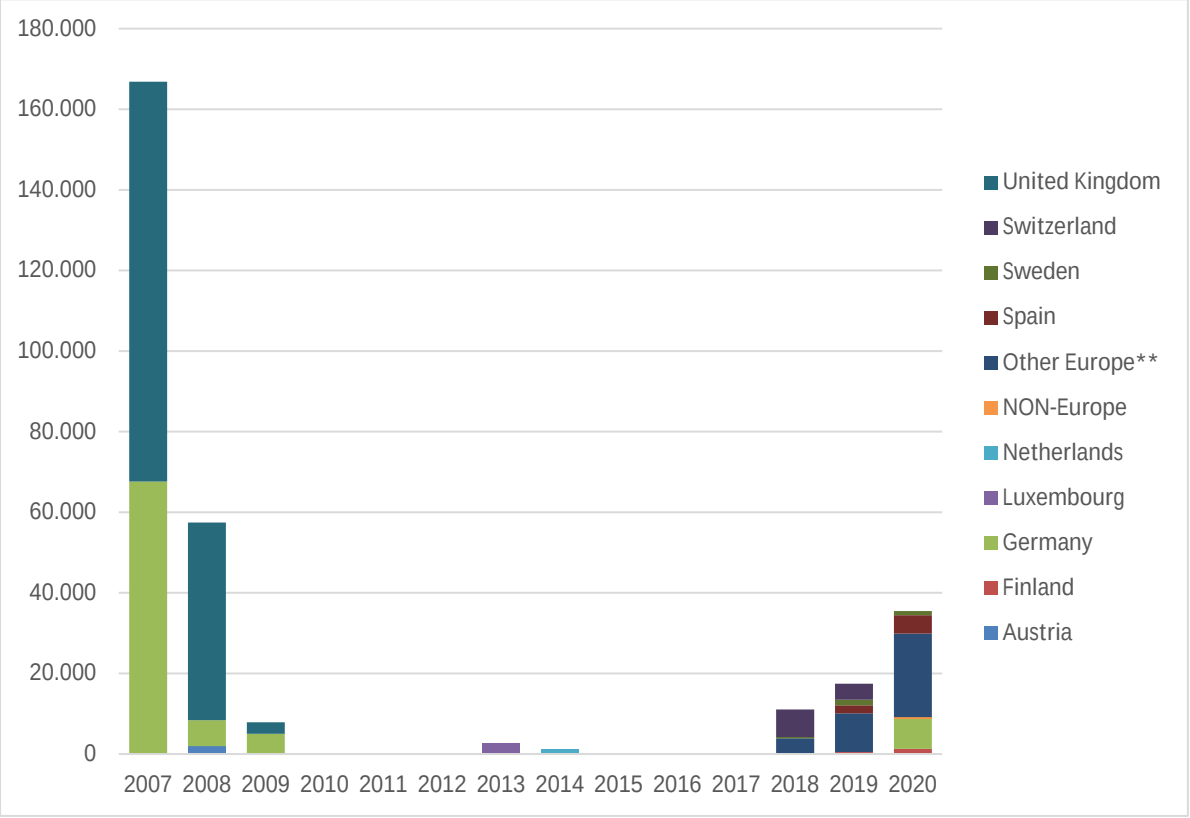
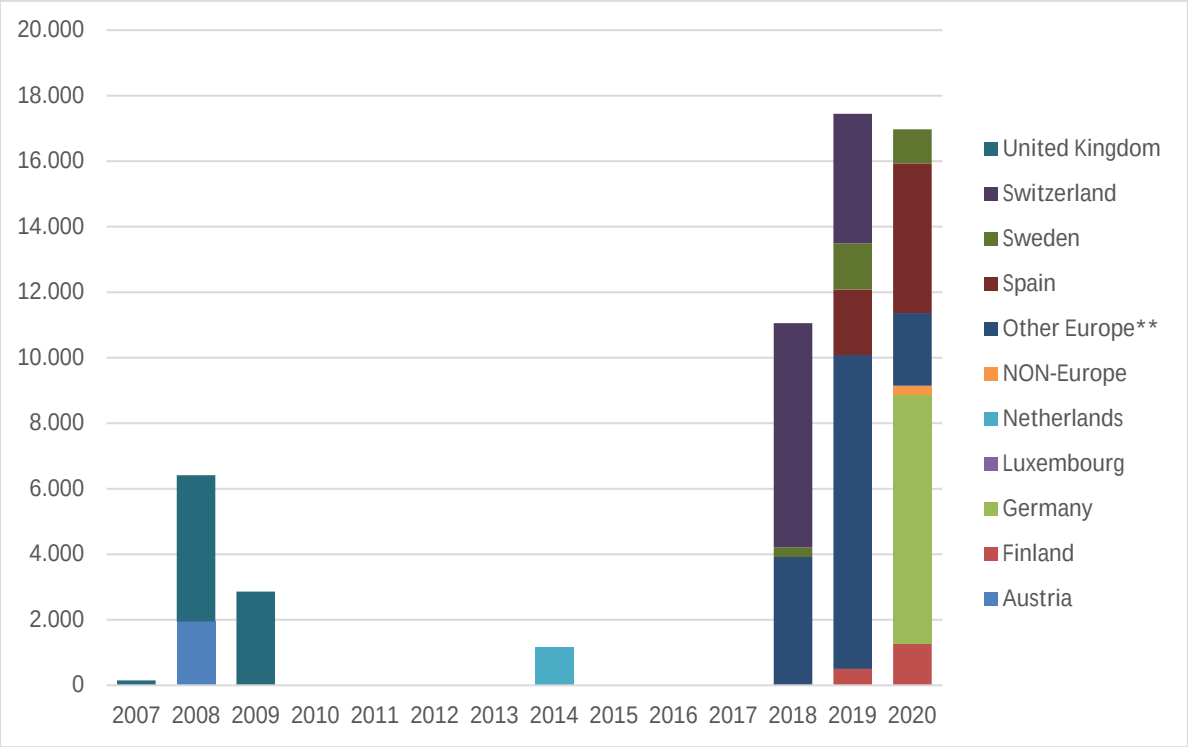


Table 7.7.3. **Geographical breakdown of flows from Other European PE funds to portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.7.4. **Geographical breakdown of flows from Other European VC funds to portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Table 7.7.5. **Flows from PE/VC funds to Other European portfolio companies (EUR thousands)**

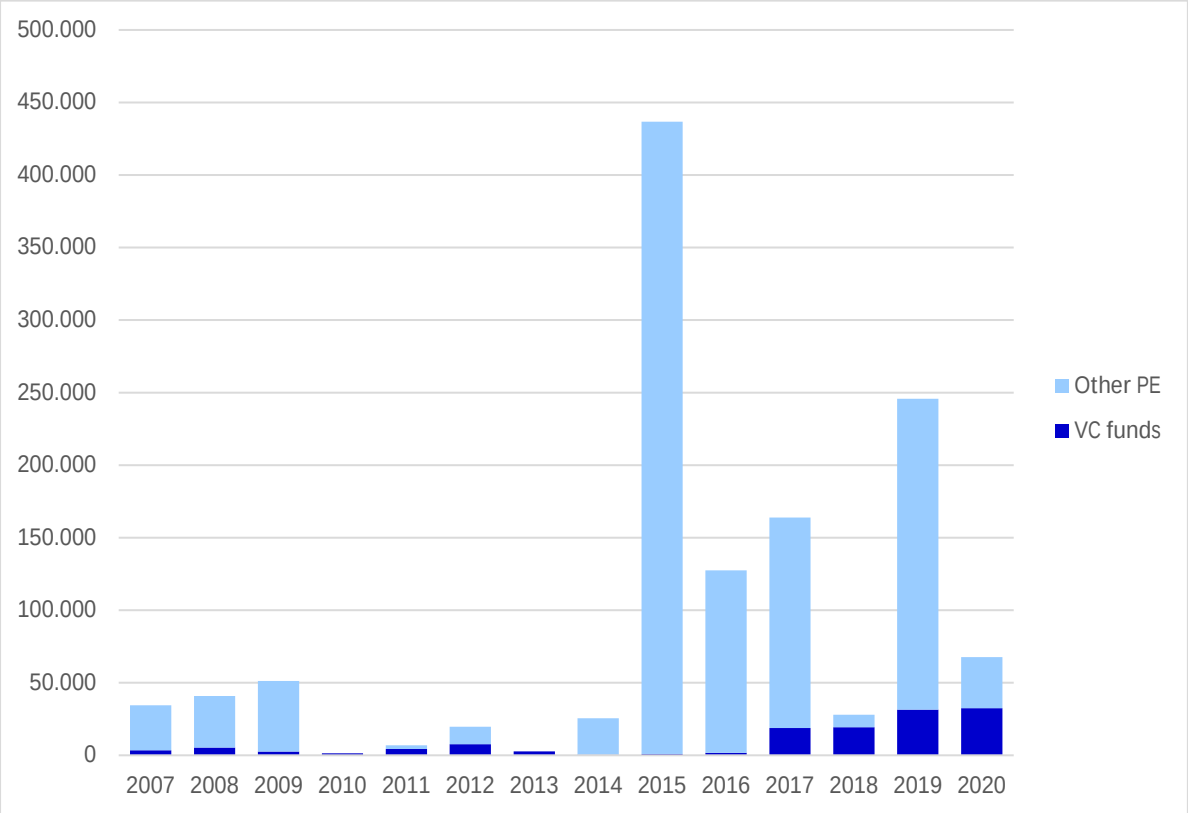


Table 7.7.6. **Top 5 foreign VC investors into Other European portfolio companies (EUR thousands)**

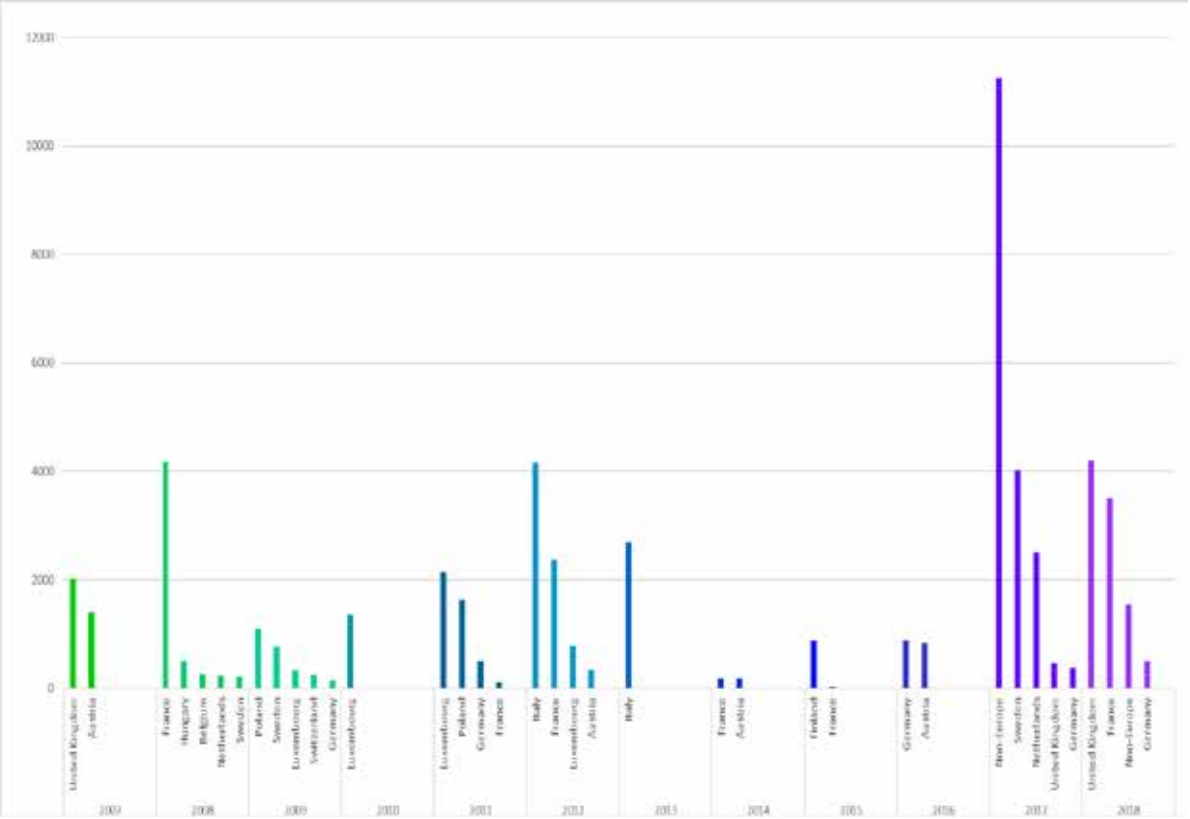
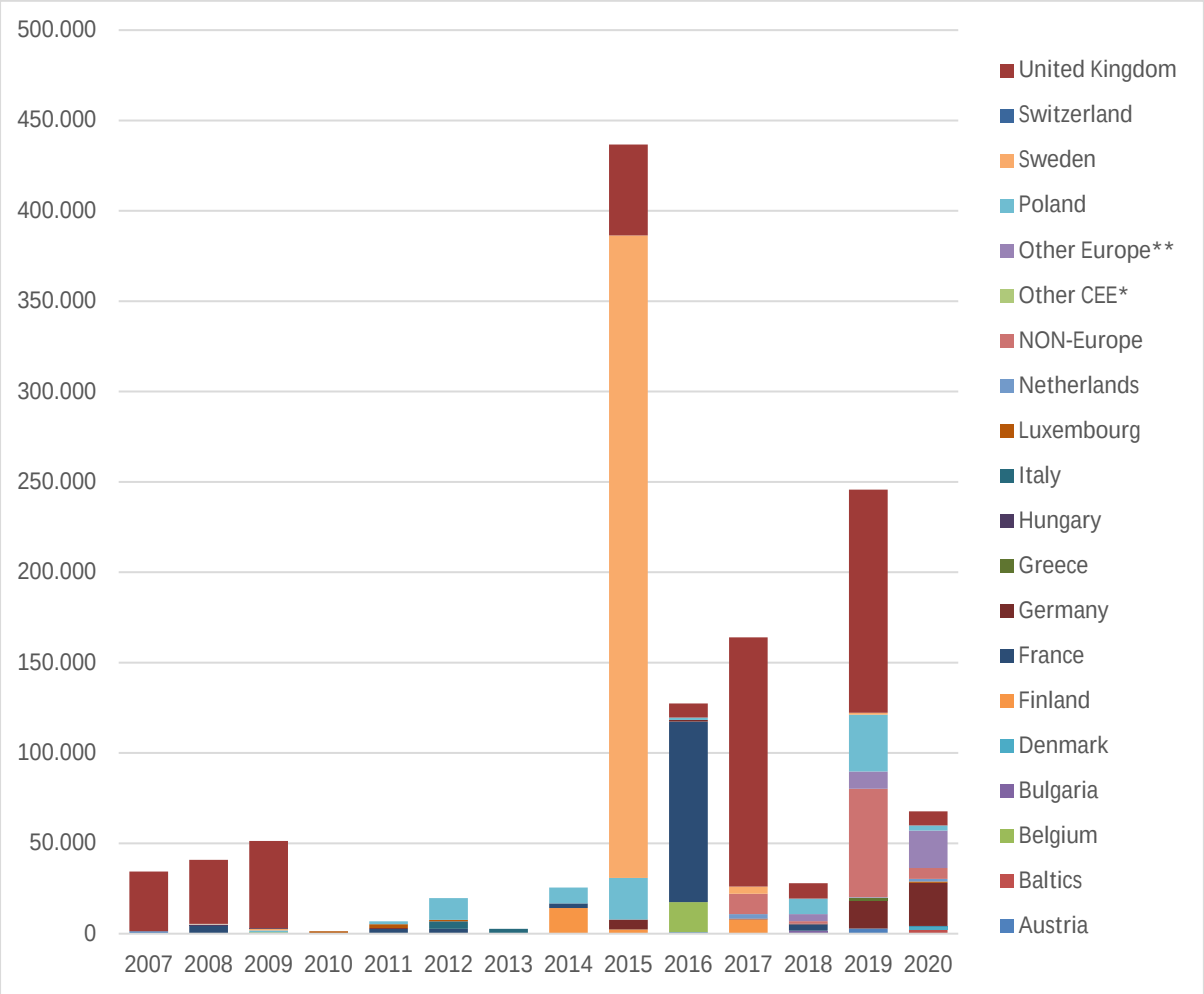


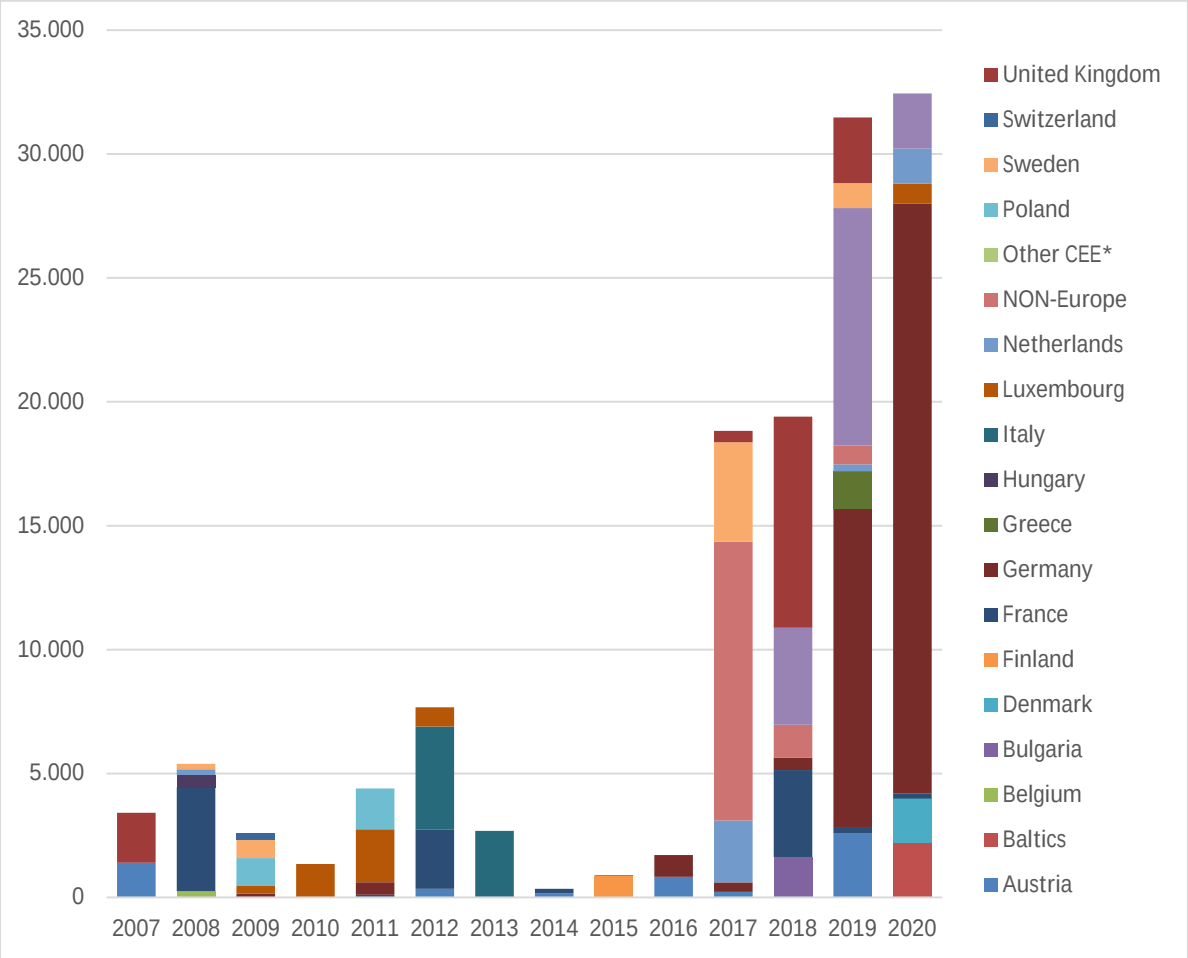
Table 7.7.7. **Geographical breakdown of flows from PE funds to Other European portfolio companies (EUR thousands)**



Other Europe** - Cyprus, Iceland, Liechtenstein, Malta, San Marino, Vatican City

Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

Table 7.7.8. **Geographical breakdown of flows from VC funds to Other European portfolio companies (EUR thousands)**



Other CEE* - Bosnia - Herzegovina, Croatia, Macedonia, Moldova, Montenegro, Serbia, Slovakia, Slovenia

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