# Public Grants and Venture Capital investments as complementary sources for SME financing*

di Andrea Bellucci[†], Gianluca Gucciardi[‡], Daniel Nepelski[§]

**Abstract**

We analyse the different characteristics of companies, and in particular of Small and Medium Enterprises (SMEs), having access to forms of public subsidy or private financing. We then examine one of the most widespread public subsidies aimed at young and innovative SMEs of the European Union (i.e., Horizon 2020) and compare it with Venture Capital, a financial instrument typically oriented to fund equity of similar companies. Conversely, by comparing the characteristics of the companies that receive one or the other types of instruments, we find significant differences in the corporate characteristics of the funded companies both in terms of size (revenues, assets) and development phase.

**JEL Classification:** G24; F21; D81; E22; E44

**Keywords:** Venture Capital, Public Grants, Investments

# Sovvezioni pubbliche e investimenti Venture Capital. Fonti complementari per il finanziamento delle PMI?

**Sommario**

Questo articolo analizza le differenti caratteristiche delle imprese, e in particolare delle PMI, che accedono a forme di sovvenzionamento pubblico o finanziamento privato. In quest'ottica, si prende in esame uno dei sussidi pubblici più diffusi orientato alle PMI giovani e innovative dell'Unione Europea (Orizzonte 2020) e lo si confronta con il finanziamento di Venture Capital, uno strumento tipicamente orientato a finanziare l'equity di aziende analoghe. Confrontando le caratteristiche delle imprese che ricevono l'uno o l'altro tipo di strumento, riscontriamo al contrario differenze significative nelle caratteristiche aziendali delle imprese finanziate dai due strumenti, sia in termini dimensionali (ricavi, asset) che di fase di sviluppo.

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**Parole chiave:** Venture Capital, Sussidi pubblici, Investimenti

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## Introduction

Access to finance is considered as one of the major bottlenecks to innovation commercialization and exploitation in Europe. To address the issue of the ‘‘Valley of Death’’, i.e. a shortfall of resources on the way to commercializing new technologies and products, a number of private and public sources of funding for innovation exist (Gampfert, Mitchell, Stamenov, Zifciakova, & Jonkers, 2016). Public source of funding and support for companies takes various forms. In Europe, for example, the European Union annually supports and finances over 200,000 European companies, including sole proprietorships, micro-enterprises, start-ups, and small and medium-sized enterprises, operating in all production and product sectors. Regarding private sources of funding for innovation and technology commercialization, during the start-up phase, companies usually try to raise funds through private means including Venture Capital (VC) funds (Gompers & Lerner, 2001). In this setting, public funding is expected to de-risk research and technology development and bears the costs of necessary failures, while private investors support mature, developed and ready to grow enterprises. It is said that, at the initial phases, research is mainly financed from public sources and, when a venture is sufficiently mature, private investors enter (Auerswald & Branscomb, 2003). Because externalities across different forms of entrepreneurial finance exist, there is a need to take a portfolio approach towards entrepreneurial finance, instead of treating private and public sources of funding separately (Cumming, Johan, & Zhang, 2018). This paper attempts to look at the patters of funding for innovative companies through a portfolio lens. It analyses the Venture Capital and public grants to innovative companies in Europe.

The EU implements its direct and active policies to support European businesses through various types of financing, including grants, loans, guarantees, trust fund awards and public procurement. Among the main plafonds available to EU-based companies, Horizon 2020 represents the largest program ever implemented by the EU for research and innovation. The program, implemented in the period 2014-2020 with an estimated expenditure of about 80 billion euros, had the ambition to lead to technological innovations by transferring great ideas from the laboratory to the market. Within the program, particular attention is paid to small and medium-sized enterprises (SMEs) which are represented as a crucial source of employment and innovation. They can collaborate on projects as part of a consortium and can receive support through a dedicated tool created specifically for highly innovative smaller companies. In the ambitions of the European Union, this "SME Instrument" would have been central to helping SMEs, or consortia of

SMEs, to assess the market feasibility of their ideas in the high-risk phase and then to further develop these ideas, also through funding for training and guidance on how to identify and attract private investors. This instrument is aimed at highly innovative SMEs wishing to develop their growth potential. It offers lump sums for feasibility studies, contributions for the main phases of an innovation project (demonstration, prototyping, testing, application development). Lastly, the marketing phase is indirectly supported through facilitated access to debt and equity instruments.

At the same time, the European Commission works to a more indirect extent so that SMEs can be facilitated to access forms of financing in the early stages of development, overcoming potential constraints on traditional financial access (e.g., in banking). Along this line, one of the identified policy measures included in the 2015 capital markets union action plan consists in support to venture capital (VC). VC investments could be an important alternative tool for young and innovative companies that encounter barriers to more traditional finance (e.g., bank loans) in accessing external financing (Bellucci et al., 2021a). Despite its rapid growth in recent years, the European venture capital industry is still small, especially compared to the United States (Gucciardi, 2019). The limited role of equity in corporate financial structures may put Europe at a disadvantage compared to economies with more diversified financial portfolios, particularly in the context of the need for financial restructuring after the COVID-19 pandemic (Bellucci et al. 2021b).

It follows that European SMEs can receive forms of financial support both publicly, for example through the Horizon 2020 SME Instrument, and privately, for instance through Venture Capital and Business Angel investments. The purposes of both funding are similar in terms of the expected results (target companies' economic growth, driven by technological innovation), while the expected benefits of the private investors are clearly different compared to those of the public ones (that is a possible exit strategy - and consequent significant economic return on the investment - for the first case, compared to a more generic increase in employment and economic growth in the EU due to European SMEs growth in the second case). At the same time, the European context offers a plethora of different types of public investment, in the form of grants, which might serve as an additional supplementary funding source for SMEs (Dvouletý et al., 2021).

Given this interrelated framework, in this work we compare public and private financing for innovative companies in Europe, having both type of financing similar objectives and goals, i.e., the financing and the development of their potential growth. In particular, we look at different types of

public grants and venture capital investments, we analyze their relative contribution to firms' financing, and we examine the characteristics of target companies also based on relevant financial information (such as total sales and assets, number of employees).

The objective of this analysis is twofold. Using a data set containing information on private venture capital investments and public subsidies (including the SME Instrument of the European Commission), this paper examines (a) the evolution of public subsidies in terms of volume and number of transactions in the EU and (b) analyses the characteristics of the companies that have received both VC investments and public subsidies aiming at analysing the investment strategies of public and private entities.

The remainder of the paper is organised as follows. Section 1 describes the data used for the analyses. Section 2 descriptively illustrates the evolution - and geographical distribution - of Public Grants and Venture Capital investments among the European Union countries. Section 3 compares the characteristics of Public Grants and VC investments, while Section 4 focuses the different features of companies receiving both public grants and VC investments.

## 1. The data

Our analysis is based on a dataset matching information related to VC investments and public grants from VentureSource (Dow Jones), integrated with information related to funds granted by the European Commission within the SME instrument (Phase 1 and Phase 2) programme scheme between 2014 and 2017.

VentureSource is a commercial database that provides a comprehensive source of information on VC-backed companies, VC investors and VC investment transactions, in every country, industry and stage of development. Some articles (Kaplan et al., 2002; Nepelski et al., 2016) have already presented a discussion on the properties of VentureSource and its comparison with other commercial databases that are typically used to study the evolution of VC trends. These works show that information available in VentureSource was more reliable and complete with respect to similar sources. Specifically, VentureSource offers longitudinal and standardised information on VC transactions within a more comprehensive setting which also includes detailed information on both VC-backed companies and VC investors (i.e., 'venture capitalists'). Similarly, Kuckertz et al. (2019) confirm the comprehensiveness of VentureSource as data source, particularly for transactions

completed in the United States and Europe (1). In addition, this database provides a comprehensive overview of public grants over a long period. For these reasons, we opted for VentureSource although alternative databases are claimed to better cover some types of investment.

The full dataset includes 3,659 public grants, 77 % from the SME instrument programme and the remaining 23 % from other public funding organizations. A subset of the data set ('matched dataset') obtained by matching the full one with Orbis (Bureau van Dijk) to get information on target firms includes a total of 696 grants, of which approximately 18 % are attributed to the SME instrument and the rest to other forms of public grants.

For the analysis of Public Grants, we complement the two datasets on Venture Capital introduced in Section 2 with two additions. First, we included deals tagged as "Grant-Government" in VentureSource. Second, we further integrated the datasets with information on firms which have received any SME Instrument grants by the European Commission within the Horizon 2020 (H2020) scheme between 2014 and 2017.

Therefore, the analysis is carried out on two data sets. The first, derived solely from VentureSource, does not contain historical information on the finances of the target companies / subsidized companies. At the same time, it provides a complete picture of both private venture capital and public subsidies in Europe during the sample period. The second, derived from the matched database, allows more detailed analysis of the companies (e.g., sectors and finance), but is limited to the subsample of matched companies.

The full dataset counts on 3,659 public grants, of which 77% from H2020 and the remaining 23% from other public granters. The matched dataset, hereafter "matched DB", shows 579 of such grants, associated to approximately 200 granters[1]. Specifically, we found 124 SME Instrument grants, of which 7 were already included in the VentureSource original dataset. Hence, the matched DB includes a total of 696 grants, of which approximately the 18% are attributable to the SME Instrument and the rest to Other Public Grants.[2]

Altogether, granters of Other Public Grants may be broadly classified in two categories: based on the matched DB: *(i)* supranational authorities, bodies or agencies, including the European Commission or the European Investment Bank, which represent around 30% of the total; *(ii)* public authorities, including ministries, states, municipalities, together with national or local

[1] Some of the grants are provided jointly by different (up to five) entities.

[2] For the sake of clarity, from now on we will tag as "SME Instrument" the grants obtained from the Horizon 2020 dataset, "Other Public Grants" the grants included in VentureSource or in the matched DB, and "Public Grants" the sum of the two. Altogether, our matched sample approximatively covers 19% of Public Grants (from VentureSource and Horizon 2020).

authorities and public companies, which represent approximately 60% of the grants. The remaining 10% consists mainly of joint ventures between public and private organizations or between supranational and national authorities.

The following analysis focuses separately on SME instruments and Other Public Grants due to their different and not necessarily homogeneous origins and types. However, some analyses are also carried out on all public subsidies. The instruments of SMEs and other public grants are then compared with Venture Capital investments. The objective is to determine the absolute amounts of public subsidies from all sources, i. e. EC and other public institutions, and their relative levels compared to venture capital investments in Europe. In addition, to analyse the investment strategies of public and private entities, the characteristics of the companies they are targeting are considered.

## 2. The evolution and geography of Public Grants and Venture Capital in the EU

We first look at the evolution of public grants and Venture Capital investments and its distribution among the European Union countries. Within the sources of public funding, particular attention is given to the role of the SME Instrument in the European financing landscape for innovative SMEs.

*Figure 1 – Cumulated number of transactions by type (SME Instrument, Other Public Grants and VC), 2008-2017*

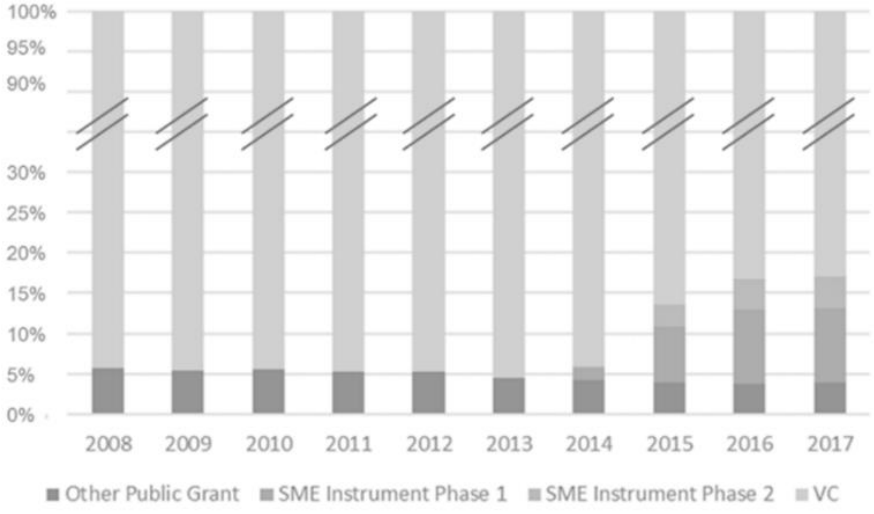
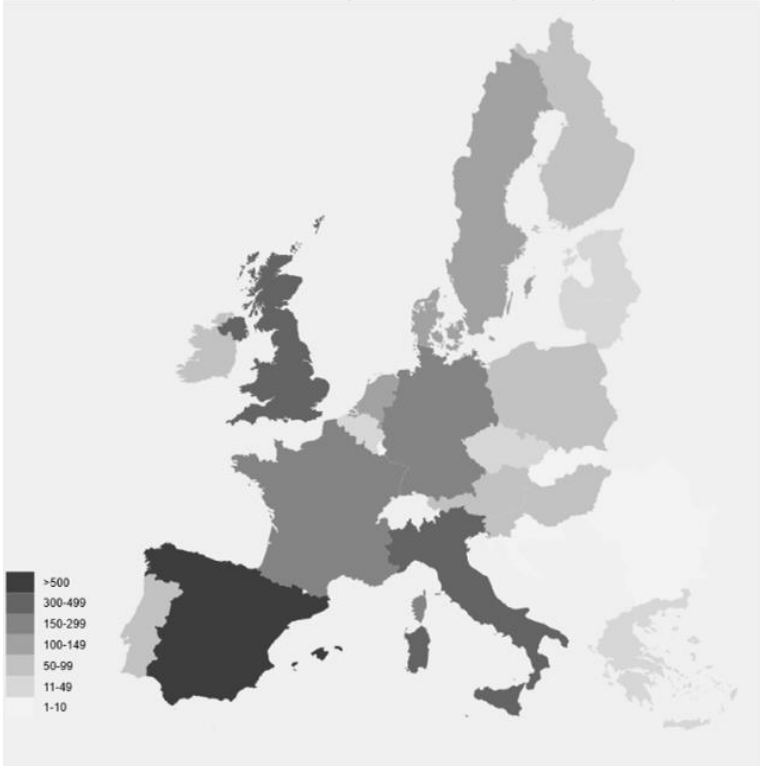


Figure 1*Figure* describes the cumulated number of transactions, including SME Instrument[3], Other Public Grants, and VC investments, in the period between 2008 and 2017. In 2008, Public Entities and Venture Capitalists provided about 1,400 times funding to innovative companies in Europe. This number more than tripled within a decade and was close to 5,000 in 2017. While at the beginning of the analysed period, Public Grants accounted for overall 6% and Venture Capital investments for 94% of the number of deals, the share of Public Grants in the number of deals increased to 17% in 2017. In the same year, the number of SME Instrument grants accounted for 77% of all Public Grants and 14% of the total number of deals, including both Public Grants and VC investments. Because of relatively smaller grants, SME Instrument Phase 1 accounted for over 70% of the cumulated SME Instrument grants in 2017.

*Figure 2 – Cumulated SME Instrument grants' number of deals by country, 2014-2017*

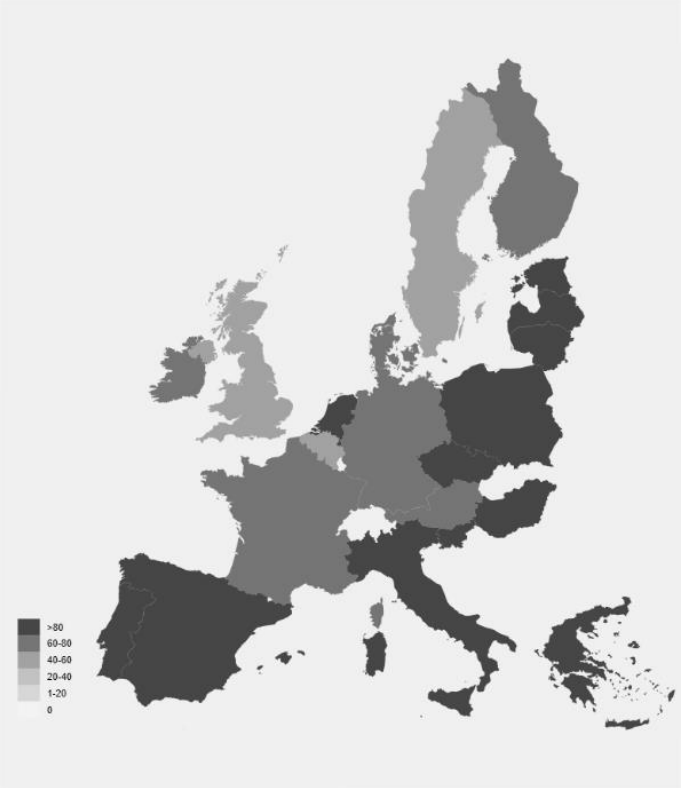



[3] The SME Instrument was launched under the Horizon 2020 Framework Programme in 2014. Hence, the time span of the grants analysed ranges from 2014 to 2017.

Turning to the geography of SME Instrument grants, Figure 2 presents cumulated number of grants across the European countries in 2014-2017. Spain, Italy, and the UK represent the top three countries raising cumulated SME Instrument funding, in terms of number of deals (50%). A similar result emerges when looking at volume of funding (43%). These three are followed by other 6 countries (Germany, France, Netherlands, Sweden, Denmark, and Finland) in which 80% of the cumulated SME Instrument funding was raised both in terms of volume of funding and number of the deals between 2014 and 2017.

Along the same line, Figure 3 presents the cumulated SME Instrument grants as a share of total Public Grants, by number of transactions by country.

*Figure 3 – Cumulated SME Instrument grants as a % of total Public Grants[4] by country in terms of deals, 2014-2017*



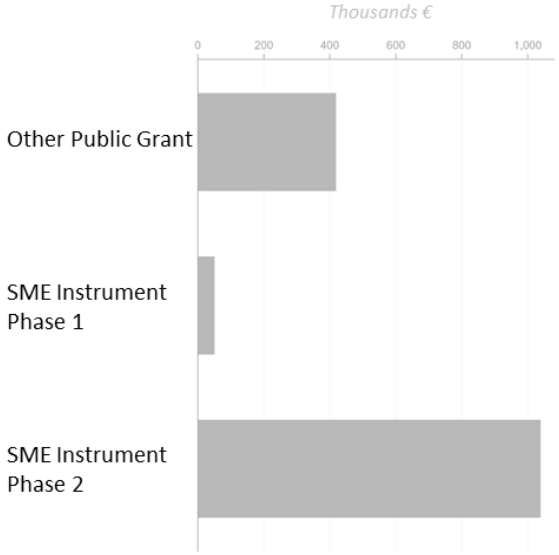

[4] 7 countries with up to 10 Total Public Grants in the period 2014-2017 were excluded from the analysis and the graphs to avoid biases in the interpretation of ratio of very small values.

From the analysis of these figures, it emerges that SME Instrument plays a key role as a public source of funding for SMEs. In many countries such as (Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, and Slovenia), it accounted for more than 95% of the overall public grant funding from 2008 to 2017. On the other side, some other European countries (Belgium, Germany, France, Sweden, and the UK) SME Instrument volumes accounted for at most 50% of Public Grants in the same period.

## 3. Analysis of Public Grants and VC funding

In this section, we compare Public Grants with VC investments in terms of some relevant characteristics (e.g., the median amount) in the case in which a firm raises both kinds of funding. More specifically, we look at the amount of public grants by category. Then, we investigate the mix of funding from different sources by analysing the share of firms receiving only public grants or receiving public grants and private VC financing. Lastly, we aim at examining whether there is any relationship between the source, the sequence of funding (private vs. public) and the volume of grants/ VC investments.

*Figure 4– Public Grants' median amount by category, 2008-2017*[5]

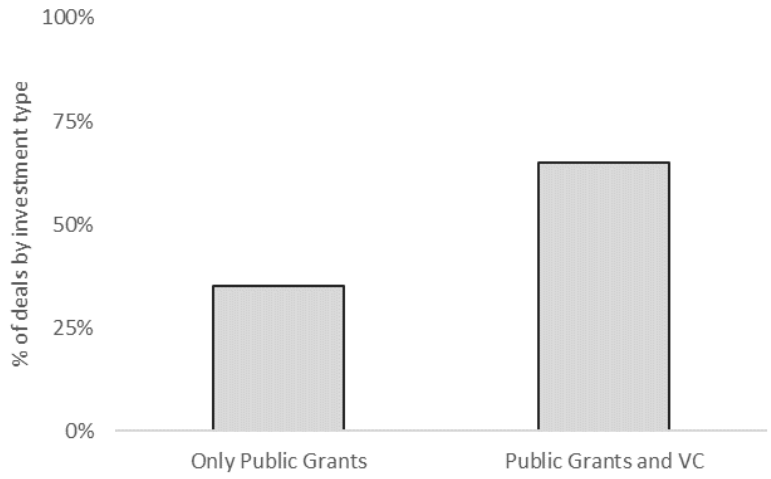



[5] SME Instrument Phase 1 and 2 figures cumulated in the available period (2014-2017).

Figure 4 presents the median cumulated amount of funding by grant category between 2008 and 2017. The median grant provided by programs other than the SME Instrument was 0.4 million Euro. This value for SME Instrument changes based on the SME Instrument phase. Phase 1 offered innovative SMEs a lump sum of 50.000 Euro for exploring and assessing the technical feasibility and commercial potential of a breakthrough innovation. In contrast, Phase 2 provided funding for innovation projects underpinned by a strategic business plan and feasibility assessment. The median amount of SME Instrument Phase 2 grant was just above 1 million Euro. Hence, this new funding instrument for innovative SMEs, introduced in the Horizon 2020 Framework Programme, provides funding that was not available at the national and regional level in Europe.

We now turn the attention to the combination of public and private funding of firms. Specifically, Figure 5 presents the percentage of firms receiving only public grants or receiving public grants and private VC financing. Among the investigated firms, one third (35%) received public grants only, while the remaining group of firms (65%) were able to receive both grants from public entities and VC investments. This evidence shows that companies based in the European Union that look for external financing are frequently making use of both public and private sources of funding.

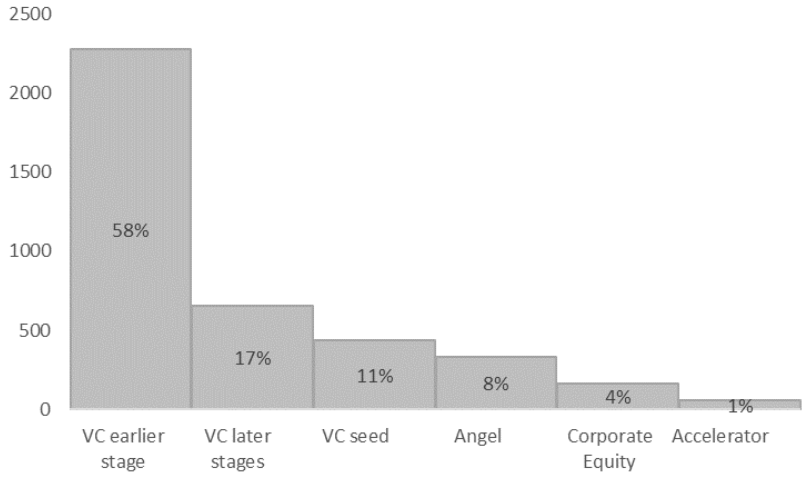
*Figure 5 – Percentage of firms raising public grants only or raising public grants and VC financing, 2008-2017*




In order to further analyse the relationship between Public Grants and VC, we look at the round of VC funding raised by firms that also received public

grants, as shown in Figure 6. Firms that raised public grants between 2008 and 2017, also received mainly Early stages of VC funding, accounting for 58% of nearly 4,000 VC funding rounds.

*Figure 6 – Cumulated distributions of VC deals (by category) raised by firms that also received public grants, 2008-2017*




The second largest type of funding by VC for firms that received also public grant funding is represented by Later Stages (17%). Business Angel investments and Seed funding represent altogether 8% and 11% of all VC investments, respectively. Funding from accelerators or Corporate VC was at the level of 1% and 4% of all the private investments involving firms that raised public grants.

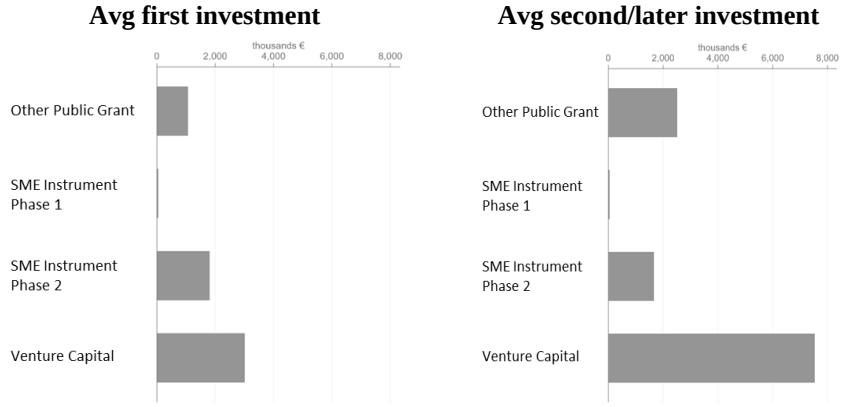
Hereafter, we investigate the relationship between the volume of the first with subsequent funding deals. Accordingly, Figure 7 compares the average volumes of SME Instrument, Other Public Grants, and VC funding, when they separately appear to be the first investment received by a firm (left) and the second (or later) raised investments (right).

The average volumes of funding for each investment type, when it is the first investment/grant received by a firm, are: Other Public Grants: 1.1 million Euro; SME Instrument Phase 2: 1.8 million Euro; VC: 3 million Euro.[6] The average volumes of funding for each investment type when it is a subsequent investment/grant received by a firm are Other Public Grants: 2.5 million Euro, SME Instrument Phase 2: 1.7 million Euro, VC: 7.5 million Euro.

[6] The SME Instrument Phase 1 is not relevant in this comparison, because firms receive a lump sum of 50,000 Euro.

Similar results in relative terms (not included here) emerge when looking at the median instead of the average values.

*Figure 7 – Comparison of volumes (by category): first raised investment vs subsequent raised investments*




Thus, according to Figure 7, except for the SME Instrument grants, the volume of funding increases from the first round to the follow up funding rounds. This seems to be the case for both other public grants and private investments.

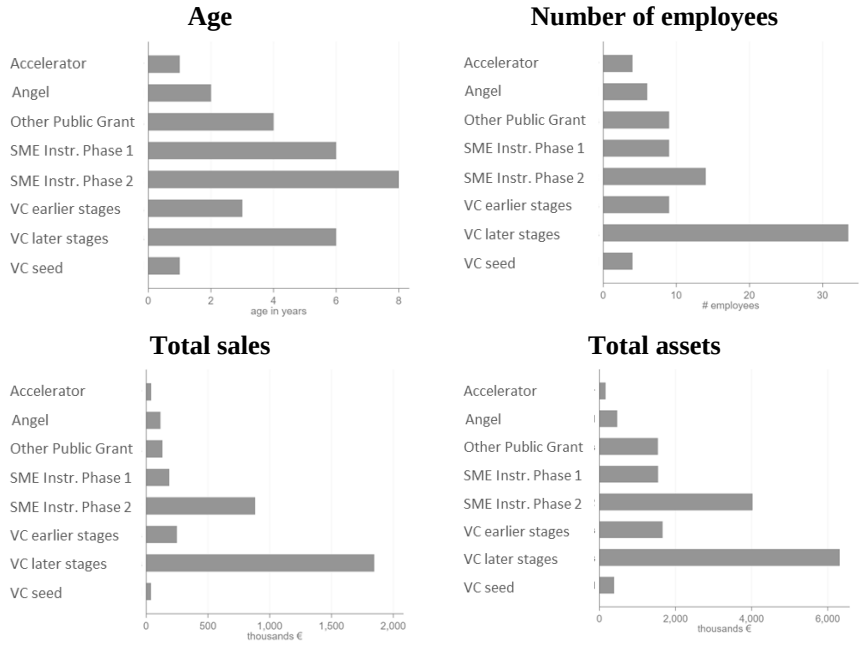
## 4. Features of firms receiving both public grants and VC investments

This section analyses the investment strategies of public and private entities based on the characteristics of the companies they are targeting. Specifically, we look at the demographics of these companies and their financial performance.

Figure 8 provides an overview of the characteristics of companies that receive public subsidies or private investments, broken down by category and source of investment, that is, public and private. It contains median values for four variables: number of employees, age, total sales, and assets. Figure 8 shows that Accelerator Funded Companies are the youngest and smallest companies in terms of number of employees, total sales, and assets. Their average age is 1 year, and they employ 4 people. Median sales and the value of assets are around 40 thousand euros and 160 thousand euros, respectively. Subsequent VC rounds are given to the most mature companies compared to

all measures except age. The average company that receives later stage venture capital investments is 6 years old, has 33 employees and an annual turnover of 1.8 million euros. The total balance is 6.3 million euros.

*Figure 8 – Characteristics of firms when receiving public grants or private investments, 2008-2017*




In relation to companies that receive funding from government entities other than the H2020 SME Instrument, there are some notable differences between the types of instruments. Public bodies that provide financing to innovative companies target relatively mature and large companies. A medium-sized company that receives a grant other than the SME instrument has 4 years and 9 employees. Regarding the financial profitability of the companies affected by other public aid, they have an annual turnover of 0.13 million euros and total assets of 1.5 million euros. In this way, companies that receive other public subsidies in terms of age, assets and employees are similar to companies that receive venture capital investments in the initial stage, while their average sales are lower.

If companies that have the support of the SME Instrument are considered, they are 6 (Phase 1) and 8 (Phase 2) years old, and they have 9 employees. The average turnover is 0.19 million euros (Phase 1) and 0.88 million euros (Phase 2). Their assets are worth 1.5 million euros (Phase 1) and 4 million

euros (Phase 2). When comparing the companies financed by the SME instrument of Phase 1 with the target companies of the private venture capitalists, they are similar in terms of total assets, sales and employees to the companies that receive the first stages. However, in terms of age, they are more like companies that are promoted to VC Later. This could indicate that the companies supported by Phase 1 of the SME Instrument are small, have a relatively high asset value, but have a low level of turnover. On the other hand, companies that receive Phase 2 of the SME Instrument seem to follow a behaviour that intervenes between companies that also raise earlier and later stages but are older.

In summary, the previous results show significant differences between the levels and patterns of financing of innovative companies by public and private entities. The analysis also shows that different types of funding institutions target different types of businesses.

## Concluding remarks

In this paper, we addressed the relevant topic of the interactions between public and private funding for companies, with specific reference to SMEs operating in the European Union.

In summary, we find that almost two-thirds of the companies that receive grants have also been the subject of private venture capital investments. Moreover, since its inception, the Horizon 2020 SME Instrument has become an important source of public funding for SMEs, contributing 50% of the total amount of public grants in 2017.

Looking more specifically at the characteristics of privately versus publicly financed companies, the above results show significant differences between the volume and structure of financing for innovative companies by public and private institutions. The analysis also shows that different types of financial institutions target different types of businesses. Despite the analysed sample may lack representativeness - since some of the analyses were carried out on a subsample of companies for which financial and industrial information was available - this work can contribute to the scientific debate on the relationship between private investment and public subsidies. From a political perspective, it could shed light on how public authorities and private investors work together to finance the creation of young SMEs in the EU.

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