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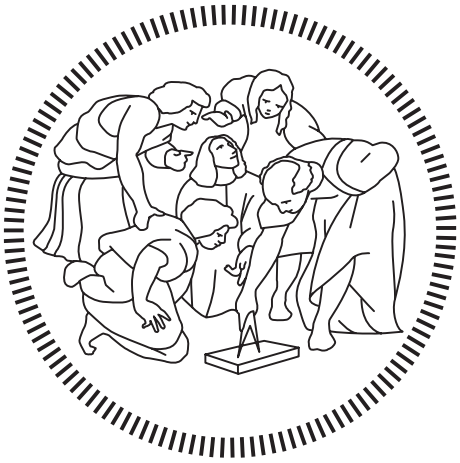

INFLUENCE OF PAST EXPERIENCE AND ABILITY FACTORS ON SATISFACTION OF EQUITY CROWDFUNDING EXPECTED PERFORMANCES

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Abstract - Italiano

Lo scopo di questo lavoro di tesi è quello di approfondire alcune dinamiche del processo di equity crowdfunding che, pur essendo un fenomeno molto recente, ha vissuto negli ultimi anni una crescita veloce ed incessante, portandolo dall'essere uno strumento di nicchia per la raccolta di fondi per le imprese a uno degli strumenti maggiormente utilizzati tra quelli della finanza alternativa.
In particolare, si andrà ad analizzare un campo lasciato attualmente scoperto dalla letteratura disponibile, ovvero quello della verifica degli scostamenti delle performance reali rispetto a quelle dichiarate come attese in fase di campagna.
Per farlo è stato necessario estrarre dai business plan, pitch e dalle pagine delle campagne sulle piattaforme i dati attesi delle compagnie per poi confrontarli con i valori reali estratti dai bilanci annuali.

Si studierà inizialmente l'effetto della presenza di fattori di esperienza e abilità pregressa sulle deviazioni delle allocazioni reali dei fondi raccolti rispetto a quelle dichiarate nei documenti presentati all'inizio della campagna di equity crowdfunding.
Successivamente si procederà a verificare se le precedenti deviazioni abbiano effetti sulla variazione del debito della compagnia, focalizzandosi in particolar modo nel capire se un'allocazione inferiore rispetto al valore atteso possa essere collegata a una riduzione del debito.
Per finire, l'ultima analisi verrà condotta sui ricavi, verificando lo scostamento dei valori reali ottenuti rispetto a quelli dichiarati come attesi per i tre anni successivi alla campagna di equity crowdfunding studiando come i precedenti fattori di abilità ed esperienza pregressa possano influire su queste deviazioni.

Parole chiave: Equity Crowdfunding; Obiettivi di allocazione; Ricavi; Debito; Business Plan; Performance Post Campagna.

Abstract - English

The objective of this dissertation is to explore some dynamics of equity crowdfunding process, that even being a newly born phenomenon, in the last years has undergone a fast and unceasing growth, that brought it from being a niche instrument for companies' funds collection to one of the most used between the ones in the alternative finance market.
In particular, it analyses a field uncovered by the currently available literature, the one of deviations of real performances from the expected ones published during the campaign.
In order to do this, has been necessary to extract from the business plans, pitches and campaigns' pages on platforms the expected data, to compare them with the real values gathered for the annual financial statements.

Initially, it is going to study the effects that the presence of past experience and ability factors could have on deviations of real allocation of collected funds with respect of the declared values presented at the beginning of the equity crowdfunding campaign.
Then it proceeds with the verification of whether the previous deviations have effects on company's debt variation, focusing, in particular, in understanding if a lower allocation with respect of the expected value could be related to a debt reduction.
Finally, the last analysis will be conducted on revenues, verifying real values' deviations from the expected ones for three years after the equity crowdfunding campaign, studying how the previously presented factors of past experience and ability could influence the deviations.

Key words: Equity Crowdfunding; Allocation Objectives; Revenues; Debt; Business Plan; Post-campaign Performances.

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Chapter 1
Executive summary

Initial stages of the life cycle are the most difficult and critical in the company's life, once used all the properties funds, the entrepreneur should rely on equity or debt capitals, getting these funds from agents in the traditional finance market could be not easy for young companies that are not able to provide enough information and/or collaterals.
For this reasons, as time progressed, a new alternative finance market was formed, and new players gradually joined it to take the place of the traditional agents.

In the last years, between the alternative finance instruments to collect funds, a particular method has taken an increasingly important place: the crowdfunding.
Through this methodology it is possible for companies to collect money from a crowd of investors, making an open call through an authorized online platform.
This innovative method is actually rooted in the very far past, indeed, it is not difficult to find in history examples of fundraising with methodologies very similar to crowdfunding.
The real innovativeness is given by the possibility to perform such campaigns through internet, connecting a huge number of investors and applicants in one unique place.

In practice, there are essentially four actors participating to crowdfunding process: an offering company, an authorized platform, banks and investors.
Crowdfunding is a term grouping together different techniques between which the most famous are the lending, the donation, the reward and the equity crowdfunding.

This dissertation work focuses on equity crowdfunding, a methodology through which companies could raise funds giving in exchange shares of the company itself, and in particular, on the Italian market.
Italy was one of the first countries in the word to adopt a specific regulamentation for this methodology in 2013, and from that moment its growth has continued unceasingly, not only in terms of market dimension but also from a regulatory point of view.
Finally, after various changes, in 2020 the last and bigger revolution arrived from the European Union, the European Crowdfunding Service Providers (ECSP) regulation, a regulatory framework that tries to set the conditions for the creation of and European equity crowdfunding market.

Italian equity crowdfunding data and information are collected, elaborated and presented by "Osservatorio Crowdinvesting del Politecnico di Milano", that each year presents a report on crowdinvesting.
Data for Italian market shows a steady growth of this methodology from 2014 till 2021, even during Covid-19 pandemic situation the numbers that this market was able to achieve were extraordinary, however data for 2022 shows the first stop in the growth of the collected amount, reflecting both the accumulated problems during the pandemic situation, the energy crisis and the Ukrainian-Russian conflict problems.

Equity crowdfunding has both benefits and problems.
Starting from the crowd of investors, it is mainly composed by not professional investors, that have not the same evaluation method of professional ones and could run serious risks in performing such investments, for this reason the evolution of regulation was and still is also aimed to their protection.
For what regard the offering companies, contrary to what thought by many, equity crowdfunding is not a way to get cash for free, but it embeds costs such as the ones to carry on the due diligence needed in order to perform it, but also risks such as the bad advisory that could come from unsuccessful or problematic campaigns.

In the last years a huge literature has been developed with the same pace at which crowdfunding grew.
Definition of a theoretical framework should start from the traditional theories such as the Peaking Order theory by (Myers and Majluf 1984) explaining that cost of funds increases with asymmetric information problems.
From these theories there have been many developments among which the credit rationing theory by (Stiglitz and Weiss 1981), explaining how banks do not always provide all the credit requested by agents in the market.
This together with a set of problems in the financial markets, leads to the exclusion from them of some agents, this phenomenon takes the name of funding gap (Gualandri and Schwizer 2008).

Equity crowdfunding is one of the methodologies initially developed to fill this gap. In order to define it the starting point is the definition of crowdsourcing (Howe 2008), that brough to the many definition of crowdfunding such as the ones of (Belleflame, Lambert and Schwienbacher 2014) or (Mollick 2014).
The last steps are the ones to pass from crowdfunding to crowdinvesting, and from it to equity crowdfunding, a peculiar way of raising funds for companies giving in exchange to investors shares of the company itself.

One of the main reasons why investors decide to invest in equity crowdfunding campaigns is the monetary return that they could have, however it is not granted and, instead, a huge part of the companies performing campaigns fails soon after it (Signori and Vismara 2018).
Another big advantage of this methodology is the possibility of eliminating the geographical barriers that usually preclude to individuals the traditional investments (Agrawal, Catalini and Goldfarb 2011).

A huge part of the currently available literature focuses on the determinants of success and on the post-campaign performances.
For what regard the success of the campaigns (Ahlers, Cumming, et al. 2015) found the importance of roadmaps and of the board's educational level, (Lukkarien, Teich, et al. 2016) found relevance for the use of social media and other investor-related aspects.
For the post-campaign performances a lot studies have been developed, (Walthoff-Borm, Vanacker and Collewaert 2018) suggested that equity crowdfunding backed companies should outperform firms backed from other sources for many reasons, among which the wisdom of crowd (Surowiecki 2004).
Another critical aspect in granting the long-term survival of the company is identified by (Signori and Vismara 2018) in the presence of a venture capitalist or a business angel between investors.

Since a gap in the literature for the allocation of resources has been found, articles focusing on IPOs have been analysed, founding that the prospectus section for use of proceeds generally provide just very general indications (Wyatt 2013) and that at the same time in this section it is usually not reported an allocation of funds for debt repayment, since it could be perceived by the market as opportunistic (Salma and Maher 2017) leading to deterioration of operating performances.

Dissertation's topic have been decided after finding a literature gap about the documentation presented by the proposing companies and their ability to respect the promises made and the expectations created with them.
For this reason, the dissertation tries to analyse whether the presence of a group of factors, defined as of "past experience and ability" in the pre-campaign context could effectively influence the results achieved, in term of deviations of the real values from the ones declared in the documents presented at the beginning of the campaign.

These documents are the business plan, a document that is usually prepared and presented by companies that are collecting funds, in order to explain and let the potential investors know the information about the business, and the pitch of the company, a presentation containing the main key information about the company and the investment.
In addition to these documents also the information published directly on the campaign's page on the online platforms have been taken into consideration.

Research of data has started from the database developed by "Osservatorio Crowdinvesting del Politecnico di Milano**"** that, in June 2023, reports 1211 Italian's equity crowdfunding campaigns.
From these, being a work mainly bases on performances analysis, some campaigns had to be excluded and, in particular, they are the ones closed without success, related to real-estate projects, happened on club deal Platforms, occurred through an investment vehicle and the ones still ongoing at the analysis date.
Once excluded all of them, it has been possible to compute the final target population composed by 730 campaigns, from which the samples for each hypothesis and model have been defined.

Talking about the data extracted from the documents presented at the beginning of the campaign, they could be divided into two main categories.

Have been gathered from the documents presented for the campaign the information on how the minimum goal for funds collection was planned to be used by companies.
Not all the companies presented these objectives, indeed, 21% of the target population, did not presented any allocation objective for the minimum collection goal.
Another 22%, presented objectives but in generic form, without specifying one or both the quantities allocated and the specific areas of allocations.
However, 57% of the companies considered, presented specific allocation objectives, declaring both the precise quantities and the areas of allocation.

After the allocation objectives, expected elements of financial statements have been collected, again, a quite relevant part of companies performing campaigns in the target population (173) did not present any kind of financial information, just in 126 cases a full expected balance sheet and income statement have been presented.
In the remaining cases only some key measures such as revenues, EBITDA, EBIT and net profits have been disclosed.

Three hypothesis were created and developed.
Initially, dissertation focuses on allocation objectives.
HP. Companies embedding a stronger past experience and ability are able to get closer to the stated expected objectives of allocation.

All the past experience and ability factors consider elements of the company in the pre-campaign context that could bring them a potential advantage in managing the funds collected during the campaign.
Among the factors considered, there are some of them that take into consideration some company's characteristics such as its age and kind or the presence of previously done capital increases, while the last two takes into account aspects related to the available human resources, and they are the presence of professional investors in the company's structure and the number of employees.

For each of the hypothesis a sample of the target population satisfying the requirements and for which there was data availability, have been extracted for the analysis.
For the hypothesis studying the deviations of real values from the allocation objectives the final sample taken into consideration was composed by 220 campaigns.

Then, the secondly presented hypothesis regards the debt's variations of the companies performing equity crowdfunding, and the effects that deviations from the allocation objectives could have on them:
HP. A negative deviations in allocation objectives is positively correlated with an increase in debt.

In this case the factors kept in consideration are the ones previously studied defining the deviations of real allocation values from the objective ones.
The final sample of campaigns satisfying the requirements was composed by 154 observations.

Finally, deviations of real revenues from the expected ones have been kept into consideration:
HP. Companies embedding a stronger past experience and ability are able to get closer to the stated expected revenues.

With factor of past experience and ability it is referring to the same considered in the first hypothesis.
For what regards the hypothesis on deviations of real revenues from expected ones the sample construction has been a little bit different, starting from the sample built for the first hypothesis, the deviations have been calculated for 3 years after the campaign.
Once eliminated again the campaigns for which there was not data availability, the sample for this last hypothesis resulted in 500 observations.

Models have been carried on using linear regressions and the multivariate multiple regression, a peculiar kind of analysis allowing to study the effects of a group of explanatory variables on different dependent variables.

For the allocation objectives hypothesis 8 different equations have been developed, one for each area of objective allocation identified (intangible assets, tangible assets, working capital, inventories, personal costs, service costs, other costs and operation costs).

To the previously factors of past experience and ability a vector of control variables have been added to keep into consideration the collected amount with respect to the target capital set for the collection, the sector in which the company is operating (identified through the ATECO code), its legal form (SB, SRL, SpA, S.A.) and the year in which the campaign took place.

Results have shown how none of the variables taken into consideration was able to completely explain all the deviations in the 8 areas.
However, many of them have been found significant in determining a positive deviation for some of the considered areas.
The most frequently found result was that the variable keeping in consideration the number of employees in the pre-campaign context was positively affecting the deviations with a quite strong statistical significance.

For the second hypothesis, a model studying the effects on debt variations that could be provided by the previous deviations, has been developed, keeping also in consideration through a categorical variable the platform on which the campaign took place.

Just lightly significant results have been found and a further development of the model has been created by considering only the campaigns related to companies with a negative debt variation (a reduction of debt), and with at least one negative deviation in allocation objectives.

Additionally, all the deviations for allocation areas for which there was not a specific allocation objective have been considered null.

Results for this second model have shown again some statistical significances but, due to the sample dimension of just 38 campaigns their reliability is limited.

Finally, the last model studying the deviations of real revenues from the expected ones, did not show significance for the variables of interest representing the past experience and ability factors, however, having kept in consideration the years to which the deviations refers to, has made it possible to find significance for them.
In particular, has been found that to shorter forecast horizon are associate more positive real revenues' deviations.

Concluding, no direct relationship have been found between the past "experience and ability" factors and deviations of real values from allocation objectives and revenues, and between the variations of debt and the deviations from the allocation objectives.
However, it was possible to define some relationships between some of these factors and the independent variable studied time by time.

Was found significancy in positively influencing deviations from intangible assets for the variable indicating the age of the company before the campaign.
Also, the category of innovative startups has been found as significant, positively affecting the deviations regarding the intangible assets allocation objectives.
As seen, the most frequently significant variable was the one keeping in consideration the number of workers in the pre-campaign context, showing positive effect for 5 of the 8 deviations from allocation objectives analysed.

The debt hypothesis brought to not very significant results, however, it has set good basis for further research, demonstrating how the possibility that companies raising funds could use them to repay some debts, could exists.

For the revenues hypothesis no significance was found for what regards the variable of past "experience and ability" taken into consideration, however it was possible to see the effects that a planning horizon more distant from the present have on the deviations of real revenues from the expected values.

Chapter 2
Introduction

European Commission defines the crowdfunding as:

"(...) a way of raising money to finance projects and businesses. It enables fundraisers to collect money from a large number of people via online platforms.".

In last years, this methodology has grown till taking a major spot in the alternative finance market becoming a widely used instrument by many entrepreneurs facing difficulties in raising funds during the company life and, in particular, during their early stages.

2.1 General introduction to crowdfunding

Early stages of a company following a "normal" lifecycle path, are the most difficult to deal with for entrepreneurs leading startups or SMEs.

Youth company usually find themselves in a situation where self-financing methods, such as own and FFF's funds[1], that are limited, have been used to create and found the activity, the sales generated are not enough even to cover the costs and to carry on the operations are required additional funds bringing them to look for external funds.
Indeed, in the current context is rare to see a company entirely self-financed and it is more frequent a firm partially financed with own funds and partially through the aid of the banking system or professional investors.

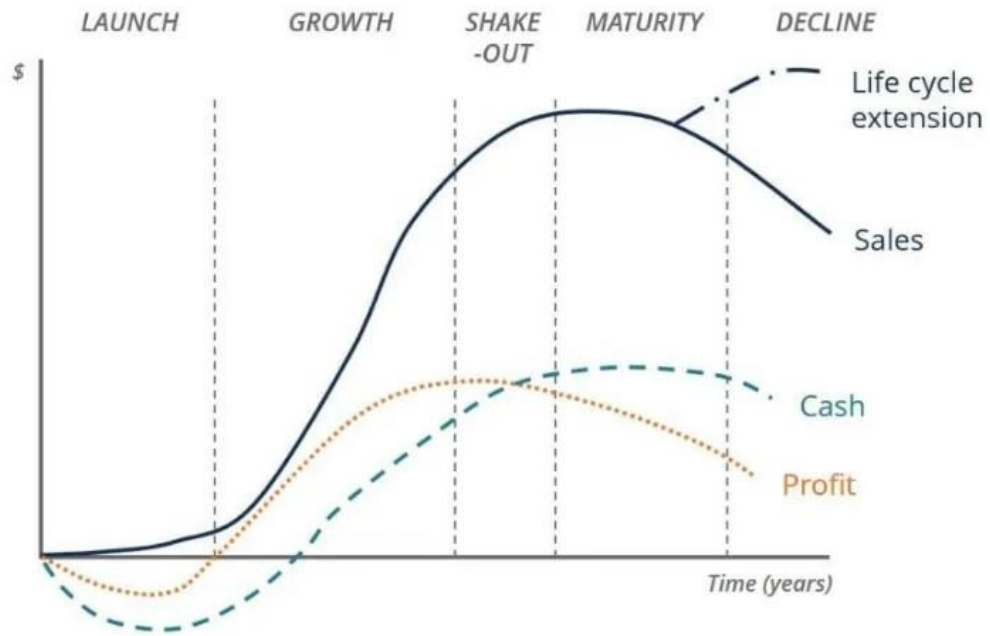


Figure 2.1 - Company "normal" lifecycle.

Source: https://corporatefinanceinstitute.com/resources/valuation/business-life-cycle/

A first way through which a company could raise external funds is by recurring to a debt solution, finding someone willing to lend money, usually a bank or another financial institution, in exchange for the return in future of the capital plus an interest rate (e.g., bank loans) with a well-defined repayment scheme.

[1] Funds provided by Friend, Family and Fools, they take also the name of "love capital", are used to start the activity, but are limited in their quantity.

Alternatively, is possible for the firm to sell shares of the company itself (e.g., equity), making investors enter in the structure of the company, sharing profits, responsibilities and decisions.
This solution, under the traditional finance market, requires the presence of professional investors (falling under the definition of private equity investors), while it is quite difficult for individuals to acquire participations in companies in their early stages of the life cycle.
Unlike the debt solutions, equity allows companies to bring inside the company new shareholders with their skills and knowledge, loosing at the same time a portion of the power over the company.

Even if these alternatives are widely used, as time goes by is becoming more evident how they are not enough, the first very powerful signal comes from the market that is naturally evolving in order to overcome firms' problems in raising capitals, this led to the creation of an alternative finance market[2].
Between the various innovations that year after year are born and joined to this market such as mini bonds, crypto currencies, assets tokenization, and many more, crowdfunding has gained in last years a growing importance.

This method allows firm to raise capital from individuals, professional and institutional investors by making an open call on an authorized online platform offering in exchange different kind of rewards.

This financing alternative offers a more flexible solution compared to the traditional ones.
A first kind of flexibility offered by crowdfunding is the possibility to leave the traditional repayment scheme offered by banks and financial institutions, usually very rigid and standardized, offering solutions like pre-selling or profit-share.
Secondly, with this methodology, and in particular with the sub-category of equity crowdfunding, it becomes possible for small companies to sell shares of equity to many, even small, investors, ceasing to rely just on professional ones.

In particular, while in the traditional system, allowing professional investors to enter in the shareholders structure could lead entrepreneurs to lose the full control of the company, with individual investors this risk is mitigated by the fact that the same share of equity is sold and so owned by a much larger number of investors that have a lower individual shareholder power.
Nevertheless, selling smaller shares to a larger group of individuals decrease bargaining power of investors that should accept what offered by the company, while in case of professional ones the large amounts invested are often related to a high bargaining power, giving them the possibility to set conditions and requirements unfavourable for the company.

[2] Defined on the Cambridge 2nd Global Alternative Finance Market Benchmarking Report as *"Alternative finance includes digital finance activities that have emerged outside of the incumbent banking systems and traditional capital markets and occur online"* (Ziegler, et al. 2021)

2.2 Crowdfunding actors and process

There are three main actors involved in a crowdfunding campaign process: the investor, the applicant or offering company and the authorized platform.

Investors could be both individuals (the biggest part), professionals or institutional ones, they are part of a group of people investing in a project, called crowd.
Regulation divides investors in two sub-categories: the sophisticated and the non-sophisticated. The former are the ones falling in the category of professional clients[3] and the ones that satisfy the criteria reported in the European regulamentation[4].
The latter are all the investors not belonging to the first category and are more protected by regulation since they have not the same knowledge and instruments of valuation of the sophisticated ones, incurring in more risks while investing.

It is necessary to underline that for some crowdfunding categories it is better to talk about donors since for peculiar crowdfunding campaigns, mainly based on charitable projects, the crowd donates without expecting anything as return, there are also other cases in which the crowd acts as lender with a repayment contract with the borrowing company.

Applicants or offering companies are firms that have necessity of funds to finance their activities or a specific project and make a request to the platform for publishing their proposal in order to have the possibility to collect the needed funds from the crowd.

authorized platform is an online portal that achieved to obtain the authorization of the local control authority (in Italy Consob[5]) to perform an intermediation activity between the investors and the offering company during the crowdfunding campaign.
It has also the role of screening and skimming the projects proposed, avoiding publishing too risky campaign, decreasing information asymmetry problems and increasing the protection of the investors.

[3] Defined in MiFID II regulation, Annex II, Section I.
[4] European regulamentation on European crowdfunding service providers for business and amending Regulation (EU) 2017/1129 and Directive (EU) 2019/1937.
[5] Commissione Nazionale per le Società e la Borsa - supervisory body of Italian finance market.

There is even a fourth category of actors involved in this process composed by banks, it was not included into the three main actors since they usually act just as intermediaries and connecting points between the other three actors.

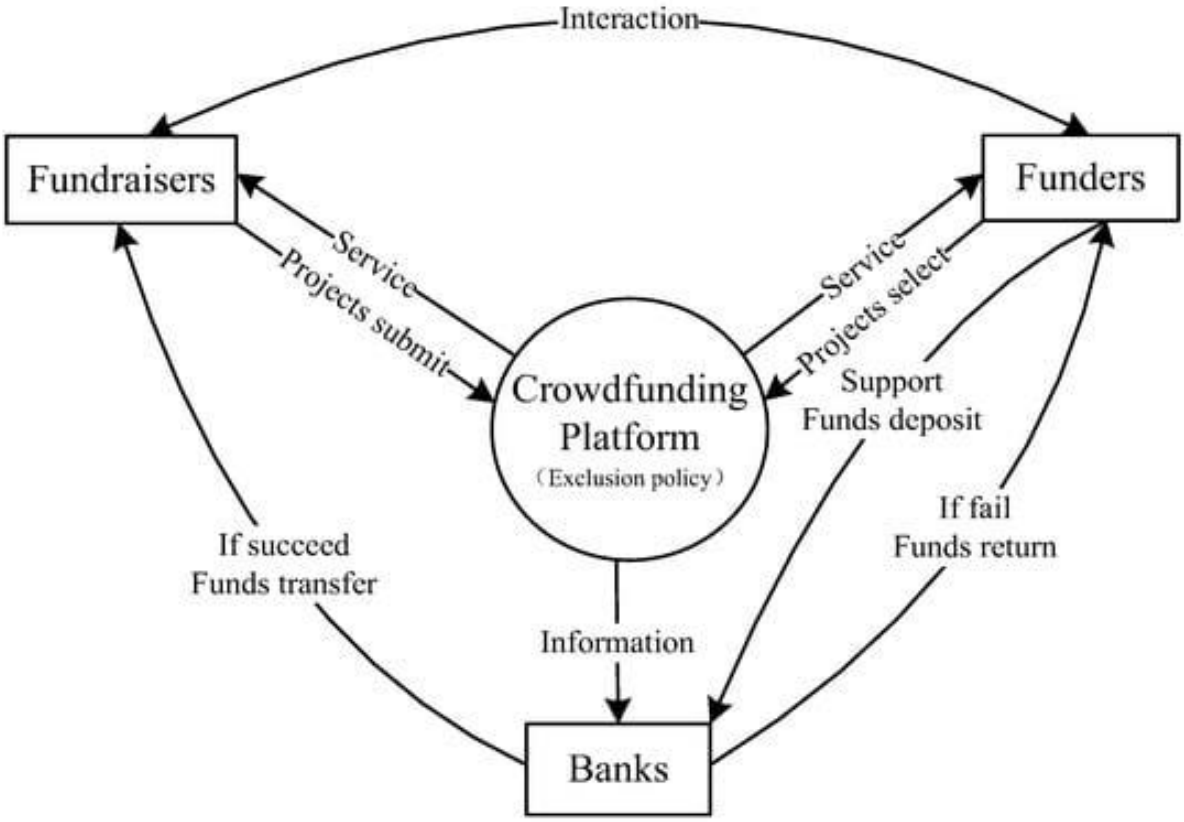


Figure 2.2 - Crowdfunding process scheme.

Source: https://www.mdpi.com/2071-1050/10/4/1053 (Wu, et al. 2018)

Crowdfunding process starts with the offering company submitting a project to the authorized platform providing all the information and documentation necessary (e.g., financial statements, expected financials, minimum and maximum amount offered, returns/reward proposed for investors…).

Authorized platform must check that everything is compliant with international and national regulations, and once done this step, if everything was compliant, the company is a potential applicant.
The platform then chooses between the potentials only the applicants better suiting their offering and it publishes their campaigns on its website, making them public for all the investors.

Once, the campaign is published the investors have the possibility to invest (or donate) till the campaign reaches the closing date or till the maximum offered amount is collected.

There can be two possible scenarios at the end of the campaign: could be the case in which it is closed with success (i.e., the minimum objective have been collected) so the intermediary bank transfers the funds collected by the crowd to the offering company or could be the case in which the campaign is closed without success and in this case the bank returns the funds to the investors.

2.3 Crowdfunding categories

Crowdfunding term groups together all the way of raising funds that implies an online open call to a crowd of people, it is possible to classify different kinds of crowdfunding by the way in which the process take place, the European Commission website offers a quite complete overview of the categories, dividing crowdfunding into:

- **Peer-to-peer lending,** this methodology is the closest to the traditional banking system. It is based on a crowd of investors that lends funds to the companies with the agreement that the borrower will repay the capital plus a certain interest rate in future.

- **Reward-based crowdfunding,** this methodology is a kind of pre-selling activity, where the company asking for funds repays the crowd of investors with a reward that usually consist in a product but that could be even a service.
  This kind of crowdfunding allows the company to create a tier-based reward system, compensating the investors giving larger amounts with more valuable rewards, incentivizing them to invest more.

- **Donation-based crowdfunding,** usually done for charitable projects where the crowd donates to sustain a project or a cause without expecting nothing as return (e.g., campaign born during Covid-19 pandemic to sustain hospitals).

- **Profit sharing or revenue-sharing crowdfunding,** as suggested by the name the offering company offers to share the future profits or revenues in exchange for the funds collected.

- **Debt securities crowdfunding,** the applicants offers as reward for investing in the campaigns their debt securities (e.g., bonds), in this way the investors giving funds subscribes them.

- **Equity crowdfunding,** one of the most growing sectors of crowdfunding, where the company sells a share of its equity to the investors that subscribe it proportionally to the invested amount.
  This allows investors to become shareholders of the company.
  The process is similar to the one of a venture capital or a stock exchange but it allows SMEs and startups to access to a channel that is usually limited for them.

- **Hybrid models,** composed by all the methodologies created by mixing the previous models.

This is not the only way to categorize crowdfunding, indeed, the offering company has the possibility to set different constraints on monetary objective of the campaign (e.g., minimum and maximum amount collectable), giving the possibility to divide them into:

- **All-or-nothing campaigns,** where the fundraiser sets the minimum and the maximum constraint on the collectable amount at the same level.
  This does not give to the investors the possibility to invest more than that amount, and the campaign is considered closed without success if the collected capital is lower than that threshold.

- **Take-it-all campaigns,** the offering company does not set any minimum objective, every amount collected is transferred to the company and the campaign always close with success.
  In this case the company could anyway set or not a maximum objective of collection.

- **Minimum amount campaigns,** where fundraiser sets just the minimum amount constraint, so that if the campaign collects less than it closes without success, while if it collects more than it the excess funds are taken no matter how much they are.

- **Maximum amount campaigns**, where the fundraiser sets just the maximum amount constraint, so that each amount below that is accepted and independently from the amount collected the campaign is closed with success.

2.4 Crowdfunding history

Crowdfunding is seen nowadays as an innovative way to collect funds, but the roots of this methodology are located far away in the past, where in many cases it is possible to see similarities with the current process.

Just taking the first part of definition of crowdfunding that explain how it is a way for collecting money from a large number of people and looking to the past, one of the most distant in time examples is the one by Themistocles, that in Athens during the fifth century B.C proposed to the most prestigious people in the agora to reinvest the money that they should get from the silver mines of the city into the building of a naval fleet.

A closer example is the one happened in 1985, when French donates to America the Statue of Liberty, but the artwork was missing the pedestal, so that the journalist Joseph Pulitzer organized a collection of funds through its journal that was an enormous success.
Many people donates, even small amounts, just to see the history written on the journal, collecting the whole necessary amount to build the pedestal.

In the middle there are many examples presenting similarities with the concept of crowdfunding.
What distinguish the previous examples from the modern concept of crowdfunding is the innovation brought by it that lies in the process, the methodologies, the legislation and the possibility to perform many campaigns in short time thanks to the presence of an online platform connecting a huge number of potential investors.

First traces of crowdfunding in its modern version are usually connected to the band "Marillon" that in 1997, in order to finance its tour in North America, launched an online campaign collecting almost $ 60.000.
It was the starting point and in the following years many charitable projects were financed through an online campaign, making this methodology more and more known.

In 2005 crowdfunding arrived in Italy where *"Produzioni dal Basso"* activated an online service to finance some projects.
Until this point this way of collecting funds was not specifically defined as crowdfunding, some sources assign the creation of this term to Michael Sullivan that, to finance videoblogs, creates the website *"Fundavlog"* using for the first time the term crowdfunding to explain the project.

In 2008 and 2009 Indiegogo and Kickstarted were founded, two companies that in the following years had taken the lead of the market of reward-based crowdfunding, becoming two of the biggest players in performing this activity, in particular the former for the European market and the latter for the American one.
The first reward and donation platforms arrived in Italy from abroad between 2010 and 2011 together with the first cases of social lending.

In 2012 there was a turning point for crowdfunding when there was a boom in platform creation and the first true crowdfunding regulation at international level was introduced in the United States with JOBS act[6].
Italy in 2013 was the first country in Europe and between the firsts in the world to introduce a specific regulamentation[7] for equity crowdfunding.

In the following years the growth and evolution of this methodology proceed at a relentless pace, the platforms and campaigns increased in number and enlarged their field of action, bringing also to the creation of some vertical specialized platforms on specific sectors (e.g., *"Concrete Investing"* that manages only real estate projects).

[6] "Jumpstart Our Business Startups Act" of 5th April 2012, regulation set in the US by the SEC.
[7] Introduction of regulation with CONSOB approval 26th June 2013.

2.5 Italian regulation history

Italy had a pioneer role in developing a regulation for equity crowdfunding, it has started in 2012 when the first proper regulation in matter of equity crowdfunding has been modelled and subsequently put in place from 2013[8], year in which Consob published the first Italian regulation about equity crowdfunding.
Initially, this methodology was admitted only for companies falling under the category of innovative startups (see annex 8.1.1) in order to promote their development, the general startups' environment and to facilitate the transition of the Italian economic system to a model focalised on knowledge and innovation.

Two years later, in 2015, a new regulation[9] enlarged to innovative SMEs (see annex 8.1.2) the possibility of adopting equity crowdfunding to raise funds, allowing at the same time investment funds and companies that invest mainly in innovative startups or SMEs to place their capitals on equity crowdfunding platforms.
These new introductions bring Consob to modify the previous regulation releasing a new version in 2016.

In 2017 the regulation evolved[10] again introducing, initially, the possibility for SMEs constituted in S.p.A. form and then also for the ones constituted as S.R.L. to raise money through equity crowdfunding.

In 2018 MiFID II regulation was introduced in the Italian regulation bringing new possibilities for SMEs adopting this financing method including:

- possibility to create particular categories of shares with different rights.
- possibility to create categories of shares without voting right or that give possibility of vote not proportionally to the share of equity owned, so with limited voting rights, in this way the current shareholders would not lose the control over the company.
- possibility to make operations on the participation when they are done in order to actuate an incentivization plan embedding participation assignment to employees, collaborators and/or associates (e.g., stock options).

[8] Introduced by D.L. n. 179 of 18th October 2012, then converted into law n. 221 of 17th December 2012 with the "Decreto Crescita 2.0".
[9] D.L. n 3 of 24th January 2015, then converted into law n.3 of 24th March 2015 with the "Decreto Investment Impact".
[10] D.L. n 50 of 24th April 2017.

Always in 2018 other innovations have been added to the Consob regulation, the main ones are:

- possibility for SMEs to issue mini bonds[11] which could be subscribed by institutional and some retail investors satisfying specific constraint (see annex 8.1.3).

- possibility for companies of foreign countries belonging to the European Union, to collect money through equity crowdfunding on Italian platforms.

- possibility for crowdfunding platforms to create a bulletin board on their website where investors could sell or buy shares acquired from previous campaigns.
  This instrument is a way to make the market more liquid[12] allowing investors to trade their investments (i.e., same concept of a stock exchange).

Finally, in 2020, European Parliament approved the ECSP[13] regulation (see annex 8.2) , which was initially planned to come in place from 10th November 2022, creating a unique environment and legislation for the whole European territory.
Deadline has then been moved to 10th November 2023 since some countries, among which Italy, were not able to put it in place and obtain the new European authorization, without which is not possible to operate.

[11] Alternative finance instruments, allowing unlisted companies to collect funds issuing bonds for a countervalue lower than € 50 million.
[12] Liquidity of the market measures the easiness of turning an asset into money, a more tradeable asset is considered more liquid.
[13] Acronymous that stays for “European Crowdfunding Service Providers”.

2.6 Crowdfunding market

Alternative finance online market has been characterized in recent years by a constant growth, as explained in the second report about the alternative finance of (Ziegler, et al. 2021), passing from a global volume of $ 89 billion in 2018, to $91 billion in 2019 and, even suffering the Covid-19 pandemic situation, to $ 113 billion in 2020[14].

In particular, the donation-based segment of crowdfunding has seen an exponential growth (160% between 2019 and 2020) that could be mostly attributable to the various charity initiatives dedicate to Covid-19 pandemic issues.

	2019 Global Dataset Excluding China				2020 Global Data Excluding China			
Alternative Finance Model	**Volume**	**Market Share**	**Model Ranking**	**Change in Ranking 2018 v 2019**	**Volume**	**Market Share**	**Model Ranking**	**Change in Ranking 2019 v 2020**
P2P/Marketplace Consumer Lending	$33,606,240,567	37%	1		$34,733,430,066	31%	1	
Balance Sheet Business Lending	$19,132,408,437	21%	2		$28,018,468,321	25%	2	
Balance Sheet Consumer Lending	$10,628,711,073	12%	3	(+1)	$11,893,247,173	11%	4	(-1)
P2P/Marketplace Business Lending	$7,378,843,454	8%	4	(+1)	$15,374,032,703	14%	3	(+1)
P2P/Marketplace Property Lending	$4,093,908,169	4%	5	(+1)	$3,073,501,606	3%	7	(-2)
Balance Sheet Property Lending	$4,039,738,352	4%	6	(-3)	$1,808,250,436	2%	9	(-3)
Invoice Trading	$3,621,223,547	4%	7	(+1)	$3,868,914,901	3%	6	(+1)
Real estate Crowdfunding	$2,874,474,252	3%	8	(-1)	$2,777,136,742	2%	8	
Donation-based Crowdfunding	$2,680,454,133	3%	9	(+3)	$7,002,577,758	6%	5	(+4)
Equity-based Crowdfunding	$1,093,646,218	1%	10	(-1)	$1,520,408,438	1%	10	
Reward-based Crowdfunding	$887,443,612	1%	11	(-1)	$1,242,796,093	1%	11	
Consumer Purchase Finance/BNPL	$591,711,865	1%	12		$505,372,721	0%	12	
Debt-based Securities	$490,227,397	1%	13	(-2)	$384,760,118	0%	13	
Crowd-led Microfinance	$182,370,557	0%	14		$151,483,348	0%	14	
Revenue/Profit Sharing	$35,585,989	0%	15	(-1)	$84,514,275	0%	15	
Community Shares	$20,886,410	0%	16	(-1)	$23,693,137	0%	17	(-1)
Mini Bonds	$6,236,156	0%	17	(-1)	$43,932,746	0%	16	(+1)
Other	$878,327	0%	18	(-5)	$3,044,581	0%	18	

Figure 2.3 - Alternative finance market volumes by model.

Source: (Ziegler, et al. 2021)

Lending-based alternatives are much more developed, taking the first places of the ranking, showing how for investors these solutions are still more reliable than other crowdfunding ways, offering a return with less uncertainty degree and working on a process very similar to the banking one and so well known by all the investors.

However, is possible to observe from data how not-lending related crowdfunding practices are in the middle of the ranking with notable volumes, showing that they achieved to gain their space in this big market, leaving also the possibility that they could grow much more.

Focusing on the Italian market it is possible to see on the 7th report about Crowdinvesting developed by the "Osservatorio Crowdinvesting del Politecnico di Milano" the evolution of equity crowdfunding.

[14] Data are not considering the China ones since it has followed a very different path following a path of boom and bust, and the data could be distorted by its presence.

Amounts collected through this methodology has been growing since 2014, even during the pandemic situation, with an amount collected during 2021 of about € 148 million (almost € 48 million more than 2020) and a whole amount collected from 2014 of € 370 million.

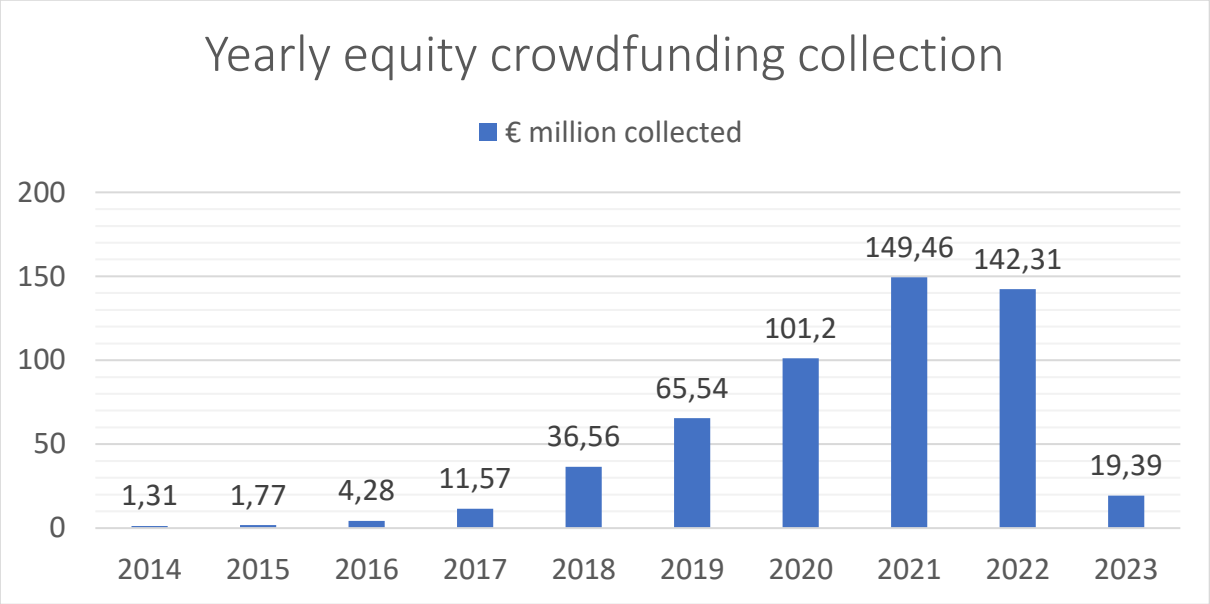


Figure 2.4 – Yearly collected amount for Italian equity crowdfunding campaigns from 2014.

Source: Database on Italian equity crowdfunding developed by "Osservatorio Crowdinvesting del Politecnico di Milano"

2022 data are not negligible, the presence Russia-Ukraine war and the energy price crisis are reflected in the collected data, emerging in the first year from 2014 without a growth in the collected amount, with a total collection of about € 142 million.

The difference with the previous year could seem not alarming from an initial look, but it become looking at the composition of the collected amount.

Table 2.1 - Comparison between equity crowdfunding campaigns of 2022 and 2021.

	Not real estate projects	***Real estate projects***	***Total***
Year - 2021	€ 106 million – 71.34%	€ 43 million – 28.66%	€ 149 million – 100%
Year - 2022	€ 87 million – 61.27%	€ 55 million – 38.73%	€ 142 million – 100%

These data shows how the real estate segment is drastically boosting the results of equity crowdfunding in 2022, with a reduction both in proportion and in absolute value of the amount invested in the "industrial" segment.

2.7 Equity crowdfunding context

This dissertation focuses on equity crowdfunding, a subcategory of crowdfunding offering through an open call the possibility for investors to receive as reward for investing shares of the company.

This method allows firms to raise funds by not recurring to debt, but they must also evaluate the presence of new shareholders, that if from one side could bring new knowledge, experience and skills inside the company, from the other, even with individual limited power, could be a brake for entrepreneurs to freely act in the decision-making process and in carry on the company's activities.

However, this risk is even mitigated by the regulation that gives entrepreneurs the possibility to sell shares with different rights granting only patrimonial and not voting ones without diluting the current shareholders' power.

Again, for equity crowdfunding the role of the authorized platform is to evaluate and control the regulation compliancy of the proposed project and to choose the ones to publish.
Additionally, having non-sophisticated investors, it must ensure their preparation level and, if it is not adequate, must provide them with all the risk indications required by law.

2.7.1 Equity crowdfunding – Entrepreneur side

As already seen, this methodology allows entrepreneurs to sell shares of their companies to investors through an authorized online platform, partially overcoming the bottleneck in raising funds in the early stages of the companies life.

It is directed to a crowd of investors which are mainly not professional, with evaluation instruments and knowledge that are less powerful than the ones of the usual ones (e.g., venture capitalist, business angels), this limits the asymmetric information problems that could arises in fundraising giving to the company a higher chance to collect the funds.

Traditional ways of collecting funds require entrepreneurs to look for investors one by one, supporting every time the costs (both monetary and in terms of time) to find and engage them, instead, equity crowdfunding allows entrepreneurs to propose the offer to every potential investor just one time on the platform, avoiding the duplication of costs.

At the same time, this methodology could be seen as an advertising method for the offering company, indeed, publishing an online campaign on the platform makes your company visible by all the users on the platform, giving the possibility to create a community that follows the firm in its growth.
It is also possible to increase the promotion made through the campaign by making the participants of the community promoters of the project, exploiting the epidemiological model and spreading the news.

The reverse side of the coin is that to undertake such a method the company must disclose a lot of information about itself, in this way it is incurring in the risk of being copied by someone.
This risk assume particular relevance in case of equity crowdfunding since a huge portion of the offering companies are innovative startup or SMEs, that could lose their competitive advantage given by their innovativeness disclosing information.

At the same time the advertising advantage could become a disadvantage, since during a campaign the company is in the spotlight, and if it ends without success of if there are problems in the meanwhile, the company could get a bad advertising, that could cause trouble both immediately and in future during others financial rounds and company's lifecycle.

It is also important to underline how this is not a free way to get cash, but this method include costs.
First of all, the platforms are work on a revenue model[15] based on fees charged to the offering companies on the collected amounts.
Then there are a group of costs faced before the starting of the campaign such as the ones to prepare all the documents needed in this process, to evaluate and define the terms of the proposal, for consultancy or legal costs to be compliant with the regulations and, finally, there are the costs to update the company structure post-campaign.

All the previously evaluated points make clear how equity crowdfunding is a way to raise funds that could bring many benefits but that cannot be taken lightly, and that as for any other form of financing, must be correctly evaluate and a great effort must be undertaken.

[15] Way through which a company generates revenues.

2.7.2 Equity crowdfunding – Investor side

The crowd of people investing in equity crowdfunding campaign is formed by individual, professional or institutional investors that through this methodology subscribe shares of the company becoming part of its shareholder structure.

This means that they shares the profits but also the responsibilities that this role entails, allowing them to be part of the company not just at the close of financial statements but during the whole life of the company, taking part to the shareholders meeting (if the shares have voting rights and not just patrimonial ones) giving them the possibility to contribute to the decision-making process.

Generally, owning shares of these companies could be an additional way for the investors to diversify their portfolios of investment, mitigating the risk associated.

Focusing on individual investors, instead, this methodology can allow them to participate in a market and in companies that are, usually, out of their reach, giving them the possibility to participate from early stages in companies that could become very important and grow a lot in future, exploiting the return that they could generate.

Even for investors there are some backwords, being this method used vastly by innovative startup and SMEs, the risk of failure is relevant and, if for a professional or institutional investor the loss could be just a bump in the road, for individuals suffering a big or many small losses could weight a lot on their portfolios and savings.

For this last point and for the fact that individuals have instruments and knowledge lower compared to the one of the professional and institutional investors the regulation is constantly evolving trying to increase their protection and awareness of risks (see paragraph 2.5).

Chapter 3
Literature review

At the same rate with which the practice of crowdfunding has grown and evolved over the years even the associated literature has done the same.
Many scholars and researchers have focalised their works in studying this new method, starting from the classical theory arriving to the development of new theory, tools and instruments able to formalize crowdfunding concept.

3.1 Information asymmetry

Information asymmetry is a phenomenon affecting the financial markets that occurs when in a transaction between two or more parts they are not provided with the same level of information, this misbalance leads to a level of inefficiency in transaction higher than in case of balanced information (or perfect information).
In the theory developed by (Myers and Majluf 1984) that takes the name of *"Peaking Order Theory"* (or *"Financial Hierarchy"*) the authors explained how the costs of financing increases with asymmetric information.

Sources of finance are divided into three main categories:

- **Self-financing,** when the owner of the company use property funds, it is the less expensive source of funds since there are no repayment (e.g., interest rate or dividends), no transaction costs[16] and no asymmetric information problems since the part involved is just one.
  The absence of these problems makes this source the less costly according to (Myers and Majluf 1984) that explained how the entrepreneurs use all their available resource before of recurring to an external sources.

- **Debt,** is more costly than the previous one since it requires the repayment of both the capital and of an interest rate, accessing to this source of funds involves also transaction costs and asymmetric information problems between the borrower and the lender.
  According to the previous model, however, debt is not the more costly source of financing, and it is considered the first choice for entrepreneurs which no longer have internal capital.

- **Equity,** is classified as the most expensive between the three since it embeds the higher asymmetric information problems.
  When a company issues new equity the investors believe that managers (that know better the company's conditions) think that the firm is overvalued and that are taking advantage of this, resulting in investors investing a lower value as new equity.

It is possible to classify asymmetric information problems depending on when they occur:

- **Asymmetric information ex-ante:** related to problems that happen before the sign of the contract (the investment), it is threated by (Akerlof 1970) that explained how different levels of information on the good's quality (investment's quality) lead to **adverse selection** problems.
  In particular, before the contract is signed the lender (investor) has no information about the borrower (company asking for funds), not knowing if it is risky or not and if it is a good choice to lend (invest) to him funds.

[16] Costs incurred in an economic transaction additionally to the purchase price.

One possible solution to this problem is **screening**, having the agent that invest (or lend) checking the quality of the one that is asking for money (e.g., bank asking for collateral and past data record of the company).

- **Asymmetric information during the life of the contract:** modelized by (Grossman and Hart 1983) that talked about the **principal – agent problem** and it regards incomplete information over agent's actions.
  In this theory authors assume to have an agent that should act on behalf of the principal and highlight how their interests could diverge with an agent maximizing its utility instead of the principal's one.
  This kind of asymmetric information leads to problem of **moral hazard** (or **adverse incentive**).
  A possible solution to this problem is **monitoring,** with the investor checking during time how the invested money are used.

- **Asymmetric information ex-post:** regards misbalance of information on the results, when lender cannot be sure about the results of the investment while the borrower is fully aware about them, this problem brought to the possible solution of a **standard debt contract**[17] that is treated by (Williamson 1987) and (Townsend 1979).

All these problems lead to **credit rationing** (Stiglitz and Weiss 1981) with banks limiting the amount of credit granted.

Early-stage periods are the most difficult for startups in terms of funding, because, once that the own funds have been used, the second less costly form of financing is debt but, in order to acquire it, the company must provide data and information showing reliability and this is usually in contrast with their high risk profiles, alternatively they could provide enough assets as collateral that usually are not sufficient in young companies to cover entirely the necessary debt (Wilson and Silva 2014).
Creating in this way a market where even worthy enterprises do not get funds due to market imperfections; this situation is defined as financing (or funding) gap (Gualandri and Schwizer 2008).

These market conditions brought to the increasing importance of the *signaling theory* that studies how one part could communicate (send a signals) to the other to let it be informed (Connelly, et al. 2011).
This theory studies how company could create signals of quality to overcome the lack of data and collateral, needed not only in case of banks' funds but for all the external source of finance.

[17] Contract imposing to the borrower to repay the minimum between the interest rate and the amount achieved from the investment.

3.2 Starting from crowdsourcing

Problems in funding with the traditional market led to the creation of an alternative finance market, trying to substitute the traditional agents with other figures, performing the same job but in a different way.

Crowdsourcing is a section of this alternative market defined as *"the act of taking a task traditionally performed by a designated agent (such as an employee or a contractor) and outsourcing it by making an open call to an undefined but large group of people."* (Howe 2008).

This term is composed by a first part derived by the word *outsourcing* that is the action though which a company externalizes something, appointing a third party to carry it out, this practice is widely used in manufacturing companies externalizing activities or entire processes, it is extensively studied by many scholars and researchers (Vaxevanou and Konstantopoulos 2015).
The second part of this term is formed by the word *crowd,* and it is needed to specify how the externalization is not directed anymore just to a third-party but to a group of people.
Additionally defining it as crowd also stressed the importance of heterogeneity of this group.

In this definition is important to underline the part of *"(...) an open call (...)"* (Howe 2008).
With these few words the author is highlighting the fact that through this methodology it is not anymore, the company that goes and looks for the agents that must perform the task but are the agents that, once discovered the possibility given by this open call, reach the company.
This important evolution of the market allows firm to avoid or at least to reduce the costs usually incurred while searching and engaging these agents.

An expansion of the previous definition was then provided, trying to define the term in its most complete form as *"(...) a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowd-sourcer will obtain and utilize to their advantage what the user has brought to the venture, whose form will depend on the type of activity undertaken."* by (Hossain and Kauranen 2015).

This definition stressed all the important elements embedded in the crowdsourcing practice.
In particular, as seen before, the heterogeneity of the group of people is very relevant and through this definition its importance is stressed, implicitly connecting this diversity to different contributions in term of money, knowledge and experience.
Secondly, the authors talk about a mutual benefit that is a fundamental element in order to make such transactions happen.
Both the parts must have a "return", and while for the offeror is clearly the completion of the task required, for the undertaker could be of different kinds.

3.3 From crowdsourcing to Crowdfunding

Crowdfunding is a branch of crowdsourcing involving companies that look for funds, as suggested by the term, that try to collect them by a crowd of people.

Even if crowdfunding has historical roots, the first time this specific term has been used was in 2006 (see paragraph 2.4) and from there a huge literature has been developed to study the process that *"(...) involves an open call, mostly through the Internet, for the provision of financial resources either in form of donation or in exchange for the future product or some form of reward and/or voting rights"* (Belleflame, Lambert and Schwienbacher 2014) and that has become a *"(...) novel way for founders to raise capital for a wide variety of projects"* (Mollick 2014).

Being a subset of the larger practice of crowdsourcing it is possible to find again in this definition the concept of open call and the mutual benefit relationship (companies receive funds in exchange for some kind of rewards).
The different points highlighted from this definition are the fact that the open call happens through the Internet, while in previous definitions this compare just on the most complete version, and the presence of a specific task related to this kind of operation that is the collection of funds.

Crowdfunding was initially created to allows firms overcoming the financing gap and to raise money necessary to sustain them in the early stages of the lifecycle.
Over the years this methodology has gained more and more importance evolving arriving to the point where its use has been enlarged to all the initial stages (from founding) and to the further stages of growth and expansion of the company, till reaching the maturity, where the company must still rely on other traditional financing sources.

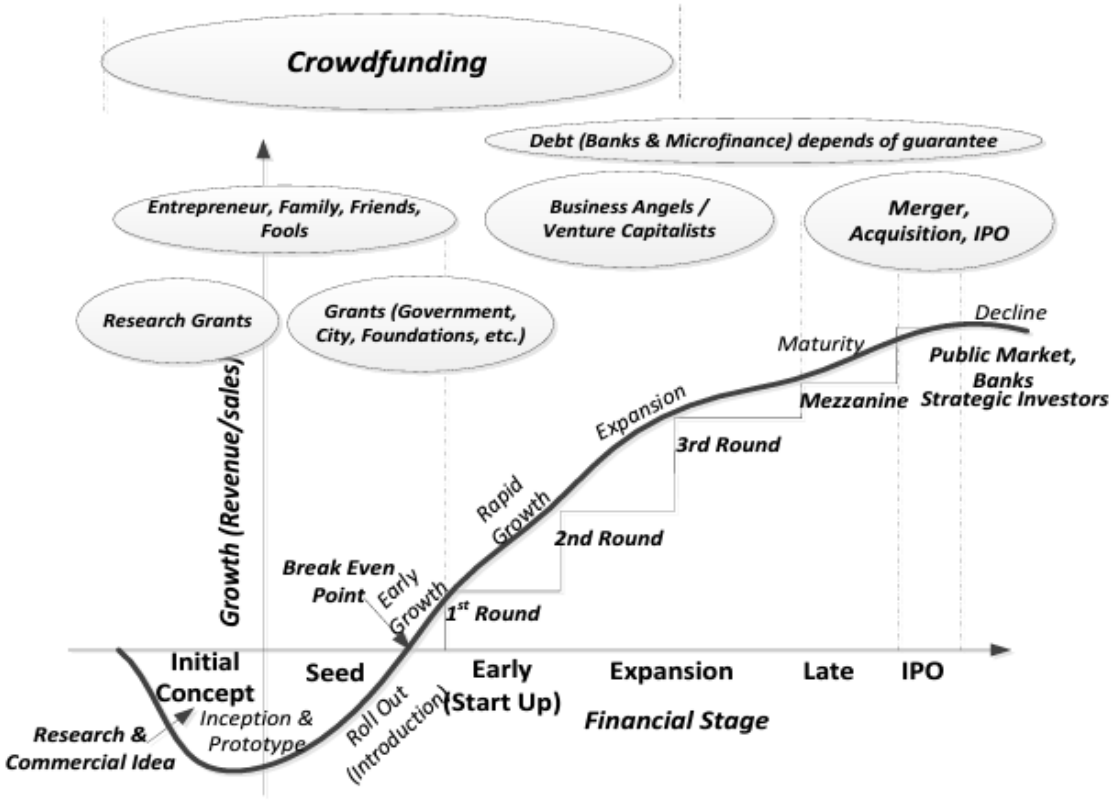


Figure 3.1 - Crowdfunding positioning during lifecycle of a company.

Source: (Lasrado 2013) extended from (Drake 2012)

In the previous definition has been highlighted the fundamental role that internet plays in the crowdfunding process but shifting the focus many scholars have tried to give different definitions bringing out different peculiar characteristics of this methodology.
(Butticè, et al. 2018) found *"three aspects that a comprehensive definition of crowdfunding should include: the provision of feedback from crowdfunders, the crucial role of crowdfunding platforms and the existence of several crowdfunding models."*

Feedbacks comes from the fact that crowdfunding allows investors and entrepreneurs to create a community around the company, with the former that become *followers* of the company (Josefy, Dean and Fitza 2016) giving them the possibility to keep in touch with it, to interact, to propose their ideas to the company or simply to report their problems.

Online platform's role is one of the most differentiating aspects between the modern definition of crowdfunding and past examples of fundraising acting with similar methodologies (see paragraph 2.4), an intermediation role that is crucial for the existence of crowdfunding.

Finally, the last point outlined by the authors is the fact that crowdfunding is a term identifying many ways for raising funds through an open call through an online platform (see paragraph 2.3).

3.4 from Crowdfunding to Crowdinvesting

Having many possibilities included in this term it is necessary another definition that goes deeper analysing a sub-class of crowdfunding.

Crowdinvesting is defined as *"(...) crowdfunding subgroup, where individuals (but also institutional and professional investors) could, though an enabling online platform, join directly to an open call for the collection of resources for a project, granting a loan (i.e., lending-based model) rather than underwriting shares of the risk capital of a company (equity-based model)"* (Osservatori Entrepreneurship Finance & Innovation 2022).
With this definition are excluded the methodologies such as the donation or reward-based ones and the focus is put on methodologies related to capitals.
With lending-based method associated to debt capital and equity-based to risk capital.

Lending model is the closest to the traditional banking system with investors that lend money to firms in exchange for the return of the capital plus an interest rate in future.
In the last report about Crowdinvesting from "Osservatorio Crowdinvesting del Politecnico di Milano" it is highlighted how, even if to define lending crowdfunding are used terms as "peer-to-peer lending" (P2P) and "social lending" business models used by existing platform could be different (Osservatori Entrepreneurship Finance & Innovation 2022).

Currently in the market there are two main models:

- **"anonymous" model,** where the crowd gives to the platform a certain amount of money specifying some conditions such as the expected interest rate and the risk appetite[18].
  From this point is the platform that tries to build a portfolio of investments for him\her considering the conditions and the preferences settled by the investor.
  After this evaluation process, before to actually allocate the money, the platform sends its offer to the backer with an expected interest rate that the solution could provide, and only when and if the offer is accepted the platform allocates the funds.

- **"P2P" model,** where the investor connecting to the platform could see who are the applicants, in this way he/she could decide autonomously to who lend the money evaluating by himself/herself the conditions offered.
  In this case there is still a fundamental role for the platform that must make an initial skimming of projects to publish only the valid ones that must be compliant with the regulation and coherent with the online platform's profile and, at the same time, campaigns that have a certain degree of "safety", avoiding publishing overly risky ones that could also damage its public image.

[18] Term used to define the amount of risk that an individual/society is available to accept in order to arrive to its objectives.

3.5 A focus on equity crowdfunding

This dissertation put the focus on the other element of Crowdinvesting, a form of crowdfunding that in the last years has gained importance, emerging as one of the main alternative financing methods for startups and SMEs, the equity crowdfunding.

This growing importance for scholars and researchers is highlighted by (Mochkabadi and Volkmann 2018) that reported an increase of 620% in equity crowdfunding studies from 2012 to 2017, remembering anyway how *"(...) research on equity crowdfunding is still in its infancy with limited and fragmented scientific knowledge"*.

In the same article the authors reported a graph representing the distribution of equity crowdfunding studies among different categories of journals showing how such a finance-based concept is studied just in a minor way from financials publications, while other fields' journals are widely researching on this topic.

From the graph is possible to see how the three main categories of journals publishing studies on equity crowdfunding deal with sectors strictly related to this methodology.
Excluding the part regarding "others", there are "entrepreneurship" and "business and management" whose connection with this procedure is intuitive since it exists only for the need of entrepreneurs to raise fund in order to run and manage their companies.
Finally, the biggest part comes from law journals, and this could be seen as a result of the growing regulamentation that is forming around this procedure.

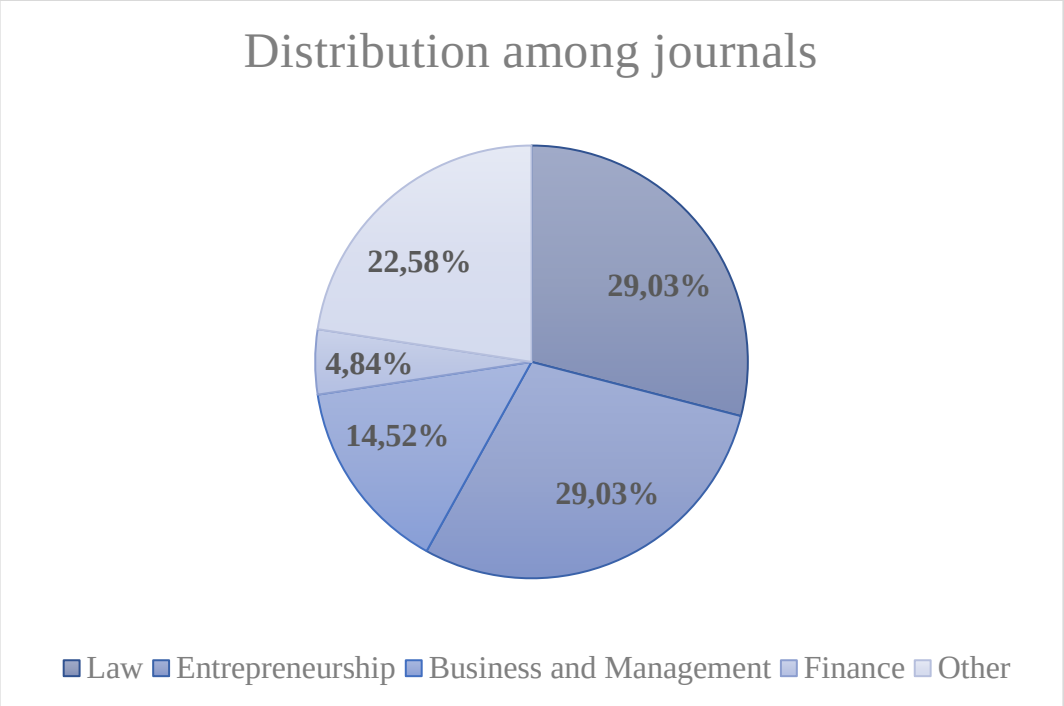


Figure 3.2 - Equity crowdfunding articles on different categories of journals.

Source: (Mochkabadi and Volkmann 2018)

Equity crowdfunding is defined as *"(...) a method of financing whereby an entrepreneur sells equity or equity-like shares in a company to a group of (small) investors through an open call for funding on Internet-based platforms"* (Ahlers, Cumming, et al. 2015).
With this definition is pointed out how the investors in this methodology are even small ones investing contained amounts and leveraging on their large number.
This characteristic sets a clear division line from the traditional financing method where there are just few professional investors committing huge capitals.

This methodology differs from the others not just in terms of investors and returns for them but working on a different segment of the market has very different characteristics.

(Vulkan, Åstebro and Sierra 2016) in their article specified some of the main differences between this methodology and the reward-based one studying the UK market:

- *"A much higher average amount pledged"*.
  Comparing data from Statista and from the last report of "Osservatorio Crowdinvesting del Politecnico di Milano" it is possible to validate this statement even for the Italian market.

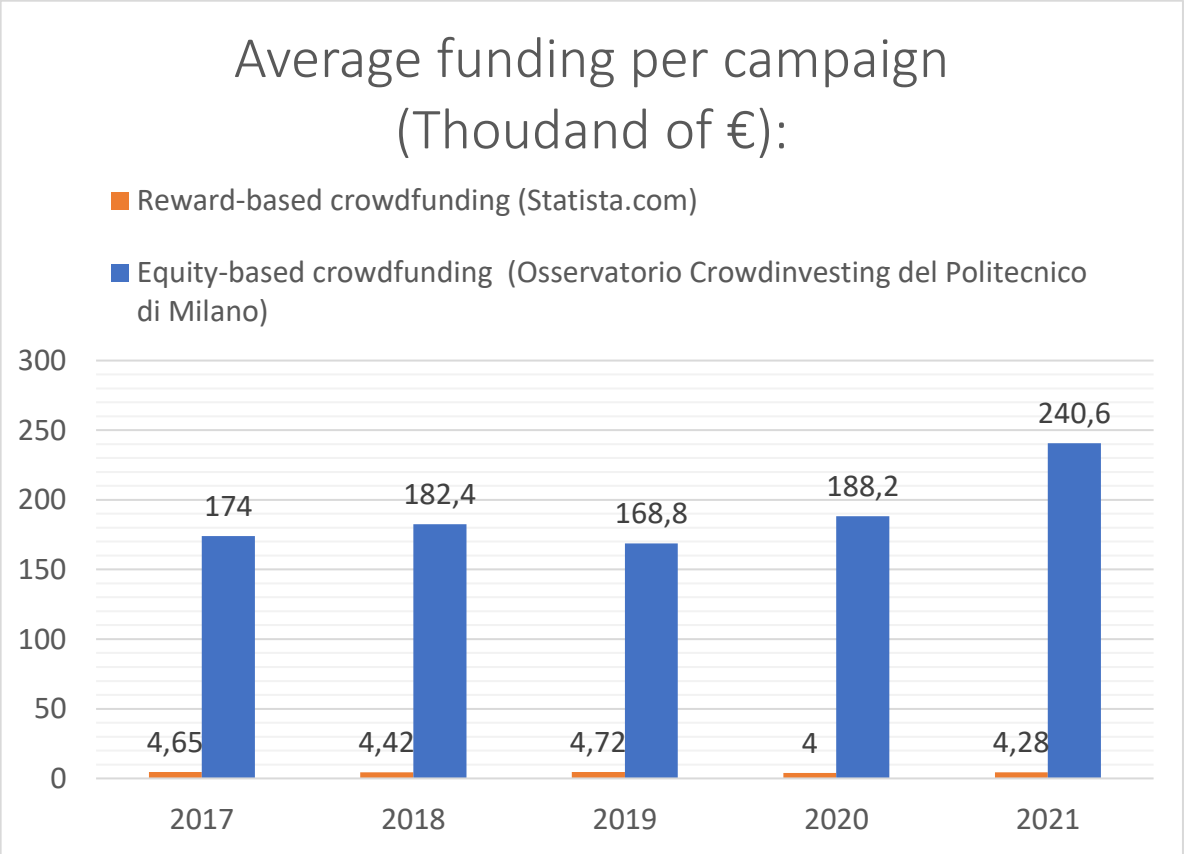


Figure 3.3 - Average funding per campaign reward vs equity crowdfunding.

The average collected amount per campaign is way much larger in case of an equity crowdfunding than for reward-based, showing consistency with the fact that in reward-based crowdfunding the reward is usually composed by product/services with a whole value that is usually contained while with equity crowdfunding a portion of the company itself is sold.

- *"A much higher average campaign goal, steadily increasing over time and lately approaching the size of first investments for VCs[19]".*

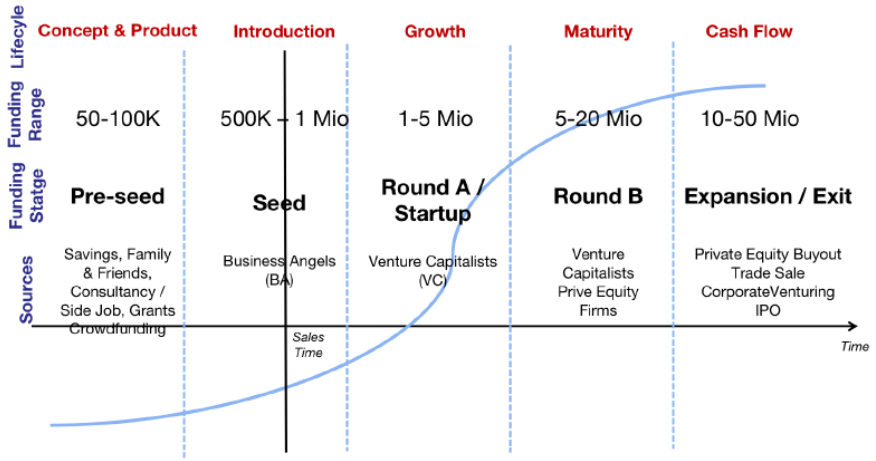


Figure 2.4 - Funding rounds during company's lifecycle

Source: https://www.aifi.it/IT/Home

Authors try to underline the importance that this method is obtaining as time goes by and, in their opinion, it will substitute the first round of funding, the one to sustain the growth of the startups, historically of competence of venture capitalist, business angels and private equity in general.

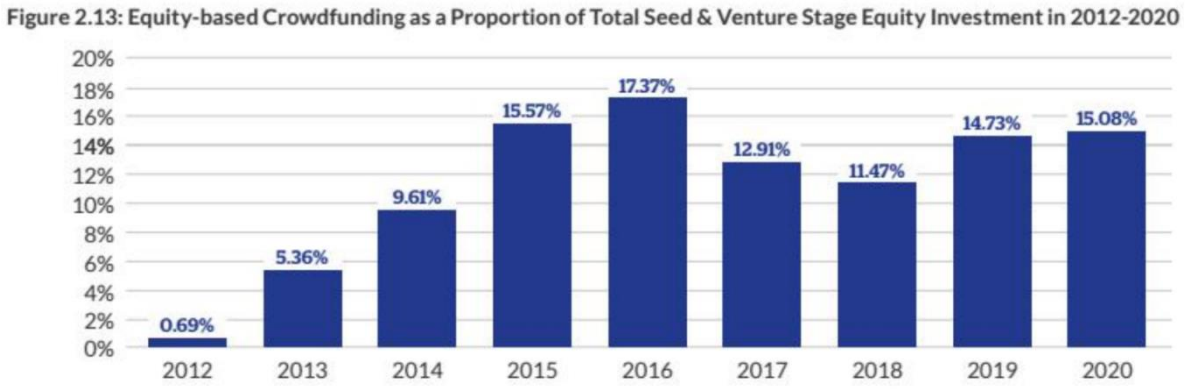


Figure 3.4 - Equity-based crowdfunding as a proportion of total seed and Venture stage equity investment in 2012-2020.

Source: (Ziegler, et al. 2021)

[19] Venture capitalists are private equity investor that provides capitals with high growth potential in exchange for an equity stake (see paragraph 3.7).

Data from "The 2nd Global Alternative Finance Market Benchmarking Report" from Cambridge University, of June 2021 partially confirm this sentence showing a growing trend for UK data from 2012 till 2016 (Year in which the previous article was written). In 2017 and 2018 there was a reduction with a subsequent rise in the following years which reflects how this method is still not mature evolving as time goes by and not yet ready to acquire the stability necessary to replace the already established methods.

However, the portion already acquired in few years is enough to understand how this is not a niche market anymore but is creating its own space in the bigger alternative finance market.

- *"The existence of (pre-money) valuation of each of the projects".*
  Having the company valuation is a fundamental step in equity crowdfunding procedure, it allows to know the effective value of the business and, consequently, allows the proposer to determine the price at which the shares are sold.

  It is one of the first data showed on the platform page of the campaign.

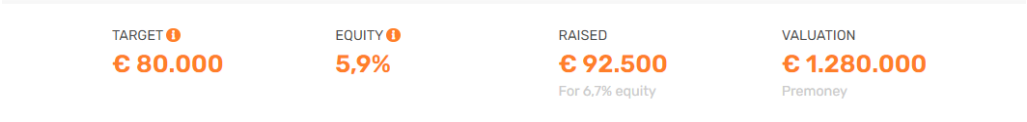


Figure 3.5 - Campaign's information on Crowdfundme.

Source: https://www.crowdfundme.it/en/

In particular, the pre-money valuation is the value of a company without considering the last round of founding (the one with crowdfunding) nor others external contribution.

Dealing about valuation for startups could be quite difficult due to lacking information, metrics and past records (see annex 8.3).

- *"The clear goal of the backers to obtain a positive monetary return on their investment".*
  Talking about equity crowdfunding the crowd is composed by investors that unlike donors are *"person, organization, or country that puts money into something in order to make a profit or receive interest"* (Cambridge University).

  The monetary condition is obviously connected to the methodology since it is based on risk capital, while in reward-based crowdfunding the investors usually put money in a project expecting a product/service in return.

3.6 Choosing equity crowdfunding and success determinants

A widely studied field is the one analysing how and why entrepreneurs and investors decide to undertake this founding way instead of others and what are the element driving the success of campaign.

These studies can help all the actors involved in the process to obtain better results.
Entrepreneurs proposing projects could increase the possibility of success for campaigns by adapting the offer to criteria defined as successfully.
The platform could accept to publish on its website only campaigns with a high probability of success, having a high success rate that results in a good advertising, attracting both more investors and more offering companies.
Finally, the investor, that in this kind of investment is not necessarily professional and has not the same evaluation instruments that usually this figure imposes, could gain even by only the previous points increasing its probability to invest in successful campaign.

3.6.1 Choosing equity crowdfunding – Entrepreneur side

Starting from the classical theorems, we have the Peaking Order theory (Myers and Majluf 1984) suggesting that the costs of financing increase as asymmetric information problems are more present and classifying internal capital as the less costly followed by debt and, finally, equity as more expensive.
From this theory is possible to gather that equity crowdfunding will be used by investor as last resort, together or as alternative to other equity methods, when possibilities to use internal founds or debt are not available.

But this theory has been reversed by some scholars among which (Fulghieri, García and Hackbarth 2020) who claimed that *"when insiders are relatively better informed on the assets in place of their firm, rather than on its (riskier) growth opportunities, equity financing can be less dilutive than debt financing",* moving equity-based methods to the same level or even above the debt-based solutions (depending on the information level of the insiders) providing a new view that considers them as alternatives for solving the same problem.

Even Garmaise studied this topic finding how many entrepreneurs prefer equity to debt in early stages of company's life for the possibility to bring inside the company investors with a skillset and knowledge necessary for the company's development, expressing how the Myers and Majluf model *"(...)is appropriate for mature firms"* (Garmaise 2001).

Starting from this point many scholars focalised their works in understanding the reasons driving entrepreneurs in choosing equity crowdfunding between all the equity-based methods.

(Estrin, Gozman and Khavul 2018) through a series of interviews to entrepreneurs that have adopted equity crowdfunding to collect money, have found some potential drivers.
They firstly found that the entrepreneurs that choose to adopt this methodology have done it with the motivation that *"(...) there was a distinct lack of funds for early-stage financing",* assigning to equity crowdfunding the role of covering the financial gap.

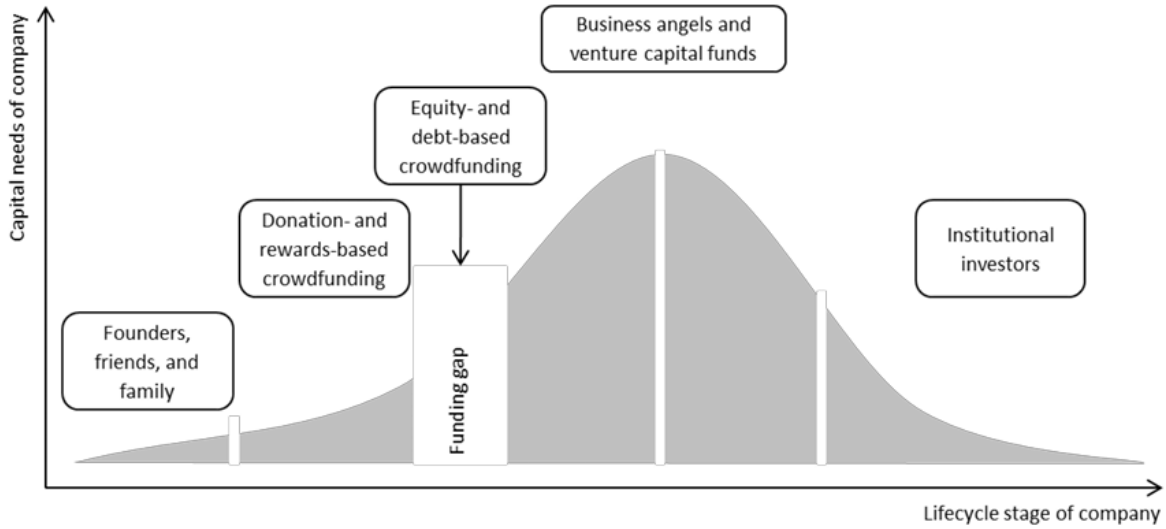


Figure 3.6 - Funding gap during company's lifecycle.

Source: (Lukkarien, Teich, et al. 2016) modified from (Rossi 2014) and (Best, et al. 2013)

Then entrepreneurs reported that in addition to the possibility to raise fund from an already existing customer base this method allows to access to a huge pool of investors, connecting to this they exposed how larger platforms allows them to attract a larger pool of investors expressing their preference to propose campaigns on them.

Inside the article is reported even a section of the interview : *"It's an easy way to raise finance, it's quick, it's low hassle administratively and there are a lot of side benefits to it. You can get publicity just by crowdfunding and you can get lots of recognition"*.
This sentence underline one of the most important secondary objective of entrepreneurs performing equity crowdfunding, the possibility to *"spread awareness of their products"*.

They finally underline how *"(...) digitisation and virtualisation of the investment process removes the need to physically attend numerous pitch events, but instead allowed virtual meetings and to upload pitch videos. A further secondary reason cited for adopting ECF is that a large network of investors may help entrepreneurs to find people with the necessary skill sets and knowledge base needed to grow the business."*.

Equity crowdfunding is seen from entrepreneurs not only as a way to centralise the fundraising, but also like a way to attract professional figures needed in carry on their activities.

3.6.2 Choosing equity crowdfunding – Investor side

Many studies have been focalised in understanding the characteristics of equity crowdfunding investors, it is possible, for example, to find a huge literature centred on gender differences between them resulting in a prevalence of male investors with, however, a growing presence of female investors. (Mohammadi and Shafi 2018), (Horvat and Papamarkou 2017), (Ziegler, et al. 2021).

According to the fact that this kind of methodology is actually an investment, one of the first drivers looked from undertakers in their choice is the expected (usually monetary) return (Vulkan, Åstebro and Sierra 2016) but, as for any investment there is no certainty about it.

From the Article "Does success bring success? The post offering lives of equity-crowdfunded firms" is possible to gather that participating to an equity crowdfunding campaign *"(…) does not necessarily provide initial crowdfunding investors with a monetary return, (…) the prospect of a return does exist. On the contrary, they face a 18% probability of losing their money by investing in firms that fail soon after the offering."* (Signori and Vismara 2018).
With this sentence is remarked the fact that in this market the investors are dealing with very high-risk profile companies facing a relevant risk of losing of their money.
Even the authors suggest attention since the 18% of soon failing companies is in first way just the percentage of companies not able to survive in the short-term after the campaign without considering the ones not able to survive in the medium/long-term and, secondly, they argued how being this method innovative and in place just from few time, this percentage is likely to change and not necessarily decreasing.

A huge incentive to invest in equity crowdfunding is given by the tax incentives, (Chen, Lin and Zhang 2018) studying the UK market data for crowdfunding from 2011 till 2014, tried to analyse the impact of the changing in taxation law[20], founding that *"investors allocate more funds to firms eligible for the tax incentives"*.

[20] They studied the introduction of the SEIS – Seed Enterprise Investment Scheme, a tax relief program for early stages companies collecting less than 150.000 British pounds sterling and that had fewer than 25 full-time employees.

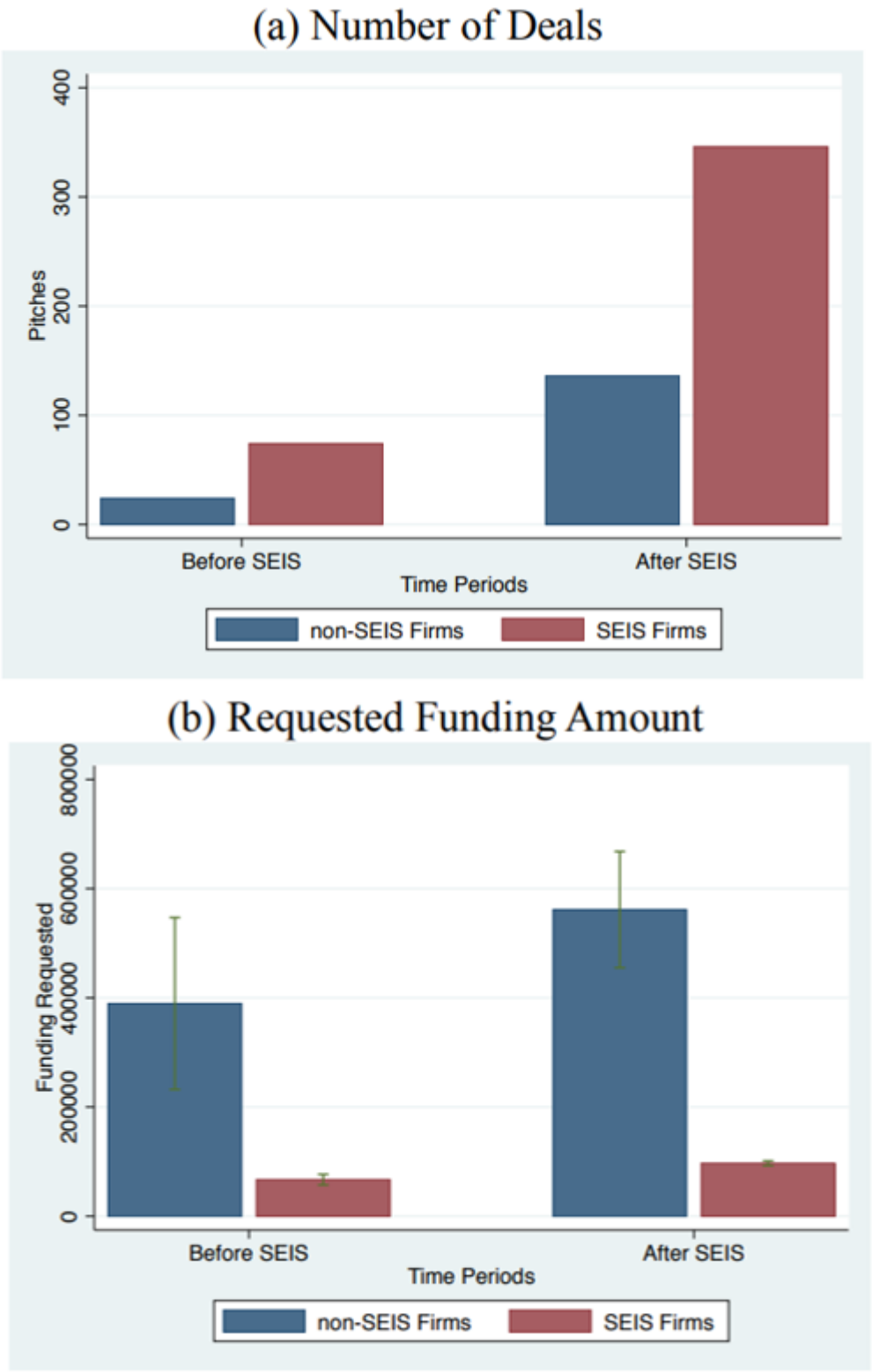


Figure 3.7 - Crowdfunding data for change in taxation between companies that achieved the benefits and the one that did not.

Source: (Chen, Lin and Zhang 2018)

Additionally, data provides evidence of increasing number of deals after the introduction of the new regulamentation, both for the eligible that for the non-eligible ones.

In Italy, for individuals that invest in innovative startups or SMEs, is offered the possibility to deduct from taxes and amount up to 50% (before 2020 was 30%) of the investment within the limit of a maximum investment in startups of € 100.000 (€ 50.000 maximum deductible amount) and in SMEs for € 300.000.
This incentive is given to investors in the case in which the offering company has not exceeded the three-year available plafond for state aid of € 200.000, while if the company has already overcome this threshold the investor could "only" achieve the deduction of 30% of the invested amount.

But monetary reasons are not the only one considered by an investor in equity crowdfunding, according to (Cecere, Rochelandet and Le Guel 2017) even behavioural and social-demographical aspects are important drivers for him/her choices.

One example is the possibility offered by equity crowdfunding to eliminate the geographically related problems not requiring anymore that the investors are close or that have the possibility to physically reach the offering company (Agrawal, Catalini and Goldfarb 2011).
In particular, with ECSP regulation (see annex 8.2) every investor living in Eurozone is going to have the possibility to invest from every platform in that area that proposes campaigns coming from all this zone (The European Parliament and the Council of the European Union 2020) moving in this way always more towards an European market eliminating the constraints imposed by a national environment.

However, according to (Guenther, Johan and Schweizer 2018) still exists a sensitivity of the investments to distance for investors located in the same country of the offering company, while seems not so relevant for the ones coming from different countries.

For what concern the behavioural aspects (Lukkarien, Teich, et al. 2016) found a "*a positive relationship between the business-to-consumer (B2C) orientation of a start-up and campaign success."*, they refers to B2C projects as more "understandable" by not professional investors, highlighting how they prefer and are more prone to invest in campaigns related to companies and businesses that they are able to understand .

3.6.3 Success determinants in equity crowdfunding

Through many studies have been identified a large group of determinants that drive the success of the campaigns, this gives the possibility to entrepreneurs to exploit them in order to have a signalling-effect (Ahlers, Cumming, et al. 2015) providing investors with signals about high-quality and worthiness of the company.

A first analysis conducted by (Ahlers, Cumming, et al. 2015) shows how *"The data highlight the importance of financial roadmaps (such as preplanned IPO or acquisition exit strategies) and risk factors (such as amount of equity offered and whether financial forecasts are provided), as well as board experience, measured by education level (e.g., percentage with MBA degrees), and number of board members. We found that external certification (including patents and government grants), in contrast, had little or no significant impact on success."*.

This assumes particular relevance for this work since it is focused on information provided as "expected results" in the pre-campaign context, giving already a confirmation that financial forecasts are relevant for the results of campaign, setting good conditions for further development.

Pre-planned IPO or other exit strategies could signal the investor the presence of a clear path to go in the entrepreneurs' mind, even for the fact that such plans are usually done for the long-term horizon, and this is reflected in a signal of credibility and reliability of the project not just in the short-term.

(Lukkarien, Teich, et al. 2016) tries to analyse different drivers for success of equity crowdfunding campaigns studying the Finnish market that was (in 2016) the 5th larger alternative finance market in Europe and found that:

- *"The funding target is positively, albeit not strongly, associated with the number of investors. It is not significantly related to the amount raised"*.

  They argued also about the possibility that investors feel more propense to invest in campaigns with larger objectives since they could bring to more important measures and consequently to a huge growth of the company, but, at the same time, they could be blocked by the possibility that raising a huge amount (condition of success of the campaign) could be difficult.

- *"The minimum investment has a strong negative relationship with the number of investor and with the amount raised"* .

  It is quite intuitive how a bigger amount invested led to a higher potential risk for investors, they have to commit a larger capital that could be lost, discouraging small investors to participate when the minimum accepted offer is too high, leaving the floor for bigger ones (e.g., professional and institutional) with higher availability of funds.

- *"Campaign duration is negatively associated with the number of investors (…) is not significantly related to the amount raised".*

  Authors argued how longer campaigns' durations could be perceived from the investors as an indicator of lack of confidence, implicitly pointing out the possibility that offering company itself is not sure about the valuation carried out, accepting a longer time to collect the required amount.
  At the same time, short-term campaign could create a *"get-it-or-lose-it"* mentality in the investors that could invest without properly evaluate the consequences, it could be seen as a signal of company being in a race toward the growth and profit, leaving them with the idea of risking to lose the possibility of a short-term profit.

- *"The availability of financials in the pitch is positively, albeit not very strongly, associated with the number of investors. However, it is not significantly related to the amount raised."*

  Even in this case, as in the previous theory by (Ahlers, Cumming, et al. 2015), has been found a relationship between the financial statements presented during the campaign period and the number of investors that could be seen as a proxy of the campaign success[21].
  This is also connected to the previously cited concept of (Lukkarien, Teich, et al. 2016) saying that investors are more attracted by business that they are able to understand, since providing information as the financial ones could be a way to make them more aware of the business.

- *"The portion of the minimum target raised during the hidden phase is strongly positively associated with the number of investors and with the amount raised.".*

  If the company is able to acquire investors before that the campaign become effectively public, it starts with a part of capital already collected, that can be perceived by investors as a signal of good quality of the company (or project) and at the same time as a higher possibility that the campaign is going to close with success.

- *"(…) the ability of a company to leverage social media networks is a strong predictor of success both in terms of the number of investors and the amount raised.".*

  Posting the campaign on social media act basically as advertising, letting more people know about it, this is reflected in a larger number of investors.
  The authors argued that could even be the case in which entrepreneurs with more promising campaign are more propense to share them on social media while more unsure campaign are not advertised by entrepreneurs to avoid potential loss of image related to campaign fail.

[21] Equity crowdfunding tries to collect funds by leveraging on a huge number of (even small) investors.

3.7 Venture capital, business angels and private equity

Private equity is *"(...) the provision of capital and management expertise given to companies to create value and, consequently, generate big capital gains after the deal"* (Caselli and Negri 2021).

Inside this category there are two kind of peculiar investors which are usually connected to funding for startups and SMEs in early stages of their life cycles: venture capitalists and business angels.

Venture capitalist are private equity investors working for an investment fund[22], supporting companies with high potential of growth with the objective to obtains a profit, usually, very high (about 10x-100x of the initial investment).

While angel investors (business angels or informal investors) are *"wealthy individuals, typically fellow entrepreneurs, willing to invest in the very early stages of a venture's development (...) also known as private investors, this term contrasts the angel investing process with the more formal and quantitative analysis done by venture capital professionals"* (Morrissette 2007) the analysis process is not the only element differentiating these investors from the venture capitalist, since they have not as only goal the monetary one but could be the case in which they invests also with secondary objectives.

A first point that characterizes venture capitalists and business angels is the fact that being professional investors, they have many instruments and knowledge that allow them to set up conditions that could vary from one investment to another, they can *"(...) separately allocate cash flow rights, voting rights, board rights, liquidation rights, and other control rights"* (Kaplan and Strömberg 2000) in addition to the possibility to set various covenants inside the contract (Hornuf and Schwienbacher 2014).

For what regard equity crowdfunding, the investment is directed to a crowd of people not necessarily professional that have not the same contractual power of venture capitalist, so the offer is highly standardized (Ahlers, Cumming, et al. 2015) with just minor differences on the basis of the subscripted amount.

A second relevant point is the fact that while after an equity crowdfunding campaign the participation of newly acquired shareholders is relatively low or null (Conti 2021), venture capitalists cover a fundamental role in *"operation of the company. Venture capitalists sit on boards of directors, help recruit and compensate key individuals, work with suppliers and customers, help establish tactics and strategy, play a major role in raising capital, and help structure transactions such as mergers and acquisitions."* (Sahlman 1990).

[22] Firms working in the asset management sector, they collect funds from people and invest them.

(Lukkarien, Teich, et al. 2016) tried to schematize the differences between reward-based crowdfunding, equity-based crowdfunding, business angels and venture capital.

Features	Rewards-based crowdfunding	Equity crowdfunding	Business angels	Venture capital
Typical funder background	Various, many have no investment experience	Various, many have no investment experience	Former entrepreneurs	Finance, consulting, industry
Source of funds	Investing own money	Investing own money	Investing own money	Investing other people's money
Funding instruments	Non-financial, e.g., products	Shares	Shares	Shares
Deal flow	Through web platform	Through web platform	Through social and/or angel networks	Through social networks and proactive outreach
Due diligence	Very limited; may be conducted by individual, if at all	Conducted by individual, if at all	Conducted by individuals based on their own experience	Conducted by staff in VC firm with potential assistance from outside firms
Geographic proximity of funders	Investments made online: funders often distant from venture	Investments made online: funders often distant from venture	Most investments local	Invest nationally (or internationally with local partners)
Post-funding role of funders	Most remain passive	Most remain passive	Active (hands-on)	Active (strategic)
Return on investment	Financial return not relevant	Financial return important (but not the only reason for investing)	Financial return important (but not the only reason for investing)	Financial return critical

Figure 3.8 - Difference between different kinds of investors.

Source: (Lukkarien, Teich, et al. 2016)

Global private equity market according to (Bain & Company 2023) has experienced a recession in 2022, with significantly lower results than the previous year.

In the report the authors highlight how the extraordinary positive situation in the post-covid environment managed to hold on for the first six months of 2022, after which the persistent inflation and series of negative events such as the Ukraine invasion, the growing tension with China and the FED[23] policies increasing the interest rate, with other national central banks following this path, brought to a stop of the growth.

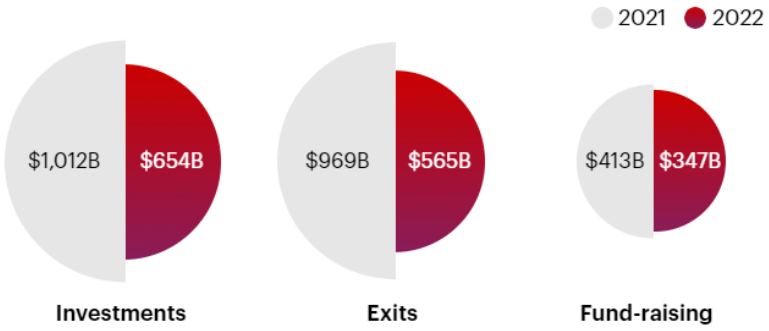


Figure 3.9 - Global private equity market size in 2021 and 2022.

Source: (Bain & Company 2023)

[23] Federal Reserve System, it is the USA's central bank.

For the Italian private equity market (AIFI - Associazione Italiana del Private Equity, Venture Capital e Private Debt 2022) has reported a huge growth with 421 operations in 2022 (35 more than 2021) for a whole invested amount of € 1.942 million (€ 863 million more than 2021) diametrically opposite to the global trend.

3.8 Post-funding performances

As previously seen, equity crowdfunding is an alternative way through which a company could raise funds in its early stages, partially "stealing" the role covered by private equity and, more in particular, by venture capitalist and business angels.

Professional investors' role, both in case of private equity investments and in equity crowdfunding campaigns, is quite different from the one of not professional ones.
Companies must trade off the possibility to bring inside the company knowledge, skills and funds of professional investors and the drawback of leaving them enter and gain importance in the company.
To correctly weight the value of their presence in the trade off, it is important to understand the differences in the post-funding performance for different kind of investors.

Many researchers and scholars have tried to formalize what results could be achieved by a company after the fundraising process for all the three previous cases.

3.8.1 Post-funding performances – Venture capital

(Wright and Robbie 1998) firstly, remark the fundamental active role of venture capitalists inside the company, analysing also how their investments in venture capital firms is illiquid with low probability of exit in the short period, assuming, in case of investment, their (active) presence for a long period of time.

Authors then highlight how venture capitalist backed firms tend to growth faster, develop more patents and have a higher productivity than not venture capitalist backed ones, attributing to this kind of professional investor the ability to positively affect growth process of companies on which they have influence.

They also explain how the former have more probability to go public, the authors reconnect this to the fact that venture capitalists, covering an active role in the company, drive it through an IPO[24] in order to exit from the investment, not always at the right value, since *"venture capitalists' governance may be biased where they have incentives to offer bad advice to their investees in the matter of premature IPO timing"* (Barry 1994).

This is strictly connected to the fact that the main objective for them is the monetary return, that usually should be obtained in very well-defined time horizon typically lower than 10-12 years. (Croce, Martí and Murtinu 2013) starting from the literature explaining how VC-backed firms performed in a superior way than the not VC-backed ones and from the critics that attribute these better performances to the screening process of these investors tried to understand, for European market, what effects the presence of such investors brings.

[24] Initial Public Offering: process through which a company become public for the first time.

They firstly found that *"productivity growth is not significantly higher in VC-backed firms than matched non-VC-backed firms before the first VC round"* this opposite result with respect to the previous studies used in their article is attributed to the fact that they were mostly based on US manufacturing firms.
These studies *"provide evidence of the strong screening abilities of US VCs"* due to the higher level of development of the US venture capital market, the authors are connecting in this way the previous results to the ability of venture capitalist in choosing the right investments.
Then this study has shown *"that productivity growth is substantially higher in VC-backed firms than in matched non-VC-backed ones after the first VC round."* finding also that after the exit of these investors this growth does not decrease, showing not only the benefits that an active professional investor could bring while he/she is working inside the company but also how him/her influence and work could bring long-term benefits.

Italian venture capital market is studied by (AIFI - Associazione Italiana del Private Equity, Venture Capital e Private Debt 2022) in the "VeM – Venture Capital Monitor" report.
This market is constantly growing and, in particular, looking to the venture capital section, in 2022 there were 310 new operations done by venture capitalist (with a growth of 9% from the previous year) with an active number of investors of 308.
This report does not present a section for the post-funding performances but there is a deepening about the follow-on investments[25] showing an increasing trend both in the number of companies funded and in the amount of funding.

	Startup italiane			Startup estere con founder italiani			Totale		
	2021	2022		2021	2022		2021	2022	
Numero operazioni initial	261	291	↑	24	19	↓	285	310	↑
Numero operazioni follow on	30	58	↑	2	2	=	32	60	↑
Numero operazioni totali (initial e follow on)	**291**	**349**	↑	**26**	**21**	↓	**317**	**370**	↑
Ammontare investito initial - mln Euro	881	1.440	↑	914	260	↓	1.795	1.700	↓
Ammontare investito follow on - mln Euro	111	423	↑	5	42	↑	116	465	↑
Ammontare totale investito (initial e follow on) - mln Euro	**992**	**1.863**	↑	**919**	**302**	↓	**1.911**	**2.165**	↑
Ammontare medio investito (initial e follow on) - mln Euro	3,9	5,9	↑	41,8	15,1	↓	7,0	6,5	↓

Figure 3.10 - Follow-on investments from venture capitalist for 2021-2022 Italian market.

Source: (AIFI - Associazione Italiana del Private Equity, Venture Capital e Private Debt 2022)

[25] Financial rounds following the first one.

3.8.2 Post-funding performances – Business angels

(Bonini, Capizzi and Zocchi 2019) studying data obtained by "Italian Business Angels Network Association (IBAN)" have shown how *"the performance and the probability of survivorship of investee companies are positively affected mostly by the presence of syndicates of co-investing angels, indicating their ability to generate a higher quality deal flow and selection process while offering to funded ventures a wider set of non-monetary contributions, crucial to survivorship and future growth."*.

In particular, they found that better performance are seen when equity capital is provided all in once instead of having multiple funding rounds, connecting this to a signal of high-quality of the relationship between business angels and the company where the latter has disclosed all the relevant information, while the former has been able to evaluate rightly the company, providing the right amount of funds.

Italian market is studied again by (AIFI - Associazione Italiana del Private Equity, Venture Capital e Private Debt 2022) reporting 75 deals, of which 71% were syndicated operations[26] with an average of 9 business angels for operation.

3.8.3 Post-funding performances – Equity crowdfunding

Lastly, it is important recall the works of scholars focusing on the post equity crowdfunding campaign results.

In their article (Walthoff-Borm, Vanacker and Collewaert 2018) hypothesized that *"There are several reasons to expect that ECF firms might outperform NECF firms that raised other sources of capital. These reasons include equity crowdfunding's unique selection mechanism—"the wisdom of crowds"—and extra-financial benefits."*[27]

"The wisdom of crowd" is a concept theorized for the first time in 2004 by (Surowiecki 2004) referring to the fact that a large group of people could act in a better way in problem-solving, decision-making, innovating and predicting than individual experts, eliminating the potential errors that one person could do alone.

Studying the UK market and comparing firms that undertook equity crowdfunding campaign and firms that undertook other financial methods, (Walthoff-Borm, Vanacker and Collewaert 2018) found that the former have a higher rate of failure against expectations writing how *"these findings suggest that despite the unique selection mechanisms embodied in equity crowdfunding platforms (i.e., the wisdom of the crowd), important adverse selection issues remain in equity crowdfunding markets*".
At the same time, they found that firms performing equity crowdfunding have a higher rate of patenting, highlighting how this method *"(...) serve as catalyst for innovative activities"* and

[26] In such kind of operations funds are provided by a group of investors, instead of just from one.
[27] Authors refers to ECF for Equity Crowdfunded while NECG for Non-Equity Crowdfunded.

that performances are positively correlated to the presence of a nominee shareholder[28] structure, while direct[29] ones focus more on patenting activity.

In the paper by (Signori and Vismara 2018) they found that the presence of venture capitalists or a business angel in the crowd of investors *is "is a strong predictor of the firm's ability to survive in the long term."* as previously seen, venture capitalists are able to drive company performance towards positive results.

Even if equity crowdfunding has a positive impact on growing opportunities for firms undertaking it (Eldrige and Nisar 2021) remains the problem that they must be exploited in order to be translated into wealth for both the company and the investors.
The post-campaign performance are strictly related to the ability of company's management to dispose the collected funds rather than to the campaign's characteristics, having in the crowd professional investors (Signori and Vismara 2018) or a nominee shareholders structure (Walthoff-Borm, Vanacker and Collewaert 2018) is synonymous of having strong managerial competence inside the company that could drive it to the success.

Finally, (Mazzer and Stradi 2019) found, studying the Italian market for equity crowdfunding, that companies that successfully raise money through this methodology have more possibilities to survive in the medium run[30] and, in the years following the collection they are able to achieve *"better financial performances than the ones that tried and failed"*.
At the same time, they found that companies achieving to obtain funds through equity crowdfunding were able to better perform than companies that failed the campaigns and that have "substituted" these funds with debt, but not than the ones able to achieve the same amount with different equity-based method.

[28] Nominee shareholders are persons appointed by the actual share owners to act in their behalf, usually due to their higher management skills.
[29] Direct shareholder structures are present when the owners of the shares are also the one acting in the management and decision-making processes of the company.
[30] The study provides data both for a 3-years and 5-years horizon.

3.9 Financial allocation of resources

Wanting to take into account the use of collected funds from equity crowdfunding but finding a literature gap for this specific topic, it was thought to find similarities with other markets.

For example, during IPOs[31] the companies are required to publish a document called "Use of proceeds" explaining how the funds are going to be used, according to (Tincher 2022), IPO proceeds are, usually invested from the company in general corporate purposes, research and development, company growth, acquisition, debt repayment or in other ways.

(Salma and Maher 2017) studied that while providing intended use of proceeds in terms of debt repayment the company face a significant deterioration in the operating performance while it does not show significantly when they are directed to investments, according to them *"IPOs that state debt repayment as the primary use of proceeds may be viewed by the market as opportunistic. This implies that these firms issue equity when their stocks are overvalued to refinance their debt (...)If IPO firms declare a specific investment as the primary use of proceeds, this implies that the capital to be raised at the offering is going to be used to maximize value.".*

(Nurwati and Bazeet 2020) Studied the Malaysian market expected proceeds for IPOs, explaining how their disclosure cover an important role, in particular in *"emerging markets that have the traits of an inefficient stock market",* they made also an interesting focus on declaration of use of proceeds for working capital explaining as it *"(...)is considered as an opaque disclosure characterised by high ex ante uncertainty of the issue and the expected future cash flow".*

Studying the Australian market, (Wyatt 2013) found that even if security regulators require the issuer to disclose the intended "use of proceeds" in the IPO prospectus, *"IPO prospectuses include only very general statements about the issuers' intended use of the proceeds."* citing also (Leone, et al. 2007) to underline the presence of evidence in other jurisdiction such as in the US.

[31] Initial Public Offerings, it is a way through which a company places for the first time shares on the stock market becoming public.

Chapter 4
Dissertation objectives and data collection

This section starts highlighting the main objectives that this dissertation would like to take into consideration and the main drivers that brough to their selection.

From this it passes to the explanation and the definition of the target population composed by 730 equity crowdfunding campaigns, achieved by eliminating from the total population of 1211 campaigns the ones not adequate to the dissertation.

A general overview of the data used in the dissertation is presented, it starts from information extracted from the business plans, pitches and platform's page for the campaign.
In particular, these information regard objectives of allocation of the collected funds and expected values gathered from the forecasted financial statements.

Finally, there are some statics on the general target population considered to develop the hypotheses and the single samples for them.

4.1 Drivers for the choice

Literature presented in previous chapter is very representative of the available information about this market, but it leaves a gap about the documentation presented by the proposing companies for the equity crowdfunding campaign and their ability to respect the promises made and the expectations created publishing them.

This dissertation is aimed at analysing deviations between the actual results obtained and the ones initially declared as expected by the proposing company, in particular the focus is on financial measures on two main sides:

- objectives in term of allocation of the collected funds, measuring the deviations of real values from the "promised" ones.
  After their measuring, also some effects that a lack in the promised allocations could bring have been analysed focalising the attention on debts of the company, analysing the possibility that the "unused" funds could be a way for the company to repay some of them.

- objectives in term of expected revenues, measuring again deviations of real values from them.

This dissertation ties to analyse whether the presence of a group of factors, defined as of "experience and skill" in the pre-campaign context could effectively influence the results in the above descripted areas.

One particular reason that brought to this decision of analysis is the fact that financial information are provided directly by companies that compute them by assuming an evaluation scheme that in most of the cases is not presented, or at least is not justified by proper explanations, often leaving investors with metrics built on "nothing".
Indeed, it is not uncommon to find in the documentation presented during the campaign, entire sections dedicated to explaining that the company manages to double or triple its revenues and profits, leaving investors without or with very short and simplified explanations on how they are going to reach these results.

For this reason, it would be interesting to look for side factors that could provide the investors with signal of reliability toward the offering companies and the expected values proposed, offering them an additional instrument to evaluate their investments.

4.2 Population and target population

Before to go on explaining more in detail the objectives and the data extraction process, it is important to underline the population from which these information and measures have been extracted and based on.

This dissertation has been developed by setting the focus on the Italian equity crowdfunding market, so that the initial point was to look for companies that have performed campaigns on Italian authorized platforms.
This information is contained in the database developed by "Osservatorio Crowdinvesting del Politecnico di Milano**"** that, in June 2023, reports 1211 campaigns held from 2014 till 2023.
This number represents the population[32] taken into account in the model's development.
The target population[33] differs from this last value, since the data taken into consideration exclude:

- data for campaigns closed without success.
  Since the research is based on the analysis of deviation of real values after an equity crowdfunding campaign from the forecasted/expected ones, the campaigns that have not raised successfully funds would missing the prerequisite of analysis.
  In particular, the unsuccessful campaigns reported in the database are 272, reducing the campaigns available for the analysis to 939.

- data for real-estate related campaigns.
  Real estate segment is very peculiar and should be treated and analysed separately, documents provided for such campaigns usually provides different measures with respect to the ones taken into account in the model both for the allocation objectives and for the financial forecast, mainly based on expected IRR[34] and ROI[35] indicators and (as already seen in paragraph 2.6) taking into account data relatives to such campaigns lead to biased results for the differences in the markets.
  Starting from the 939 campaigns previously defined and subtracting all the real estate related ones (that are 100), the second step leaves with 839 campaigns.

- data from club deals.
  Club deals are companies performing syndicated investments[36], they do not allow everyone to invest in their projects but just to a selected group of investors that are subscribed (and accepted) to the website.
  In this way the club deal does not publish the campaigns but informs the investor when there is an opportunity and him/her decides deal-by-deal if join or not.

[32] The population represents the full set of possible units of analysis.
[33] Subset of population, targeted by the research.
[34] Internal Rate of Return is the discount rate that makes Net Present Value of the investment = 0.
[35] Return on Investment is a profitability measure, frequently used in order to understand the performance of an investment.
[36] Investments where a group of investors pools capitals in order to invest in a deal.

These kinds of companies have been excluded for two main reasons, the first one is because is missing one of basic concept of crowdfunding that is the presence of a heterogeneous crowd, indeed, in these kinds of deals there are only selected investors, eliminating the possibility that everyone, satisfying the legal requirements, could invest. The second motive is because in the majority of cases, the campaigns happened through vehicles of investment, and the reason of their exclusion is explained in the next bullet point.
Once excluding the 44 campaigns from club deals, the "available" campaigns are reduced to 795 deals.

- data for campaigns which occurred through an investment vehicle.
  Such companies are created with the only goal to collect funds to invest in other companies, they are usually empty containers without a past data record that could be analysed and compared.
  At the same time, having that unique goal bring these companies to work on a participation-profit logic and not on a business one that is the analysed core of this work.
  Subtracting the 49 falling in this category, 764 potentially available campaigns remains.

- data for campaigns still on going at the analysis date.
  By necessity these campaigns must be excluded from the ones taken into account, since there are no possibility to have real values obtained after the campaign.
  Once, subtracted the 16 on going campaigns, the final available population that is considered as target population is composed by 730 campaigns.

Table 4.1 - Computation of target population.

Number of campaigns reported in the database	**1211 campaigns (100%)**
Number of campaigns closed without success	- 272 campaigns (22.46%)
Number of campaigns real-estate related	- 100 campaigns (8.25%)
Number of campaigns coming from club deals	- 44 campaigns (3.63%)
Number of campaigns with an investment vehicle	- 49 campaigns (4.04%)
Number of campaigns still on going	- 16 campaigns (1.32%)
Target population	**= 730 campaigns (60.3%)**

This target population represents the initial group from which data have been extracted and analysed, then for each hypothesis have been taken into consideration different samples, belonging to this larger group, in function of the different characteristics that have been considered and data availability.

4.3 Data sources

Information found on different sources are used in order to carry on the dissertation.
The first kind of data used are the expected ones, published by the companies at the beginning of the campaign, they could be found on different places, that are:

- business plan, a document that is usually prepared and presented by companies that are collecting funds, in order to explain and let the potential investors know the information about the business.
  There is no standardised form for developing this kind of document, however, following the vision of many sources is possible to divide a general business plan in two sections. A first part should be descriptive, and the authors should try to explain the main characteristics of the company and of the investment.
  In this part is usually possible to find insights about marketing, strategy, products, intellectual properties, the team composition and also the core drivers and the vision of the company together with all the investment-related part responding to all the potential doubt that could come in the investor's mind.
  The second part should be more focused on financial and numerical aspects both on present and past data and information, it should also include a part of data expected or forecasted for the future.

- pitch of the company, it is a document, often in form of presentation, that tries to summaries in few slides the main concepts that are usually presented in a more complete form in the business plan.
  This kind of document tries to "attract" the investor by providing them with a general overview of the company and of the investment without going deeper as the previously presented document.
  Again, it is possible to find different types of presentation always describing qualitatively the company, while they do not go often into depth regarding the financial aspects, usually reporting only measures considered as relevant (e.g., revenues, EBIT/EBITDA).

- Platform's website, that has for every campaign a dedicated webpage reporting the main information of the campaign and also about the company, as well as the "technical" information about the investment (e.g., minimum/maximum amount collectable, minimum investment chip, company's valuation…).

In particular, it is important to underline that all these documents are available in many cases for the non-investor just until the closing of the campaign, while after it they are always available for the investors of the specific campaign but not always for others[37].

[37] In order to have access, must in any case be signed up on the web site.

All the work done with data was possible thanks to the digital archive created and updated by "Osservatorio Crowdinvesting del Politecnico di Milano" on Italian equity crowdfunding, containing the whole documentation published for each campaign on the platform.

Information gathered from these sources was then be compared to the actual results achieved by the companies thanks to the extrapolation of data from the financial statements that they present every year.

In particular, the analysis is be based on two main documents:

- balance sheet, from which have been extracted data about assets, working capital, debt and equity.

- income statement, where the main data extracted were related to revenues, profitability measures and costs.

The information were gathered from two main sources: AIDA[38] and Telemaco[39].

[38] Database, built and distributed by "Bureau Van Dijk S.p.A" containing all the financial statement, anagraphical and commercial information for the Italian limited companies.
[39] Telematic system developed by the Italian chambers of commerce, allowing the access of the practices stored in their databases, it was used in order to extract additional information that have been integrated with the previously ones.

4.4 Gathered data

Extraction of information has started from the documents presented at the beginning of the campaign, data gathered could be divided into allocation objectives and forecast/expected statements elements.

4.4.1 Allocation objectives

In this category there are all the information regarding the indications provided about how funds collected going to be used and allocated by the company after the equity crowdfunding campaign.
From a general perspective is possible to divide companies from which these data have been gathered into three main categories:

- Companies providing specific allocation objectives.
  In this first group there are all the companies that provide clear information on how collected funds are going to be used, not only in terms of area of destination but also in terms of quantitative division for each area, an example is provided in the figure 4.1.
  In particular, it is important to underline that for the purposes of the thesis' development, this category includes just objectives where the areas of destinations are univocally traceable to accounting metrics fundable in the financial statements.

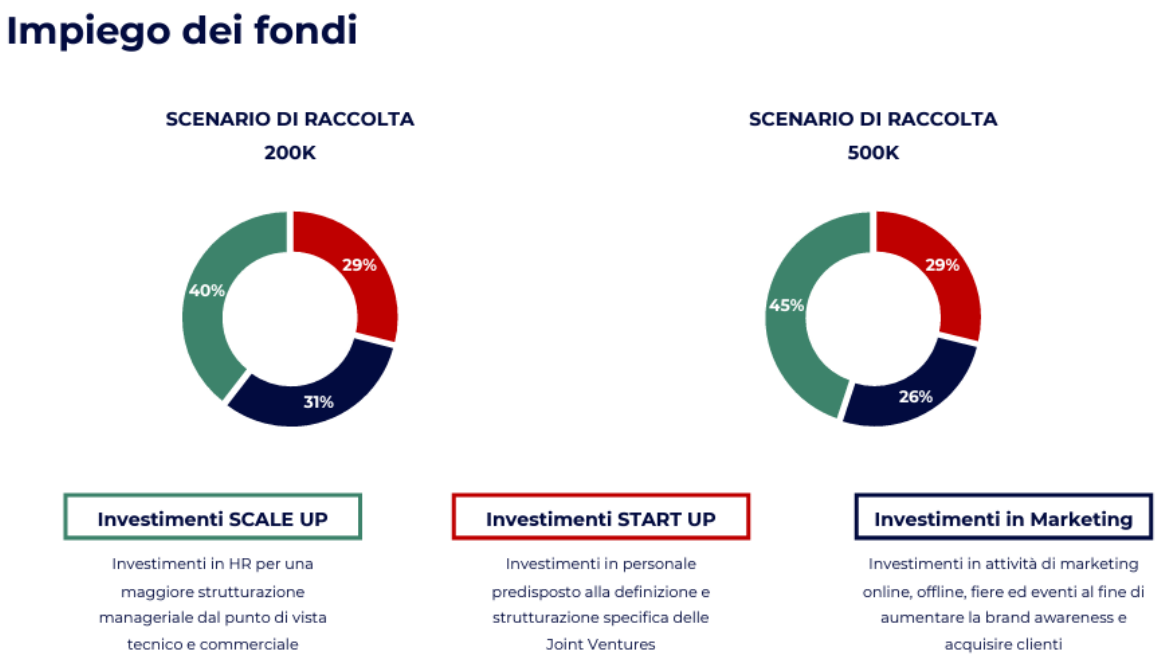


Figure 4.1 - Example of specific allocation objectives.

Source: extracted from a pitch presented for an equity crowdfunding campaign.

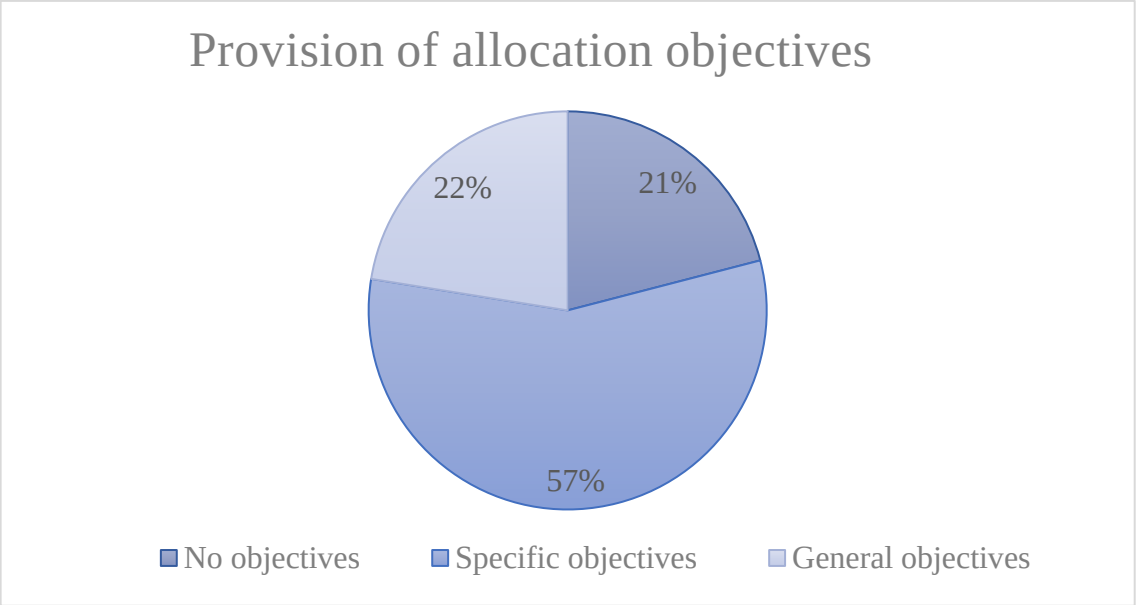
All data have been extracted considering the minimum objective of collection, in order to have a standard level allowing the comparison of all the companies in the same way. In the cases where there was a specific objective allocation without a clear specification about whether it was referred to the minimum or maximum collection, it has been assumed that for each amount of capital raised, the company would maintain fixed the allocation percentages, and the objectives allocation have been calculated on their basis.

- Companies providing general allocation objectives.
  In this category have been included all the companies that even providing objectives of allocation, do not clearly specify the areas of destination or their quantitative division, again an example is provided in figure 24, where in the left case there is not a quantitative division, while on the right the first objective is not directly allocable univocally to financial accounting measures.

Figure 4.2 - Example of general allocation objectives.

Source: extracted from pitches presented for two different equity crowdfunding campaigns.

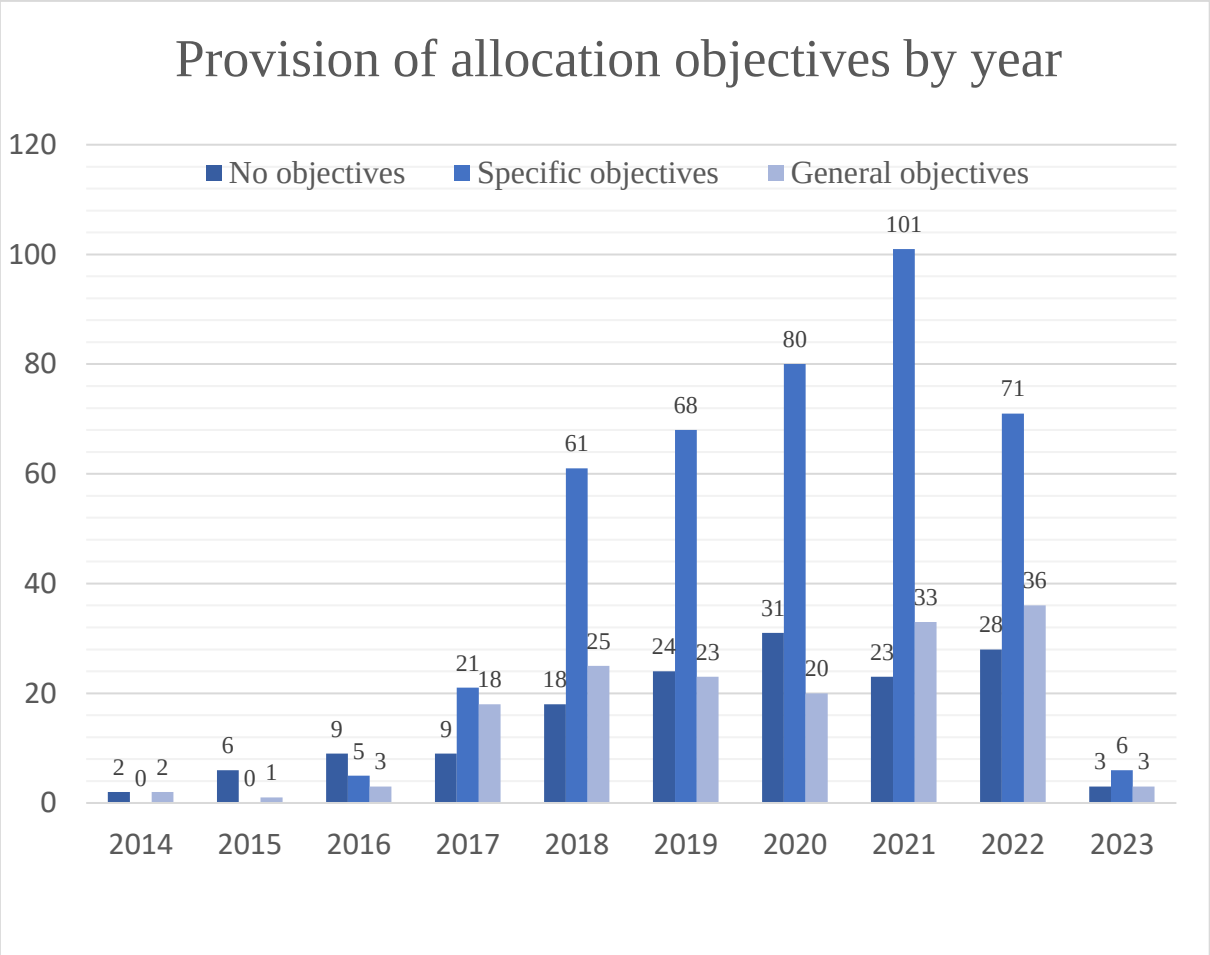
- Companies not providing objectives.
  Last category is composed by the companies that do not provide any objective for the allocations of funds.
  This section comprises both the companies that do not set objectives in one of the observed documents, but also the companies that do not presents the studied documents at all, not providing investors with any information.
  Finally, in this category are also considered all the companies that gives specific allocation objectives but only for the maximum collection goal.



Sample dimension: 730 campaigns

Figure 4.3 - Division between companies providing specific, generic and not providing at all allocation objectives for the campaign.

Analysing the target population previously defined, has been possible to identify specific objective for more than half of the companies, but the relevant presence of companies presenting general objectives, or even not presenting them at all, could lead to serious asymmetric information problems.



Sample dimension: 730 campaigns

Figure 4.4 - Yearly division of campaigns for companies presenting different objectives or not presenting them at all in the target population.

Analysing the data year by year, excluding 2023 since many campaigns are still ongoing and the year is not finished, it is possible to see how the number of companies presenting objectives of allocation is increased with time and also that from 2018 the proportion of companies providing specific allocation objectives is increased.

The percentage of this category for years 2018-2022 is ranging from 50 to 65% of the total, that even if it is still not enough to say that asymmetric problems do not arise, is enough to say that this market is evolving in the direction of a more complete information.

4.4.2 Expected elements of financial statements

From the total target population, in 173 campaigns was not presented any kind of information about financial statements measures, just 126 cases disclosed a full balance sheet and income statement, while in the other cases at least one of the key measures between revenues, EBITDA and EBIT have been shared.

CONTO ECONOMICO – SCENARIO 1)

CONTO ECONOMICO €	2017 Consuntivo	2018 E	2019 E	2020 E	2021 E	2022 E	2023 E
Ricavi							
Consumo							
Manodopera diretta							
Altri costi variabili di produzione							
Provvigioni							
Costi variabili generici commerciali							
Totale costi diretti							
1° Margine di contribuzione							
% sul totale							
Costo del lavoro fisso							
Costi amministrativi							
Costi commerciali							
Costi industriali							
Costi generali							
Costi discrezionali							
EBITDA							
% sul totale							
EBIT							
% sul totale							
EBT							
% sul totale							
Utile / (Perdita)							
% sul totale							

STATO PATRIMONIALE – SCENARIO 1)

STATO PATRIMONIALE €	2017 Consuntivo	2018 E	2019 E	2020 E	2021 E	2022 E	2023 E
Crediti v/clienti	31.167	53.200	132.493	286.185	635.967	930.871	1.175.770
Magazzino	229.190	229.190	229.190	229.190	229.190	229.190	229.190
Altre attività/passività correnti	260.764	262.996	231.996	165.036	165.036	165.036	165.036
Debiti v/fornitori	(226.772)	(169.471)	(65.335)	(123.892)	(248.489)	(334.028)	(410.335)
Capitale Circolante Netto	**294.349**	**375.915**	**528.344**	**556.519**	**781.704**	**991.069**	**1.159.661**
Immobilizzazioni Immateriali nette	532.597	467.484	402.371	337.258	272.145	207.031	141.918
Immobilizzazioni Materiali nette	713.352	742.246	747.928	697.011	711.093	715.175	709.258
Immobilizzazioni Finanziarie	0	0	0	0	0	0	0
Attivo Immobilizzato	**1.245.949**	**1.209.730**	**1.150.299**	**1.034.268**	**983.238**	**922.207**	**851.176**
Fondi rischi e oneri	0	0	0	(3.455)	(22.626)	(243.199)	(209.793)
T.F.R.	(8.101)	(5.367)	(11.046)	(16.945)	(28.690)	(40.949)	(53.647)
Totale fondi	**(8.101)**	**(5.367)**	**(11.046)**	**(20.400)**	**(51.316)**	**(284.148)**	**(263.440)**
Capitale investito netto	**1.532.197**	**1.580.277**	**1.667.597**	**1.570.388**	**1.713.626**	**1.629.128**	**1.747.397**
Debiti a lungo	912.293	753.881	705.000	645.000	580.000	490.000	380.000
Debiti a breve	-	219.475	534.706	556.165	374.594	-	-
Disponibilità Liquide	(37.777)	-	-	-	-	(482.197)	(1.441.557)
Posizione finanziaria Netta	**874.516**	**973.356**	**1.239.706**	**1.201.165**	**954.594**	**7.803**	**(1.061.557)**
Capitale sociale + Riserve	(53.728)	(210.270)	(466.116)	(645.146)	(703.814)	(314.006)	548.288
Utile	(161.628)	(255.846)	(179.030)	(58.668)	389.808	862.294	1.187.629
Soci conto finanziamenti	873.037	1.073.037	1.073.037	1.073.037	1.073.037	1.073.037	1.073.037
Patrimonio Netto	**657.681**	**606.921**	**427.891**	**369.223**	**759.031**	**1.621.325**	**2.808.954**
Totale Fonti Finanziamento	**1.532.197**	**1.580.277**	**1.667.597**	**1.570.388**	**1.713.626**	**1.629.128**	**1.747.397**

Figure 4.5 - Example of full statements presented for an equity crowdfunding campaign.

Source: business plan presented for an equity crowdfunding campaign.

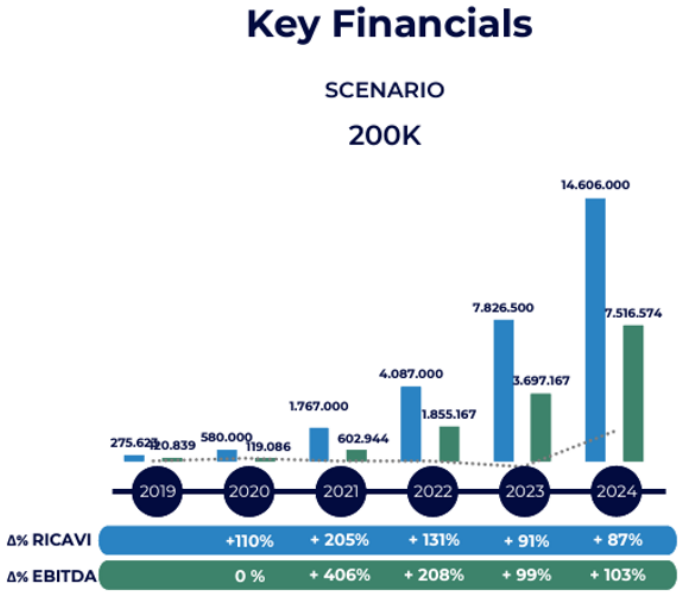


Figure 4.6 - Example of key financials indicators presented for an equity crowdfunding campaign.

Source: pitch presented for an equity crowdfunding campaign.

From the key measures previously indicated, the firstly excluded from the analysis has been the EBIT, this decision have been taken since by extracting data from the ones that have presented full statements and the one that have presented just key measures, only 308 companies presented the expected EBIT.

Even if the number of observations could seem acceptable to carry on an analysis, once going to analyse the sample for each hypothesis, the constraints imposed and the data availability brough to a not satisfactory amount.

While for revenues and EBITDA that are respectively presented 554 and 516 times, allowing to have a good sample even after the limitations imposed by each hypothesis, was, however, decided to exclude EBITDA since, being the sample under analysis vastly majority composed by innovative startups, this has not been evaluated as an interesting "success-driving" measure to analyse for them.

Table 4.2 - Financial data availability, resuming table.

Target population	***730 campaigns (100%)***
Campaigns with full statements	126 campaigns (17.26%)
Campaigns with no information	173 campaigns (26.70%)
Campaigns with information about revenues	554 campaigns (75.89%)
Campaigns with information about EBITDA	516 campaigns (70.68%)
Campaigns with information about EBIT	308 campaigns (42.19%)

4.5 Target population – Statistics

Finally, before to start with the hypotheses definition and explanation, some key measures for the target population have been analysed in order to have a general overview for the companies performing campaign in this group.

A first measure of interest for the target population is the mean of the collected funds for these campaigns that is € 404.122,30, with values ranging from € 20.100 till € 6.472.820 for the campaign of the company "Forever Bambù 27 s.a.", the only one who passed the 5 million of collection.

Variable	Obs	Mean	Std. dev.	Min	Max
Collected	730	404122.3	568198.4	20100	6472820

Figure 4.7 - General statistics for the collected amount between the target population

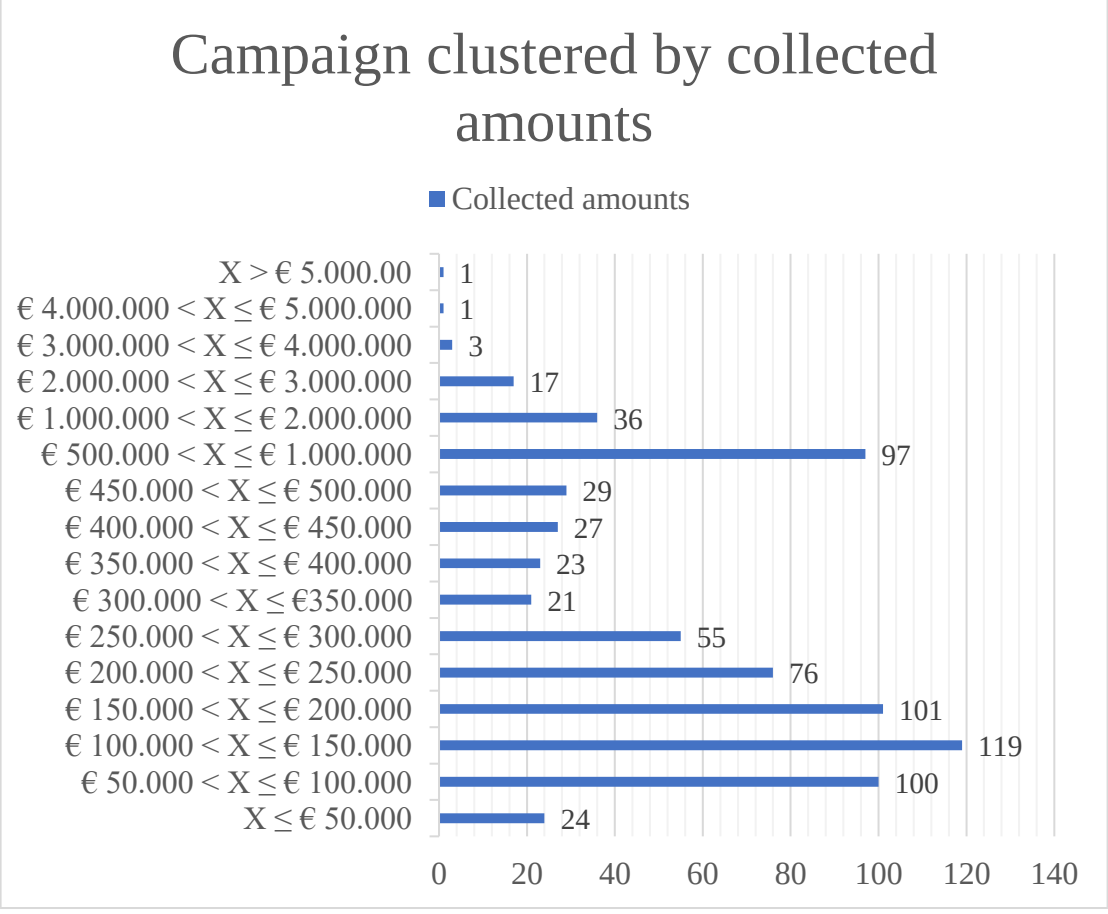


Figure 4.8 - Target population campaign divided by clusters on the collect amount basis.

It interesting to note from the graph above, how even if the biggest part (about 65%) of companies achieved to collect amount lower than € 300.000, the cases for which the collected amounts are higher are not that sporadic, just looking to the companies that collect an amount included between half and € 1 million it is possible to calculate that they represents the 13.29% of the whole sample.
Comparing their number with the one of companies that collect the smallest amounts (lower than € 50.000), could give a first signal of the importance of equity crowdfunding, showing how it is a method allows to collect relevant amounts and not just additional funds to integrate the ones from other sources.

After this first measure also the minimum objectives of collection and the target capital for the campaigns have been analysed, in order to have a general idea about the differences between the real collections end the expected ones.
These two measures are slightly different between them since some companies sets very low minimum objectives with higher collection expectation resumed in the measure of target capital, keeping both of them in consideration allows to keep track of both of these aspects.

Variable	Obs	Mean	Std. dev.	Min	Max
Target	730	205639.7	347898.8	250	4000000
Min_Obj	730	166004.8	259147.6	0	4000000

Figure 4.9 - General statistics for minimum objective of collection and capital target variables for the target population.

It is possible to see how, the average value of the target capital is higher than the minimum objective of collection, this is quite an obvious result, not only because the companies set higher capital targets, as was already seen, but also because if they do not provide a target capital, the minimum objective of collection is considered for this value.

While it is possible to see that the minimum value of the target capital is never equal to 0 in the target population, this because logically, no company would set its target to 0, the minimum value is however very close to this value, however the lowest values (below € 1.000) are just few observations usually connected to companies that doesn't provide minimum collection objectives and that keep a similar line even for the target.

Instead, the minimum value for the minimum objectives could take value 0, for the companies that do not set minimum objective of collection (Take-it-all campaign, see paragraph 2.3).

At the same time, it is possible to get from the standard deviations how these values presents a high variability in the sample, for this reason more detailed distributions are presented in the below graphs.

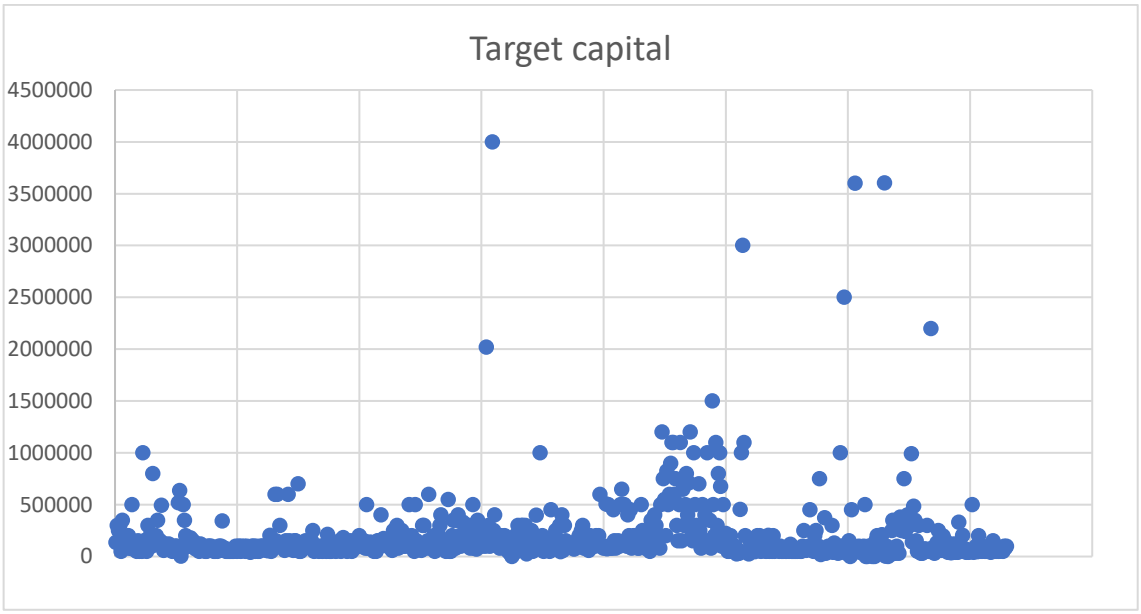


Figure 4.10 - Target capital distribution between the target population.

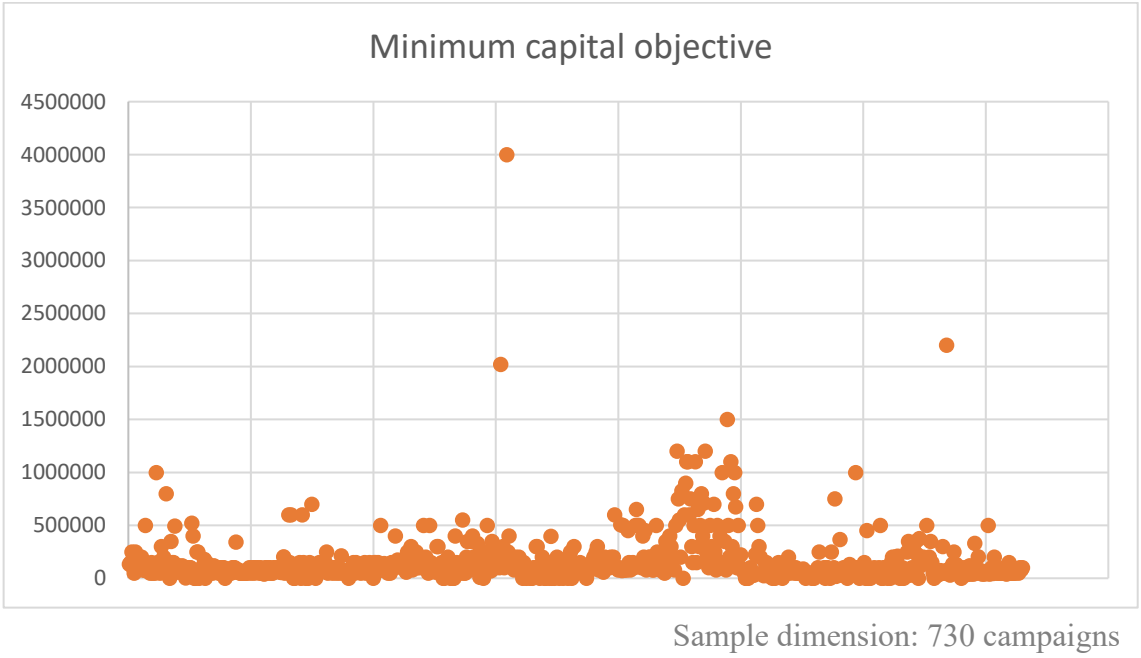


Figure 4.11 - Minimum capital objectives between the target population.

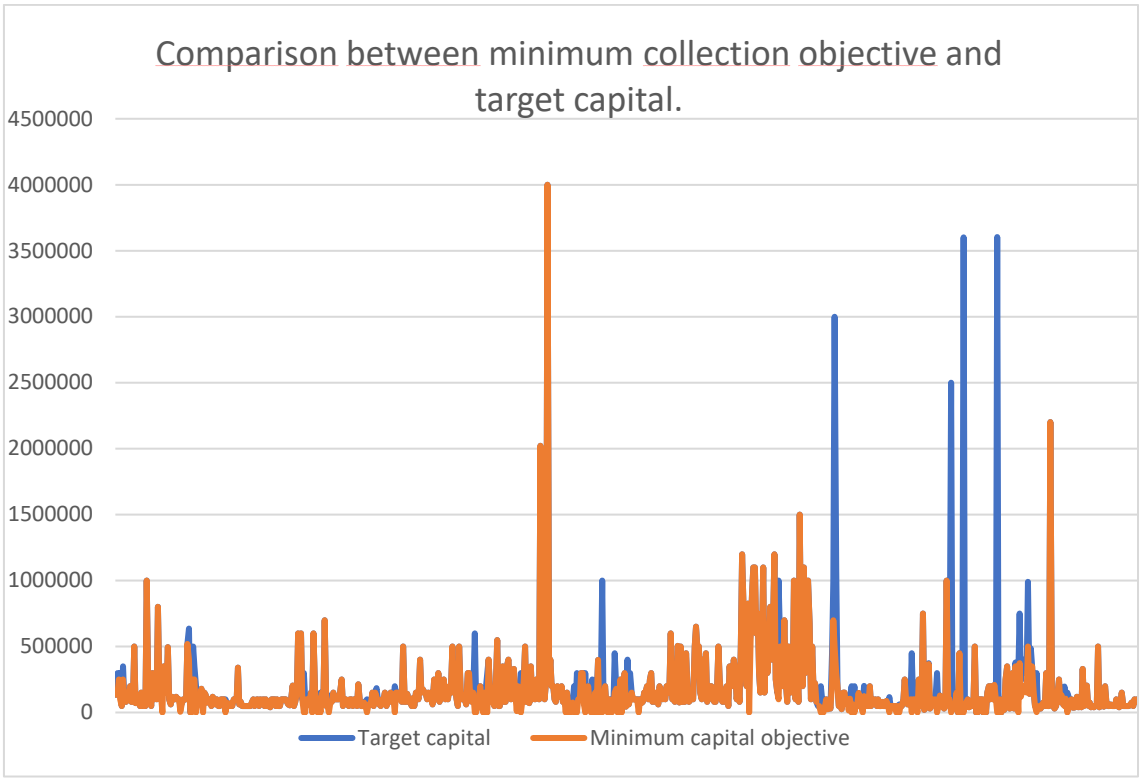
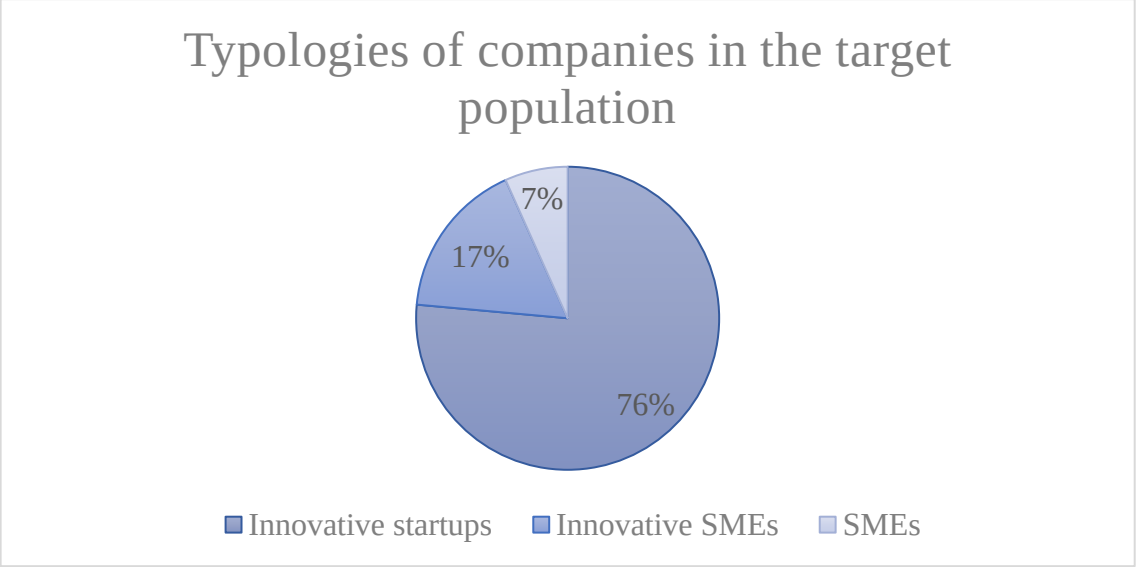


Figure 4.12 - Distributions comparison between minimum capital objectives and target capital collection.

Looking to the distributional graph become more evident how outliners perform a big role in defining the previous data, having the biggest part of the sample with contained values for both the metrics and few ones with huge values.
It is also possible to see that these two metrics are characterized by similar distributions showing no particular deviations.

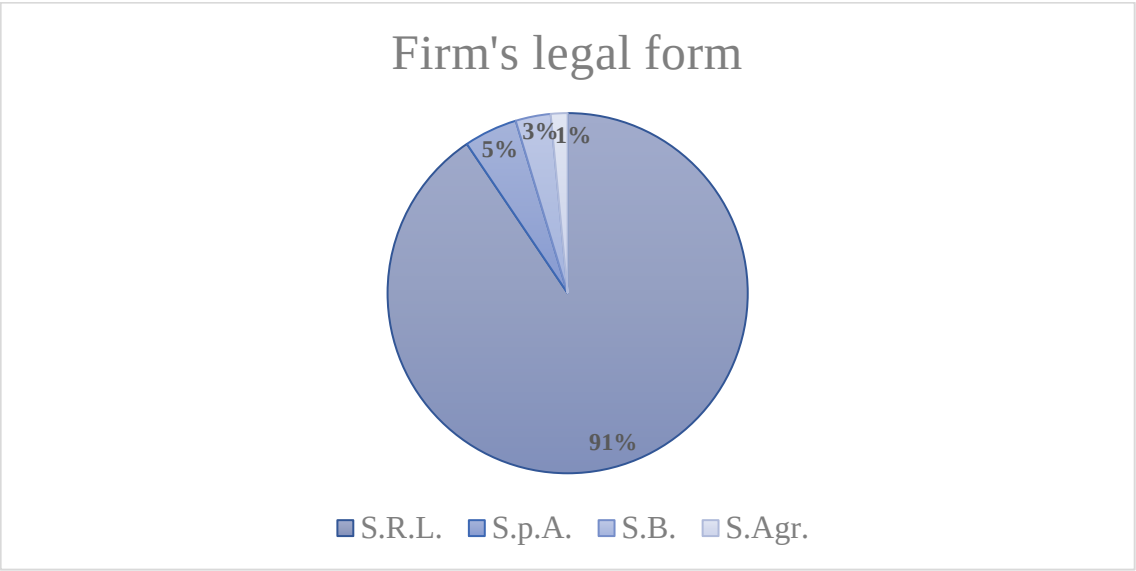
Another aspect that it is important to underline is the typologies of companies related to the campaigns in the target population, indeed, the biggest part is composed by innovative startups (which definition is reported in the annex 8.1.1) and the smallest one by innovative SMEs (definition in the annex 8.1.2) and SMEs.



Sample dimension: 730 campaigns

Figure 4.13 - Target population division between innovative startups, innovative SMEs and SME.

This composition is coherent with the previously explained literature, associating to equity crowdfunding a role of coverage of the financial gap for companies in early life-stages.
Instead, according to the legal form to which the companies performing the campaigns are registered to the chamber of commerce, they could be divided as in the below graph.



Sample dimension: 730 campaigns

Figure 4.14 - Division of companies in the target population on their legal form basis, dividing in S.R.L., S.p.A., S.B. and S.A.

Most of the target population campaigns have been performed by S.R.L.[40] companies, while just a minor part of it have been performed by "S.p.A.[41]", "S.B.[42]", "S.A.[43]".

Finally, has been seen in the introductory part of the work how equity crowdfunding is gaining importance with time passing, having a general look to how the campaigns in the target population are divided between different years gives an additional signal about this.

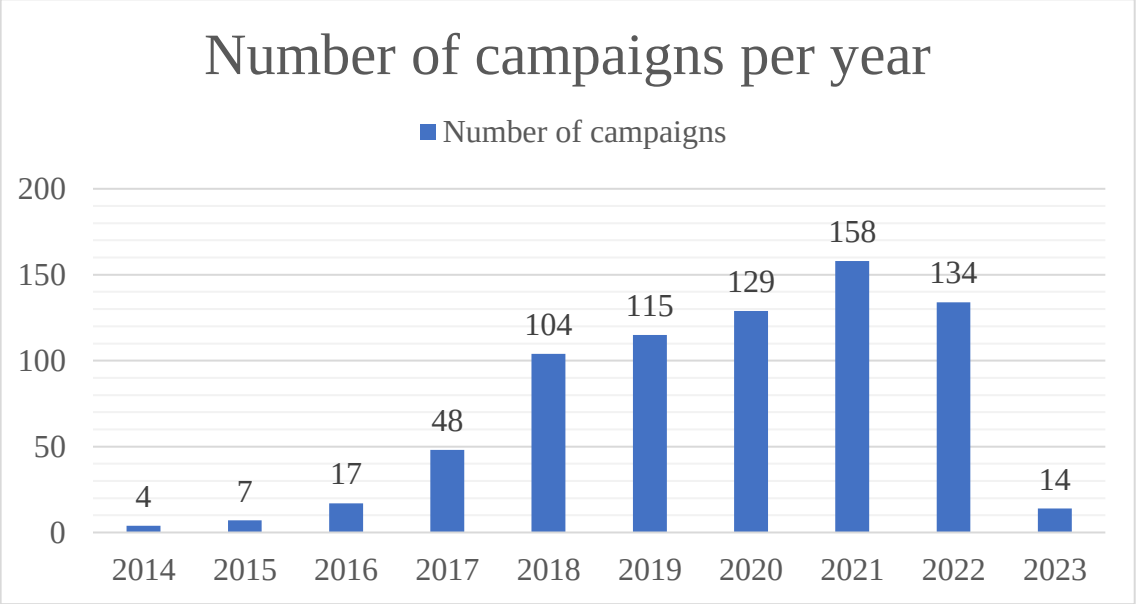


Figure 4.15 - Division of the target population on the basis of the year in which the company perform the campaign.

Excluding data from 2023 from the analysis, since the year is still on going, it is possible to see how the target population distribution among the years is pretty similar to the general equity crowdfunding one (paragraph 2.6) with an increasing number of campaign year after year and with a lower number of them for 2022, this is also due to the fact that being this year characterized by a huge presence of real-estate related campaigns (see paragraph 2.6) the number of campaign suffers from their exclusion.

[40] "Società a responsabilità limitata", the equivalent of Limited Liability Company (LLC)
[41] "Società per Azioni", the equivalent of Public Limited Company (PLC)
[42] "Società Benefit", societies embedding in their social object both profit objectives and society and environmental-related ones.
[43] "Società Agricola", Agricultural companies.

Chapter 5
Hypotheses

Once defined the literature gap and the thesis objectives, the hypotheses on which the entire research work is based have been developed.

Firstly, it is presented the hypothesis that tries to understand the effects that the pre-campaign presence of elements of past experience and ability could have on deviations of real funds' allocations from the objectives or expected values declared in the documents presented for the campaigns.

After this, the focus is shifted to the relationship between the previously descripted deviations and the company's debt variation for the year following the campaign, in order to investigate about the possibility that the collected funds could be used to repay debts, instead of as stated.

Finally, deviations of actual revenues from expected values published for the campaign in the expected financial statements are going to be analyzed in function of the previous past experience and ability elements.

5.1 Deviations from objectives allocation

First research hypothesis is aimed at analysing whether the presence of past experience and ability elements in companies before the equity crowdfunding campaigns could influence their ability to contain deviations from the expected allocation objectives presented at the beginning of the campaign.

This first hypothesis that is presented measures the differences between real values allocated in the year following the campaign and the expected values declared in the prospectus at the beginning of the campaign, trying to understand if the presence of some internal factors before it could influence this aspect or not.

In particular, it looks to contributes from six areas of interests:

- presence of previous capital increases, that could lead to a better satisfaction of the objectives for the acquired ability of the company in managing the collected funds.

- presence of professional investors in the pre-campaign company's structure, having seen how their ability and work is able to positively influence post-funding results (Croce, Martí and Murtinu 2013), it is expected to be influent even in this case.

- presence of patents owned by the company, which represent a fundamental element that could drive company's success.

- typology of companies defining their category in terms of innovative startups, innovative SMEs and SMEs, as the innovativeness of the company and the maintenance of the "status" could significantly compromise the satisfaction of the objectives.

- age of the companies that perform campaigns, that is an indirect signal of their experience, it is expected that companies with a longer history are better able to set and meet objectives thanks to the management experience gained in the previous years.

- number of employees in the company in the pre-campaign context, a higher amount of them could bring inside the company different knowledge and abilities, that could positively influence the setting and the ability to reach the objectives.

After all these considerations, the hypothesis has been settled as:

HP. Companies embedding a stronger past experience and ability are able to get closer to the stated expected objectives of allocation.

5.1.1 Allocation objectives - Sample definition

Starting from the target population (defined in the paragraph 4.2) of 730 companies, a sample of them with data and characteristics compatible with the analysis have been extracted.

In order to define the sample, the first step was to exclude from the available pool all the companies presenting general objectives or not presenting them at all (see paragraph 4.4.1) leaving with an initial sample of potentially available campaigns for the analysis of 413 cases between 2016 and 2023.
From this initial value must still be subtracted the number of campaigns for which there is no real data availability, in particular, in addition to a limited number of campaigns happened between 2016 and 2020, given the need to verify deviations in the year following the campaign, have been excluded all the ones that took place in 2021, 2022 and 2023 since data are still not available at the date of writing.
Excluding these 193 companies the final sample taken into consideration is composed by 220 observations.

Table 5.1 - Allocation objectives hypothesis, sample definition.

Target population	***730 companies (100%)***
Companies presenting general allocation objectives	164 companies (22.47%)
Companies not presenting any allocation objectives	153 companies (20.96%)
First available sample(*)	**413 companies (56.57%)**
Companies for which there is no real data availability	193 companies (27.94%)
Sample taken in consideration for the hypothesis	**220 companies (28.63%)**

Campaigns contained in the sample are, for the biggest part, related to innovative startup (see annex 8.1.1), followed in number by innovative SMEs (see annex 8.1.2) and lastly by SMEs.

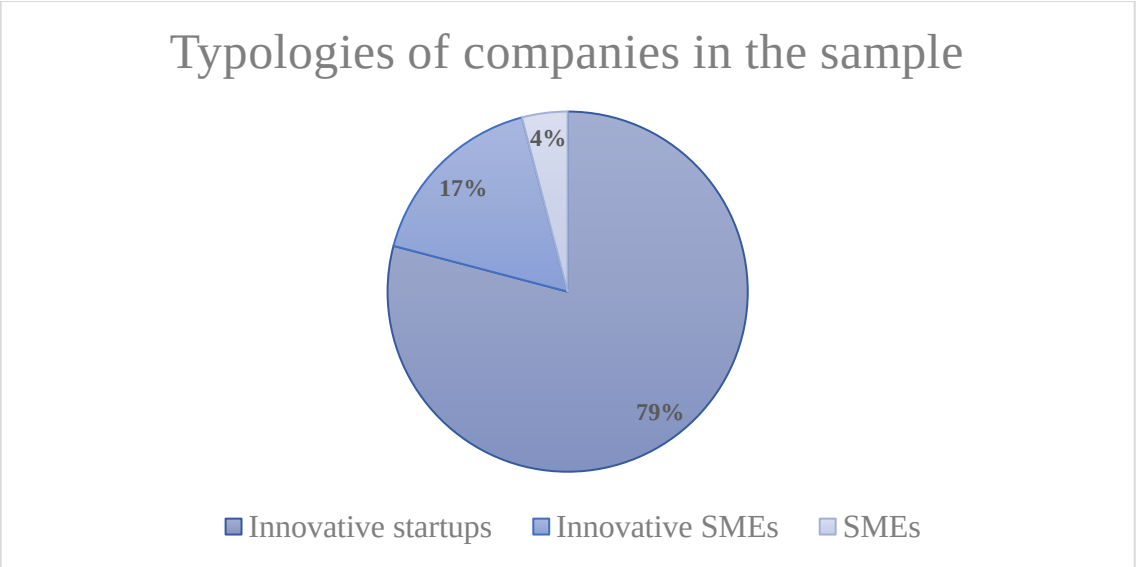


Figure 5.1 - Division of the sample for the allocation objectives hypothesis between innovative startups, innovative SMEs and SMEs.

Comparing these numbers with ones of the target population we could see how they do not differ too much, in this sample the is just a smaller portion of SMEs with the respect of the whole population target.

5.1.2 Allocation objectives – Variables definition and statistics

In order to study the deviations of real allocations from the objectives' ones, 8 areas in which the sample of companies under analysis plan to invest have been identified, and one variable considering the monetary deviation between real and objective values[44] have been created for each of them.

Each variable, has been evaluated in its logarithmic form, following the general formulation:

Equation 5.1 - General formula of computation of the deviations.

$$Deviation = \ln(1 + Real\ value\ allocated) - \ln(1 + allocation\ objective)$$

Through this formula it is possible to have a proxy of the relative deviation for the specific area, however for mathematical reasons it does not work in presence of negative arguments of the logarithm, for this reason for the few observations (11 in total between all the deviations) falling in this case, the deviation has been calculated has:

[44] Note that if for the area under analysis the company did not present any allocation objective, it is considered equal to 0.

Equation 5.2 - Computation of deviation with negative values.

$$\frac{Real\ value\ allocated - allocation\ objective}{\frac{1}{2}(Real\ value\ allocated + allocation\ objective)}$$

For simplicity of analysis the 8 variables are explained grouping them in two different groups, on the basis of which statement they are referring to.

The first group of these variables of deviations are related to the balance sheet.

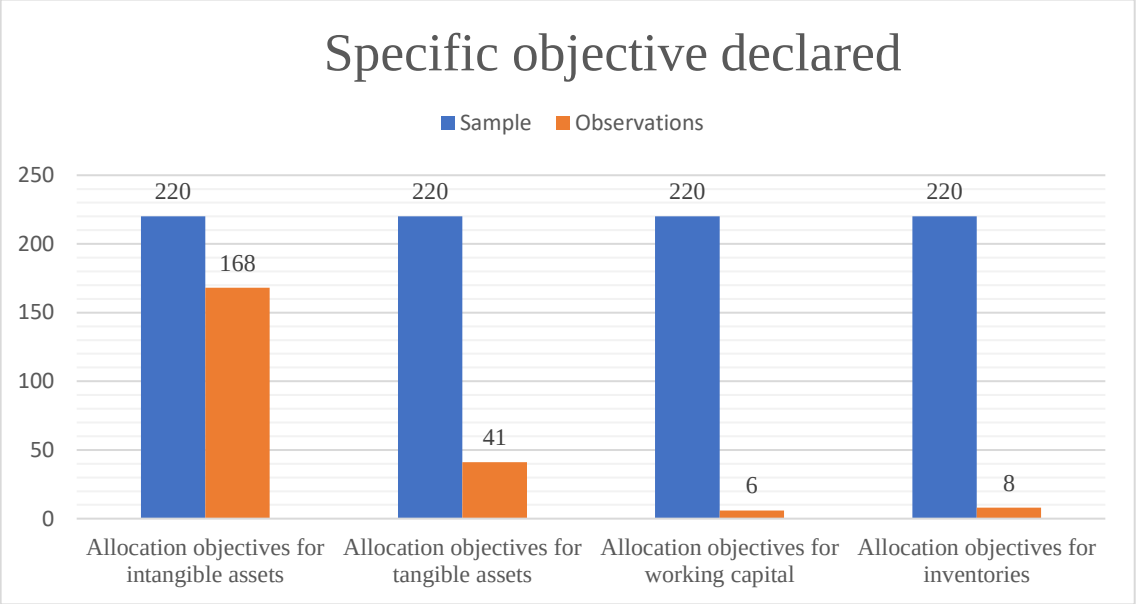


Figure 5.2 - Number of observations of specific objectives for each of the 4 balance sheet's areas identified.

Most of companies performing campaigns in the sample has specified objectives of allocation for the intangible asset accounting section, and in particular, the most recurring objectives are for patents, IT technologies and R&D expenses[45].
Following this, there is the presence of allocation objectives in tangible assets (e.g., building, machinery…) while the less frequent ones are for working capital and inventories.
However, it is important to underline that the companies in the sample usually specified more than one area in which they plan to invest into.

[45] According to the Italian Civil Code ("Libro Quinto – Del lavoro – Titolo V – Delle Società (Art.2424)") R&D expenditures contrary to what would seem for their cost nature, must be recorder in the balance sheet activities section, under the intangible asset accounting voice.

Intangible assets allocation objectives deviations
This variable measures the difference between the real values allocated to intangible assets for the year following the campaign and the objective of allocation indicated in the documents at the beginning of the campaign.

Before to go in depth with the variable explanation, it is necessary to explain the assumption that has been made in its calculation, since the majority of the companies in the sample have drawn up reduced-form balance sheets (see annex 8.6).

According to the Italian Civil Code inside the accounting section of intangible assets are included 7 different sub-elements composing it, but companies that have the possibility to drawn up a reduced-form balance sheet are obliged to disclose only their aggregated value and not each sub-element's ones.
For this reason, all the allocations objectives, even if they were specifically allocable to an intangible assets' component (in particular, in the sample the biggest part sets R&D expenditures objectives), were considered in terms of the whole category of intangible asset.

Stato patrimoniale	
Bilancio non consolidato	31/12/2020 EUR
⊟	12 mesi Abbreviato ICS
Attivo	
A. CREDITI VERSO SOCI	0
Quota di capitale richiamata	0
B. TOTALE IMMOBILIZZAZIONI sep.ind. Di quelle conc. In loc. Finanz.	42.784
B.I. TOTALE IMMOB. IMMATERIALI	42.019
B.I.1. Costi impianto e ampl.	n.d.
B.I.2. Costi ricerca e pubb.	n.d.
B.I.3. Diritti brevetto ind.	n.d.
B.I.4. Concessioni, licenze	n.d.
B.I.5. Avviamento/Differenza di consolidamento	n.d.
di cui: Avviamento	n.d.
B.I.6. Imm. in corso	n.d.
B.I.7. Altre immobiliz. Immateriali	n.d.
Fondo amm.to Immob. Immateriali	n.d.

Figure 5.3 - AIDA data extraction for intangible assets.

Since this category is subject to amortization[46], for the variable regarding this group evaluation of the real amount allocated have been used a formula closer to the capex's one, considering

[46] Practice through which the value of an intangible asset is fully registered in the balance sheet at the first year, but the cost is spread year by year over its useful life, decreasing time by time its value.

the real value for the year in consideration, adding the amortization for that year and subtracting the real value from the previous year.

Equation 5.3 - Calculation formula for real allocated amount for intangible asset.

$$Real\ allocated\ amount\ on\ intangible\ assets =$$

$$= Value\ of\ intangible\ assets_{t+1} + value\ of\ intangible\ assets' D\&A_{t+1}$$

$$- Value\ of\ intangible\ assets_t$$

$$Where\ t\ was\ the\ year\ of\ reference^{47}\ for\ the\ campaign$$

Once evaluated the real value of intangible assets' deviations from allocation objectives, it has been transformed in its logarithmic form.
Finally, the allocation objective (always in logarithmic form) has been subtracted to the real value, obtaining the deviation.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Int_As	220	1.643464	5.840504	-11.9184	13.44019

Figure 5.4 - General statistics for intangible assets' deviation variable.

Even if the mean of the deviations is contained and positive (means that on average have been allocated a real value higher than the objective ones), from the minimum/maximum values and from the standard deviation, it is possible to see how the variability for this variable is quite high.

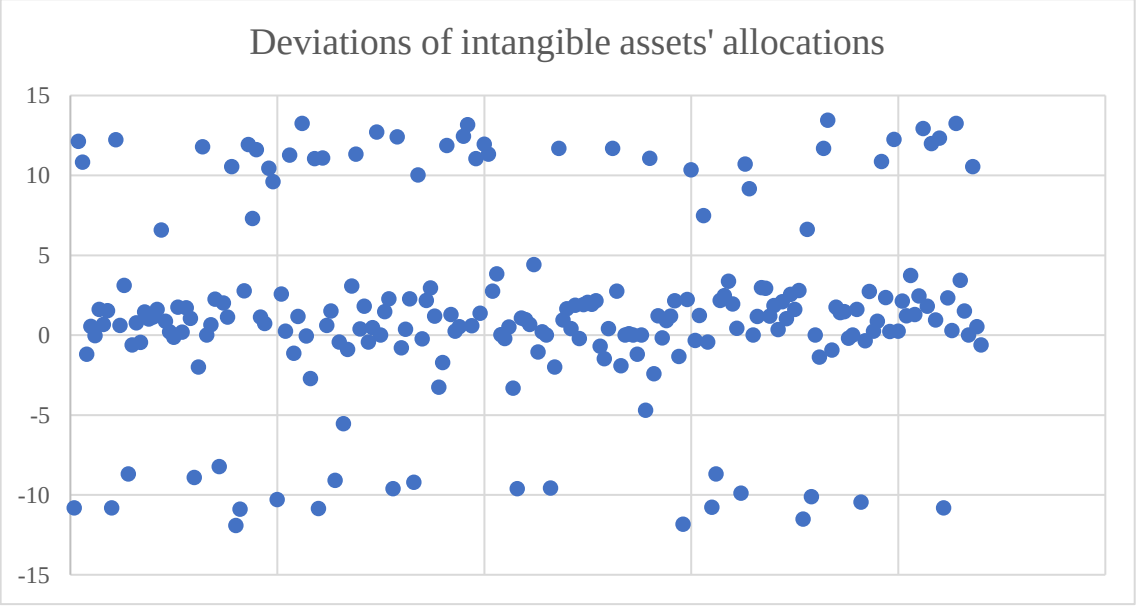


Figure 5.5 – Distribution of deviations on intangible assets' allocations.

[47] As year of reference for each campaign have been considered the year in which the campaign closes.

Tangible assets allocation objectives deviations

This second variable takes into consideration the deviations of real allocation from the objective ones for the tangible assets' area.
The calculation way is pretty similar to the previous one, with a first step to evaluate the real allocation value that in this case is exactly the capex formula, and a second one with the subtraction of the objective value.

Equation 5.4 - Real allocated amount for tangible asset calculation.

$$Real\ allocated\ amount\ on\ tangible\ assets =$$

$$= Value\ of\ tangible\ assets_{t+1} + value\ of\ tangible\ assets' D\&A_{t+1}$$

$$- Value\ of\ tangible\ assets_t$$

$$Where\ t\ was\ the\ year\ of\ reference^{48}\ for\ the\ campaign$$

Again, the difference between the real and the objective values is done between the logarithms.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Tan_As	220	3.953782	5.141857	-10.4913	13.47022

Figure 5.6 - Deviations of tangible assets' statistics, from Stata.

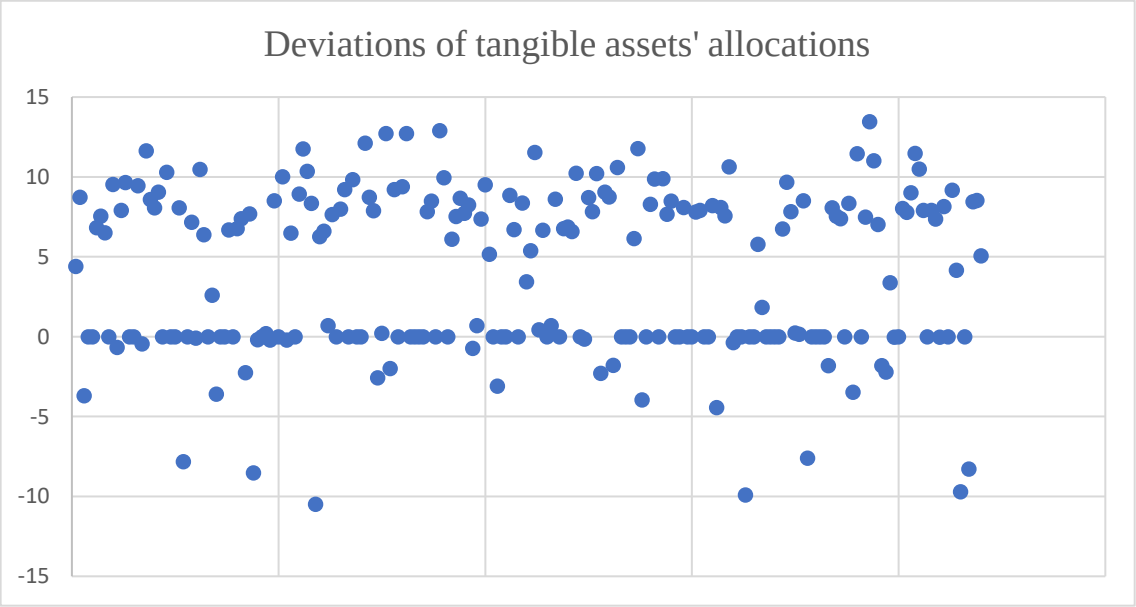


Figure 5.7 – Distributions of deviations on tangible assets 'allocation objectives.

Looking to the average statistics and to the distribution graph, it is possible to note that even if the mean is again positive, the variability is high and the frequency of negative deviations,

[48] As year of reference for each campaign have been considered the year in which the campaign closes.

corresponding to lower-than-expected invested amounts, with respect to the ones of intangible assets is higher.

Working capital allocation objectives deviations

Real value of working capital allocation have been computed by subtracting to the current activities the current debt, once obtained the real value, the allocation objective was subtracted in order to get the deviation variable.

Variable	Obs	Mean	Std. dev.	Min	Max
D_W_Cap	220	8.744962	6.181376	-14.03852	15.07887

Figure 5.8 - Deviations of working capital's statistics from Stata.

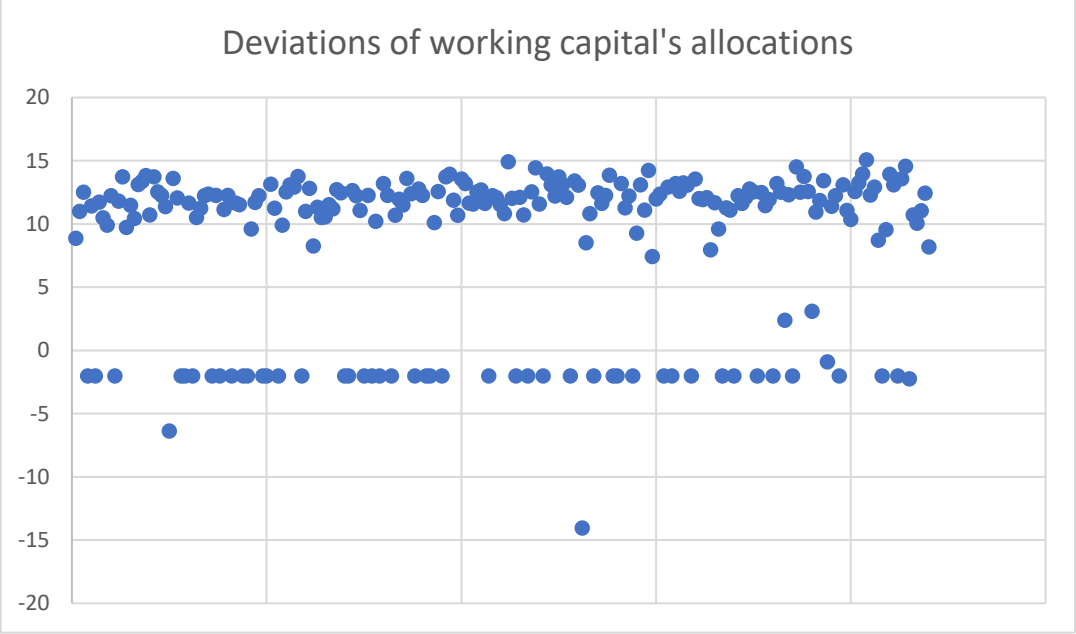


Figure 5.9 - Distributions of deviations on working capital's allocation objectives.

Again, from the distributional graph, it is possible to gather that even if more frequently there is a positive deviation, there are some not negligible cases with a negative one.

Inventories allocation objectives deviations

In some of the documents presented at the beginning of the campaign for the sample taken into consideration there are specific references to investments aimed at stocks and inventories.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Inv	220	4.233602	5.671314	-10.59666	13.55266

Figure 5.10 - Deviations of inventories' statistics, from Stata.

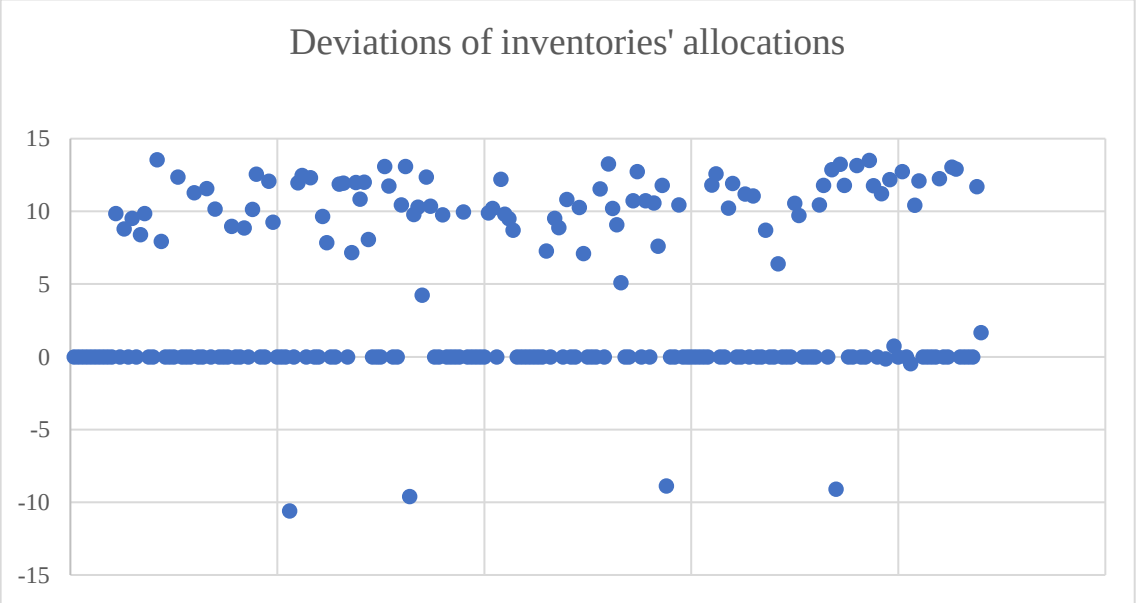


Figure 5.11 - Distributions of deviations on inventories' allocation objectives

It is possible to note from the distributional graph that a lot of the companies in the sample have a deviation on the zero axis.
This is due to the fact that many of them does not work with inventories, showing both no allocation objective and null real values allocated, that once in the general formula presented before becoming the difference between two equal logarithms, giving 0 as result.

The second part of variables created in order to describe deviations in the allocation objectives are all related to the income statement.

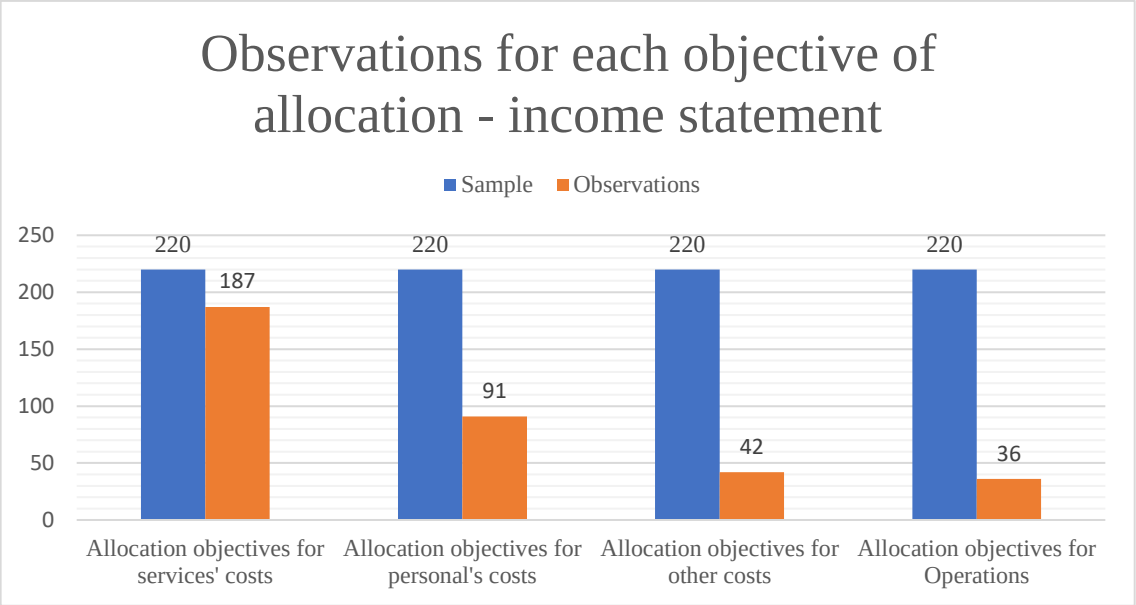


Figure 5.12 - Observations for each objective of allocation - income statement.

In this case the bigger part of firms sets allocation objectives for services and personal costs, but the difference in frequencies of appearance between the first two objectives of allocation and the last two is not so large as in the case of the balance sheet ones.

Personal costs allocation objectives deviations

This variable takes into consideration deviations of real personal costs for the year after the campaign (extracted from AIDA, taking the voice B9[49] of the income statement) and the allocation objectives.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Pers_C	220	4.335995	6.646379	-11.15626	14.15738

Figure 5.13 - Personal costs deviation variable statistics, from Stata.

[49] B9 point of the income statement under the Italian Civil Code is "Costi della produzione – per il personale".

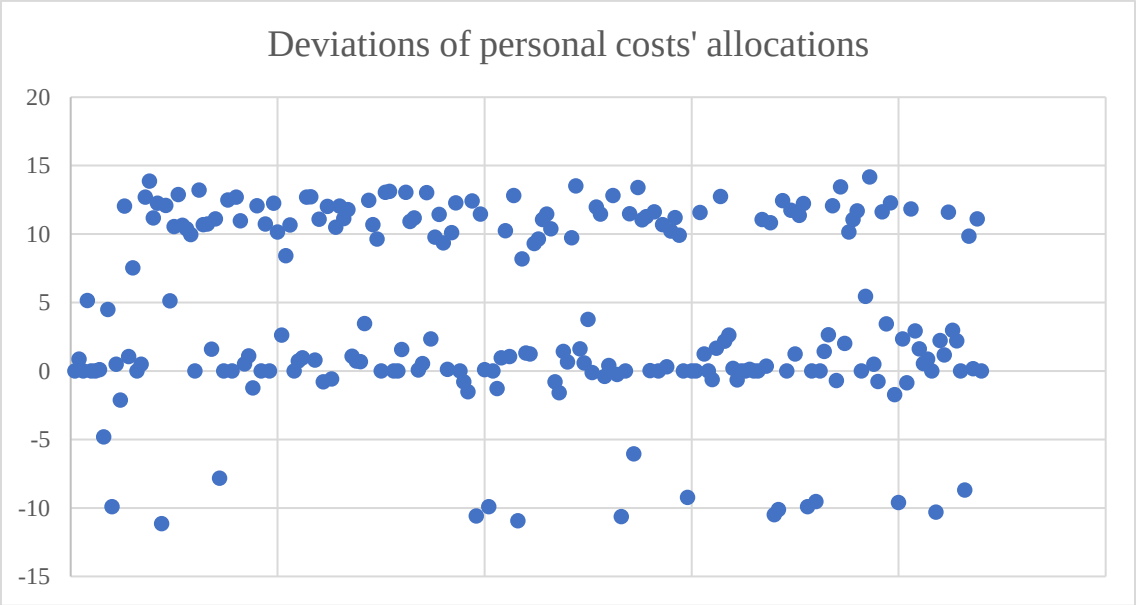


Figure 5.14 - Distributions of deviations on personal costs 'allocation objectives.

Services costs allocation objectives deviations

In this case as for the case of intangible assets are included all the different allocations objectives addressable to this category (e.g., marketing, consultancy, participations to faire and events and all the others cost imputable to the accounting voice B7[50] of the income statement) without having the possibility to keep them divided for the lack of so specific real data.

However, it is important to underline that the biggest part, both in number of times in which they appear and for their quantity, is composed by marketing costs, while just a minor part regard others kind of services.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Serv_C	220	3.014515	3.902021	-10.59666	13.11736

Figure 5.15 - Service costs deviation variable statistics, from Stata.

[50] B7 point of the income statement under the Italian Civil Code is "Costi della produzione – per servizi".

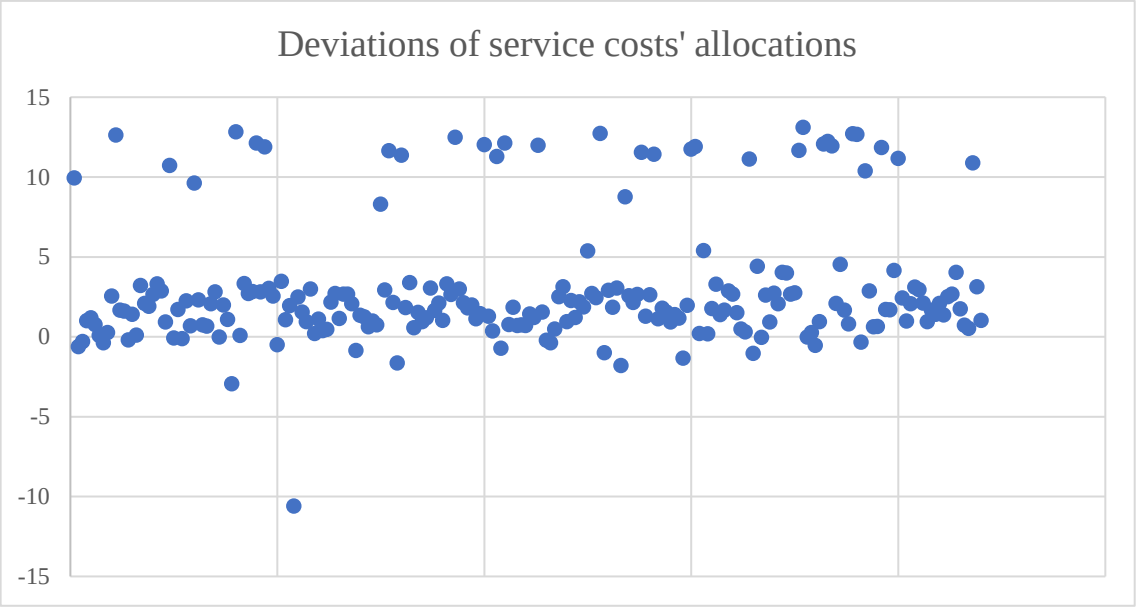


Figure 5.16 - Distributions of deviations on service costs 'allocation objectives.

Other costs allocation objectives deviations

For this variable have been taken into consideration just the allocation objectives where there is a specific reference to an allocation for other costs.
Once gathered the allocation objective his value have been subtracted to the real value extracted through AIDA from the B14[51] point of the income statement.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Oth_C	220	6.868939	4.053163	-3.746559	11.58898

Figure 5.17 - Other costs deviation variable statistics, from Stata.

[51] B14 point of the income statement under the Italian Civil Code is "Altri oneri di gestione".

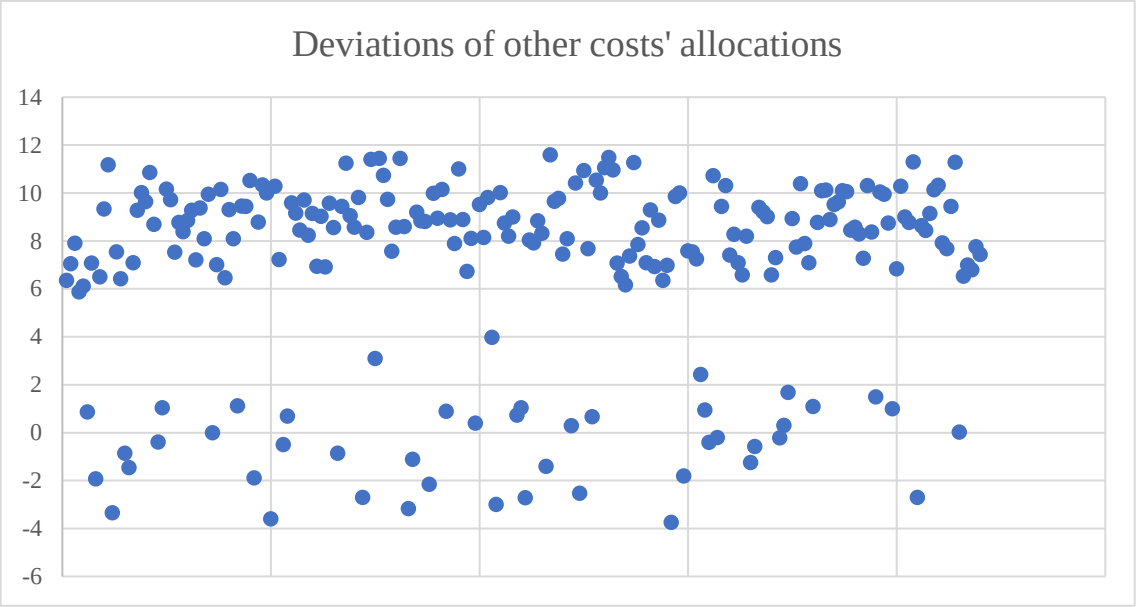


Figure 5.18 - Distributions of deviations on other costs' allocation objectives.

Operations costs allocation objectives deviations

For the costs indicated by the objectives as operations ones have been considered as real value of allocation the sum of the cost for the raw material (B6[52] on the income statement) and the costs for the use of third-party assets (B9[53] of the income statement).

Variable	Obs	Mean	Std. dev.	Min	Max
D_Op_C	220	8.103913	4.798725	-9.517899	15.52092

Figure 5.19 - Operation costs deviation variable statistics, from Stata.

[52] B6 point of the income statement under the Italian Civil Code is "Costi della produzione – per materie prime, sussidiarie, di consumo e di merci".
[53] B8 point of the income statement under the Italian Civil Code is "Costi della produzione – per godimento di beni di terzi".

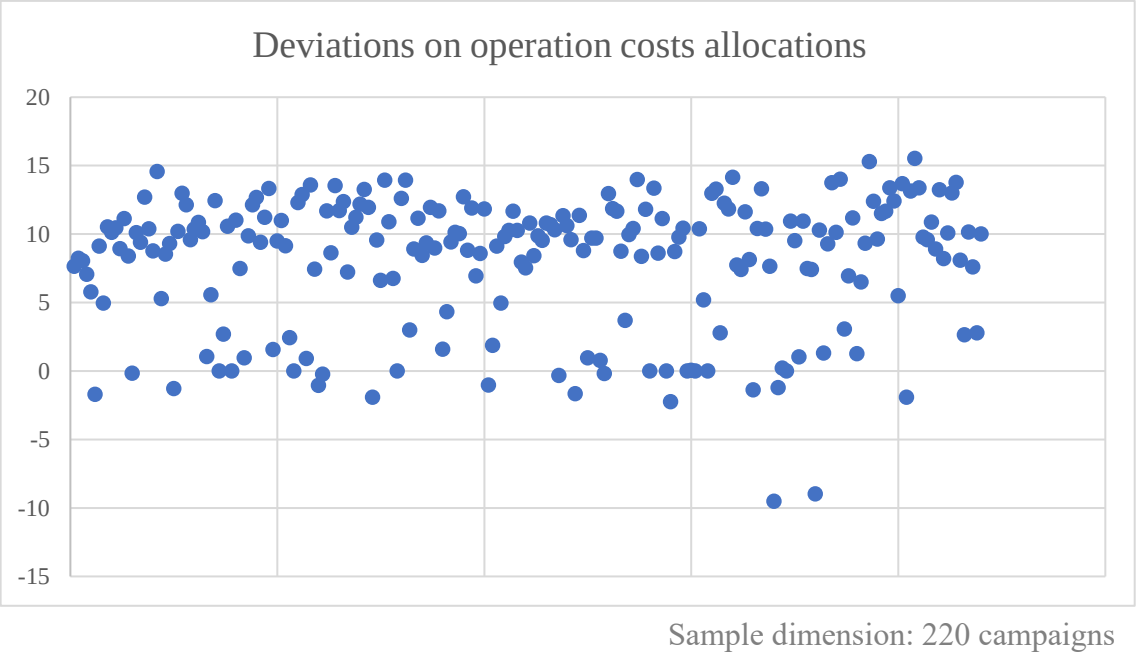


Figure 5.20 - Distributions of deviations on operation costs' allocation objectives.

Capital increase.

It is a binary/dummy variable assuming value 1 if the company performing the campaign has already carried out a capital increase in the years preceding the campaign, and 0 otherwise.
In order to calculate it for each company have been analysed the values of social capital for the pre-campaign period starting from 2013 (year 0 available on AIDA), and the presence of a positive yearly variation of this voice has been considered as an increase in capital.

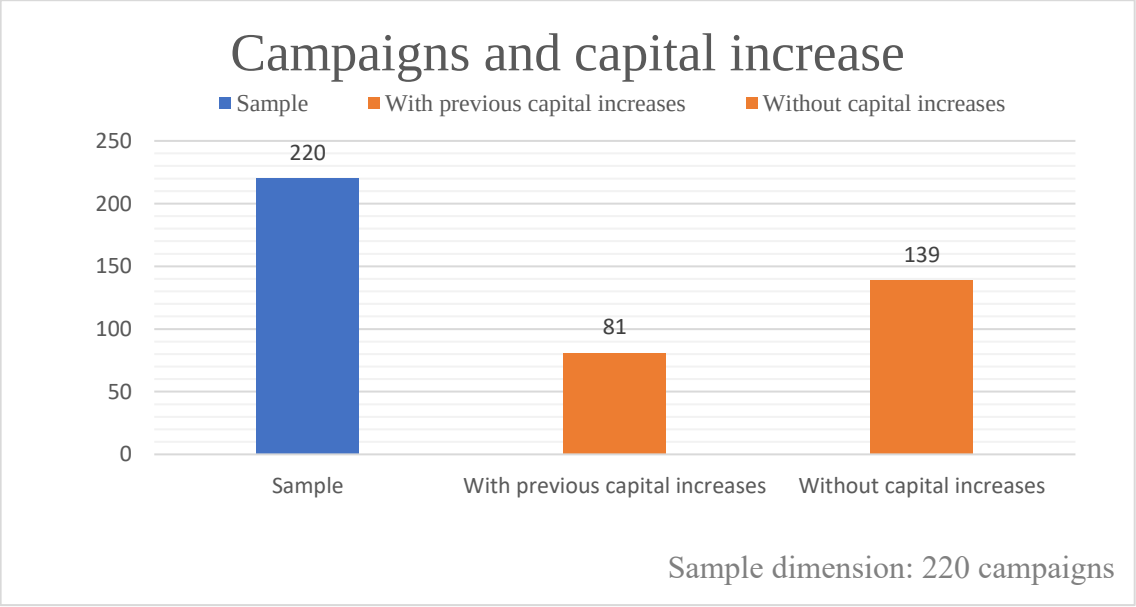


Figure 5.21 – Clustering of companies in the sample in the ones that already performed capital increases before the campaign and the ones that did not.

Variable	Obs	Mean	Std. dev.	Min	Max
Cap_Raise	220	.3681818	.483411	0	1

Figure 5.22 - Capital increase variable resume from Stata.

Patents

Even this one is a binary/dummy variable assuming value 1 if the company that performs the campaign owns one or more patent and 0 otherwise.
For its evaluation have been considered the available statements (business plan, pitch or deck and the chamber of commerce certificate[54]) at the beginning of the campaign have been analysed one-by-one, setting this value equal one if in them there is a clear reference to the presence of a patent.

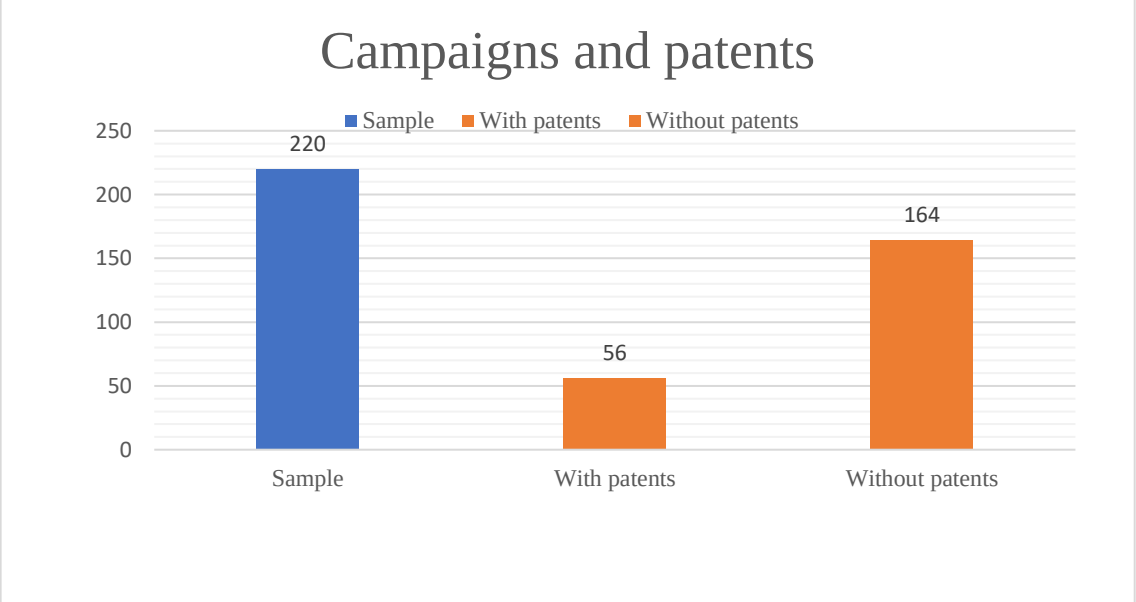


Figure 5.23 - Clustering of companies in the sample in the ones owning at least one patent and the ones that did not.

Variable	Obs	Mean	Std. dev.	Min	Max
Patents	220	.2545455	.4365988	0	1

Figure 5.24 - Patents variable resume from Stata.

[54] "Visura camerale", document containing all the information about the company in terms of VAT number, company legal form, business areas, shareholders, managers…

Professional investors

It is a variable considering the presence of professional investors in the company, it has been created by comparing the quantity of shares with voting rights owned by them with the total amount of social capital both extracted from the pre-campaign chamber of commerce certificates.
In particular, as professional investors have been taken into consideration all the venture capitalist funds, the business angels funds, stock brokerage firms, incubators and accelerators.

Equation 5.5 - Professional investors quote calculation.

$$Professional\ investors = \frac{Shares\ with\ voting\ rights\ owned\ by\ professional\ investors}{Total\ capital}$$

Variable	Obs	Mean	Std. dev.	Min	Max
Profession~S	220	.0625727	.1400963	0	1

Figure 5.25 - Professional investors variable resume from Stata.

In the sample this variable assume an average value of 6.18%, however it ranges from 0 to 100% with 152 observations showing the former results and just one company the latter.

Variable	Obs	Mean	Std. dev.	Min	Max
Profession~S	68	.2024412	.1881917	.002	1

Figure 5.26 - Professional investors variable from Stata just when present.

Considering just the 68 companies for which there is the presence (even minimal) of a professional investor, the average value increases to 20.24%.

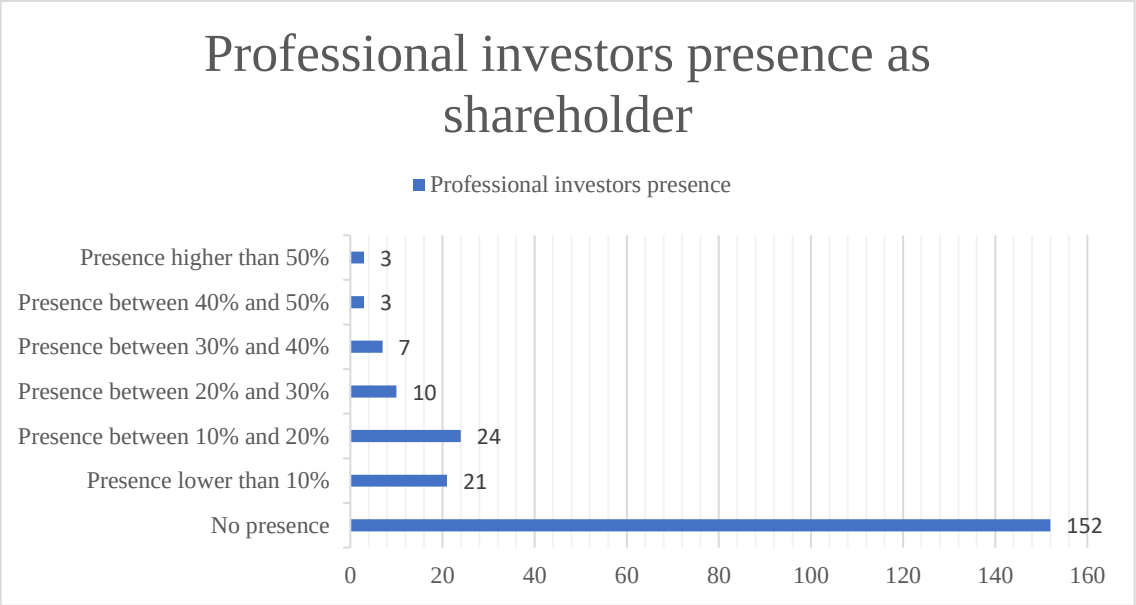


Figure 5.27 - Clustering of professional investor presence ratio.

Even from previous statistics is shown an average presence of professional investors of about 20%, showing on a graph their presence clustering them on the basis of different percentages of presence, it could be seen that in the majority of the cases, the participation of such kind of investors is lower than 20%.

Age

This variable was created in order to consider the maturity of the company performing the campaign.
It simply represents the difference between the year of reference of the campaign and the year of constitution of the company.

Equation 5.6 - Age of the company calculation.

$$Age = Year\ of\ campaign - Year\ of\ company's\ constitution$$

Variable	Obs	Mean	Std. dev.	Min	Max
Age	220	3.672727	4.238568	0	31

Figure 5.28 - Age variable from Stata.

The average age of the companies performing equity crowdfunding in the sample taken into consideration is of 3.67 years, a number that is perfectly compatible with the fact that this financing method has emerged as an alternative to help companies in raising funds in their early stages of life.

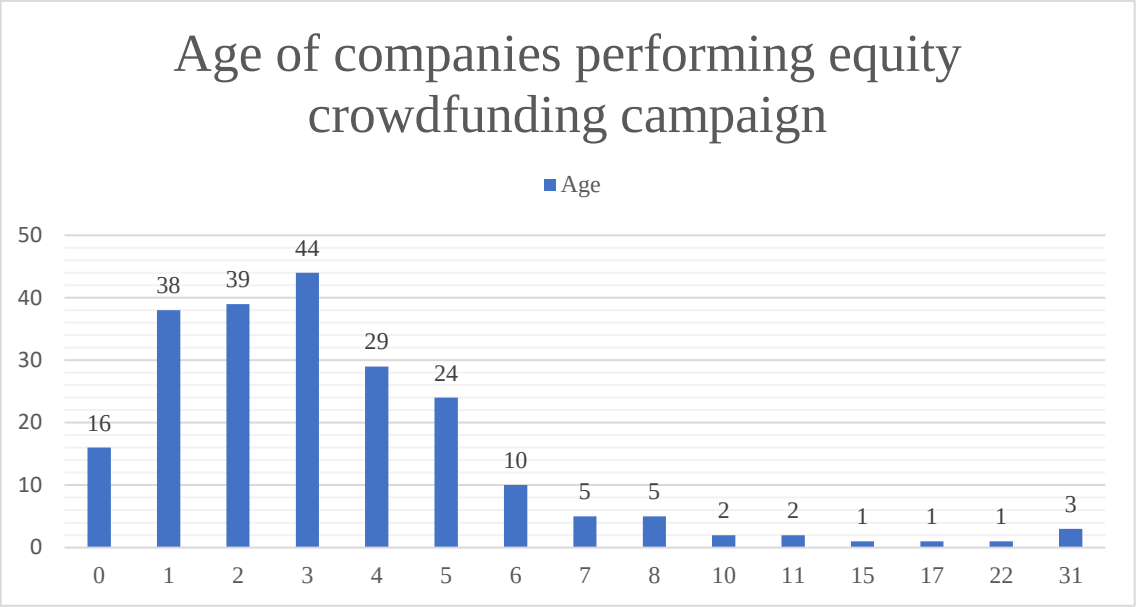


Figure 5.29 - Age of companies performing equity crowdfunding.

Looking more in particular to the distribution of age between the companies in the sample it is possible to get that the biggest share have an age that range between the 0 and the 5 years, while just a minor part is older.

Kind of company

Finally, another important variable taken into consideration was the kind of company performing the equity crowdfunding campaign.
It has been defined as a categorical variable differentiating the companies performing the campaigns in the sample between innovative startups (INN SU), innovative SMEs (INN SME) and SMEs (SME).

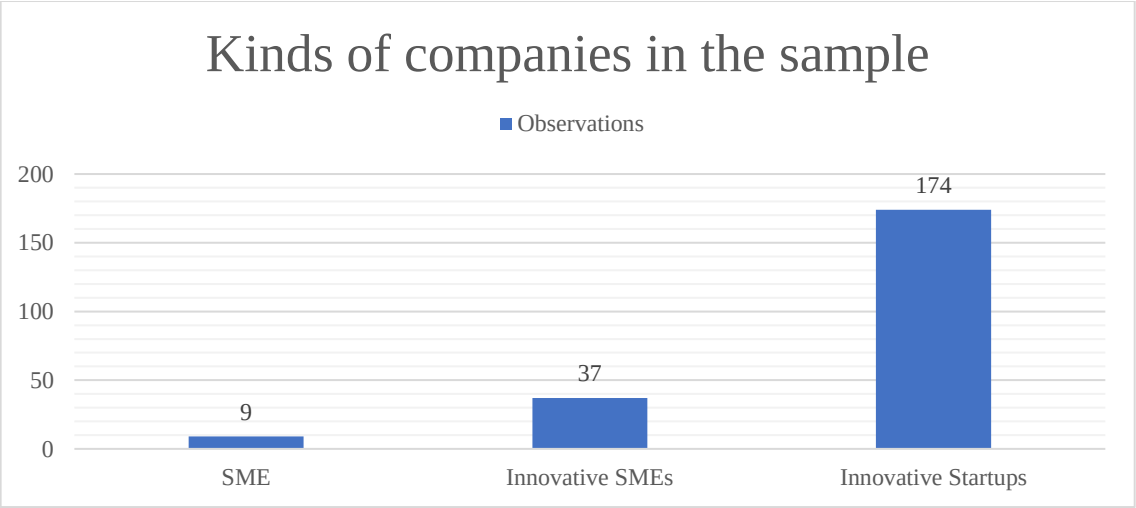


Figure 5.30 - Division of the sample for the hypothesis on allocation objectives between SMEs, innovative SMEs and innovative startups.

Variable	Obs	Mean	Std. dev.	Min	Max
SME	220	.0409091	.1985313	0	1
INSME	220	.1681818	.3748806	0	1
INSU	220	.7909091	.4075868	0	1

Figure 5.31 - Variable Kind, statistics, from Stata.

Being a categorical, it is substantially composed by dummies variables which values range between 0 and 1 (the only two values that they can assume), however from these statistics is possible to get, as previously done, that the biggest part of the analysed sample is composed by innovative startups.

Number of employees before the campaign

It has been considered since the presence of a higher number of workers inside the company in the pre-campaign context could be a signal for a more structure work team with the potential presence of dedicated figures for the analysis and setting of expected results or objectives.

In order to evaluate it, have been extracted from AIDA the number of employees for the year before the campaign, or in the case in which the company age was equal to 0 (newly born) has been settled equal to 0.

Variable	Obs	Mean	Std. dev.	Min	Max
Employees	220	2.959091	3.992362	0	27

Figure 5.32 - Variable Employees statistics from Stata.

From the observations comes an average number of workers of about 3 for each company, with a remarkable standard deviation, for this reason it is better to look more in detail to the different numbers:

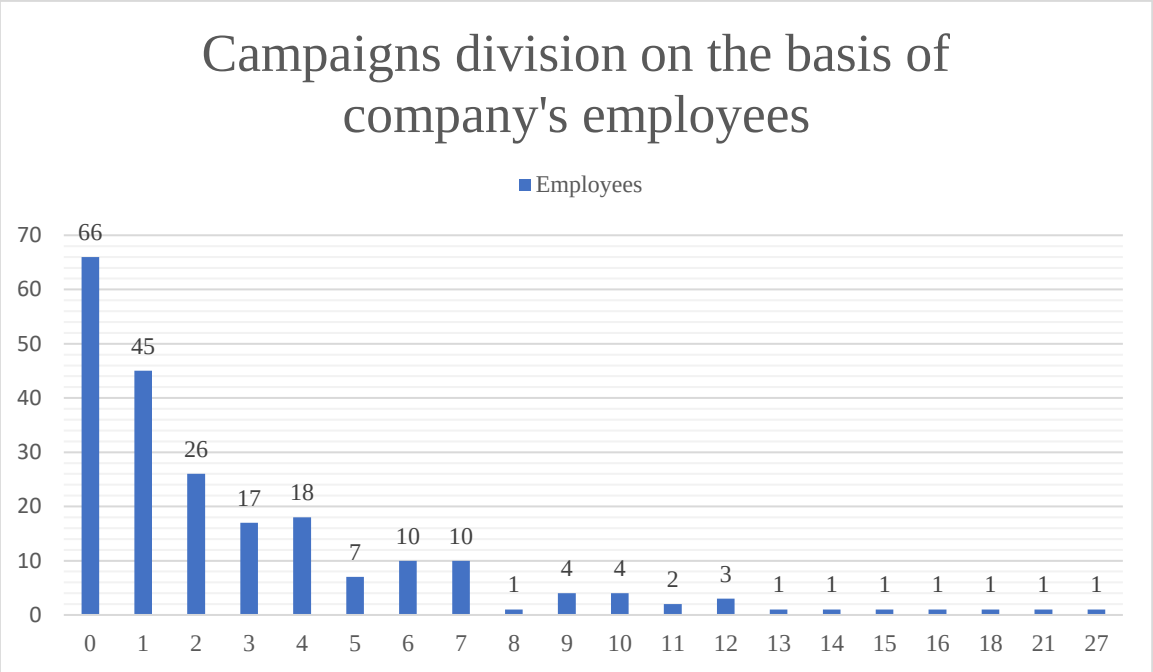


Figure 5.33 - Campaign division by number of employees pre-campaign of the company.

It is possible to notice that the biggest part is composed by companies having just one employee or none of them, finding themselves below the average value previously founded.

In addition to these variables, some control ones were defined, in order to consider the potential effect that other variables not of interest for this analysis could have on the results.

Ratio between collected amount and target capital

Have been considered important to take into consideration the fact that some companies set very low minimum objectives, but at the same time they indicate a higher collection target, through this variable was possible to analyse the effects that a higher or lower collection with respect of the target could have on the results.
For its calculation the data used are the one recorder in the Italian equity crowdfunding database by "Osservatorio Crowdinvesting del Politecnico di Milano" that keeps track of both the collected amount and the target of collection for each campaign.

Equation 5.7 - Variable Collected amount over target definition.

$$Collected\ over\ target = \frac{Collected\ amount\ for\ the\ campaign}{Target\ of\ collection}$$

Variable	Obs	Mean	Std. dev.	Min	Max
Collected_~t	220	2.300198	1.559896	.3629442	12.74832

Figure 5.34 - Variable collected over target from Stata.

From the analysis of this variable emerge how the average collection of capital is 2.3 times the target, however with a standard deviation and a range of values that is quite relevant, analysing a little bit more in detail the situation:

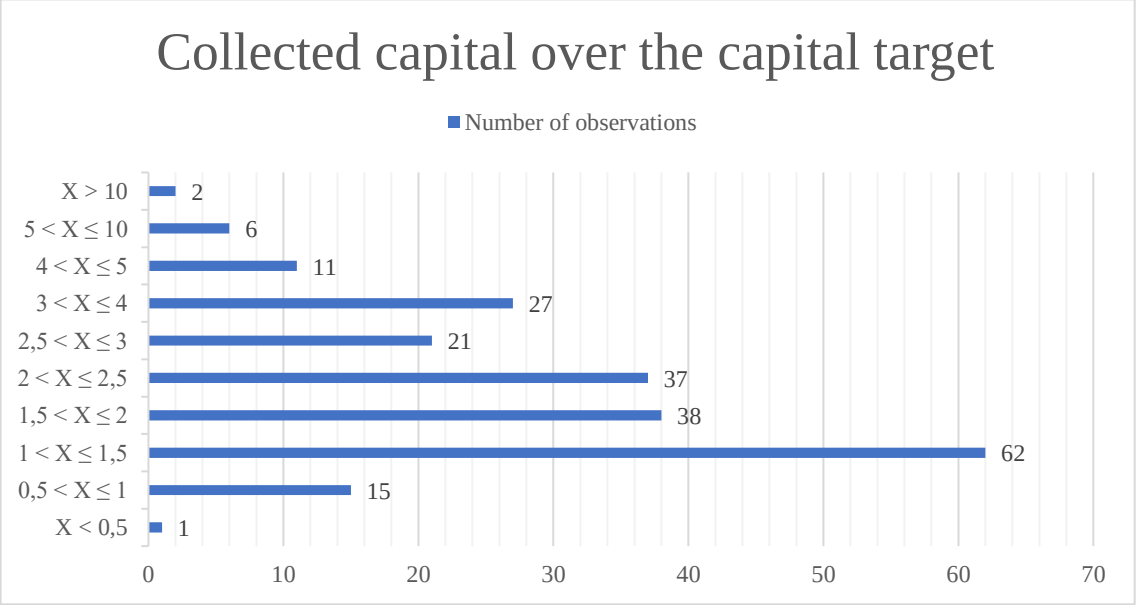


Figure 5.35 - Cluster of ratios between the collected capital and the target one.

In almost all of the cases taken into consideration in the sample, the target capital have been reached and exceeded, even if the biggest part of the companies ended with a collection amount between 1 and 2.5 times the capital target, it is interesting to see how there is a quite relevant number of companies that have collected much more than it.

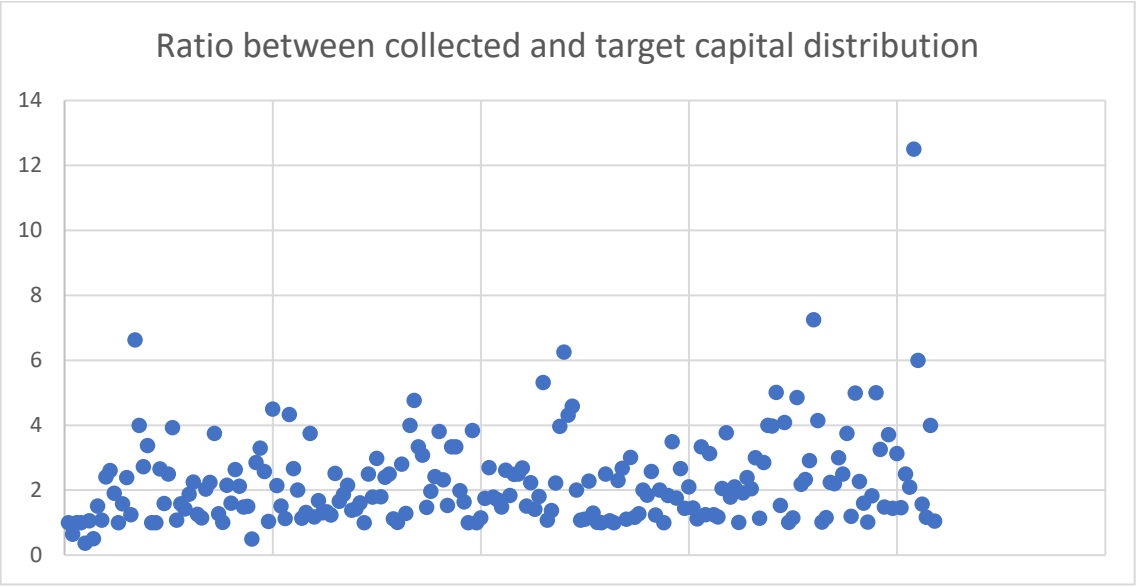


Figure 5.36 – Distribution of the values assumed by the ration between the collected and the target capitals.

Sector

Another important aspect that have been taken into account is the sector in which the company performing the campaign is working.
This variable has been defined on the basis of the ATECO code[55] of the company, that can be found on the chamber of commerce certificate, but it is also reported in the previous database.

Have been identified 8 main categories of ATECO codes taken into consideration while the others are grouped together in the "Other ATECO" group, in particular they are:

Table 5.2 - ATECO codes definitions.

ATECO code	Description
ATECO J	Information and communication services.
ATECO A	Agriculture, forestry and fishing.
ATECO C	Manufacturing activities.
ATECO K	Financial and insurance activities.
ATECO L	Real-estate activities.
ATECO M	Professional, scientific and technical activities.
ATECO G	Wholesale and retail trade; Repair of motor vehicles and motorcycles.
ATECO F	Constructions.
Others ATECO	Containing all the others ATECO codes. Taking the ones that appear in the sample: D: Supply of electricity, gas, steam and air conditioning. I: activities of accommodation and catering services. P: education. Q: health and social welfare. R: arts, sports and entertainment.

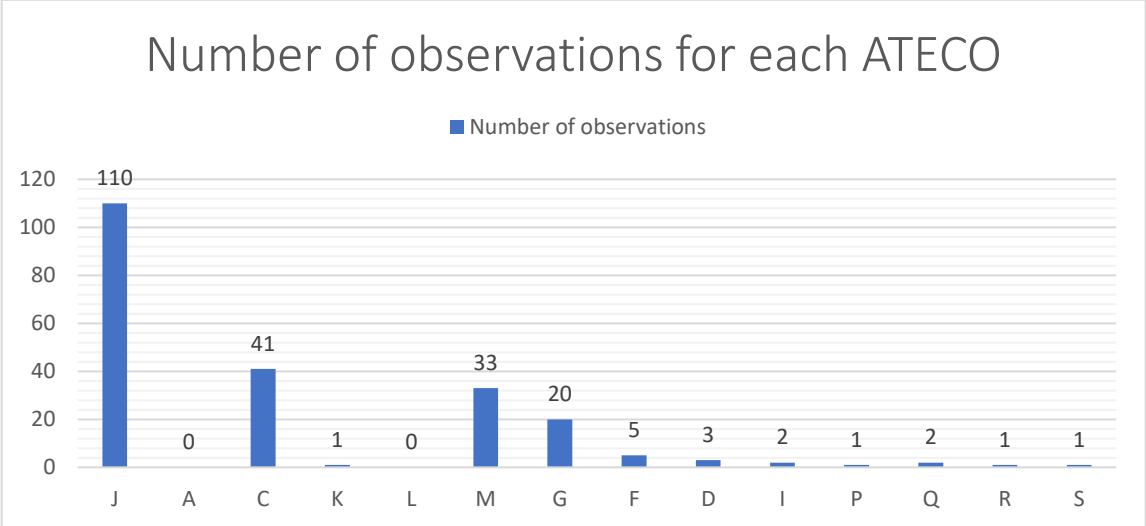


Figure 5.37 - Number of observations for each ATECO code.

[55] Economic activities' classification code for Italian companies.

Most of the companies performing the campaigns in the sample are related to information and service activities, this figure is not surprising, as having in the sample mainly innovative startups and innovative SMEs was expected that this area, that is between the ones with the highest degrees of innovation, would be more frequently observed.

It is also possible to observe how two of the principal ATECO codes (A and L) are totally not present in the analysed sample.

Variable	Obs	Mean	Std. dev.	Min	Max
Oth_AT	220	.0454545	.2087739	0	1
ATECO_J	220	.5	.5011403	0	1
ATECO_C	220	.1863636	.3902879	0	1
ATECO_K	220	.0045455	.06742	0	1
ATECO_M	220	.15	.3578857	0	1
ATECO_G	220	.0909091	.2881354	0	1
ATECO_F	220	.0227273	.1493726	0	1

Figure 5.38 - ATECO variables statistics, from Stata.

Legal form

It is another categorical variable specifying whether the companies is registered at the chamber of commerce as “S.R.L”, “S.p.A”, “S.B.” or “S.A.”.
This information is again collected from the previous database by “Osservatorio Crowdinvesting del Politecnico di Milano”.

Variable	Obs	Mean	Std. dev.	Min	Max
SB	220	.0090909	.0951283	0	1
SRL	220	.9545455	.2087739	0	1
SpA	220	.0363636	.1876202	0	1

Figure 5.39 - Stata tabulation of Legal form variables.

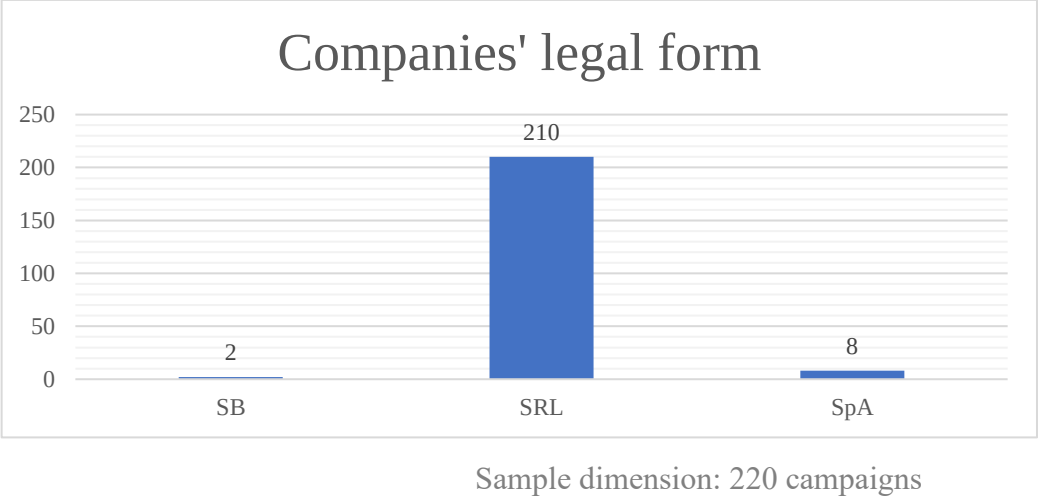


Figure 5.40 - Division of the companies performing the campaigns in the sample between SB, SRL and SpA.

As can be seen from the previous graph and statistics, in the considered sample there are not companies constituted in an S.A. form.

Year of the campaign

Finally, the last control variable considered is the year in which the campaign take place, taking into consideration the natural evolution of equity crowdfunding and of the proposing companies.

Even this variable is a categorical one, imposing for each campaign the year category.

Variable	Obs	Mean	Std. dev.	Min	Max
Y_2016	220	.0227273	.1493726	0	1
Y_2017	220	.0772727	.2676326	0	1
Y_2018	220	.3136364	.4650286	0	1
Y_2019	220	.2681818	.4440231	0	1
Y_2020	220	.3181818	.4668327	0	1

Figure 5.41 - Stata tabulation of Year variable.

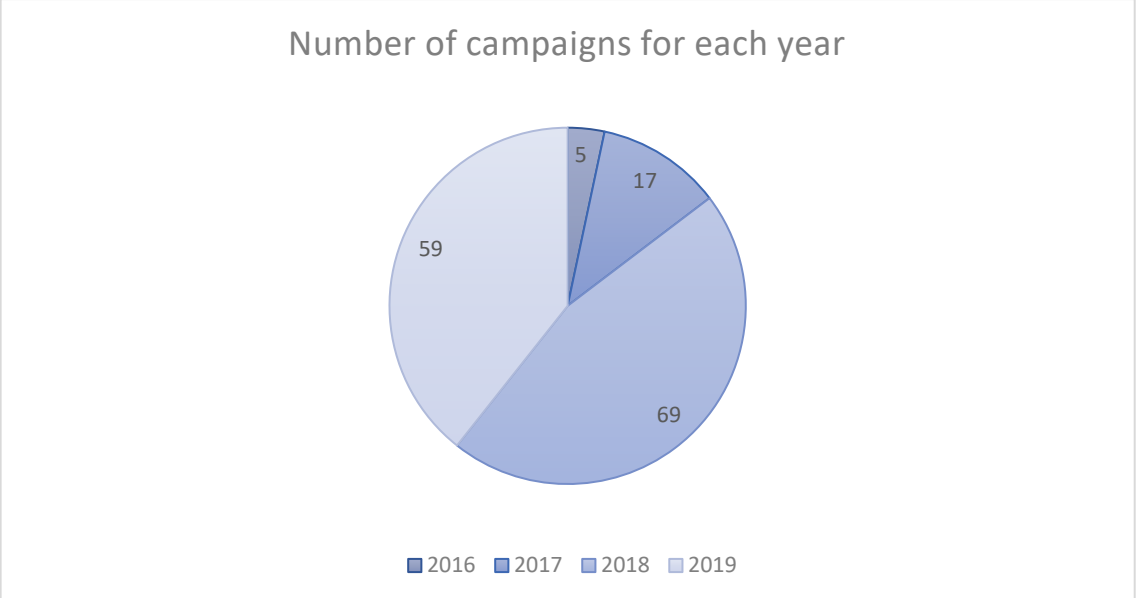


Figure 5.42 - Number of campaigns observed in the sample for each year from 2016 to 2020.

Before to proceed it is necessary to check if between the variables taken into consideration to study their effects on the allocation objectives' deviations, there are some dependencies, to evaluate them was be used the variance-covariance and the correlation matrixes calculated between variables.

In particular, this study is focused in understanding the dependence relationship between the variables that could really present a dependence relationship, for this reason have been studied: Relationships between *Age* and the dummies used to represent the kind of the company performing the campaign.
It is expected that less innovative companies are associate with a higher age, since many of the newborn or at least young one based their activities on innovation.

	Age	SME	INSME	INSU
Age	17.9655			
SME	.063678	.039415		
INSME	.909174	-.006912	.140535	
INSU	-.972852	-.032503	-.133624	.166127

	Age	SME	INSME	INSU
Age	1.0000			
SME	0.0757	1.0000		
INSME	0.5722	-0.0929	1.0000	
INSU	-0.5631	-0.4017	-0.8745	1.0000

Sample dimension: 220 campaigns

Figure 5.43 - Variance-covariance matrix (on the left) and correlation matrix (on the right) for Age-kind variables.

From the variation-covariation matrix is not highlighted any particular covariance relationship, together with the fact that from the correlation matrix the coefficients between *age* variable and the others three are still far from 1, allows to exclude the presence of a linear dependency relationship between them.

Another relationship studied is the one between the kind of the company again and the presence of patents, this because their presence is one of the subjective objective used together with other two (see annexes 8.1.1 and 8.1.2) in order to define an innovative startup and an innovative SMEs.
If it had been a mandatory requirement for their definition, the variables could not be considered together for a total dependency but being just one of the 1 out of 3 requirements to satisfy to be an innovative startup, and 1 of the 2 out of 3 ones for the innovative SMEs, has been considered acceptable to include them and analysing more carefully their dependence.

	Patents	SME	INSME	INSU
Patents	.190619			
SME	-.001328	.039415		
INSME	-.00191	-.006912	.140535	
INSU	.003238	-.032503	-.133624	.166127

	Patents	SME	INSME	INSU
Patents	1.0000			
SME	-0.0153	1.0000		
INSME	-0.0117	-0.0929	1.0000	
INSU	0.0182	-0.4017	-0.8745	1.0000

Sample dimension: 220 campaigns

Figure 5.44 - Variance-covariance matrix (on the left) and correlation matrix (on the right) for Patents-kind variables.

From the variance-covariance matrix it is possible to see how a quite weak positive relationship between the presence of patents for innovative startups is present, however its weaknesses and the correlation coefficient gathered from the right table are enough to exclude a real relationship of dependence between them.

These two were the check more important to underline, however the single covariances and correlations have been analysed without finding particularly important evidence, and the full variance-covariance and correlations matrixes are reported in the annex 8.5.

5.2 Debt variations

The second research hypothesis tries to study the link between the company's debt variation in the year following the campaign and the deviations from the allocation objectives and therefore the non-allocation of the declared quantities.

In particular, it is going to look if the lack of allocation compared to what was stated, in some areas could be linked to a debt reduction with a company that use the collected funds to repay debts instead of use them as promised.

Back to the theory from (Salma and Maher 2017) firms having no legal constraint in following the provided expected allocation of the funds collected, may use them to repay debt without saying it, to not show an opportunistic behaviour to investors.

At the same time this study allows to analyse if the presence of positive deviations, and therefore of a higher real allocation with respect of what stated, could be linked to debt, having companies taking additional funds to cover these further investments.

According to this premises, the second hypothesis have been stated as follow:

HP. A negative deviations in allocation objectives is positively correlated with an increase in debt.

5.2.1 Debt variations – Sample definition

The sample definition for this hypothesis has started from the previous one of 220 companies for which data about the objective allocations are available and have been subtracted other 66 campaigns for data availability reasons.

Table 5.3 - Sample definition for debt hypothesis.

Target population	***730 companies (100%)***
Companies presenting general allocation objectives	164 companies (22.47%)
Companies not presenting any allocation objectives	153 companies (20.96%)
First available sample(*)	**413 companies (56.57%)**
Companies with no real data availability (1)	193 companies (26.44%)
Sample previously taken in consideration	**220 companies (30.13%)**
Companies with no real data availability (2)	66 companies (6.16%)
Sample taken into consideration	**154 companies (23.97%)**

Even in this case the biggest part of the sample is composed by innovative startups, while the minor by innovative SMEs and SMEs.

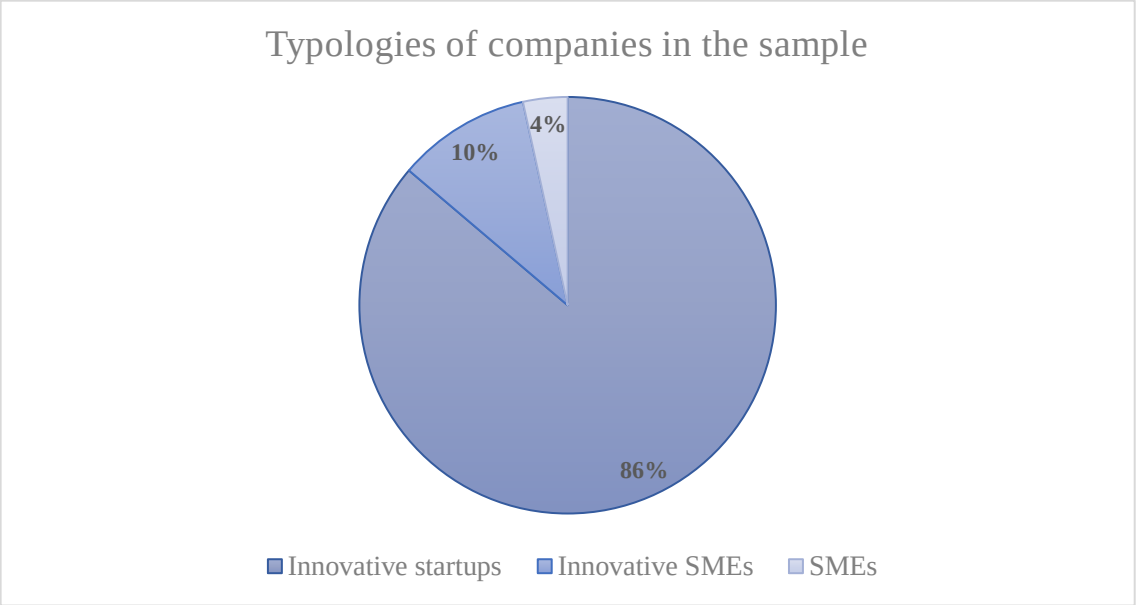


Figure 5.45 - Debt variation - Typologies of companies in the sample.

5.2.2 Debt variations – Variables definition and statistics

For this hypothesis the variable under study is the variation of debt between the year following the campaign and the one in which it happens.

Equation 5.8 - Debt variation variable definitions.

$$Debt\ variation = \ln(1 + Overall\ Debt_{t+1}) - \ln(1 + Overall\ Debt_t)$$

$$where\ t = year\ of\ the\ campaign\ and\ t + 1\ the\ year\ after\ it.$$

In particular, more attention is paid to negative variations (debt reduction compared to the previous year) in order, to understand whether the lack of a correct (in term of declared – real) allocation could influence this value.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Debt	154	.3528345	.7507751	-1.586432	3.28369

Figure 5.46 - Debt variation statistic, from Stata.

Even if the mean value of the variable among the observation is positive (there was an increase in debt), it is interesting see more in detail how the absolute values of variations are divided according.

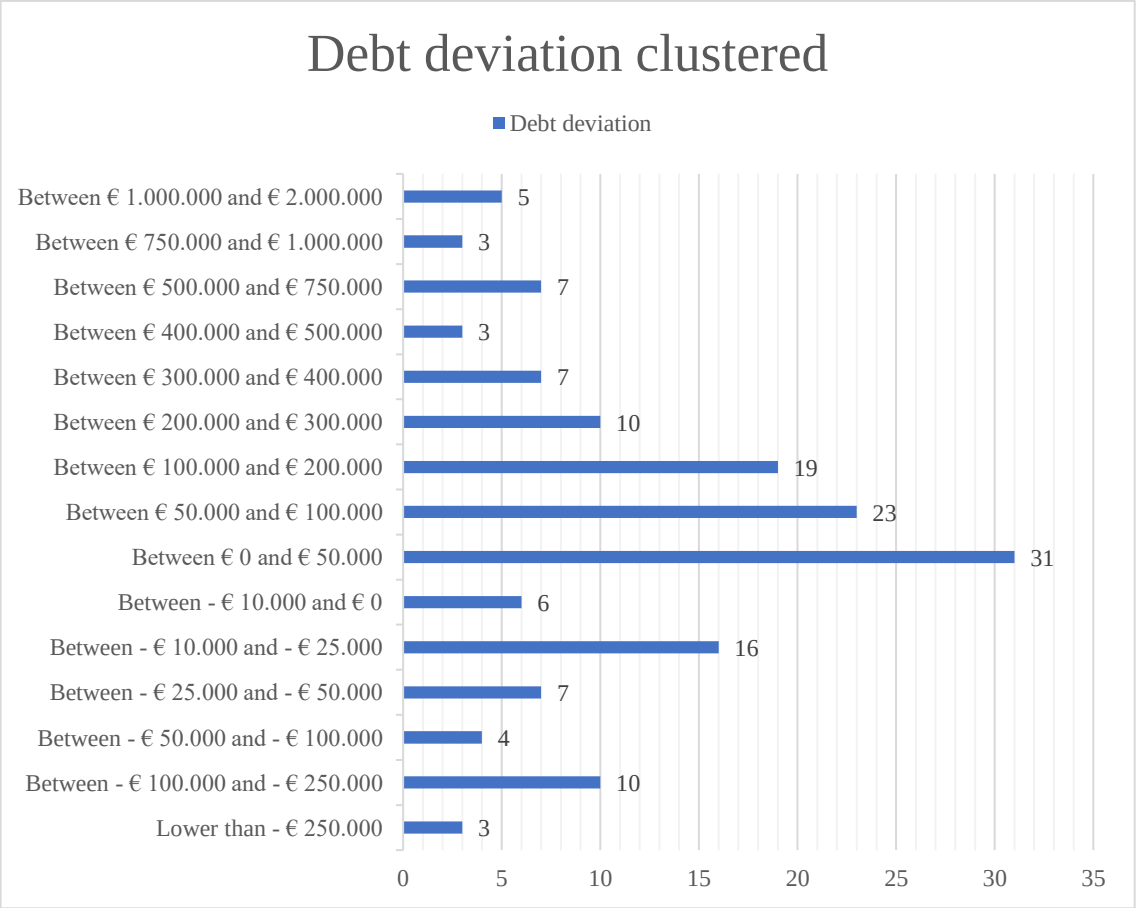


Figure 5.47 - Clustered debt deviations in absolute values.

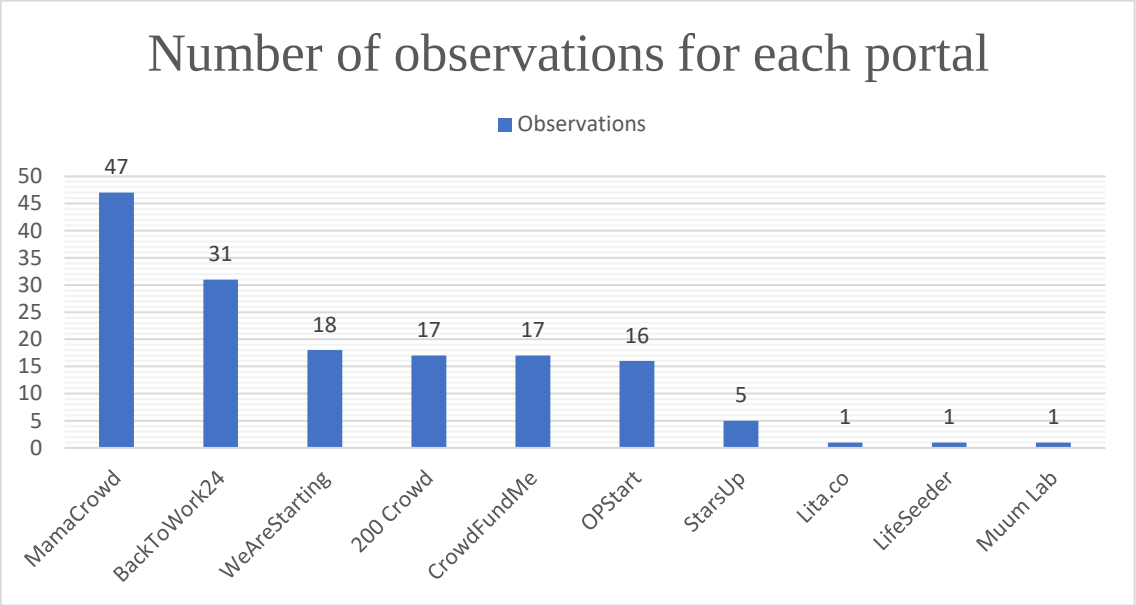
How it is possible to see from the previous figure, a small but relevant number of campaigns taken into account are related to companies which have a negative debt variations.

Factors of "past experience and ability" presented in the first presented hypothesis are used again in order to find relationships that could influence debt variations.
Even if it is not necessary explain their construction again, it is important to review the presented statistics, in order to align them to the new sample taken into consideration.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Int_As	154	1.657707	5.685709	-11.84043	13.44019
D_Tan_As	154	3.860788	5.323451	-10.4913	13.47022
D_W_Cap	154	9.412247	5.591596	-3.411438	15.07887
D_Pers_C	154	3.938511	6.602434	-11.15626	14.15738
D_Serv_C	154	2.909144	3.982943	-10.59666	13.11736
D_Oth_C	154	7.001627	3.965311	-3.746559	11.58898
D_Op_C	154	7.991884	4.895678	-9.517899	15.52092

Figure 5.48 - Debt variations - variables summary.

Additionally to these, in this hypothesis have been considered a set of 8 binary/dummy variables indicating the platform on which the campaign take place.



Sample dimension: 154 campaigns

Figure 5.49 - Number of observations for each platform.

As it is possible to see in the graph above, the biggest part of the sample under analysis, regards campaigns happened on MamaCrowd and BackToWork24.
Platform showing just one observation have been collected under a single variable named "*Other portals"*.
These variables take value 1 if the campaign have been published on the portal to which it is referring to, or 0 otherwise.

Variable	Obs	Mean	Std. dev.	Min	Max
Oth_Port	154	.0194805	.1386574	0	1
MamaCrowd	154	.3051948	.4619923	0	1
BackToWork24	154	.2012987	.402279	0	1
CrowdFundMe	154	.1103896	.3143972	0	1
OPStart	154	.1038961	.3061212	0	1
_200_Crowd	154	.1103896	.3143972	0	1
WeAreStart~g	154	.1168831	.3223292	0	1
StarsUp	154	.0324675	.1778165	0	1

Figure 5.50 - Platform variable, statistics from Stata.

From the general statistics a clear consequence of the fact that they are dummy variables used in order to categorize the platforms which appear at least once in the sample, is the fact that the minimum and the maximum values are always equal to 0 and 1.

Even the control variables considered for this hypothesis have been changed keeping in consideration the items that could lead to potential variation of the debt.

Revenues

Amount of revenues that the company performing the campaign is able was able to generate in the year of the campaign is the first control variable kept into consideration.
Even this one has been considered in logarithmic form.

Variable	Obs	Mean	Std. dev.	Min	Max
Revenues	154	11.74743	2.271701	0	16.04952

Figure 5.51 - Revenues statistics from Stata.

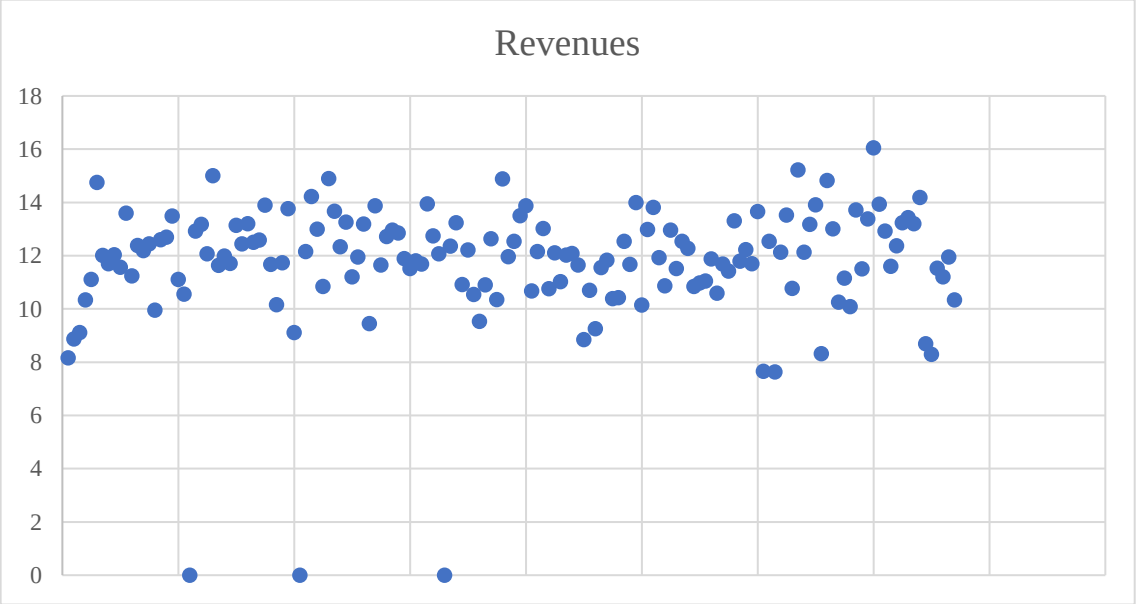


Figure 5.52 - Revenues values distributions for the companies in the sample.

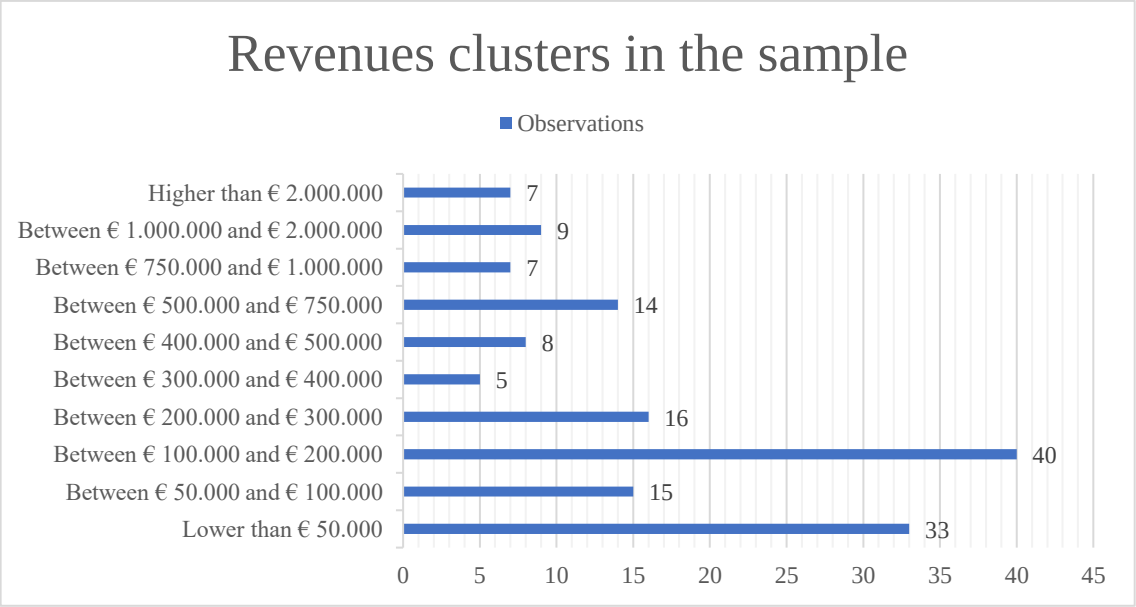


Figure 5.53 - Revenues clustered for the companies in the sample for the debt variation hypothesis.

From the cluster graph it is possible to see how, in the majority of the cases, the revenues of the companies considered are contained with values lower than € 300.000 , while for other few cases they explode to very huge values.
From the general statistics shown above, the minimum value that appear is 0, there are indeed five companies which revenues for the campaign's year are null.

Total asset value

This measure have been kept into consideration as a proxy of the business size, expecting bigger businesses to be more subject to debt variations.
How initially seen in this work, one of the main problems in raising debt is the absence of collateral, and a company with a higher total asset value, could rely on better collateral, allowing it to access to higher amount of debts.

Variable	Obs	Mean	Std. dev.	Min	Max
Total_Asset	154	13.13833	.9781262	10.89258	16.33796

Figure 5.54 - Total asset value variable statistics, from Stata.

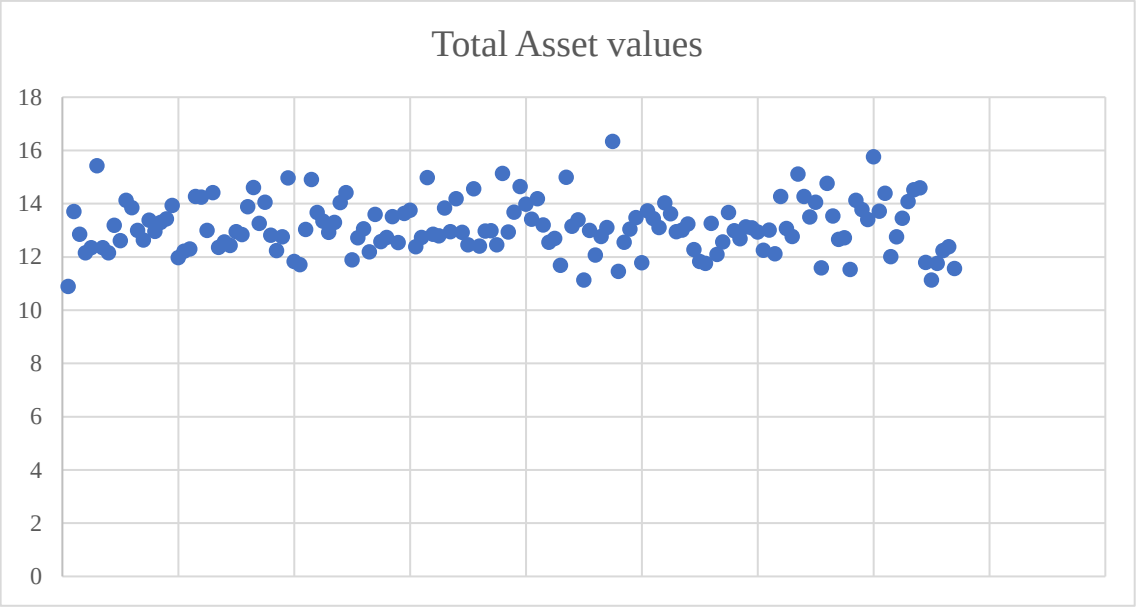


Figure 5.55 - Total asset values distributional graph.

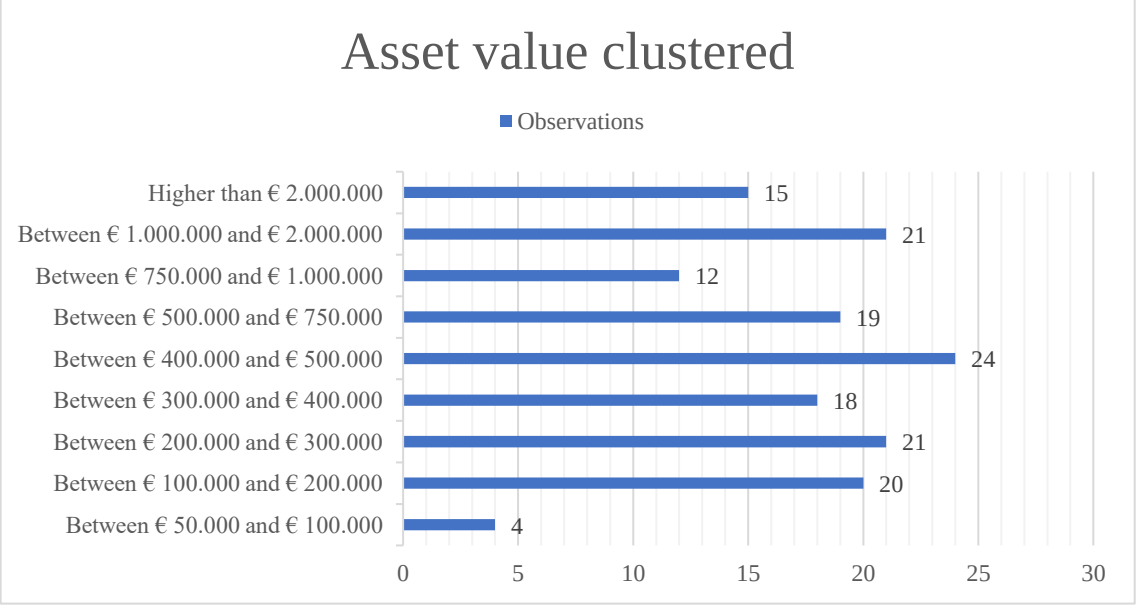


Figure 5.56 - Assets value clustered for the companies in the sample for the debt variation hypothesis.

Liquidity variation

Another important variable to consider while dealing with debt variations, is again the variations of the liquidity in the company.
It has been measured as the difference between balance sheet item *cash and cash equivalents* for the year following the campaign and for the reference one.
Through this variable is possible to keep in consideration the fact that a higher liquidity level could allow the company to repay the debt.

Variable	Obs	Mean	Std. dev.	Min	Max
Liquidity_~n	154	-.1874064	2.389043	-10.22648	12.96015

Figure 5.57 - Liquidity variation variable statistics, from Stata.

From the first statistics of this variable, it is possible to see how the values that it could assume are both positive, when there is an increase in the cash and cash equivalent section, and negative, when instead there is a decrease in it.

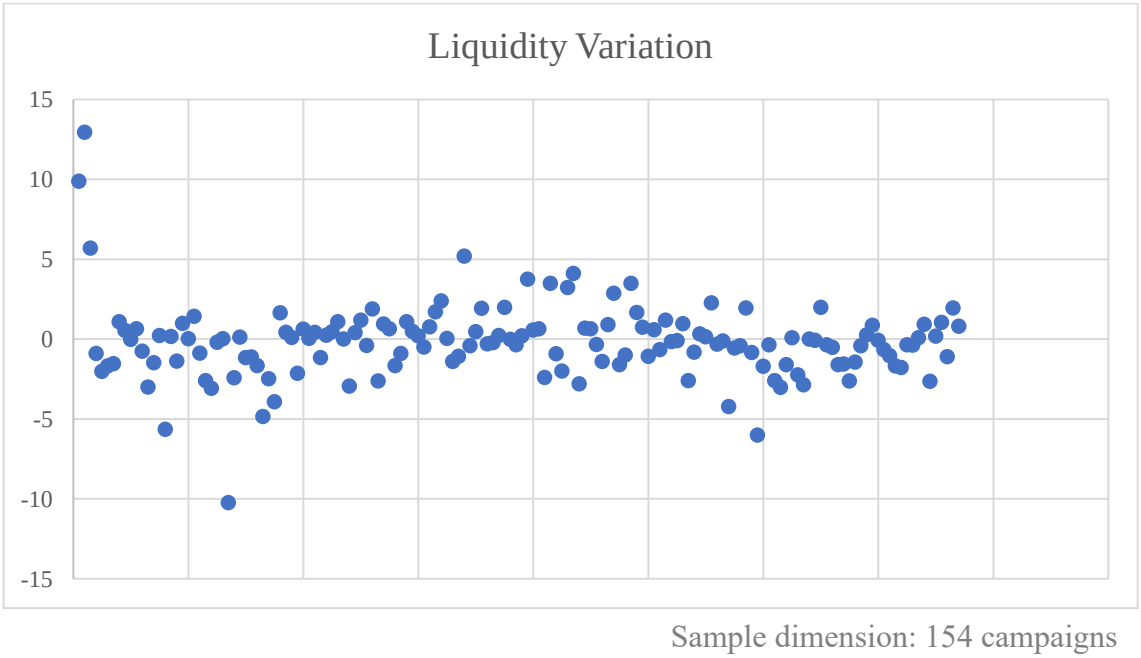
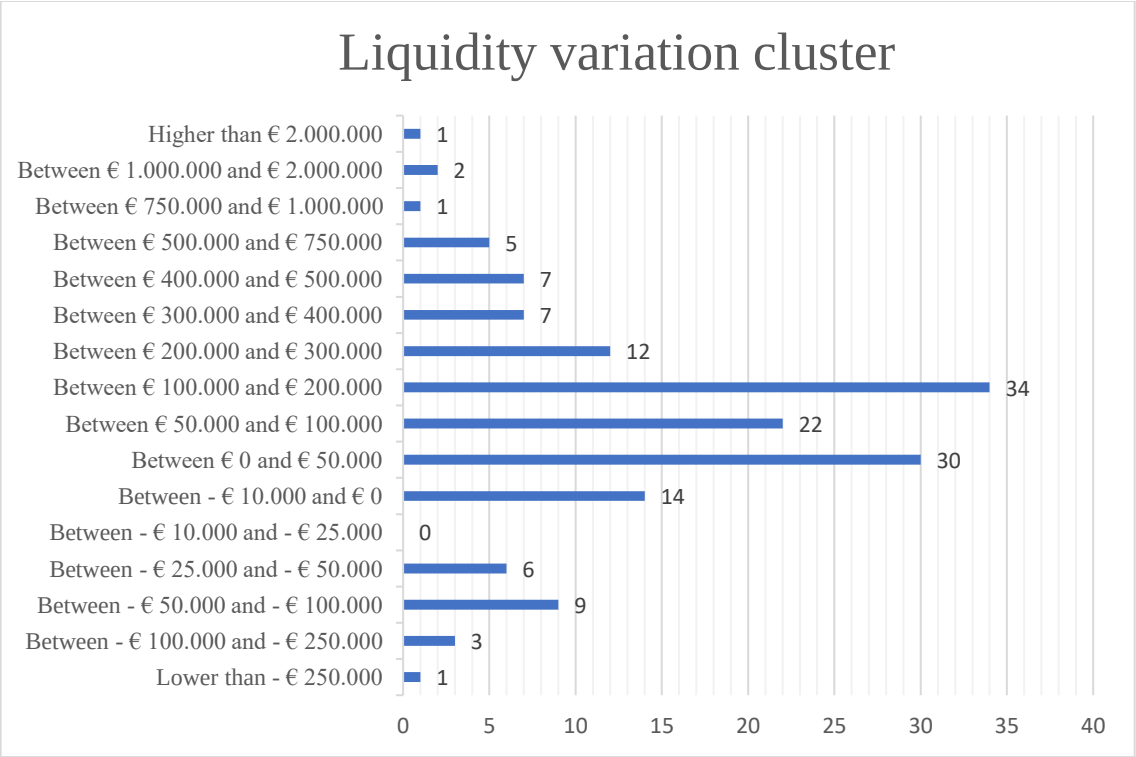


Figure 5.58 - liquidity variation values distributional graph.

However, it interesting to look also to the clustered graph for the absolute values.



Sample dimension: 154 campaigns

Figure 5.59 - Liquidity variation clusters for the debt variation hypothesis sample.

Number of shareholders

Finally, the number of shareholders in the company in January of the year of the campaign have been extracted from AIDA, in order to be considered.
The reason of this choice is to take into account the fact that a larger number of shareholders available in the company, could means a larger amount of equity capital, that could influence the debt amount.

Variable	Obs	Mean	Std. dev.	Min	Max
Shareholders	154	12.51299	20.30011	0	143

Figure 5.60 - Number of shareholders variable, statistics.

From a first analysis of the statistics could be seen that the average number of shareholders for the companies taken into consideration is about 12.5, but in January of the year of the campaign there are some companies in the sample presenting a shareholders number equal to 0.

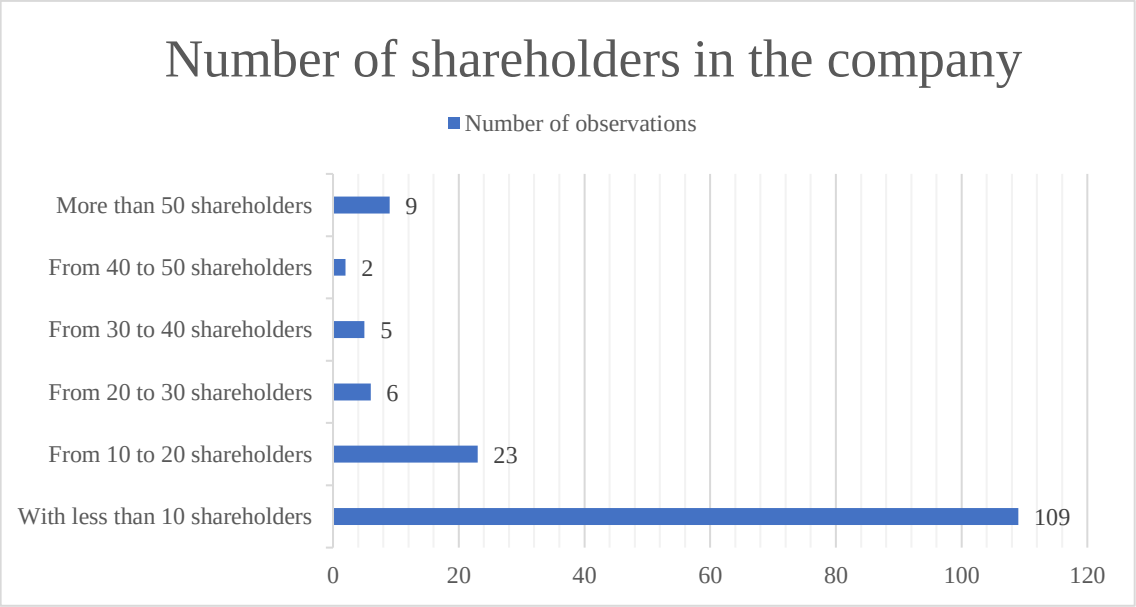


Figure 5.61 - Number of shareholders present in the company in January of the year of the campaign.

However, the biggest part of the analysed campaign, are related to a company having less than 10 shareholders.

Again, the variance-covariance and correlation matrixes were studied, however, no particular cases of dependence were founded, they have been both reported in the annex 8.5.

5.3 Deviations from expected revenues

Finally, the last presented hypothesis is based on the analysis of deviations of actual revenues from the expected value extracted from the forecasted financial statement published at beginning of the campaign.
previously described factors of past experience and ability of the company were used also in this case in order to understand their relationships with the deviations.

It is expected that companies embedding a stronger past experience and abilities before the campaign could better set and achieve the attend results in term of revenues, starting from the theory by (Signori and Vismara 2018) presented in the literature according to which the presence of a venture capitalists or a business angels could provide better performances after an equity crowdfunding campaign, it is expected that their presence from even before the collection of funds should help in contain the deviations under analysis, both for their contribute in setting the expected financial measures, but also for their ability to achieve good performances after the campaign.

For a similar reason the presence of a higher number of workers that could bring different skills, abilities and knowledge inside the company is expected to have a positive effect on the revenues' deviations.

Presence of patents inside the company could be seen as a signal for a studied and well analysed product that could be already available for sale, bringing to better performances, in terms of revenues, than companies that still have to make this process.

The age of the company performing the campaign is a direct indicator of the company's past experience, it is expected that older companies should better perform, having spent more time in managing the company.

At the same way, the ones that already performed previous capital increase should have acquired a level of experience that should enable them to obtain better results from the use of funds than companies that have not made them.

An interesting variable which effects must be controlled is the kind of company (innovative startups, innovative SMEs or SMEs) because if it is true that innovative startups could face more difficulties in turning their "efforts" into revenues, it is also true that they are the ones that have the higher incentives in making this number increase, being their valuation based mostly on it.

After an overall evaluation of the previous point the last hypothesis could be stated as:

HP. Companies embedding a stronger past experience and ability are able to get closer to the stated expected revenues.

5.3.1 Deviations from expected revenues – Sample definition

Sample's construction for this hypothesis is a little bit different, having considered deviations of actual revenues from the expected values for 3 years after the campaign.

Using also in this case the allocation objectives as one of the analysed variables allows to start the sample definition from the same 220 campaigns done between 2016 and 2020, multiplying this number by 3 observations for each campaign, it is expected a sample of 660 observations. Unfortunately, some data about revenues for 2021 and all the data for 2022 and 2023 were not available on AIDA leaving with a sample of 500 observations.

Table 5.4 - Sample for revenues deviations hypothesis.

Target population	***730 campaigns (100%)***
Observations for the first year after the campaign	195 campaigns (27.71%)
Observations for the second year after the campaign	193 campaigns (26.44%)
Observations for the third year after the campaign	112 campaigns (15.34%)
Total number of observations	**500 observations (68.49%)**

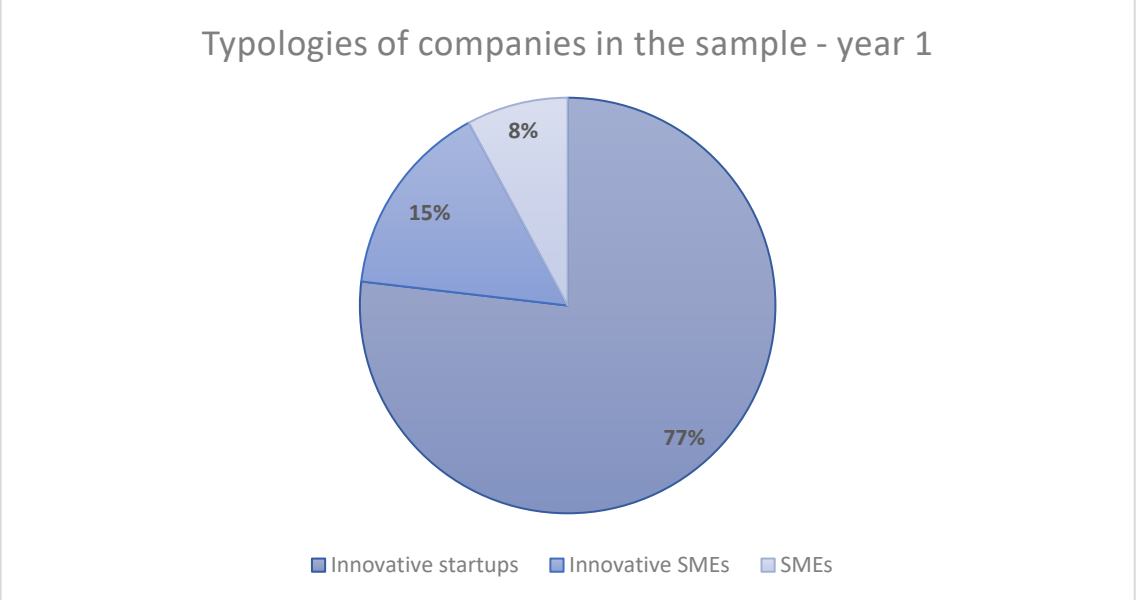
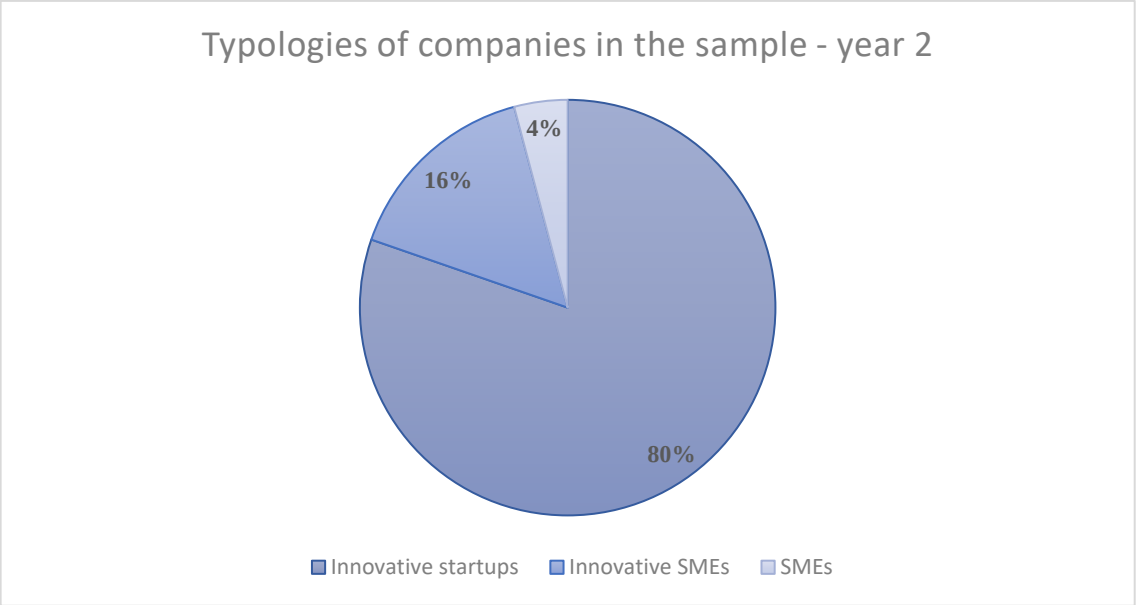
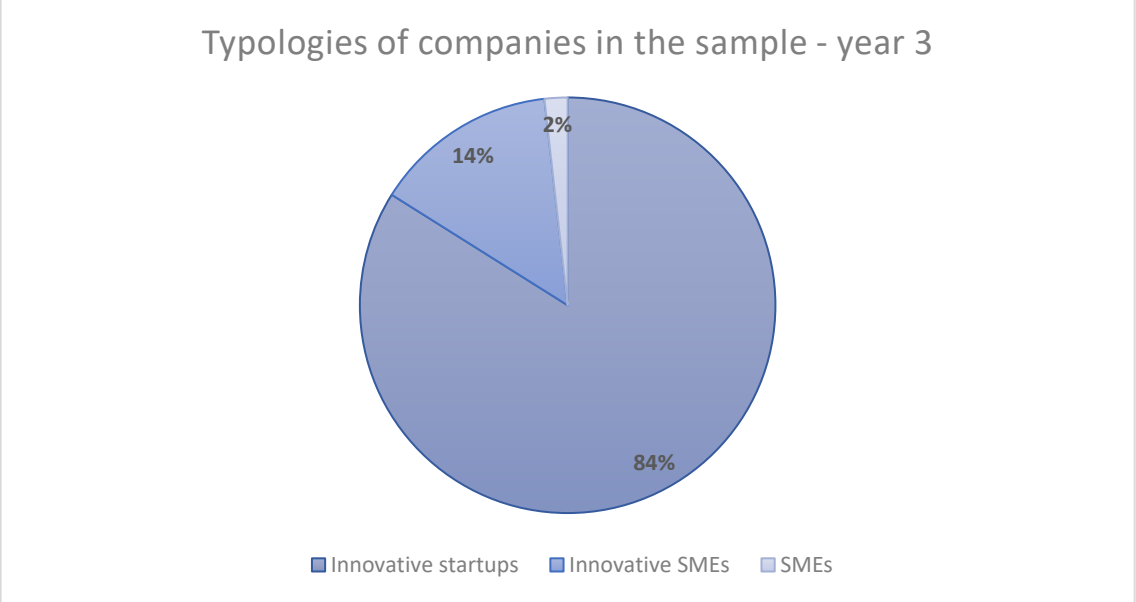


Figure 5.62 - Typologies of companies in the sample – observations for the data about the first year after the campaign.



Sample dimension: 193 campaigns

Figure 5.63 - Typologies of companies in the sample – observations for the data about the second year after the campaign.



Sample dimension: 112 campaigns

Figure 5.64 - Typologies of companies in the sample – observations for the data about the second year after the campaign.

5.3.2 Deviations from expected revenues – Variables definition and statistics

This hypothesis studies the deviations of real revenues from the expected ones declared in the statement at the beginning of the campaign, they were calculated by simply subtracting to the real revenue values extracted again from AIDA the expected value for the year from the expected financial statements.

Equation 5.9 - General equation for revenues' deviations computation.

$$D\_Revenues = \ln(1 + Real\ Revenues_t) - \ln(1 + attended\ revenues_t)$$

Variable	Obs	Mean	Std. dev.	Min	Max
D_Revenues	500	-1.314625	2.401424	-14.09949	12.21308

Figure 5.65 - Revenues deviations statistics, from Stata.

From the general statistics, it is possible to note a negative mean value with a quite high standard deviation.

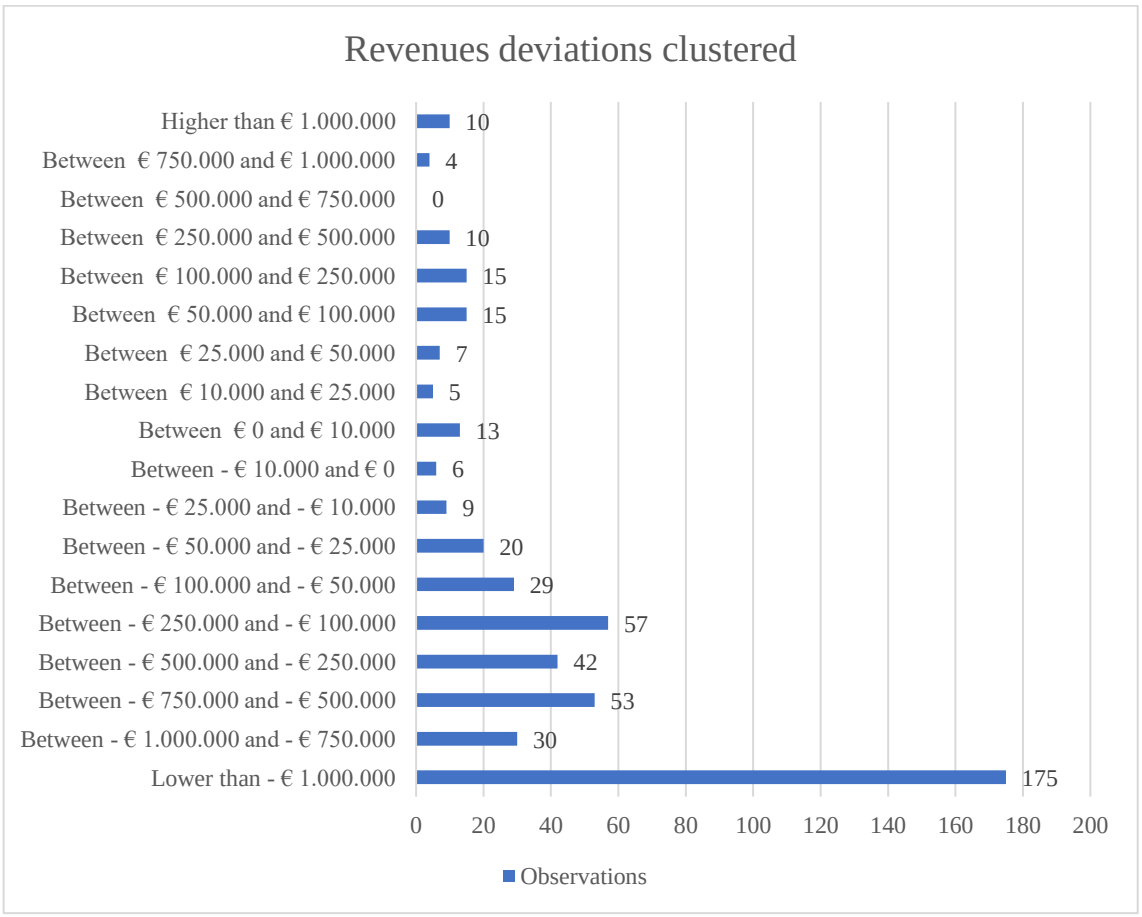
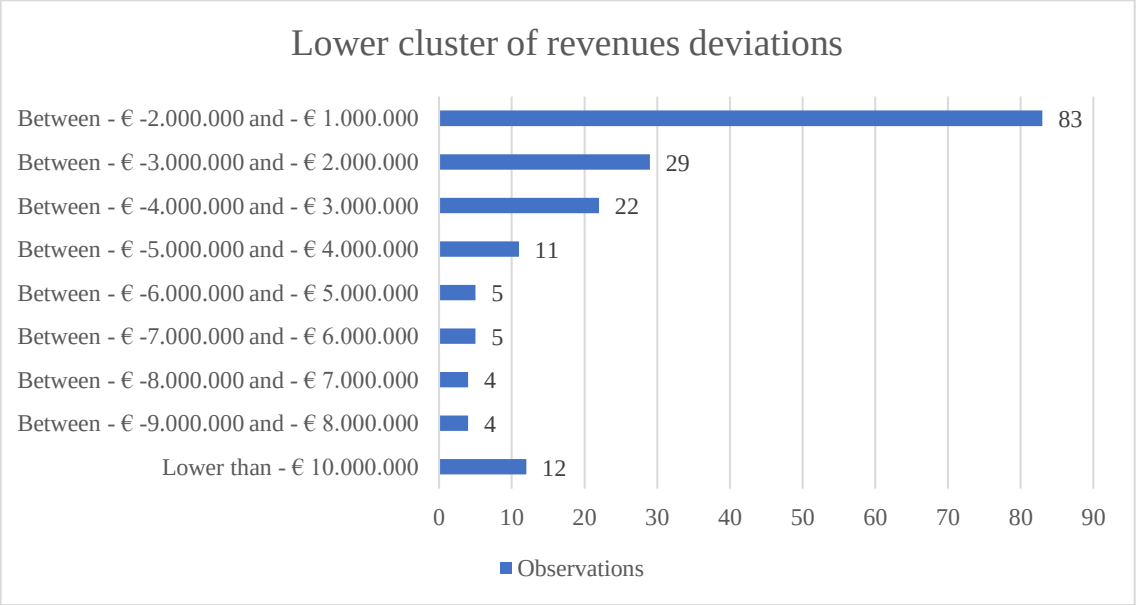


Figure 5.66 - Deviation of real revenues from the expected values clustered.

But looking to the clusters of absolute values for the deviations in the graph above, it is possible to see that a huge portion of the sample in analysis is composed by campaign related to companies that have achieved deviations between real revenues and expected ones lower than - € 1 million.
However, since the number is huge a further division of this cluster in subcluster could give a better view about the situation.



Sample dimension: 175 observations

Figure 5.67 - Deeper look to lowest cluster of revues deviations.

Looking in a deeper way at the situation for the lowest cluster previously described, , it is possible to see that even if the biggest part of the deviations are imputable to the lower group (going from - € 1 million till - € 2 million) still a large number of companies to which the campaigns in the sample are related presents incredibly high negative deviations.

Some of the variables used for the analysis are the same of the first hypothesis, and in particular they are: *Capital raise, Professional share, Patents, Age, Kind of company,* and for the control variables: *Employees, Collected amount over Target capital, ATECO, Legal form* and *Year.*

Construction method of these variables has been kept constant, for this reason is not presented again the explanation, even distributions does not change significantly, but they are however presented in the figures below focusing explanations only in presence of particular changes.

Variable	Obs	Mean	Std. dev.	Min	Max
Cap_Raise	500	.384	.486845	0	1
Profession~S	500	.062232	.1435235	0	1
Patents	500	.262	.440163	0	1
Age	500	3.712	4.290206	0	32
SME	500	.036	.1864767	0	1
INSME	500	.154	.3613102	0	1
INSU	500	.81	.3926938	0	1

Figure 5.68 - Variables' statistics, from Stata.

Variable	Obs	Mean	Std. dev.	Min	Max
Employees	500	5.28	35.84717	0	567
Collected_~t	500	2.292328	1.536344	.3629442	12.74832
ATECO_J	500	.468	.4994747	0	1
ATECO_C	500	.196	.3973661	0	1
ATECO_K	500	.004	.0631821	0	1
ATECO_M	500	.166	.3724533	0	1
ATECO_G	500	.098	.2976124	0	1
ATECO_F	500	.02	.1401402	0	1
Oth_AT	500	.048	.2139803	0	1
SB	500	.012	.1089943	0	1
SRL	500	.94	.2377247	0	1
SpA	500	.048	.2139803	0	1
Y_2016	500	.022	.1468302	0	1
Y_2017	500	.066	.2485308	0	1
Y_2018	500	.288	.4532846	0	1
Y_2019	500	.34	.4741832	0	1
Y_2020	500	.284	.4513884	0	1

Figure 5.69 - Control variables statistics, from Stata.

Since no particular difference from the results presented for the first hypothesis in the general statistics were found, it is not necessary to further elaborate on the obtained results and it is possible to pass looking the distributional graph for each variable.

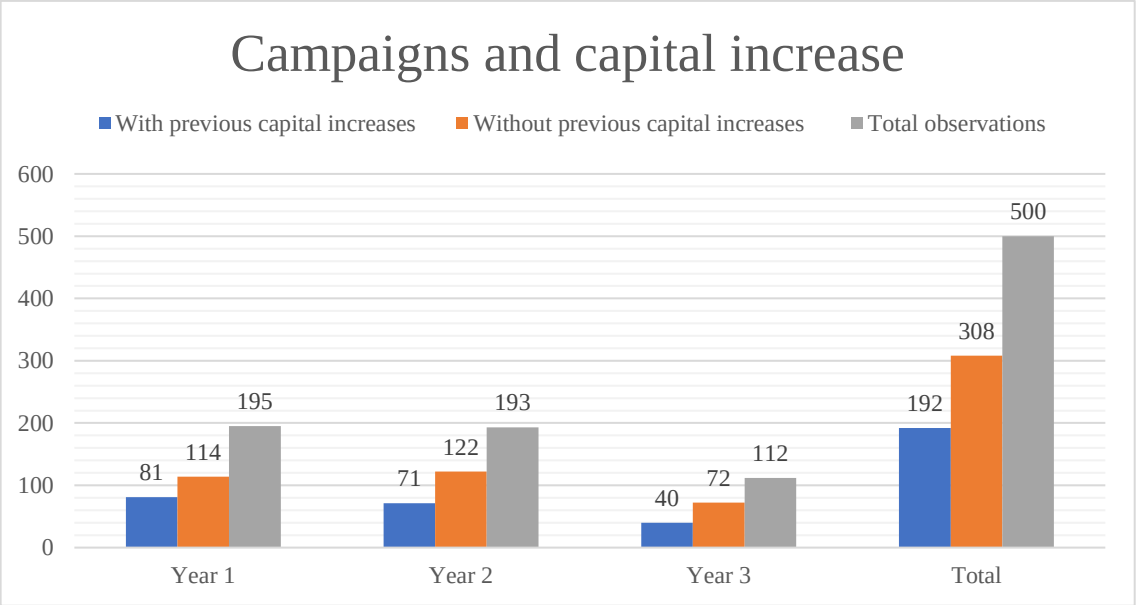


Figure 5.70 - Capital raise variable in the sample for revenues deviations hypothesis.

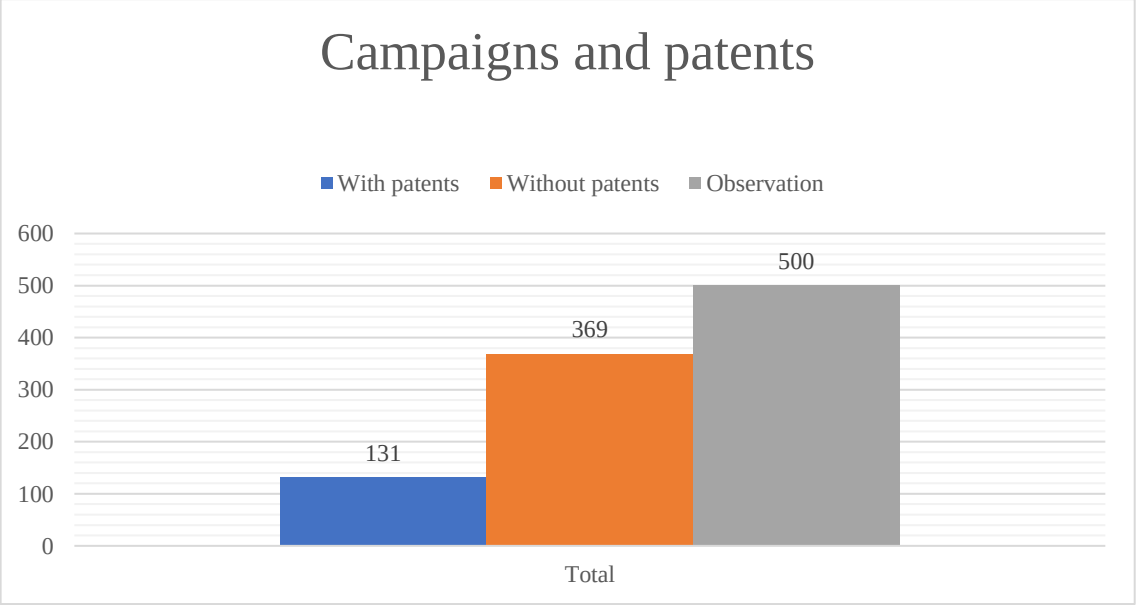
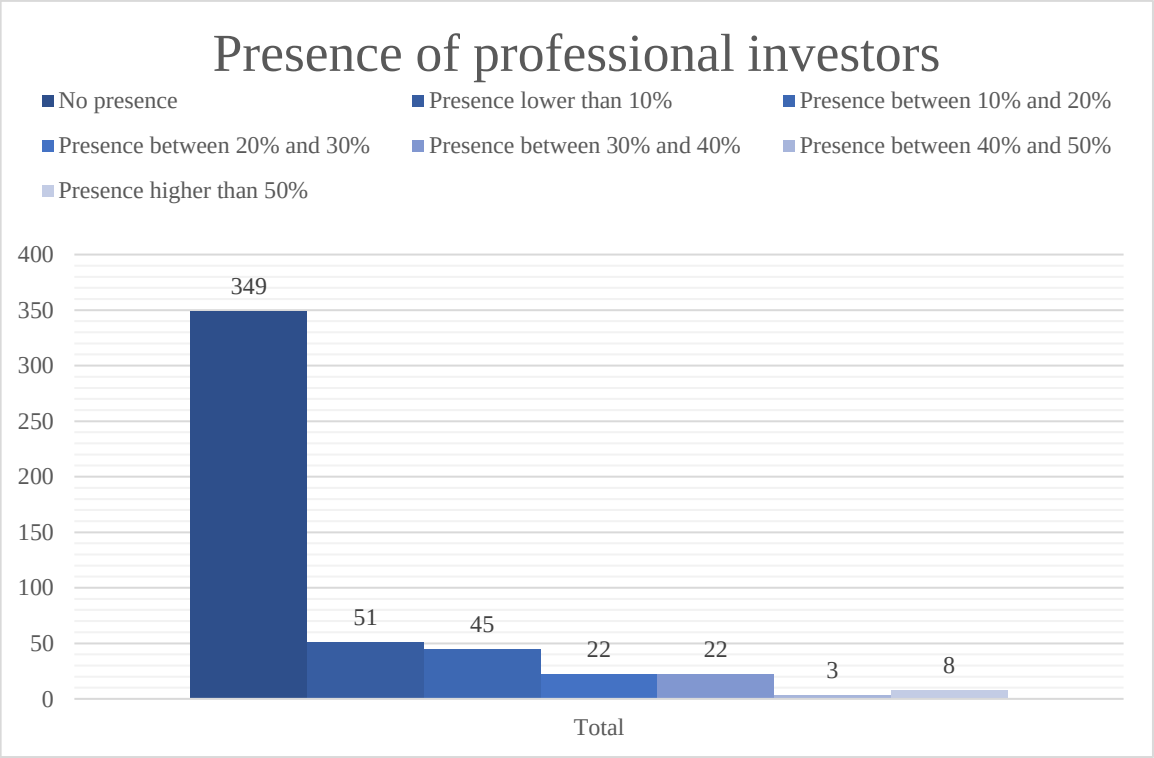


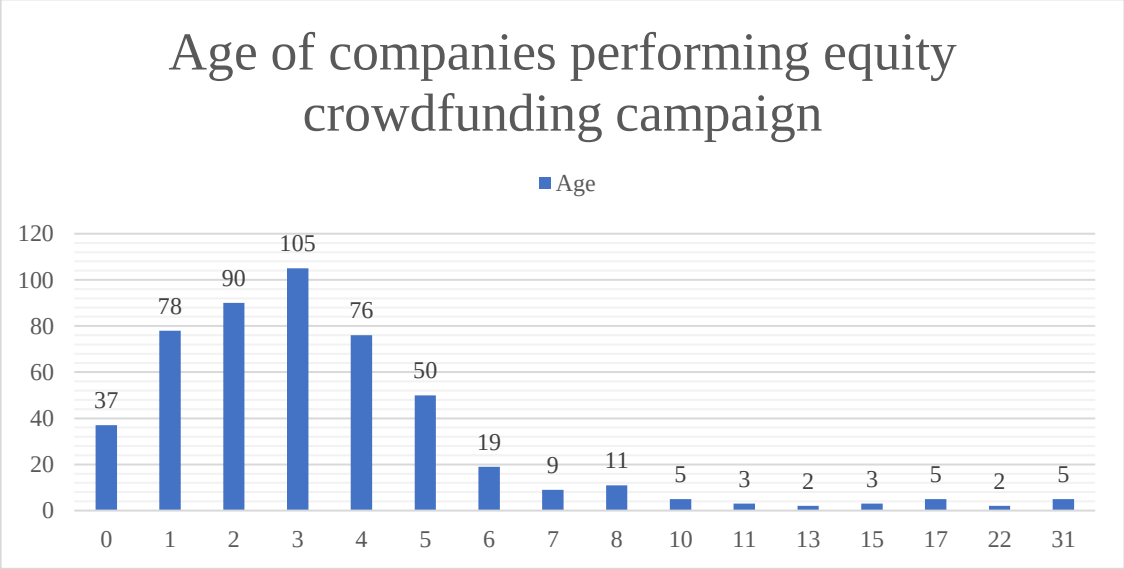
Figure 5.71 - Patents variable in the sample for revenues deviations hypothesis.



Sample dimension: 500 observations

Figure 5.72 - Presence of professional investors in the companies performing campaigns in the sample.

For what regards the presence of professional investors inside the companies before the campaigns, even if the majority remains, as before, with no presence of them, there are some slightly differences in the distribution for the groups where they are present, however, are just minor changes that does not significantly affect the distribution.



Sample dimension: 500 observations

Figure 5.73 - Age of companies performing equity crowdfunding campaigns in the sample.

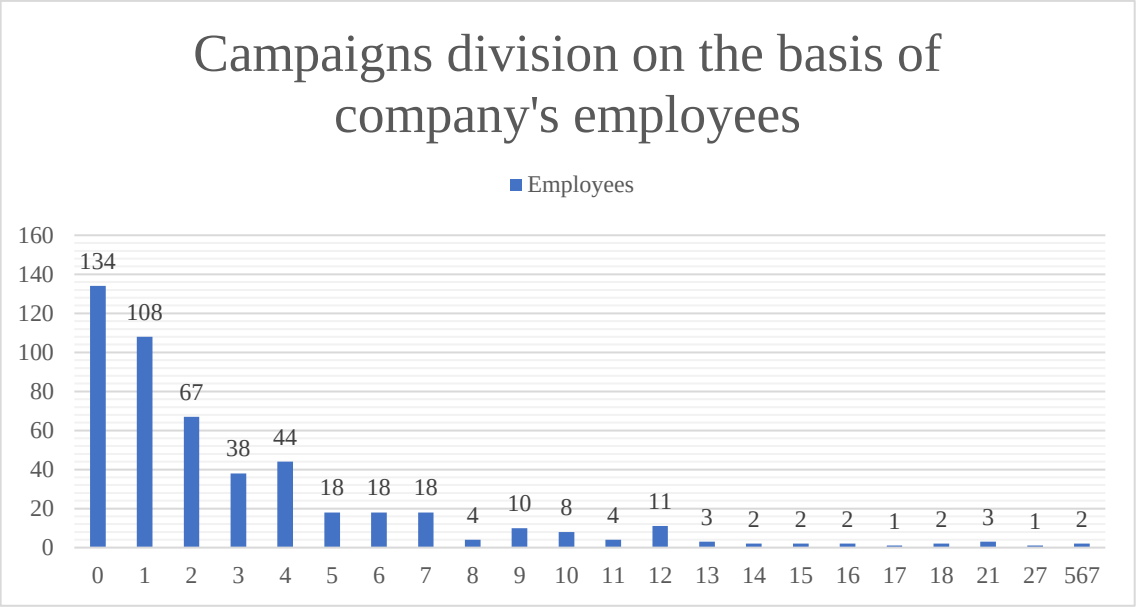


Figure 5.74 - Campaigns division on the basis of company's employees.

Again, for age of the companies and the number of employees, some small differences are present, but are mainly due to the fact that even being just the same sample "triplicated", some companies must have been excluded due to absence of data for the third year of analysis.

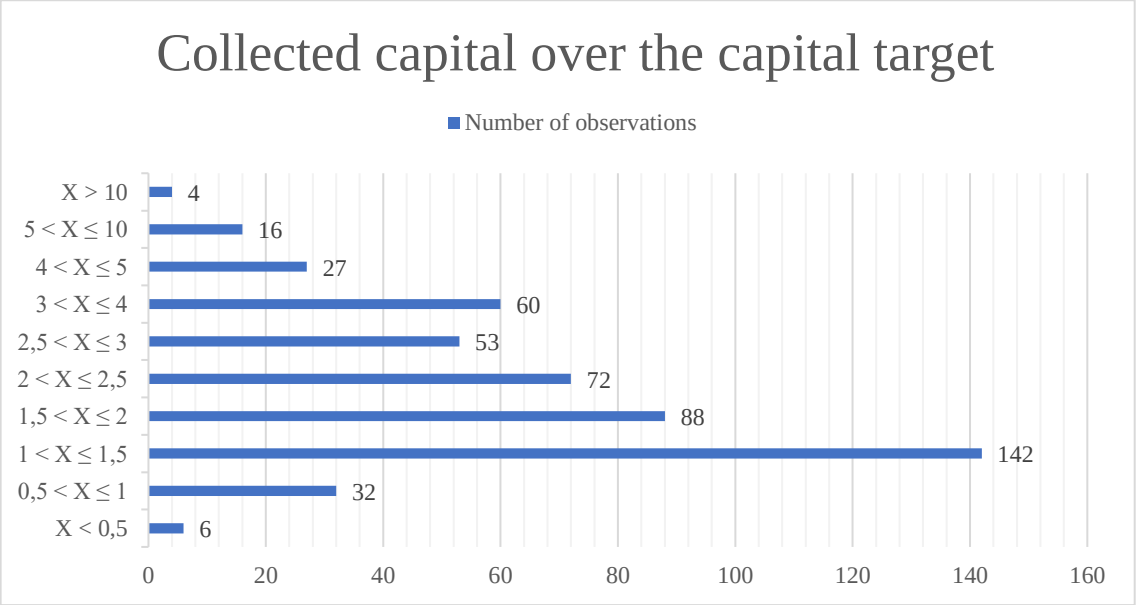


Figure 5.75 - Collected capital over capital target clustered values.

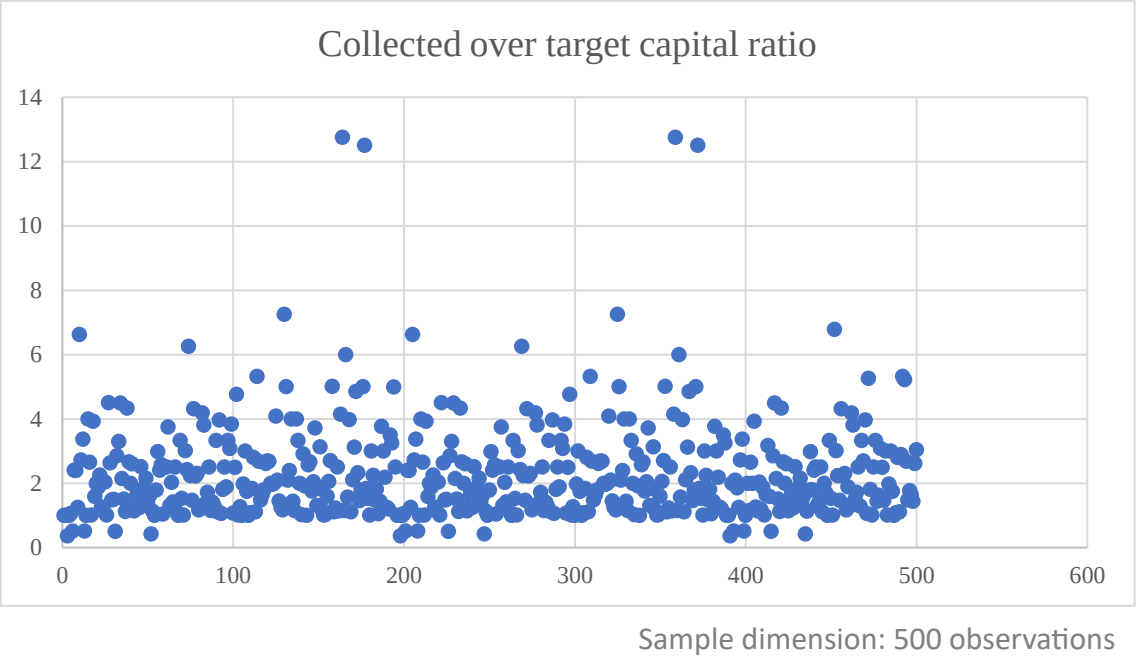


Figure 5.76 - Distribution of collected capital over capital target ratio.

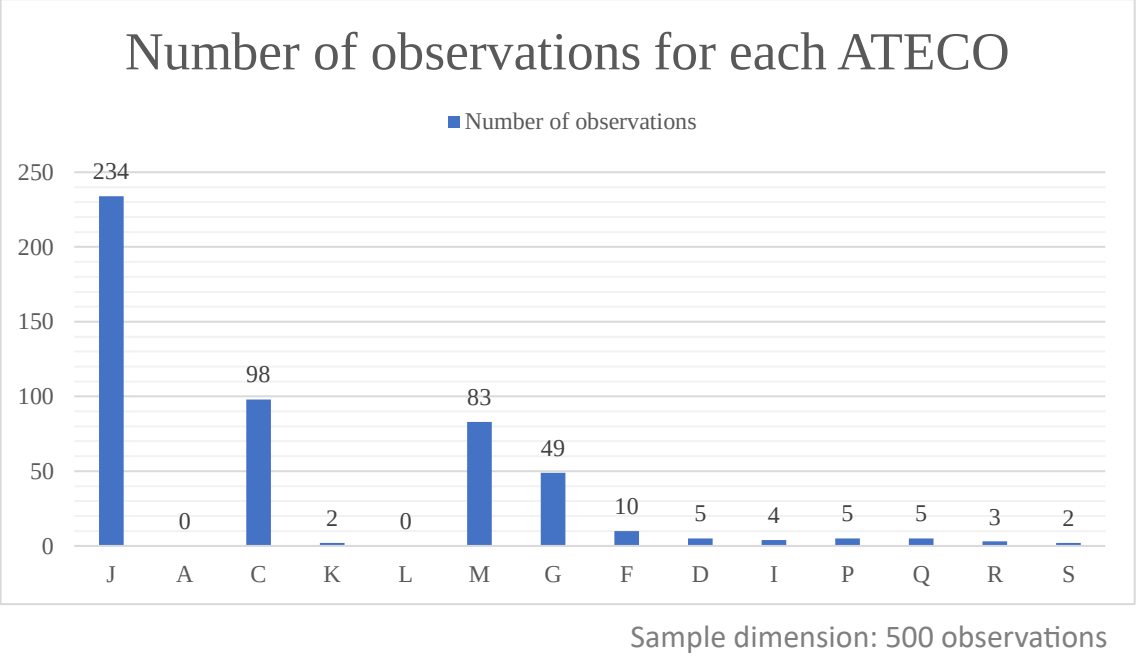


Figure 5.77 - ATECO code division for the companies performing campaigns in the sample.

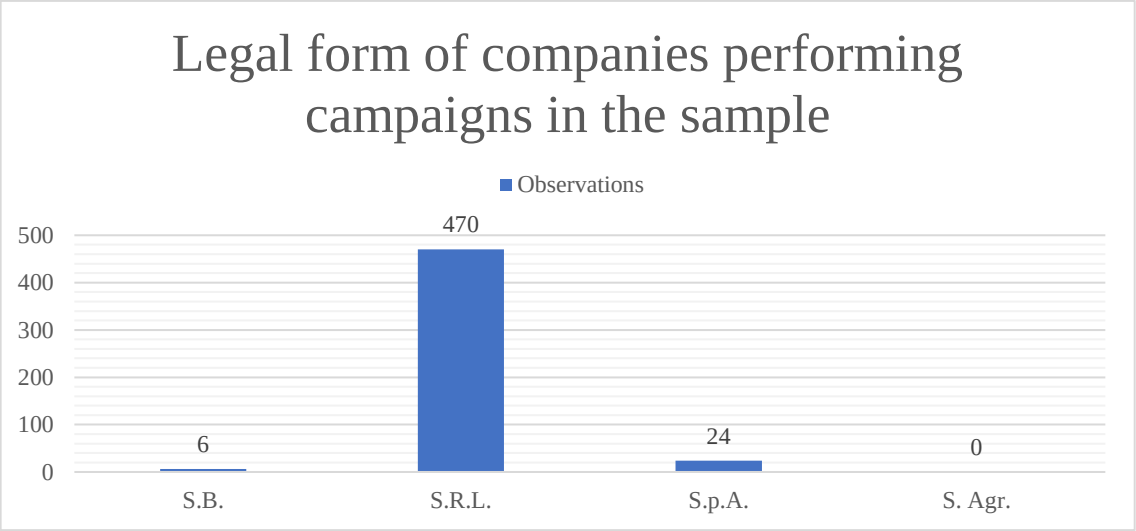


Figure 5.78 - Legal form of companies performing campaigns in the sample.

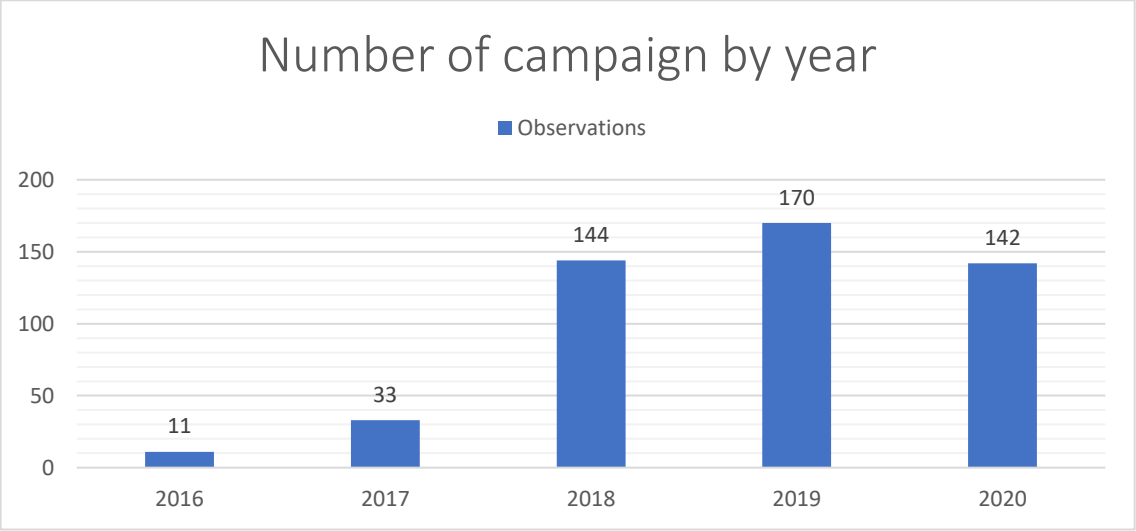


Figure 5.79 - Number of campaigns in the sample divided by year.

For this hypothesis, only one additional variable has been developed, since the sample take in consideration deviations of real revenues from the expected ones for three years after the campaign, it was therefore considered as important to keep in consideration which of the three years the deviation is referred to.
This was done in order to consider the fact that longer previsions could be less precise, leaving companies with deviation for the second or third year worse than the ones for the first one.

Year of deviation

It is a categorical realised through 3 binary/dummies variables, one for each year (first, second and third) each one assuming value 1 if the deviation value is referred to that year and 0 otherwise.

Variable	Obs	Mean	Std. dev.	Min	Max
D_Year_1	500	.39	.4882384	0	1
D_Year_2	500	.386	.4873181	0	1
D_Year_3	500	.224	.4173396	0	1

Figure 5.80 - Year of deviation variable statistics, from Stata.

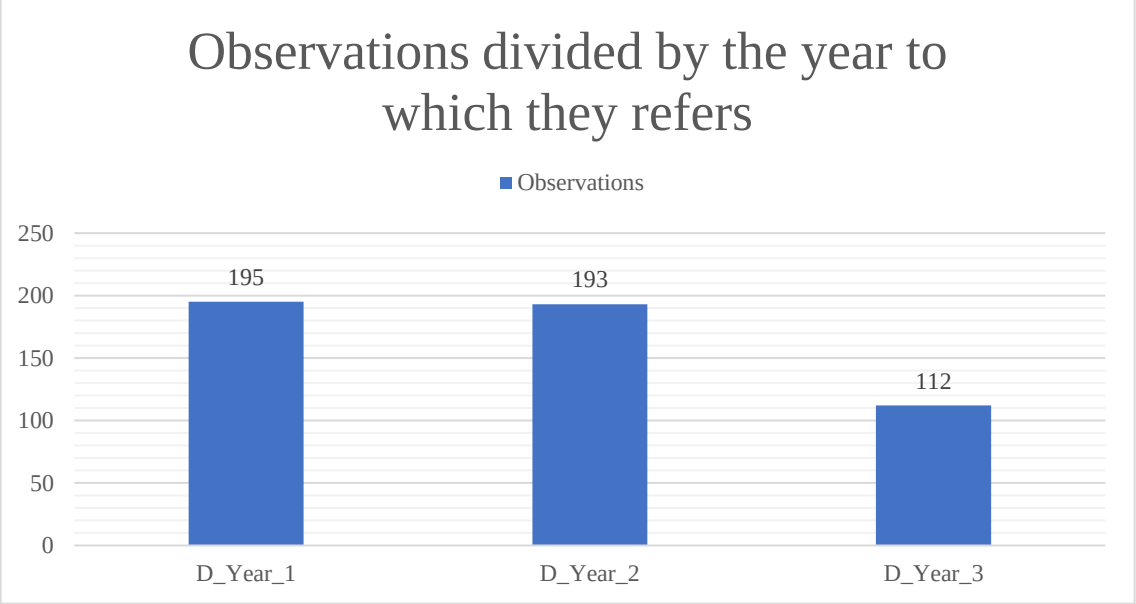


Figure 5.81 - Division of the sample between deviation for the first year after the campaign, for the second and third.

As previously introduced, in the sample of this hypothesis there are more observations for the first year than for the second and the third ones, because as the distance from the year of the campaign increase, it becomes more probable to have a deviation for one of the years with partial (2021) or complete (2022 and 2023) lack of data.

Once again, the dependence relationships between the variable have been studied through the covariance-variance and correlation matrixes, having not found significant relationships, the complete table are fundable in the annex 8.5.

Chapter 6
Models

This section shows the model used in this dissertation.

It starts from the general theories behind them, referring also to technical and specific literature for the individual models adopted.

Once the basic concepts and theories have been identified, it proceeds with the construction and formulation of the specific models, also indicating the expectations about the results that could be obtained.

6.1 Theoretical model used

In the development of the dissertation two main models have been used:

- Ordinary Least Squares (OLS)
- Multivariate multiple regression

However, it is done a small introduction about linear regression in order to set the prerequisite for the explanations.

6.1.1 Classical Linear Regression Model (CLRM)

Linear regression is based on the concept that the dependent variable could be linearly described by one or by a combination of explanatory variables, for this reason the general regression structure form assumes the equation form of a straight line:

Equation 6.1 - Classical Linear Regression Model structure form for the single observation.

$$y_i = \alpha_i + \beta x_i + \epsilon_i$$

Considering just one observation of the regression it is possible to say that y represents the dependent variable that should be described, α is a constant term, x is the explanatory variable, ϵ is the residual term of error and β is the coeffieicent of interest that should be calculated through the regression.

But linear regression work on sample of observations and not just one, according to this with the general formulation is indicated in vectorial form:

Equation 6.2 - Classical linear regression model, vectorial form structure.

$$Y = \begin{bmatrix} y_1 \\ y_2 \\ . \\ . \\ . \\ y_n \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ . \\ . \\ . \\ \alpha_n \end{bmatrix} + [\beta] \begin{bmatrix} x_1 \\ x_2 \\ . \\ . \\ . \\ x_n \end{bmatrix} + \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \\ . \\ . \\ . \\ \epsilon_n \end{bmatrix} \; with\, n = number\ of\ observations$$

Finally, in the previous case it was used a single explanatory variable to describes the dependent one, but in most of the model there are more of them, making the generalized model structure:

Equation 6.3 - Classical Linear Regression Model generalized.

$$Y = \alpha + \beta X + \epsilon$$

6.1.2 Ordinary Least Squares

Ordinal Least Squares (OLS) is one of the more basic methods between the econometrics techniques, it allows the user to estimate the relationships between one dependent variable and the explanatory ones (that could be one or more).

In particular, through this technique it is possible to estimate the parameters of a set of explanatory variables in a linear function.

Through the OLS methodology, the sum of the squared distances between the values of the dependent variable observed and the ones predicted by the linear function is minimized.
The outputs of this model are the unknown parameters β that have calculated by minimizing the previously described sum of distances.

Equation 6.4 - OLS results formulation.

$$Y = \hat{\alpha} + \hat{\beta}X + \hat{\epsilon}$$

Having $\hat{\alpha}$ and $\hat{\beta}$ being the OLS estimators that are even known as Best Linear Unbiased Estimators (BLUE), since they own the properties:

- "Best" – since $\hat{\beta}$ has the minimum variance among the class of linear unbiased estimators.

- "Linear" – since $\hat{\alpha}$ and $\hat{\beta}$ are linear combinations of the random variable.

- "Unbiased" – since on average the actual values of $\hat{\alpha}$ and $\hat{\beta}$ will be equal to their true values.

- "Estimators" – since $\hat{\alpha}$ and $\hat{\beta}$ estimate the true values of α and β.

Graphically, the model returns a line with intercept $\hat{\alpha}$ and $\hat{\beta}$ as slope, as it is possible to see in the figure below.

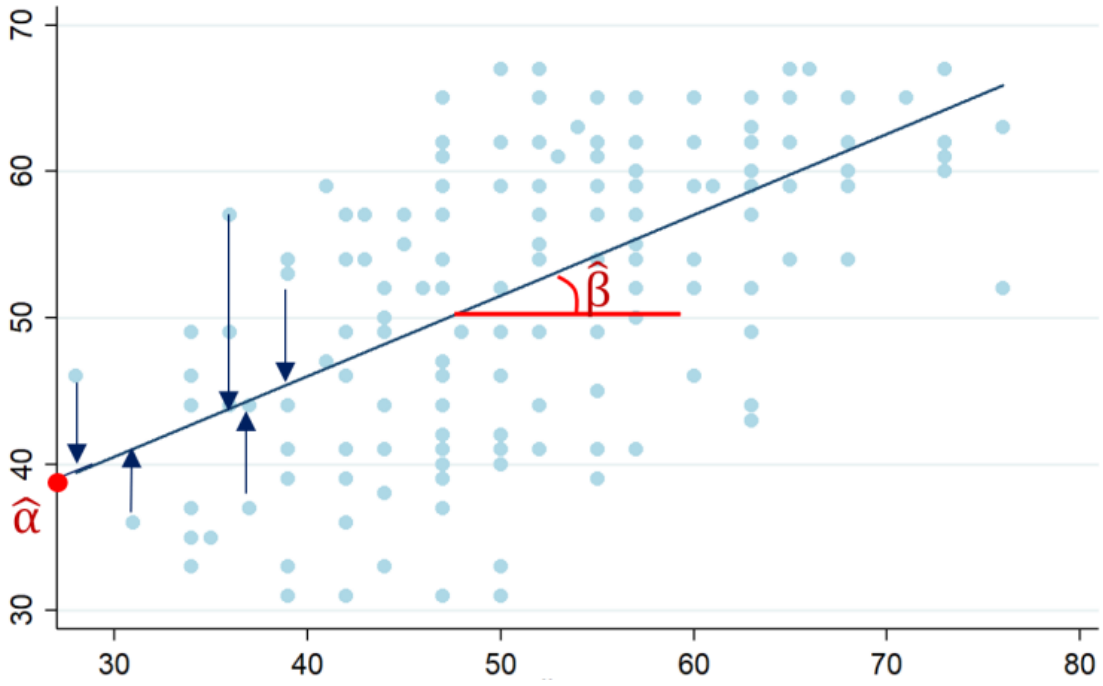


Figure 6.1 - Example of OLS parameters estimation.

Source: "Empirical companion, EFI MSc theses" WeBeep course, offered by Politecnico of Milan.

$\hat{\beta}$ is the parameter of interest since it is representative of the impact that a change in the explanatory variable have on the dependent one.

6.1.3 Multivariate multiple regression model

Multivariate multiple regression is a *"method of modelling multiple responses, or dependent variables, with a single set of predictor variables"* (University of Virginia Library 2017).

The basic concept behind this model is to make one linear regression for each of the dependent variables using always the same explanatory ones.

6.2 Model the hypotheses

Once the basics theory concepts have been identified, it is possible to move on with the construction of the models for single hypothesis.
Before to this it is interesting to make a small resume on what is analysed and what are the results expected.
For the hypothesis about deviations on objective allocations it is studied the influence that "past experience and ability" factors embedded in the companies performing the campaigns, could have on the deviations for each of the 8 areas of allocation identified in the chapter 5.1.2.

For this first analysis it is expected that the factors previously cited would positively influence the deviations of real values from the expected ones, with companies showing higher presence of them being better able to allocate the collected funds.
Having a strong literature about the role of professional investors in positively influencing the post-investment performances, it is expected that their presence before the campaign could significantly affect the results in the same way.

Once results for the first hypothesis have been found and described, the next model developed studies the relationships between the 8 deviations in allocation objectives and the variation of the company's debt.

It is expected that companies not performing a faithful allocation could use the funds collected to repay debts, showing in this way negative yearly variations on the debt.
It is interesting to see if the lack of allocation in certain areas could be linked to the expectations described above.
Interesting results in this case would also open the way for further future studies on whether or not the debt repayment may be a hidden objective for these companies which do not declare it for reasons similar to the ones described in the literature by (Salma and Maher 2017).

Finally, the last presented hypothesis is based on finding relationship between the "past experience and ability" factors used even in the first described one, and the deviations of real revenues from the ones declared as expected, and again, it is expected that the presence of these factors could positively influence the ability of the company to achieve higher deviations.

6.2.1 Allocation objectives - Model's structure

Starting from the hypothesis:

HP. Companies embedding a stronger past experience and ability are able to get closer to the stated expected objectives of allocation.

A model of multivariate multiple regression based on 7 equations have been developed, to study the deviations from allocation objectives for the sample composed by 220 campaigns.

Table 6.1 - Dependent variable resuming table for objectives allocation hypothesis.

Dependent variables	Typology	Value
D_Int_As	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For intangible assets.
D_Tan_As	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For tangible assets.
D_W_Cap	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For working capital.
D_Inv	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For inventories
D_Pers_C	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For personal costs.
D_Serv_C	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For service costs.
D_Oth_C	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For other costs.
D_Op_C	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For operation costs.

As already introduced in the previous chapters, these dependent variables are studied keeping in consideration as explanatory ones (or regressors) factors of past experience and ability embedded in the company in the pre-campaign context.

Table 6.2 - Explanatory variables resuming table for objectives allocation hypothesis.

Explanatory variables	Typology	Value
Cap_Raise	Binary	It assumes value 1 if the company performing the campaign has already done a capital raise in the year before the ECF, and 0 otherwise.
Professional_S	Numerical - %	$\frac{Voting\ right\ shares\ owned\ by\ professional\ investors}{Social\ capital}$
Patents	Binary	It assumes value 1 if the company performing the campaign has one or more patents, and 0 otherwise.
Age	Numerical	Age of the company performing the campaign.

Explanatory variables	Typology	Value
Kind	Categorical	Represents the typology of company performing the campaign, it is built through 3 different binary variables: 1) *SME*, assuming value 1 if the company is an SME, and 0 otherwise. 2) *INSME*, assuming value 1 if the company is an innovative SME, and 0 otherwise. 3) *INSU*, assuming value 1 if the company is an innovative startup, and 0 otherwise.
Employees	Numerical	Number of employees in the company before the campaign.

In order to avoid multicollinearity problems[56] for the categorical variable *Kind* (since the sum of the three dummies would be always equal to 1, the dummy variable SME have been chosen as reference group for the analysis, this allows to exclude it, eliminating the multicollinearity problems.
In this way the results show only how the fact that a company is an innovative SME or innovative startup could influence the results instead of being an SME.

As already introduced in the paragraph 5.1, all these variables are expected to be positively correlated with the deviations from allocation objectives.
Presence of previously done capital increases, should allow the company to have more experience in fund's management, allowing it to obtain better results in terms of allocations.
Presence of professional investor that have been already validated by the previous literature as an element positively influencing the post-campaign performances, should positively influence even the deviations acting on one side on the post-campaign allocations and on the other side on the setting of the objectives in the pre-campaign context.
The positive influence given by the presence of patents, is expected since it signals a previous work and way undertaken by the company that could have already clearly determined the need and how to satisfy them.
It is expected that less innovative kind of companies could be better able to respect the allocation objectives, while more innovative ones status could change the business direction more easily, consequently changing even the needs in term of allocation.
The age of the company is a direct measure of their experience, older companies are expected to have more abilities and knowledge in setting the objectives and achieve them.
Finally, a higher number of employees is expected to positively influencing the deviations, since it would mean a higher probability to have between them someone fully dedicated in setting and control the reaching of the objectives.

[56] Problems generated when one of the explanatory variables can be linearly predicted by other explanatory variables, in particular this problem happens in presence of variable highly correlated or variables whose sum is equal to 1.

Finally, a group of control variables have been included in the model, this was done in order to exclude from the results the effect that these ones could have on them.

Table 6.3 - Control variables resuming table for objectives allocation hypothesis.

Control variables	Typology	Description
Collected_Target	Numerical - %	$\frac{Collected\ capital}{Target\ capital}$
ATECO	Categorical	Represents the sector in which the company operates, it is built on 9 different binary variables: 1) *ATECO_J*, binary assuming value 1 if the company has the ATECO code J - information and communication services, 0 otherwise. 2) *ATECO_C*, binary assuming value 1 if the company has the ATECO code C - manufacturing activities, 0 otherwise. 3) *ATECO_K*, binary assuming value 1 if the company has the ATECO code K – financial and insurance activities, 0 otherwise. 4) *ATECO_M*, binary assuming value 1 if the company has the ATECO code M – professional, scientific and technical activities, 0 otherwise. 5) *ATECO_G*, binary assuming value 1 if the company has the ATECO code G – wholesale and retail trade; repair of motor vehicles and motorcycles, 0 otherwise. 6) *ATECO_F*, binary assuming value 1 if the company has the ATECO code F - constructions, 0 otherwise. 7) *Oth_AT*, binary assuming value 1 if the company has different ATECO than the previously ones, 0 otherwise.
Legal Form	Categorical	Represents the legal form of the company, it is built on 3 different binary variables: 1) *SB*, assuming value 1 if the campaign is performed by a company registered as "Società Benefit", and 0 otherwise. 2) *SRL*, assuming value 1 if the campaign is performed by a company registered as "S.R.L.", and 0 otherwise. 3) *SpA*, assuming value 1 if the campaign is performed by a company registered as "S.p.A.", and 0 otherwise.
Year	Categorical	Represents the year in which the campaign took place, it is built on 5 different variables: 1) *Y_2016*, assuming value 1 if the campaign took place in 2016, and 0 otherwise. 2) *Y_2017*, assuming value 1 if the campaign took place in 2017, and 0 otherwise. 3) *Y_2018*, assuming value 1 if the campaign took place in 2018, and 0 otherwise. 4) *Y_2019*, assuming value 1 if the campaign took place in 2019, and 0 otherwise. 5) *Y_2020*, assuming value 1 if the campaign took place in 2020, and 0 otherwise.

Even in this case, to avoid multicollinearity problems, reference groups have been identified for each categorical variable:

- for *ATECO*, the reference group have been identified the group having others ATECO codes.
- for *Legal Form*, the reference group have been identified in the variable SB companies.
- for *Year*, the reference group have been identified in 2016 campaigns.

Additionally, in the sample in analysis there are no observations for the ATECO codes A and L, for this reason the categories defined in the chapter 5.1.2 for them have not been considered as binary variables for defining the sector of the companies.

Once all these variables were defined, they were simply put together creating 8 different equations summarized in the table below.

Table 6.4 - The 8 equations analysed with the multivariate multiple regression.

$D\_Int\_As = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$
$D\_Tan\_As = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$
$D\_W\_Cap = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$
$D\_Inv = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$
$D\_Pers\_C = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$
$D\_Serv\_C = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$
$D\_Oth\_C = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$
$D\_Op\_C = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$

6.2.2 Allocation objectives - Model's results

Number of obs = 220

W = Wilks' lambda L = Lawley-Hotelling trace
P = Pillai's trace R = Roy's largest root

Source	Statistic		df	F(df1,	df2) =	F	Prob>F	
Model	W	0.0311	51	408.0	1292.1	1.74	0.0000	a
	P	2.6469		408.0	1344.0	1.63	0.0000	a
	L	4.8607		408.0	1274.0	1.90	0.0000	a
	R	1.8827		51.0	168.0	6.20	0.0000	u
Residual			168					

Figure 6.2 - Tests to verify the statistical significance of taking all the equations for the dependent variable together.

Starting from the tests to verify if all the equations taken together are statistically significant, it is possible to see that from all the 4 tests it is shown a strong statistically significance.

Once this have been verified, it is possible to carry out the analysis on all the single dependent variables.

Table 6.5 - Resuming table of significance for deviations related to balance sheet items.

VARIABLES	*(1)* *D_Int_As*	*(2)* *D_Tan_As*	*(3)* *D_W_Cap*	*(4)* *D_Inv*
Cap_Raise	1.090	1.320	-0.430	-1.276
	(0.876)	(0.727)	(0.921)	(0.655)
Professional_S	0.707	1.875	-1.769	1.008
	(3.081)	(2.559)	(3.240)	(2.307)
Patents	0.211	0.0966	1.888 *	0.830
	(1.051)	(0.873)	(1.105)	(0.787)
Age	4.890 *	-1.973	-0.407	-0.583
	(2.292)	(1.903)	(2.411)	(1.716)
INSME	4.719 *	-1.022	0.501	-3.097
	(2.133)	(1.771)	(2.243)	(1.597)
INSU	0.0287	0.228 *	0.134	-0.0146
	(0.124)	(0.103)	(0.130)	(0.0925)
Employees	0.0346	0.241 *	0.0953	0.289 **
	(0.113)	(0.0936)	(0.119)	(0.0844)
Collected_Target	0.569 *	0.372	0.543 *	0.400 *
	(0.269)	(0.224)	(0.283)	(0.202)
ATECO_J	-3.257	3.764 *	1.703	0.0360
	(2.047)	(1.700)	(2.153)	(1.532)
ATECO_C	-2.660	3.198	2.615	6.765 ***
	(2.274)	(1.888)	(2.391)	(1.702)
ATECO_K	-16.66 *	5.645	2.237	1.284
	(6.673)	(5.541)	(7.018)	(4.995)
ATECO_M	-3.670	2.173	2.719	1.454
	(2.204)	(1.830)	(2.318)	(1.650)
ATECO_G	-3.650	2.112	3.655	7.186 ***
	(2.359)	(1.959)	(2.481)	(1.766)
ATECO_F	-2.387	2.589	1.964	-1.553
	(3.454)	(2.868)	(3.633)	(2.586)
SRL	3.996	9.382 *	-5.537	3.402
	(4.337)	(3.601)	(4.561)	(3.246)
SpA	3.919	11.15 **	-1.377	1.701
	(4.906)	(4.074)	(5.160)	(3.673)
Y_2017	-3.138	2.736	0.544	2.393
	(3.144)	(2.610)	(3.306)	(2.353)
Y_2018	-1.200	1.924	-1.788	2.060
	(2.890)	(2.400)	(3.040)	(2.164)
Y_2019	-1.543	1.941	-0.856	2.011
	(2.865)	(2.379)	(3.013)	(2.144)
Y_2020	-1.456	0.994	-0.415	1.350
	(2.928)	(2.431)	(3.079)	(2.192)
Constant	-4.253	-12.03 *	10.27	-1.976
	(5.620)	(4.667)	(5.911)	(4.207)
Observations	220	220	220	220
R-squared	0.106	0.205	0.118	0.469

** = p-value < 0.05, ** = p-value < 0.01, *** = p-value < 0.001*

Table 6.6 - Resuming table of significance for deviations related to income statement items.

VARIABLES	*(5)* *D_Pers_C*	*(6)* *D_Serv_C*	*(7)* *D_Oth_C*	*(8)* *D_Op_C*
Cap_Raise	1.190	-0.128	0.616	-0.540
	(0.900)	(0.574)	(0.584)	(0.674)
Professional_S	0.113	1.133	-1.533	-3.077
	(3.167)	(2.022)	(2.054)	(2.371)
Patents	0.287	0.117	-1.118	-1.714 *
	(1.080)	(0.689)	(0.701)	(0.809)
Age	-5.028 *	-0.216	-1.430	-1.346
	(2.356)	(1.504)	(1.528)	(1.764)
INSME	-2.826	-2.141	-1.900	-1.823
	(2.192)	(1.399)	(1.422)	(1.641)
INSU	0.227 *	-0.0151	0.110	0.0349
	(0.127)	(0.0811)	(0.0824)	(0.0951)
Employees	0.553 ***	-0.0508	0.167 *	0.308 ***
	(0.116)	(0.0740)	(0.0752)	(0.0867)
Collected_Target	0.188	0.422 *	0.472 **	0.524 *
	(0.277)	(0.177)	(0.179)	(0.207)
ATECO_J	0.680	-1.554	-1.470	-1.628
	(2.104)	(1.343)	(1.365)	(1.575)
ATECO_C	0.721	-0.349	-0.828	0.221
	(2.337)	(1.492)	(1.516)	(1.749)
ATECO_K	*8.241*	*9.455 **	*0.502*	*1.723*
	(6.859)	*(4.378)*	*(4.449)*	*(5.135)*
ATECO_M	-0.915	-1.025	-0.706	-0.978
	(2.265)	(1.446)	(1.469)	(1.696)
ATECO_G	-0.588	-1.943	0.112	2.535
	(2.425)	(1.548)	(1.573)	(1.815)
ATECO_F	-4.568	-1.518	0.264	0.299
	(3.551)	(2.266)	(2.303)	(2.658)
SRL	-6.364	-1.235	1.038	-1.704
	(4.458)	(2.845)	(2.891)	(3.337)
SpA	-6.847	-1.034	2.867	-0.682
	(5.043)	(3.219)	(3.271)	(3.775)
Y_2017	-0.313	-0.492	-2.962	-1.872
	(3.231)	(2.062)	(2.096)	(2.419)
Y_2018	3.184	-0.0499	-1.311	-1.734
	(2.971)	(1.896)	(1.927)	(2.224)
Y_2019	1.338	-0.0559	-1.874	-1.584
	(2.944)	(1.879)	(1.910)	(2.204)
Y_2020	-0.0329	0.361	-2.046	-2.888
	(3.009)	(1.921)	(1.952)	(2.253)
Constant	8.781	6.260	8.460 *	12.71 **
	(5.777)	(3.687)	(3.747)	(4.325)
Observations	220	220	220	220
R-squared	0.271	0.138	0.175	0.216

** = p-value < 0.05, ** = p-value < 0.01, *** = p-value < 0.001*

Starting from the first regression run for the deviations from intangible assets allocation objectives, the only variables of interest resulted as statistically significant are the ones used in order to categorize the kind of the company.
This must be seen considering the fact that the reference group has been settled for SMEs, therefore, the results signal a positive correlation between the innovativeness of the company and the deviations, this could be due to the fact that in order to maintain the innovativeness status, these companies should rely a lot on items like R&D and patents, making the allocation in this group be even higher than what expected.
Between the control variables, instead, just the dummy categorizing the companies with ATECO code K (financial and insurance activities) and the ratio between the collected and the target capital show statistical significance.
Focusing on the latter, it is interesting to note that a higher collected capital have a positive impact on deviations of real allocated values from the objectives one for the intangible assets.
Looking at the trend of this variable among the various regressions carried out for this multivariate model, it would be possible to outline a first pattern of allocation of the extra-funds collected, understanding where the funds exceeding the target goal are allocated.

Passing to the second area of allocation identified, the one of tangible assets, it is possible to see that only the variables for the age of the company and the number of employees before the campaign show statistical significance with a positive impact on the deviation.
Coherently with what expected, older companies are better able to respect the allocation objectives, at least for tangible assets' area.
The positive relationship between the number of employees before the campaign and the deviation for tangible assets could be due to the fact that having a larger team means having a higher probability to find in between someone with the skills necessary to draw up expected results closer to the realistic ones.
Another way to see this result is by considering that companies with a higher number of workers are usually larger than the others, and for this reason they have a higher availability to be spent on assets.
Finally, it is interesting to note that even the dummies defining the legal form of the company are significant and positively related with the deviation, again this must be considered in terms of the reference group that has been set for benefit societies.

For the test on deviations from working capital's allocation objectives none of the variables of interest has been found as significant.
The one showing the highest significance is the dummy variable indicating whether the company owns a patents.
Reasoning about the fact that working capital is one of the "faster-changing" indicator talking about the balance sheet, since it is computed as the difference between the current assets and the current liabilities, could be that looking on a yearly basis the "real" values are not catch.
More precise analysis could be done having precise information about the cashflows of the company, that are currently unavailable (see annex 8.6).

For what regards the regression studying the effect of the variable of interest on the deviations from inventories' allocation objectives it is possible to see that most of the past experience and ability factors identified are not significant.
The only strong significance it is found for *employees* variable, in particular, it is found a positive correlation between the number of employees in the company before the campaign and the deviations from inventories' allocation objectives.
A weaker significance is shown by the variable *Cap_Raise,* but contrary to expectations the presence of previous capital increases bring a negative contribution to the deviations from allocation objective for inventories' area.
For the control variables the ratio between the collected and the target capital is again significant and positively correlated to the deviation.
Even two ATECO code variables show a quite strong positive statistical significance, and they are the ones for ATECO C (manufacturing activities) and for ATECO G (wholesale and retail trade; Repair of motor vehicles and motorcycles), coherently with the fact that, between the codes in the sample, these two are the ones representing the companies most relying on inventories.

Passing to the deviations related to income statement's accounting section the first one analysed is the one regarding the personal costs.
The only variable showing a very strong positive statistical significance for the personal costs allocation objectives' deviations is the number of employees before the campaign.
This could be partially due to the fact that companies already presenting a high number of workers in the pre-campaign context are more aware of the costs that they must face, making them able to sets more precise objectives.
Across the variable of interest even the dummy categorizing the innovative SMEs resulted as significant, but this time with a negative impact on the deviation.
Thinking again to the reference group sets for the SMEs, this negative impact given by the dummy *INSME* that is not resulted as significant even for innovative startups, could be due to the fact that this kind of companies are in the "middle".
While SMEs have a traditional business structure and could rely on information that could better allow them to plan the needs and satisfy them, the innovative version of these companies for their innovativeness could not rely on much information on which base their plans.
At the same time innovative startups are companies in the very initial stages of the life cycle for which the needs of skills and abilities coming from different people could bring them in spending much for this area, even more than what planned.

The second area related to income statement is the one of deviations from the service costs' allocation objectives.
This time none of the variable taken into consideration is statistically significant, while between the control ones the ratio between the collected and the target capital is again significant and positively correlated to the deviation.
Finally, even the dummy indicating the ATECO code K is relevant and has a positive impact on the deviation, this code is for categorize financial and insurance activities, does not result strange that such companies could provide higher deviations for this area.

Running the regression for the deviations on other costs' allocation objectives, it gives as result that only the variable indicating the number of employees before the campaign is significant and it has a positive effect on the deviations.
Again, the ratio between the collected and the target capital is significant and positively related to the deviation of other costs' allocation objectives.

Finally, the last regression has been carried on for operation costs' deviations from allocation objectives.
It is possible to see that the variable *employees* is again strongly significant with a positive coefficient.
Even the variable *Patents* shows for the first time in this regression a statistical significance, but contrary to what expected, it has a negative effect on the deviations.
Between the control variables, instead, the only one that assumes a relevant statistical significance is the ratio between the collected and the target capital, again with a positive coefficient.

Resuming the situation found carrying on the multiple regressions, the variable that shows more times a statistical significance is the one regarding the number of employees before the campaign, and in that cases, it resulted as positively influencing the deviations.
Indeed, between the 8 regressions carried on, this variable resulted as significant and with positive effect 5 times, the three times that it does not result as significant are for deviation on tangible assets, working capital and service costs' allocation objectives.
As already said the test performed on working capital could be influence by the fact that the rate at which this indicator changes may be greater than the data collection capacity.

6.2.3 Debt variations - Model's structure

This model is based on the hypothesis:

HP. A negative deviations in allocation objectives is positively correlated with an increase in debt.

As explained in the paragraph 5.2.1 the sample under analysis is built on 154 equity crowdfunding campaigns happened between 2016 and 2020.
The focus was put on studying the influence that deviations from the allocation objectives could have on variations of the debt in the year following the campaign.

According to these indications, a model of linear regression analysis have been built using the variables summarised in the tables below.

Table 6.7 - Dependent variable resuming table for debt variation hypothesis.

Dependent variables	Typology	Value
D_Debt	Numerical -	$\ln(1 + Debt_{t+1}) - \ln(1 + Debt_t)$ Where t is the year of the campaign.

Table 6.8 - Explanatory variables resuming table for debt variation hypothesis.

Explanatory variables	Typology	Value
D_Int_As	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For intangible assets.
D_Tan_As	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For tangible assets.
D_W_Cap	*Numerical*	$ln(1 + Real\ allocation) - ln(1 + Objective\ allocation)$ *For working capital.*
D_Pers_C	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For working capital.
D_Serv_C	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For inventories
D_Oth_C	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For personal costs.
D_Op_C	Numerical	$\ln(1 + Real\ allocation) - \ln(1 + Objective\ allocation)$ For service costs.

explanatory variables	Typology	Value
Portal	Categorical	Represents the platform on which the campaign took place, it is built on 8 different binary variables: 1) *MamaCrowd*, binary assuming value 1 if the campaign was on it, 0 otherwise. 2) *BackToWork24*, binary assuming value 1 if the campaign was on it, 0 otherwise. 3) *CrowdFundMe*, binary assuming value 1 if the campaign was on it, 0 otherwise. 4) *_200_Crowd*, binary assuming value 1 if the campaign was on it, 0 otherwise. 5) *WeAreStarting*, binary assuming value 1 if the campaign was on it, 0 otherwise. 6) *StarsUp*, binary assuming value 1 if the campaign was on it, 0 otherwise. 7) *Oth_Port*, binary assuming value 1 if the campaign was on other platforms, 0 otherwise.

In this hypothesis even if the previously dependent variables are used as explanatory variables.

In order to avoid multicollinearity problems, for the categorical variable *Portal,* the dummy variable *Oth_Port* have been considered as reference group and for this reason it is not displayed in the results.

Table 6.9 - Control variables resuming table for debt variation hypothesis.

Control variables	Typology	Value
Revenues	Numerical	$\ln(1 + Revenues_{t+1}) - \ln(1 + Revenues_t)$ Where t is the year of the campaign.
Total_Asset	Numerical	$\ln(1 + Total\ asset_{t+1}) - \ln(1 + Total\ asset_t)$ Where t is the year of the campaign.
Liquidity_Variation	Numerical	$\ln(1 + Cash\ and\ CE_{t+1}$[57]$) - \ln(1 + Cash\ and\ CE_t)$ Where t is the year of the campaign.
Shareholders	Numerical	Number of shareholders in the company in January of the year of the campaign.

Once all the variables were defined, it was possible to formalize the model as follow:

Equation 6.5 - Equation analysed with the debt variation hypothesis.

$$D_{Debt} = \beta_0 + \beta_1(D\_Int\_As) + \beta_2(D\_Tan\_As) + \beta_3(D\_Inv) + \beta_4(D\_Pers\_C) + \beta_5(D\_Serv\_C) + \beta_6(D\_Oth\_C) + \beta_7(D\_Op\_C) + \beta_8(MamaCrowd) + \beta_9(BackToWork24) + \beta_{10}(CrowdFundMe) + \beta_{11}(OPStart) + \beta_{12}(\_200\_Crowd) + \beta_{13}(WeAreStarting) + \beta_{14}(StarsUp) + \gamma(Controls) + u$$

[57] Cash equivalents, short term investment securities.

6.2.4 Debt variations - Model's results

Source	SS	df	MS	Number of obs	=	154
				F(18, 135)	=	1.32
Model	12.8918731	18	.71621517	Prob > F	=	0.1860
Residual	73.3485934	135	.543322914	R-squared	=	0.1495
				Adj R-squared	=	0.0361
Total	86.2404664	153	.563663179	Root MSE	=	.7371

D_Debt	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
D_Int_As	.020949	.011389	1.84	0.068	-.001575	.0434729
D_Tan_As	.0151505	.0131387	1.15	0.251	-.0108338	.0411348
D_W_Cap	.0053297	.0118337	0.45	0.653	-.0180737	.0287331
D_Pers_C	.0177863	.0103082	1.73	0.087	-.0026001	.0381726
D_Serv_C	-.001023	.0175723	-0.06	0.954	-.0357755	.0337296
D_Oth_C	-.0049507	.017386	-0.28	0.776	-.0393348	.0294334
D_Op_C	-.0116135	.0138477	-0.84	0.403	-.0389999	.015773
MamaCrowd	-.4411325	.5037923	-0.88	0.383	-1.437479	.5552137
BackToWork24	-.6418923	.4889733	-1.31	0.191	-1.608931	.3251464
CrowdFundMe	-.8044535	.5098597	-1.58	0.117	-1.812799	.203892
OPStart	-.5227052	.5120317	-1.02	0.309	-1.535346	.489936
_200_Crowd	-.351097	.5128736	-0.68	0.495	-1.365403	.6632092
WeAreStarting	-.2385118	.4893437	-0.49	0.627	-1.206283	.7292596
StarsUp	-.4505715	.5829456	-0.77	0.441	-1.603459	.7023156
Shareholders	.002287	.0031265	0.73	0.466	-.0038961	.0084702
Liquidity_Variation	.0274001	.0278955	0.98	0.328	-.0277687	.0825688
Revenues	.0263089	.0333616	0.79	0.432	-.03967	.0922878
Total_Asset	-.1627264	.0844854	-1.93	0.056	-.3298125	.0043597
_cons	2.563478	.9807104	2.61	0.010 *	.6239341	4.503021

* = p-value < 0.05, ** = p-value < 0.01, *** = p-value < 0.001

Figure 6.3 - Linear regression results for debt variations hypothesis.

Once run the test, there is no statical significance for all the variables, both for the interest and for the control ones.
Some low significances are shown for the variables *D_Int_As*, *D_Pers_C* and *Total_Asset.*
Starting for the variable of interests, it is possible to note that both have a positive correlation with the variation of debt.

This could be both means that an allocation lower than the objective one could bring to a decrease of debt, but also the contrary, so that a higher allocation with respect of the objective one could be related to an increase of the debt.

Total asset amount, instead, shows a negative relationship with the variation of debt.

This hypothesis lead to some further analysis, indeed, in the sample only 47 of the 145 campaigns have a negative variation of the debt and between them only 38 have at least one negative deviation in one of the allocation objectives area.
Even if the sample is quite small, have been considered interesting to run a model with the same formulation of before, but considering just the 38 companies previously descripted.
Additionally, the deviations are considered equal to 0 whenever there is not an objective of allocation for that area.
It has been removed the dummy variable defining whether the campaigns were performed on StartsUp since there were not any observations in this sub-sample for it.

Source	SS	df	MS	Number of obs	=	38
				F(17, 20)	=	2.07
Model	3.09754097	17	.182208292	Prob > F	=	0.0607
Residual	1.76087112	20	.088043556	R-squared	=	0.6376
				Adj R-squared	=	0.3295
Total	4.85841209	37	.131308435	Root MSE	=	.29672

D_Debt	Coefficient	Std. err.	t	P>|t|		[95% conf.	interval]
D_Int_As	.0217086	.0179748	1.21	0.241		-.0157861	.0592033
D_Tan_As	.0799293	.0282745	2.83	0.010	*	.0209496	.138909
D_Wc	-.3026058	.5555695	-0.54	0.592		-1.461503	.8562918
D_Pers_C	.0327532	.0200315	1.64	0.118		-.0090318	.0745381
D_Serv_C	-.0677133	.0321155	-2.11	0.048	*	-.134705	-.0007216
D_Oth_C	.0575161	.0766509	0.75	0.462		-.1023748	.217407
D_Op_C	-.0509787	.0435667	-1.17	0.256		-.1418573	.0398999
MamaCrowd	-.3581517	.3412015	-1.05	0.306		-1.069886	.3535821
BackToWork24	-.0669128	.3435349	-0.19	0.848		-.7835142	.6496885
CrowdFundMe	-.3904144	.3582009	-1.09	0.289		-1.137608	.3567797
OPStart	-.3473478	.3161226	-1.10	0.285		-1.006768	.3120725
_200_Crowd	.1191688	.5011289	0.24	0.814		-.9261678	1.164505
WeAreStarting	-.0295795	.485717	-0.06	0.952		-1.042767	.9836085
Revenues	.0686162	.0244095	2.81	0.011	*	.0176988	.1195336
Total_Asset	.0590957	.1083992	0.55	0.592		-.1670211	.2852125
Liquidity_Variation	.0025479	.0297102	0.09	0.933		-.0594266	.0645224
Shareholders	.0046694	.0029591	1.58	0.130		-.0015032	.010842
_cons	-1.548283	1.464788	-1.06	0.303		-4.603777	1.50721

* = p-value < 0.05, ** = p-value < 0.01, *** = p-value < 0.001

Figure 6.4 - Results of deep analysis on hypotheses about the debt variation.

Results of this second regression are more interesting for the assumptions made in its construction.
Again, it is not found any statistical significance for the variables categorizing the platform in which the campaign took place, but significances have been found for some deviations.
Looking to the one from tangible assets, it is possible to see positive significance, signaling that the presence of a lower allocation with respect the objective one could positively affect the probability to have a reduction of debt.
Even if a similar result was previously found, this test is more centred on the hypothesis, considering only the companies with negative debt variation (a reduction of debt) and that have at least a negative allocation objective (lower allocation with respect of the objective).
It is a first real insight about the existence of the possibility that amount not allocated as declared could be used to pay back the debt.
For the deviations from the service costs objectives, instead, a negative significant correlation is present, going in the opposite direction with respect of the previous one.

However, the size of the sub-sample under analysis makes it difficult to establish the statistical validity of the results, but they represents a good starting point for further research.

6.2.5 Deviations from expected revenues - Model's structure

With the last model, analysing a sample of 500 observations, it was wanted to verify the following hypothesis:

HP. Companies embedding a stronger past experience and ability are able to get closer to the stated expected revenues.

The variables kept into consideration in the linear regression model's building are summarized below.

Table 6.10 - Dependent variables resuming table for deviations from expected revenues hypothesis.

Dependent variables	Typology	Value
D_Rev	Numerical	$\ln(1 + Real\ Revenues) - \ln(1 + Attended\ revenues)$

Table 6.11 - Explanatory variables resuming table for deviations from expected revenues hypothesis.

Explanatory variables	Typology	Description
Cap_Raise	Binary	It assumes value 1 if the company performing the campaign has already done a capital raise in the year before the ECF, and 0 otherwise.
Professional_S	Numerical - %	$\frac{Voting\ right\ shares\ owned\ by\ professional\ investors}{Social\ capital}$
Patents	Binary	It assumes value 1 if the company performing the campaign has one or more patents, and 0 otherwise.
Age	Numerical	Age of the company performing the campaign.
Kind	Categorical	Represents the typology of company performing the campaign, it is built through 3 different binary variables: 4) *SME*, assuming value 1 if the company is an SME, and 0 otherwise. 5) *INSME*, assuming value 1 if the company is an innovative SME, and 0 otherwise. 6) *INSU*, assuming value 1 if the company is an innovative startup, and 0 otherwise.
Employees	Numerical	Number of employees in the company before the campaign.

As for the firstly explained hypothesis, in order to avoid multicollinearity problems, the SMEs companies have been identified as reference group, and the variable *SME* is not included.

The reasons for which these variables have been considered as potentially positively influencing the revenues variations are the same specified for the first hypothesis.

Table 6.12 - Control variables resuming table for deviations from expected revenues hypothesis.

Control variables	Typology	Value
Collected_Target	Numerical - %	Ratio between the collected amount and the target capital.
ATECO	Categorical	Represents the sector in which the company operates, it is built on 9 different binary variables: 8) *ATECO_J*, binary assuming value 1 if the company has the ATECO code J - information and communication services, 0 otherwise. 9) *ATECO_C*, binary assuming value 1 if the company has the ATECO code C - manufacturing activities, 0 otherwise. 10) *ATECO_K*, binary assuming value 1 if the company has the ATECO code K – financial and insurance activities, 0 otherwise. 11) *ATECO_M*, binary assuming value 1 if the company has the ATECO code M – professional, scientific and technical activities, 0 otherwise. 12) *ATECO_G*, binary assuming value 1 if the company has the ATECO code G – wholesale and retail trade; repair of motor vehicles and motorcycles, 0 otherwise. 13) *ATECO_F*, binary assuming value 1 if the company has the ATECO code F - constructions, 0 otherwise. 14) *Oth_AT*, binary assuming value 1 if the company has different ATECO than the previously ones, 0 otherwise.
Legal Form	Categorical	Represents the legal form of the company, it is built on 3 different binary variables: 1) *SB*, assuming value 1 if the campaign is performed by a company registered as “Società Benefit”, and 0 otherwise. 2) *SRL*, assuming value 1 if the campaign is performed by a company registered as “S.R.L.”, and 0 otherwise. 3) *SpA*, assuming value 1 if the campaign is performed by a company registered as “S.p.A.”, and 0 otherwise.
Year	Categorical	Represents the year in which the campaign took place, it is built on 5 different variables: 1) *Y_2016*, assuming value 1 if the campaign took place in 2016, and 0 otherwise. 2) *Y_2017*, assuming value 1 if the campaign took place in 2017, and 0 otherwise. 3) *Y_2018*, assuming value 1 if the campaign took place in 2018, and 0 otherwise. 4) *Y_2019*, assuming value 1 if the campaign took place in 2019, and 0 otherwise. 5) *Y_2020*, assuming value 1 if the campaign took place in 2020, and 0 otherwise.

Control variables	Typology	Value
Deviation's Year	Categorical	Indicates which of the three post-campaign years taken into consideration, the deviation refers to, it is built on 3 different variables: 1) *D_Year_1*, assuming value 1 if the deviation is referred to the first year after the campaign, 0 otherwise. 2) *D_Year_2*, assuming value 1 if the deviation is referred to the second year after the campaign, 0 otherwise. 3) *D_Year_3*, assuming value 1 if the deviation is referred to the third year after the campaign, 0 otherwise.

To the variables used in the first presented model, have been added a new categorical one to keep in consideration to what of the three post-campaign years, for which the deviations have been calculated, it refers to.

Reference groups for the categorical variables have been settled as in the first model:

- for *ATECO*, the reference group have been identified the group having others ATECO codes.
- for *Legal Form*, the reference group have been identified in the variable SB companies.
- for *Year*, the reference group have been identified in 2016 campaigns.
- For the new variable Deviation's year, the reference group have been identified in third year deviations.

Once again, after the variable definition the model was formulized as follow:

Equation 6.6 - Equation analysed in the revenues deviations from expected values model.

$$D\_Rev = \beta_0 + \beta_1(Cap\_Raise) + \beta_2(Professional\_S) + \beta_3(Patents) + \beta_4(Age) + \beta_5(SME) + \beta_6(INSME) + \beta_7(INSU) + \beta_8(Employees) + \gamma(Controls) + u$$

6.2.6 Deviations from expected revenues - Model's results

Source	SS	df	MS	Number of obs	=	500
				F(22, 477)	=	5.47
Model	579.703449	22	26.3501568	Prob > F	=	0.0000
Residual	2297.9495	477	4.8175042	R-squared	=	0.2015
				Adj R-squared	=	0.1646
Total	2877.65295	499	5.76683958	Root MSE	=	2.1949

D_Revenues	Coefficient	Std. err.	t	P>|t|		[95% conf.	interval]
Cap_Raise	-.0373752	.2197805	-0.17	0.865		-.4692327	.3944824
Professional_S	1.085978	.7428711	1.46	0.144		-.3737263	2.545682
Patents	-.1239779	.2522204	-0.49	0.623		-.6195783	.3716225
Age	.0261709	.0273567	0.96	0.339		-.0275837	.0799256
INSME	.6508557	.608409	1.07	0.285		-.5446374	1.846349
INSU	.9436801	.5680688	1.66	0.097		-.1725465	2.059907
Employees	.0020203	.0027689	0.73	0.466		-.0034205	.0074612
Collected_Target	.0745261	.0676257	1.10	0.271		-.0583551	.2074072
ATECO_J	-.9980715	.5105918	-1.95	0.051		-2.001359	.0052158
ATECO_C	-.5343563	.5621773	-0.95	0.342		-1.639006	.5702939
ATECO_K	-.8009552	1.727511	-0.46	0.643		-4.195427	2.593516
ATECO_M	-1.223886	.544733	-2.25	0.025	*	-2.294259	-.1535134
ATECO_G	-.5521347	.5804966	-0.95	0.342		-1.692781	.5885119
ATECO_F	-1.79814	.8677485	-2.07	0.039	*	-3.503223	-.0930583
SRL	-2.759756	.9553067	-2.89	0.004	**	-4.636886	-.8826267
SpA	-2.277676	1.07188	-2.12	0.034	*	-4.383866	-.1714855
Y_2017	3.86025	.8062474	4.79	0.000	***	2.276014	5.444486
Y_2018	3.519867	.7384314	4.77	0.000	***	2.068886	4.970847
Y_2019	3.693236	.729116	5.07	0.000	***	2.26056	5.125912
Y_2020	3.674457	.7554635	4.86	0.000	***	2.190009	5.158904
D_Year_1	2.017997	.27519	7.33	0.000	***	1.477263	2.558731
D_Year_2	.9619384	.2750196	3.50	0.001	**	.4215386	1.502338
_cons	-3.632937	1.318435	-2.76	0.006	**	-6.223596	-1.042278

Figure 6.5 - Linear regression results for deviations from expected revenues hypothesis.

For this last model none of the variables kept in consideration is resulted as statistically significant in determining the amount of deviations between real and expected revenues.

It is possible to see that the closest to be significant are the variables dummy to categorize the innovative startups, contributing positively to the deviation from expected revenues.

However, looking to the dummy control variables indicating the deviation's year, it is possible to see that both have a strong statistical significance, looking also to the coefficients it is possible to get that to shorter forecast horizon are associate higher revenues' deviations (in term of real – expected).

This is coherent with the average value of revenues' deviation for the three years:

Table 6.13 - Average revenues' deviation by year.

	Sum of revenues' deviations	Number of observed campaign	Average deviation per campaign
Year 1	- 69.497.186,75 €	195	-356.395,83 €
Year 2	- 269.733.314,24 €	193	-1.397.581,94 €
Year 3	- 353.645.495,51 €	112	-3.157.549,07 €

It is also possible to note that the variables categorizing the years in which the campaigns took place are all positively correlated to the revenues deviations from attend values, and strongly significant.
This data must always be seen in optic of the reference group (set at 2016), and as it possible to note by the coefficients there is not a reflection of the equity crowdfunding year by year growth in the revenues deviations.

Chapter 7
Conclusions

This chapter concludes the work by providing a sum up of the main takeaways, results and implications obtained by the models.
It tries also a connection and comparison with literature presented in the initial part, trying to understand whether the results obtained are compatible or alternative to the already studied ones.

It is shown how for the first hypothesis, it was not possible to identify a univocal effect of the variables indicating past experience and ability taken into consideration on all the 8 areas of allocation, it was, however, possible to find effects of the single variables on the single deviation.
For the debt hypothesis it has been possible to find the first clues that may indicate that under allocation in some areas could lead to a debt's reduction, however, the need of further analysis has been identified.
The last presented hypothesis on revenues did not give satisfactory results from the point of view of the variable of interest, but it did give them for time-related factors.

Finally, some further ideas and possible future developments are presented.

7.1 Conclusion and takeaways

The first analysed hypothesis tried to understand whether the allocation objectives published during the equity crowdfunding campaigns were satisfied after the collection.
To study them have been considered factors of "past experience and abilities" embedded in the company in the pre-campaign context.
It was expected that a higher presence of these factors would have brough to a more complete satisfaction of the objectives, these expectations were also supported by a literature that was, in some part, very close to the objectives of this dissertation.

Starting with the analysis for what regard the presence or the absence of previous capital increase, it is possible to highlight that the expectations were that companies that already performed fundraising campaigns (of any kind) could use the previously acquired experience in order to both set and reach in a better way its allocation objectives.
However, between the 8 areas of allocation identified it has shown only five times a positive coefficient of the regressions, indicating a positive effect of its presence on the deviations, additionally it never resulted as statistically significant.
Generalizing the results, it is not possible to consider the presence of previous capital increases as an influencing factor for achieving better performances in term of allocations.

Presence of professional investors in the company's structure before the campaign was the second factor analysed, the expectations were again that a higher presence of them would have been a positively influencing element for the satisfaction of allocation objectives.
These expectations were also supported by the theories that studied how their presence brought companies to achieve better performances in the post-campaign context.
(Croce, Martí and Murtinu 2013) explained that the VC-backed companies are able to perform in a superior way with respect of the not VC-backed ones, and similar results are found talking by business angels by (Bonini, Capizzi and Zocchi 2019) and by (Signori and Vismara 2018).
Again, the results did not provide any significant evidence for what regards this variable, showing that the present of such investors does not statistically influence the satisfaction of the allocation objectives set by companies.
Even this time, given the results achieved through the model, is not possible to conclude that the presence of professional investors is significant for the deviations from allocation objectives.

Presence of patents, was considered as an initial signal of ability of companies in having less problems in allocating the resources, having already a starting point from which start building everything around.
Results of the models show that the variable indicating the presence of patents is significant only for deviations from working capital's allocation objective, with a positive effect on them.

However, the working capital allocation area has not given particularly interesting results, and this has been reconducted to the fact that this indicator changes frequently during the year, and the balance sheet data takes are not sufficient to catch the real effects and allocations. Even for this third factor could not be defined a significant effect on deviations from allocation objectives.

The age of the company has been considered as a direct signal of its ability and experience, or at least even if this is not always true, it has been considered as a good proxy for it.
According to the results of the regression, this variable is statistically significant for deviations from intangible assets and personal costs' allocation objectives.
Focusing on the former, it is interesting to note that intangible assets are "long-effects" items that, between the analysed areas, are the expenditures requiring more analysis.
Between them are included the research and development costs, one of the main frequently declare allocation objective in the equity crowdfunding campaigns analysed.
Thinking about them, it is possible to underline that they require a huge initial expenditure, for something that in the better case is going to be a core part of the business for a long period, or that in the worst case is not even going to be used.
These implications lead to thinking that the decision-making process for them could be more affected by the age of a company than other areas.
However, it is not possible to define a general relationship between the age and the satisfaction of the allocation objectives.

Then has been kept into consideration the kind of company performing the campaign, diving them between innovative startups, innovative SMEs and SMEs.
By definition innovative startups (see annex 8.1.1) are young companies, and it was expected for this reason a lower experience level and consequently a better results in term of allocations moving from the most innovative startups to the most traditional SMEs.
Results are the opposite of the expectations, showing a positive correlation between the deviations from intangible assets and the fact that companies are innovative startups, actually showing what was another discussed point during the development of the work.
Having innovative startups having young companies that should rely a lot on costs for development of the business, it is not strange for this reason to see that the only areas in which their presence is significant and positively correlated to the deviations are the ones of intangible assets and personal costs.
Indeed, inside the intangible assets accounting section are contained the amounts spent in R&D and for the patenting activities, two areas that are fundamental for these companies, even for the constraint that their status require (see annex 8.1.1 and 8.1.2).
At the same time the employees and workers are one of the key strenght factors on which startups rely, it is possible to see the importance of the team not only again from the status requirements but from the business plans and pitches presented for the campaigns.
In these documents it is frequently found the composition of the team with the story, the abilities, the competences, the roles and many more information for each of them.
For this reasons, even if it is not possible to say that the kind of company performing the campaign is significant for the deviations from allocation objectives, could be possible to say

that this variable is significant for the deviations from intangible assets and personal costs' allocation objectives.

Finally, the last variable of interest for this first model is the number of employees before the equity crowdfunding campaign.
Expectations were that a higher number of workers in the pre-campaign context could signal a higher probability of finding someone with abilities to set both the objectives of allocation and the ways to reach them, leading to better satisfaction of them.
This variable is the one that most frequently shown strong significance and a positive impact on the deviation from allocation objectives.
In three regressions it has not shown a statical significance and they are the ones performed for the intangible assets, the working capital and the service costs.
Excluding the working capital for which reasoning have been already made, it is possible to make for tangible assets' deviations a similar reasoning to the one done for intangible assets in explaining the effect of the age of the company performing the campaign.
Deviations of tangible assets' allocation from objective values could be more related to other "experience" factors, and probably the number of employees is not so influencing.

Concluding, for the firstly presented hypothesis, that was defined as:

HP. Companies embedding a stronger past experience and ability are able to get closer to the stated expected objectives of allocation.

Was not possible to find a general framework of factors influencing all the deviations from allocation objectives, however it has been possible to find some of them influencing specific area of allocation.

After this hypothesis a second one has been presented with the objective of carrying out an analysis of the debt variations in the companies performing equity crowdfunding campaigns.
In particular, it was wanted to understand if the amount of debt's variations in these companies could be influenced by the previously descripted deviations on allocation objectives.
Even basing the analysis on the theory by (Salma and Maher 2017) that shows how setting in the IPO prospectus use of proceeds for repayment of debt could be seen as opportunistic by the market and lead to worst results, creating in this way an incentive for equity crowdfunding proposing companies in not declaring an eventual use of funds for this reason.
The first regression was carried on all the companies both with positive and negative debt variations, considering all the allocation objective deviations and it is resulted as not significative.

The only variable showing a low significance was the one for deviation from intangible assets' allocation objectives.

However, a further development of the regression has been developed considering only the campaigns related to companies that presented a negative debt variation (a reduction of debt).
For what regards the allocation objectives' deviations, they have been considered equal 0 whether there was not a specific declaration of objective for the area (while before was the allocation objective considered as 0 in that case and not the deviation).
To the previous specified companies have been subtracted the ones not presenting any negative deviation in the allocation objectives.
The final sample under analysis was formed by 38 campaigns, a quite low number that could not be lead to very significant results, but that, however, sets good initial conditions for further research.

Results for this second regressions shows the same statistical significance for the intangible assets' deviations in determining the debt variations.
They have been considered more relevant that the previous ones, for the conditions set for the construction of the regression.

Finally, the last model presented was aimed at analysing the deviations of real revenues obtained after campaign with the ones declared as expected at the beginning of the equity crowdfunding process.
Deviations for three years after the campaigns were studied, considering again as dependent variables the ones used in the previous hypothesis for allocation objectives to represent past "experience and ability" factors in the pre-campaign context.

No statistical significance is shown in the model's results for the explanatory; however, two additional dummies variables were added in order to keep in consideration to which year after the campaign the deviation was referring to.
These variables resulted as strongly statistically significant, showing the horizon of forecasting could influence the deviation of real revenues from the attending one.

7.2 Further developments

Being the uncovered by the literature field quite large, the number of possible further studies and developments its huge.

Simply starting by the data availability problems encountered during the development of this dissertation, becomes clear how better data both in terms of quantity and quality could lead to better and more in-depth analysis.

Focusing on the debt variation hypothesis, the presence of a larger sample of campaign corresponding to required characteristics, could have led to more reliable and complete results.

At the same time, the dependent variables taken into consideration in the analysis of the hypotheses about allocation objectives and revenues' deviation just consider some of the possible elements that could influence them.

Even the fact that this dissertation is based on data collected for minimum objective of collections gives additional possibilities, as the study of how the extra-fund are used or how the results change for the maximum collection objectives.

Chapter 8
Annexes

8.1 Definition of innovative startups and SME's, retail investors for mini bonds

8.1.1 Innovative startup definition

> According to the MIMIT[58] website an innovative startup is a young company, with a high technological content, with high potential for growth and represents, for this reason, one of key points of the Italian industrial policy.

In particular, to be defined as innovative startup a company must satisfy some requirements.

With reference to DL 179/2012, art.25, comma 2, an innovative startup is a limited company, constituted also in cooperative shape, which satisfies the following objective requirements:

- New enterprises or founded from not more than 5 years.
- Has residence in Italy, or in another European economic space but with a production site or a branch in Italy.
- Have an annual income lower than 5 million Euros.
- It is not listed on a regulated market or on a Multilateral trading facility.
- It does not and never have distributed dividends.
- Has as only or prevalent social object the developing, production and marketing of a high-tech product.
- It is not result of an M&A transaction.

And at least one of three of the subjective requirements:

- It sustains R&D expenses of, at least, 15% of the maximum value between the total cost and the value of the production.
- It employs high-skilled personnel (at least 1/3 PhD students or researchers, or at least 2/3 with master's degree).
- It owns at least one patent or a registered software.

[58] "Ministero delle Imprese e del Made in Italy" – ex. MISE ("Ministero dello Sviluppo Economico")

8.1.2 Innovative SMEs definition

According to MIMIT website an innovative SME is the second evolutive stage of the innovative startups.

Again, to be defined as innovative SME a company must satisfy some requirements.

With reference to DL 3/2015, art. 4, an innovative SME is a limited company, constituted also in cooperative shape, which satisfies the following objective requirements:

- Residence in Italy or in another European economic space but with a production site or a branch in Italy.
- It has done the certification of the last balance and, eventually, of the consolidated balance.
- It is not listed on a regulated market.
- It is not simultaneously registered to the special section of innovative startups.

And at least two of three of the subjective requirements:

- It sustains R&D expenses of, at least, 3% of the maximum value between the revenues and the cost of production.
- It employs high-skilled personnel (at least 1/5 PhD students or researchers, or at least 1/3 with master's degree).
- It owns at least one patent or a registered software.

8.1.3 Eligible investors for mini bonds

Retail investors that can subscribe mini bonds must be part of one of these categories:

- ones owning a financial products portfolio (including deposits) which value is higher than € 250.000.
- ones that engage themselves in investing at least € 100.000 in such kind of offers, and that declare in a document the awareness of risks incurred.
- retail investors as part of portfolio management service or advice on financial matters.

8.2 ECSP regulation

ECSP[59] regulation has been published for the first time as draft in March 2018 and it was regarding just two financial models of crowdinvesting: equity crowdfunding and social lending with exclusion of peer-to-peer lending to private agents (already regulated by European directives).

This regulation have been created to overcome one of the biggest problem of this market, the absence of a unique regulatory framework.
Indeed, was possible to find between the European Union state members multiple regulations, often quite different one from another.
ECSP regulation should help in overcoming this problem and additionally would empower the investors protection.
The objective of this regulation is to create a unique European market for crowdfunding, allowing European platforms to operate in more EU member states, this is possible even today, but platforms must be compliant with each of the local regulations of the states in which it operates, while with this new regulation the platform must be compliant with only the European regulamentation.

Additionally, some major changes or introductions have been made by this regulation:

- initial text has set a maximum collectable amount through crowdfunding of € 1 million for a company in 12 months, since many countries already had a higher threshold (e.g., Italy € 5 million, Germany and UK € 8 million), this value has been set to € 8 million for everyone.

- for what regards the communication the initial ban for platforms campaigns communication and marketing has been removed, encouraging them to communicate to make possible a comparison on performances of closed campaigns.

- additional importance for supervisory activities has been leave to local supervisory bodies, reducing responsibilities initially given to ESMA[60].

- ICOs[61] on crowdfunding platform are possible only when their amounts do not exceed the threshold of € 8 million and if ECSP regulation's constraints, with additional requirements such as the fact that it should not be a private placement, are satisfied.

- for the platforms the regulation is divided between two points.

  For the European platforms are considered different the ones offering crowdfunding from the lending ones asking for different information level for each kind of platform and for different risk levels.

[59] Regulation of the European Parliament and Council on European Crowdfunding Service Providers (ECSP) for Business.
[60] European Securities and Markets Authority, supervisory body of the European financial market.
[61] Initial Coin Offerings (ICOs) is the process through which a company goes public for the first time.

For the non-European platforms has been stated that they should be able to perform in Europe if they have an authorization in their origin countries, respecting however the European rules.

8.3 Startups valuation, failure and unicors

Startups' evaluation process is quite complex since the lack of enough data and information and the usually peculiar characteristics of these businesses make it difficult to use traditional methods.
Indeed, startups usually do not have profits but work with negative margins due to the huge costs they have to suffer in order to create and manage the new business, at the same time expectations for startups are quite different from the ones for traditional companies, embedding a much higher risk.

However, raise funds without knowing the value of the company it is not possible, for this reason some ways to evaluate these companies have been developed considering both quantitative and qualitative parameters.

In particular, two kind of values are calculated:

- Pre-money value, that is the company's value without including the last round of funding or external contributions to risk capital.

- Post-money value, indicating how much a company worth after receiving capital and/or investments.

Have been developed evaluation methods that takes into account different measures, that could range from expected future results (DCF[62] method), the value of comparable companies (relative valuation[63]) till reaching the consideration of peculiar characteristics of the company itself.
An example for the latter is the Berkus method keeping in consideration 5 key factors, related to specific risks, and attributing a monetary value to them and by summing these values the one of the company is obtained.
Finally, one of the simplest methods to evaluate such companies is to consider the cost to replicate them, however, with this method usually are achieved the lowest possible values, since it does not take into consideration the potential developments of the company, and at the same time does not consider properly the value of intangible assets.

For startup, especially for the innovative ones, intangible assets assume a fundamental value, for example a patent that could have a low value for other companies, in the hand of an innovative startup with an innovative idea on how to use it could become a gold mine.
In the same way the value of the teams of people working in the startups are not considered, while often they are the biggest value for such companies.

[62] Discounted Cash Flow, method through which the future expected cashflows together with the expected interest rate are used in order to evaluate the current company's value.
[63] Through this method the value of the company is found by looking to similar companies (a group of comparable companies in terms of the core drivers of the target) for which the values is known, and thank to this is possible to obtain an approximated value.

Another important element kept into consideration by investors is the fact that startups are usually related to a high risk of failure, especially talking about the innovative ones.
According to the U.S. Bureau of Labor Statistics data for small businesses, only 80% of them survived after the first year, 50% fail in the first 5 years and 65% within 10 years.

Moving to the Italian market IlSole24Ore reported a failure rate of startups in the first 4 years of life equal to 95%, finding the main failure causes in: fragile businesses, undervaluation of legal and administrative matters, lack in collection and/or bad managing of funds and ideas launched on the market without previously validation.

However, between the huge amount of companies failing there are few shining: the unicorns.
This term was popularized by Aileen Lee that in its article of 2013 "Welcome To The Unicorn Club: Learning From Billion-Dollar Startups", used it to define private owned startups with more than one billion dollars of valuation.

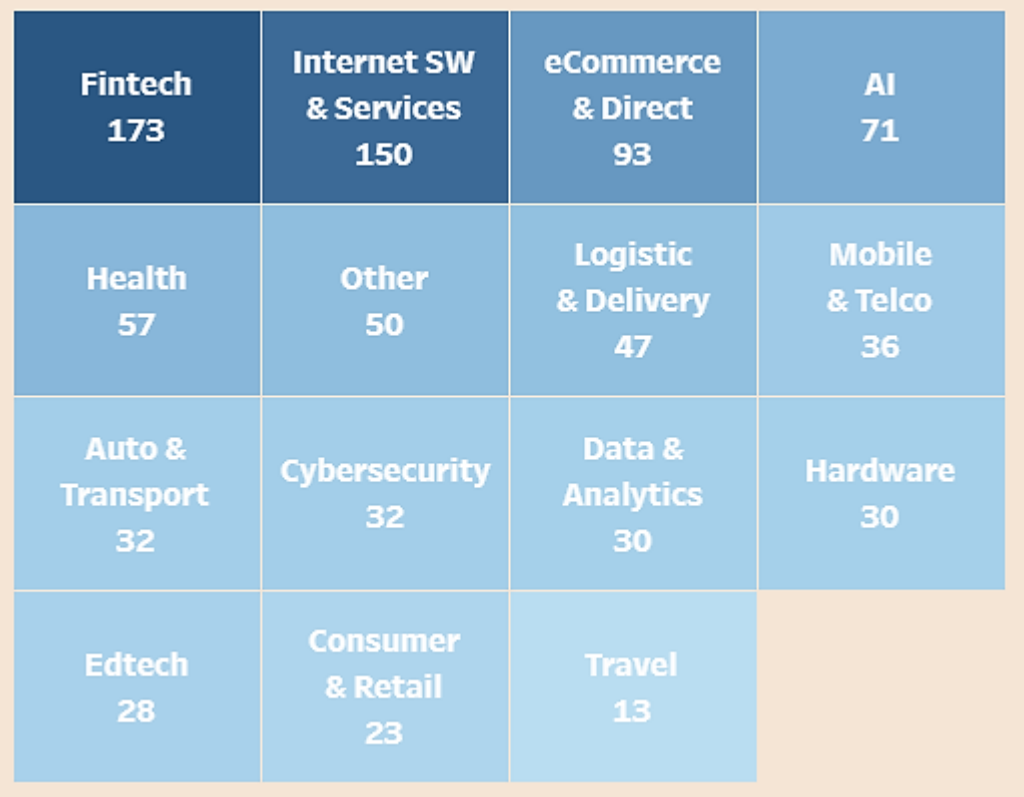


Figure 8.1 - Sectorial division of startups valued at least 1 billion dollars in October 2021

Source: (Il Sole 24 Ore 2021)

From 2000 the software-based startups able to achieve a valuation higher than $ 1 billion have been the 0.07%, between them there are companies like Airbnb and Robinhood.

Subsequently, even the term hectocorn was created to define companies with a value higher than $ 10 billion, and the two most iconic companies able to achieve this title are Facebook and Google.

8.4 Covid effects

During the development of the dissertation has not been considered the effect of Covid-19 pandemic situation, however some considerations are due.

Covid-19 pandemic situation has characterized the period going from initial months of 2020 till May and June 2021, it made Italian companies alternate periods of opening and closing for the lockdowns.
This period had enormous consequences on Italian economic situation, as it is possible to read on a note of (Orlando and Rodano 2022) published by Banca D'Italia, there was a reduction of 8.9% of the GDP[64] in 2020.
However, the authors notice also a reduction in the number of firms failed or exit from the market, tendency that has been confirmed even for 2021, disappointing expectation about the fact that a so relevant reduction in GDP would have bring to a business crisis.

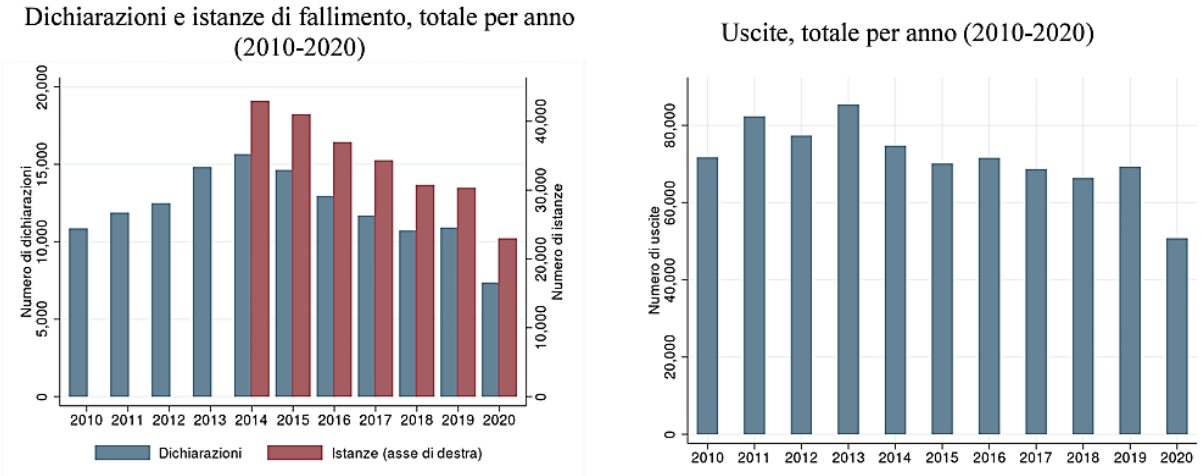


Figure 8.2 -Trend of Italian companies' failures (to the left) and total exits from the market (to the right).

Authors connect this result to the measure adopted by the government to help companies facing difficulties during the Covid pandemic situation, indeed, they show with the graph below that these measure have been used more by companies facing the higher negative variation on revenues, allowing these companies to remain in the market.

[64] Gross Domestic Product, measure the total value of all the finished goods and services produced within the country's borders in a specific time frame.

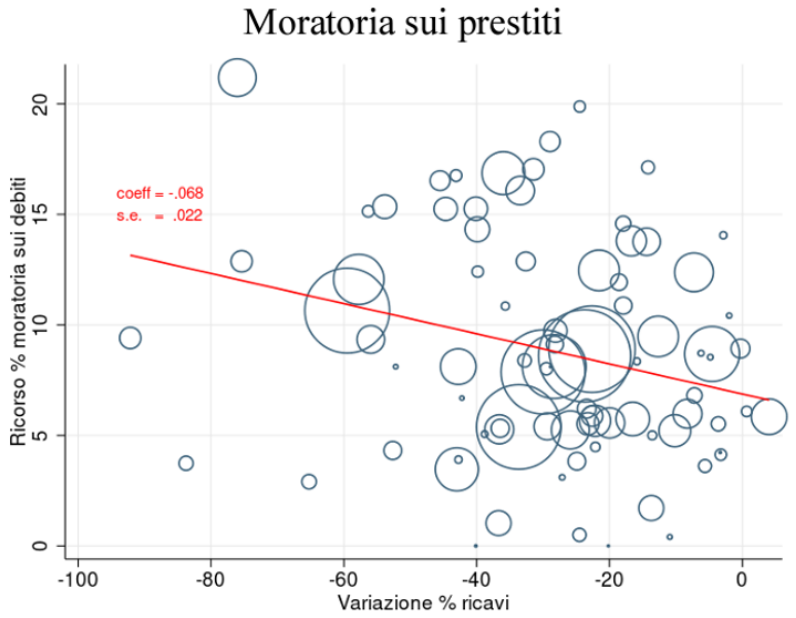


Figure 8.3 - Effects of the moratoria on loans, on revenues variation.

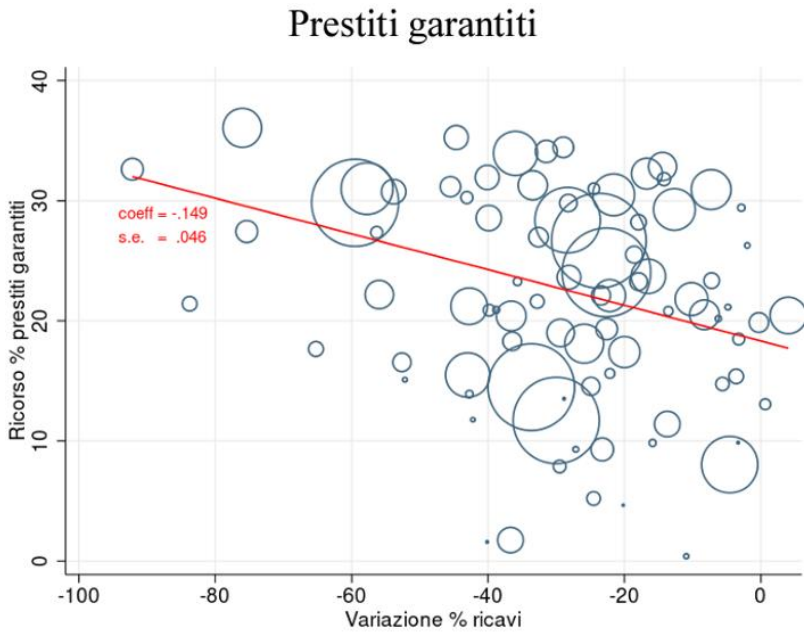


Figure 8.4 - Effects of secured loans[65] , on revenues' variations.

[65] Loans secured by the Italian government introduce to help Italian companies facing difficulties after Covid-19 pandemic situation.

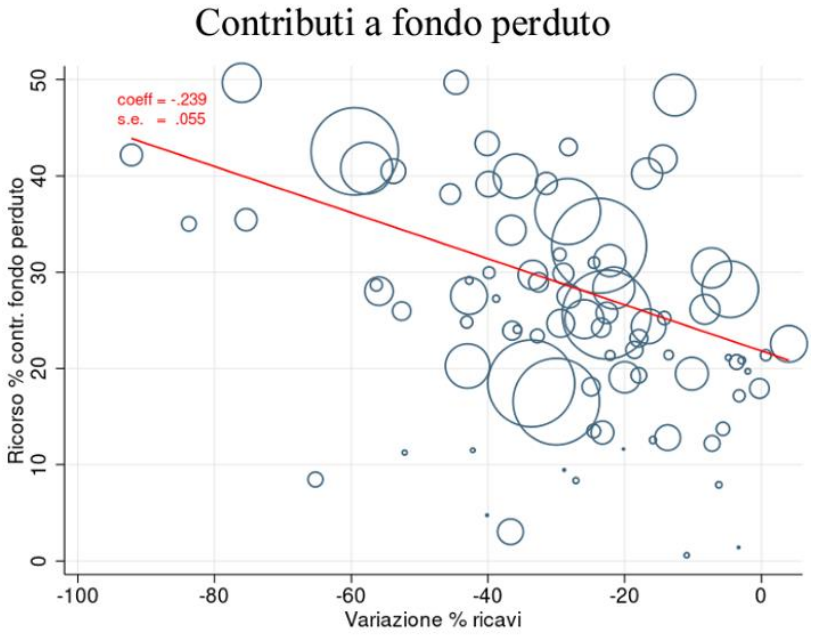


Figure 8.5 - Effects of the grants, on revenues variation.

However, companies are not the only actors in equity crowdfunding affected by Covid-19 pandemic situation, even the investors have been hit.
In an occasional paper by (Guglielminetti and Rondinelli 2021) published by Banca D'Italia is shown how the amount of consumption in 2020 declined significantly with a corresponding increase in the savings rate.

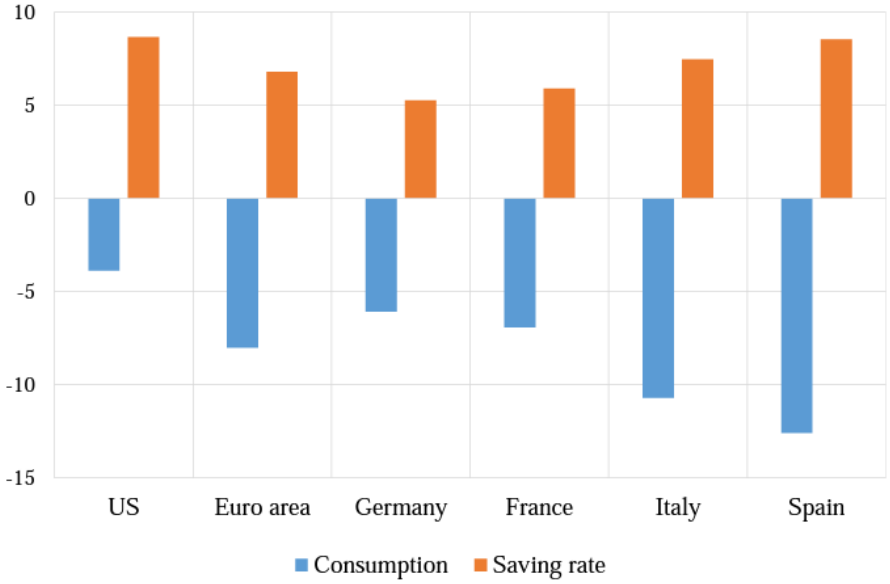


Figure 8.6 - World comparison of consumptions and saving rates.

Source: (Guglielminetti and Rondinelli 2021) with data from FRED[66] and Eurostat[67]

[66] Federal Reserve Economic Data, database managed by research division of the Federal Reserve.
[67] Statistic office of the European Union collecting and elaborating data from state member to perform statistics.

According to the figure above Italy is the second state for the size of the variation in the consumption and saving rates.
Considering the fact that the part usually used to perform investment increased (savings) there may have been a positive effect on investment means, including crowdfunding.

However, the reasons that brough to an increase in savings are quite different from the usual ones, the agents decrease consumption both to face difficulties in the future, but also because they were, in some way, forced to do this with lockdown, having not so much possibilities to spend money.
Authors try to analyse through surveys the reasons that brought to a cut in the expenditures and the results are summarized in the graph below.

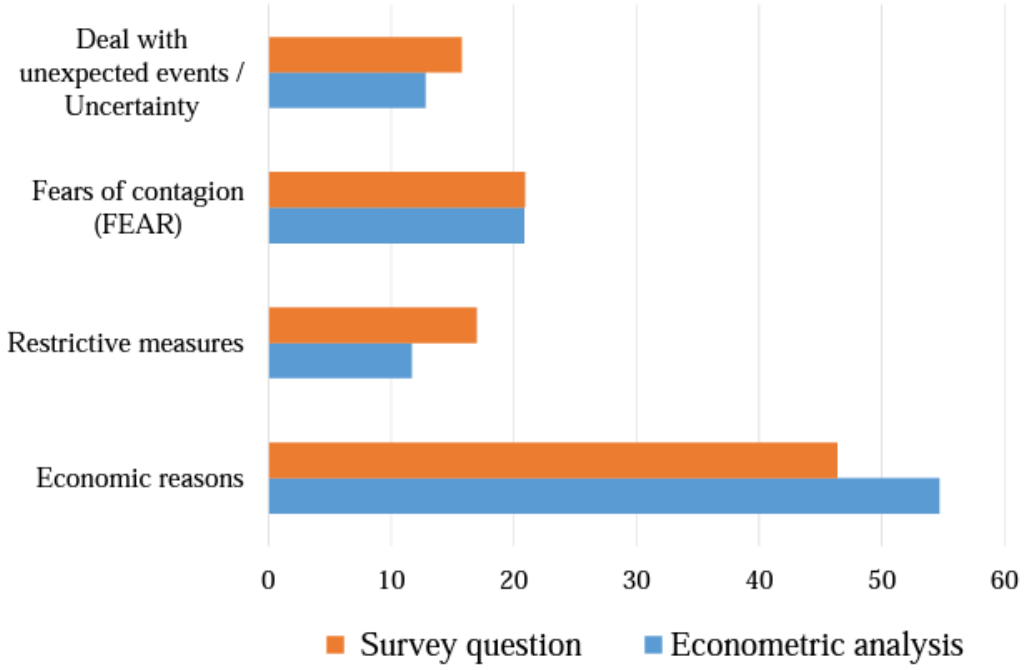


Figure 8.7 - Reasons for cutting expenditures during Covid-19 pandemic situation.

Source: (Guglielminetti and Rondinelli 2021)

Most of the agents interviewed, provide as main driver for the expenditure cutting, the economic reasons, implicitly suggesting how these kind of actors does not use the money to invest but kept them to face their economic problems.

It is, instead, more interesting to look to the other three categories for which the increase in savings could be transformed immediately or in a second moment into an investment.

8.5 Variance-Covariance and correlation matrixes

	Cap_Raise	Profes~S	Patents	SNE	INSNE	INSU	Age	Employ~s	Collec~t	Oth_AT	ATECO_J	ATECO_C	ATECO_K	ATECO_M	ATECO_G	ATECO_F	SB	SRL	SpA	Y_2016	Y_2017	Y_2018	Y_2019	Y_2020
Cap_Raise	.233686																							
Profession~S	.010619	.019627																						
Patents	.00631	-.006151	.190619																					
SNE	-.005998	.000963	-.001328	.039415																				
INSNE	.042819	.00073	-.00191	-.006912	.140535																			
INSU	-.03682	-.001692	.003238	-.032503	-.133624	.166127																		
Age	.2489	-.001045	-.121793	.063678	.909174	-.972852	17.9655																	
Employees	.366729	.062649	-.08543	.056476	.545724	-.6022	5.05048	15.939																
Collected~t	-.029256	-.012272	.126486	-.010131	.016045	-.005915	-.119574	.48666	2.43327															
Oth_AT	-.003113	.002668	-.007057	.007264	.006019	-.013284	-.01702	.074927	-.003807	.043587														
ATECO_J	-.025114	.005315	-.077626	-.011416	-.02968	.041096	-.39726	-.057078	-.043078	-.022831	.251142													
ATECO_C	.011263	-.001756	.071067	-.003093	.000477	.002615	.253051	.057887	.073687	-.00851	-.093607	.152325												
ATECO_K	.002885	-.000286	-.001162	-.000187	-.000768	.000955	-.003072	.009319	-.003523	-.000208	-.002283	-.000851	.004545											
ATECO_M	.008447	-.001109	.007306	.007534	.02032	-.027854	.222831	-.094292	-.00668	-.006849	-.075342	-.028082	-.000685	.128082										
ATECO_G	.012038	-.003404	.004151	.00083	.007472	-.008302	-.038605	.067663	-.00437	-.004151	-.045662	-.01702	-.000415	-.013699	.083022									
ATECO_F	-.008406	-.001429	.003321	-.000934	-.00384	.004774	-.019925	-.058427	-.012229	-.001038	-.011416	-.004255	-.000104	-.003425	-.002076	.022312								
SB	.001204	.000798	-.002325	-.000374	.00303	-.002657	.053217	-.013325	.007409	.004151	-.004566	-.001702	-.000042	.003196	-.00083	-.000208	.009049							
SRL	-.006019	-.004111	.007057	-.002698	-.006019	.008717	-.065172	-.061229	-.009867	-.002491	.004566	.00851	-.004359	-.006849	-.000415	.001038	-.008717	.043587						
SpA	.004815	.003312	-.004732	.003072	.002389	-.006061	.011955	.074554	.002458	-.00166	-6.6e-18	-.006808	.0044	.003653	.001245	-.00083	-.000332	-.034869	.035201					
Y_2016	-.00384	.005421	-.001245	-.000934	-.00384	.004774	-.051889	-.058427	-.034203	-.001038	.006849	.000311	-.000104	-.003425	-.002076	-.000519	-.000208	-.003528	.003736	.022312				
Y_2017	-.010315	-.000524	-.006061	-.003176	.000643	.002532	-.061353	.030573	-.011928	-.003528	.002283	-.0099	-.000353	.002055	-.002491	.011934	-.000706	-.005604	.00631	-.001764	.071627			
Y_2018	-.006413	-.001601	.006559	.005376	-.007327	.001951	.262931	.177273	-.0976	.003944	-.015982	.014342	-.001432	-.006164	.003321	.001972	.001702	.009755	-.011457	-.007161	-.024346	.216252		
Y_2019	.024097	.008531	.004483	-.011021	.009485	.001536	.010544	-.030075	.000947	.001453	-.002283	.013719	-.001225	.005251	-.010793	-.006123	.002117	-.001453	-.000664	-.006123	-.020818	-.004496	.197156	
Y_2020	-.003528	-.011827	-.003736	.009755	.001038	-.010793	-.160232	-.119344	.142785	-.00083	.009132	-.018472	.003113	.002283	.012038	-.007264	-.002906	.00083	.002076	-.007264	-.024699	-.100249	-.00572	.217933

Sample dimension: 220 campaigns

Figure 8.8 - Variance-covariance matrix for allocation objectives hypothesis variables .

	Cap_Raise	Profess~S	Patents	SNE	INSNE	INSU	Age	Employees	Collect~t	Oth_AT	ATECO_J	ATECO_C	ATECO_K	ATECO_M	ATECO_G	ATECO_F	SB	SRL	SpA	Y_2016	Y_2017	Y_2018	Y_2019	Y_2020
Cap_Raise	1.0000																							
Profession~S	0.1568	1.0000																						
Patents	0.0299	-0.1006	1.0000																					
SNE	-0.0625	0.0346	-0.0153	1.0000																				
INSNE	0.2363	0.0139	-0.0117	-0.0929	1.0000																			
INSU	-0.1869	-0.0296	0.0182	-0.4017	-0.8745	1.0000																		
Age	0.1215	-0.0018	-0.0658	0.0757	0.5722	-0.5631	1.0000																	
Employees	0.1900	0.1120	-0.0490	0.0713	0.3646	-0.3701	0.2985	1.0000																
Collected_~t	-0.0388	-0.0562	0.1857	-0.0327	0.0274	-0.0093	-0.0181	0.0781	1.0000															
Oth_AT	-0.0308	0.0912	-0.0774	0.1753	0.0769	-0.1561	-0.0192	0.0899	-0.0117	1.0000														
ATECO_J	-0.1037	0.0757	-0.3548	-0.1147	-0.1580	0.2012	-0.1870	-0.0285	-0.0551	-0.2182	1.0000													
ATECO_C	0.0703	-0.0321	0.4171	-0.0399	0.0033	0.0164	0.1530	0.0372	0.1210	-0.1044	-0.4786	1.0000												
ATECO_K	0.0885	-0.0303	-0.0395	-0.0140	-0.0304	0.0347	-0.0107	0.0346	-0.0335	-0.0147	-0.0676	-0.0323	1.0000											
ATECO_M	0.0488	-0.0221	0.0468	0.1060	0.1515	-0.1910	0.1469	-0.0660	-0.0120	-0.0917	-0.4201	-0.2010	-0.0284	1.0000										
ATECO_G	0.0864	-0.0843	0.0330	0.0145	0.0692	-0.0707	-0.0316	0.0588	-0.0097	-0.0690	-0.3162	-0.1513	-0.0214	-0.1328	1.0000									
ATECO_F	-0.1164	-0.0683	0.0509	-0.0315	-0.0686	0.0784	-0.0315	-0.0980	-0.0525	-0.0333	-0.1525	-0.0730	-0.0103	-0.0641	-0.0482	1.0000								
SB	0.0262	0.0599	-0.0560	-0.0198	0.0850	-0.0685	0.1320	-0.0351	0.0499	0.2090	-0.0958	-0.0458	-0.0065	0.0939	-0.0303	-0.0146	1.0000							
SRL	-0.0596	-0.1405	0.0774	-0.0651	-0.0769	0.1024	-0.0736	-0.0735	-0.0303	-0.0571	0.0436	0.1044	-0.3097	-0.0917	-0.0069	0.0333	-0.4389	1.0000						
SpA	0.0531	0.1260	-0.0578	0.0825	0.0425	-0.0793	0.0150	0.0995	0.0084	-0.0424	-0.0000	-0.0930	0.3479	0.0544	0.0230	-0.0296	-0.0186	-0.8902	1.0000					
Y_2016	-0.0532	0.2590	-0.0191	-0.0315	-0.0686	0.0784	-0.0820	-0.0980	-0.1468	-0.0333	0.0915	0.0053	-0.0103	-0.0641	-0.0482	-0.0233	-0.0146	-0.1131	0.1333	1.0000				
Y_2017	-0.0797	-0.0140	-0.0519	-0.0598	0.0064	0.0232	-0.0541	0.0286	-0.0286	-0.0631	0.0170	-0.0948	-0.0196	0.0215	-0.0323	0.2985	-0.0277	-0.1003	0.1257	-0.0441	1.0000			
Y_2018	-0.0285	-0.0246	0.0323	0.0582	-0.0420	0.0103	0.1334	0.0955	-0.1345	0.0406	-0.0686	0.0790	-0.0457	-0.0370	0.0248	0.0284	0.0385	0.1005	-0.1313	-0.1031	-0.1956	1.0000		
Y_2019	0.1123	0.1371	0.0231	-0.1250	0.0570	0.0085	0.0056	-0.0170	0.0014	0.0157	-0.0103	0.0792	-0.0409	0.0330	-0.0844	-0.0923	0.0501	-0.0157	-0.0080	-0.0923	-0.1752	-0.4092	1.0000	
Y_2020	-0.0156	-0.1808	-0.0183	0.1053	0.0059	-0.0567	-0.0810	-0.0640	0.1961	-0.0085	0.0390	-0.1014	0.0989	0.0137	0.0895	-0.1042	-0.0654	0.0085	0.0237	-0.1042	-0.1977	-0.4618	-0.4135	1.0000

Sample dimension: 220 campaigns

Figure 8.9 - Correlation matrix for allocation objectives hypothesis variables.

	D_Int_As	D_Tan_As	D_W_Cap	D_Pers_C	D_Serv_C	D_Oth_C	D_Op_C	Oth_Port	MamaCr~d	BackT~24	CrowdF~e	OPStart	_200_C~d	WeAreS~g	StarsUp	Shareh~s	Liquid~n	Revenues	Total_~t
D_Int_As	32.3273																		
D_Tan_As	-2.99397	28.3391																	
D_W_Cap	-5.24072	3.21321	31.2659																
D_Pers_C	-6.01328	7.49473	2.52272	43.5921															
D_Serv_C	1.50163	1.19234	1.10131	4.93763	15.8638														
D_Oth_C	1.26018	1.45606	.568623	.318237	3.42408	15.7237													
D_Op_C	-2.12659	3.40792	3.68944	8.0417	1.84698	4.13039	23.9677												
Oth_Port	-.095836	.003222	-.074036	-.138022	.091169	-.009598	-.070945	.019226											
MamaCrowd	.135586	.661851	.171835	.340962	-.342435	.128241	.203241	-.005984	.213437										
BackToWork24	.044727	-.399418	-.014707	-.255947	.253738	-.074935	-.249626	-.003947	-.061837	.161828									
CrowdFundMe	-.172712	.139434	.035413	.108164	-.002287	.019182	.074026	-.002165	-.033911	-.022367	.098846								
OPStart	-.109052	-.162155	-.005024	.118941	-.036237	-.274513	-.071688	-.002037	-.031916	-.021051	-.011544	.09371							
_200_Crowd	.094068	.026848	.060585	-.022468	-.041496	.100721	.104417	-.002165	-.033911	-.022367	-.012266	-.011544	.098846						
WeAreStart~g	-.015951	-.03923	-.147133	.040491	.165381	.124494	.029429	-.002292	-.035905	-.023682	-.012987	-.012223	-.012987	.103896					
StarsUp	.11917	-.230551	-.026934	-.192121	-.087833	-.013592	-.018856	-.000637	-.009974	-.006578	-.003608	-.003395	-.003608	-.00382	.031619				
Shareholders	-1.01607	5.64104	15.3979	-11.1064	-1.61864	10.3011	10.1884	-.212673	-.098761	.628088	.688099	-.589593	-.07007	-.576691	.231602	412.095			
Liquidity_~n	-.682448	1.29437	2.87066	.7122	.744335	-.284645	.779748	.049773	-.15381	-.123172	-.00263	.067662	-.00429	.096842	.069625	2.72058	5.70753		
Revenues	-.145279	3.89533	1.98373	3.3831	1.97876	1.98975	4.03545	-.050498	.196373	-.052448	.007684	-.000261	.068841	-.101941	-.067749	6.48458	-.2804	5.16063	
Total_Asset	.352037	1.61749	1.49078	1.7169	.633607	1.39595	1.6681	-.032188	.100926	-.01869	.024464	-.006148	-.001768	-.042119	-.024476	4.20966	-.115072	1.12183	.956731

Sample dimension: 154 campaigns

Figure 8.10 - Variance-covariance matrix for debt variations hypothesis variables.

	D_Int_As	D_Tan_As	D_W_Cap	D_Pers_C	D_Serv_C	D_Oth_C	D_Op_C	Oth_Port	MamaCrowd	BackToWork24	CrowdFunde	OPStart	_200_Crowd	WeAreStarte	StarsUp	Shareholders	Liquidity_m	Revenues	Total_Asset
D_Int_As	1.0000																		
D_Tan_As	-0.0989	1.0000																	
D_W_Cap	-0.1648	0.1079	1.0000																
D_Pers_C	-0.1602	0.2132	0.0683	1.0000															
D_Serv_C	0.0663	0.0562	0.0495	0.1878	1.0000														
D_Oth_C	0.0559	0.0690	0.0256	0.0122	0.2168	1.0000													
D_Op_C	-0.0764	0.1308	0.1348	0.2488	0.0947	0.2128	1.0000												
Oth_Port	-0.1216	0.0044	-0.0955	-0.1508	0.1651	-0.0175	-0.1045	1.0000											
MamaCrowd	0.0516	0.2691	0.0665	0.1118	-0.1861	0.0700	0.0899	-0.0934	1.0000										
BackToWork24	0.0196	-0.1865	-0.0065	-0.0964	0.1584	-0.0470	-0.1268	-0.0708	-0.3327	1.0000									
CrowdFundMe	-0.0966	0.0833	0.0201	0.0521	-0.0018	0.0154	0.0481	-0.0497	-0.2335	-0.1768	1.0000								
OPStart	-0.0627	-0.0995	-0.0029	0.0588	-0.0297	-0.2261	-0.0478	-0.0480	-0.2257	-0.1709	-0.1199	1.0000							
_200_Crowd	0.0526	0.0160	0.0345	-0.0108	-0.0331	0.0808	0.0678	-0.0497	-0.2335	-0.1768	-0.1241	-0.1199	1.0000						
WeAreStarte	-0.0087	-0.0229	-0.0816	0.0190	0.1288	0.0974	0.0186	-0.0513	-0.2411	-0.1826	-0.1282	-0.1239	-0.1282	1.0000					
StarsUp	0.1179	-0.2436	-0.0271	-0.1636	-0.1240	-0.0193	-0.0217	-0.0258	-0.1214	-0.0920	-0.0645	-0.0624	-0.0645	-0.0666	1.0000				
Shareholders	-0.0088	0.0522	0.1357	-0.0829	-0.0200	0.1280	0.1025	-0.0756	-0.0105	0.0769	0.1078	-0.0949	-0.0110	-0.0881	0.0642	1.0000			
Liquidity_m	-0.0502	0.1018	0.2149	0.0452	0.0782	-0.0300	0.0667	0.1503	-0.1394	-0.1282	-0.0035	0.0925	-0.0057	0.1258	0.1639	0.0561	1.0000		
Revenues	-0.0112	0.3221	0.1562	0.2256	0.2187	0.2209	0.3629	-0.1603	0.1871	-0.0574	0.0108	-0.0004	0.0964	-0.1392	-0.1677	0.1406	-0.0517	1.0000	
Total_Asset	0.0633	0.3106	0.2726	0.2659	0.1626	0.3599	0.3483	-0.2373	0.2233	-0.0475	0.0796	-0.0205	-0.0058	-0.1336	-0.1407	0.2120	-0.0492	0.5049	1.0000

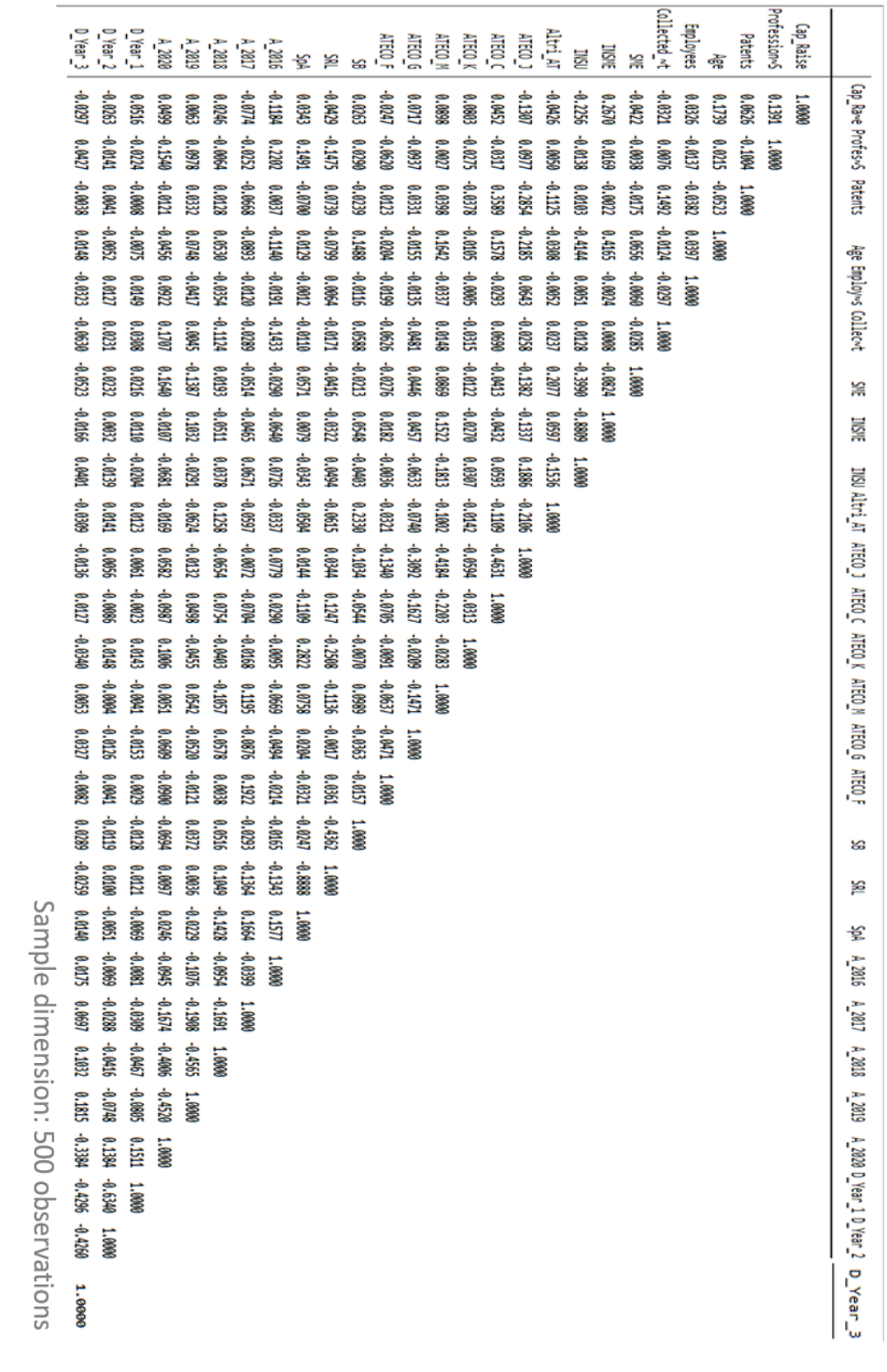
Sample dimension: 154 campaigns

Figure 8.11 - Correlation matrix for debt variations hypothesis variables

	Cap_Raise	Profess~S	Patents	Age	Employs	Collect	SNE	INSNE	INSU	Altri_AT	ATECO_J	ATECO_C	ATECO_K	ATECO_M	ATECO_G	ATECO_F	SB	SRL	SpA	A_2016	A_2017	A_2018	A_2019	A_2020	D_Year_1	D_Year_2	D_Year_3
Cap_Raise	.237018																									
Profession~S	.009716	.028599																								
Patents	.013419	-.006341	.193743																							
Age	.363319	.013251	-.008741	18.4059																						
Employees	.569619	-.078388	-.602565	6.10285	1285.02																					
Collected_wt	-.023995	.001681	.108875	-.081922	-1.63346	2.36035																				
SNE	-.003832	-.000101	-.001435	.052473	-.004016	-.008165	.034774																			
INSNE	.046958	.000878	-.000349	.645643	-.031182	.000436	-.005555	.130545																		
INSU	-.043126	-.000777	-.001784	-.698116	.071343	.007728	-.020218	-.12499	.154208																	
Altri_AT	-.004441	.000153	-.010597	-.028222	-.039519	.007786	.008289	.004617	-.012986	.045788																
ATECO_J	-.031776	.007005	-.062741	-.468152	1.11526	-.019792	-.012874	-.02412	.036594	-.022309	.249475															
ATECO_C	.008754	-.001805	.062774	.268986	-.417715	.042094	-.003062	-.004196	.009259	-.009427	-.001912	.1579														
ATECO_K	.002469	-.000249	-.00105	-.002854	-.001122	-.003061	-.000144	-.000617	.000762	-.000192	-.001876	-.000786	.003992													
ATECO_M	.016289	.000144	.006521	.262333	-.449379	.008455	.006036	.020477	-.026513	-.007984	-.077844	-.032601	-.000665	.138721												
ATECO_G	.010389	-.004001	.004333	-.019816	-.143727	-.022001	.002477	.004918	-.007395	-.004713	-.045956	-.019246	-.000393	-.016301	.088573											
ATECO_F	-.001683	-.001247	.000762	-.012765	-.0998	-.013481	-.000721	.000922	-.0002	-.000962	-.009379	-.003928	-.00008	-.003327	-.001964	.019639										
SB	.001395	.000454	-.001146	.069595	-.045451	.00985	-.000433	.002156	-.001723	.005435	-.005627	-.002357	-.000048	.004016	-.001178	-.00024	.01188									
SRL	-.00497	-.005024	.007735	-.001443	.05491	-.006246	-.001844	-.002766	.004609	-.003126	.004088	-.011784	-.003768	-.01006	-.00012	.001202	-.011303	.056513								
SpA	.003575	.00458	-.006589	-.011848	-.009459	-.003604	.002277	.000609	-.002886	-.002309	.001539	-.009427	.003816	.006044	.001299	-.000962	-.000577	-.04521	.045768							
A_2016	-.000465	.00464	-.000236	-.071808	-.100361	-.032318	-.000794	-.003395	.004188	-.001058	.005715	.001691	-.000088	-.003659	-.00216	-.000441	-.000265	-.004689	.004954	.021559						
A_2017	-.000363	-.000899	-.007307	-.095182	-.106693	-.011033	-.002381	-.004172	.006553	-.003174	-.00069	-.000955	-.000265	.011066	-.006481	.006693	-.000794	-.008956	.00885	-.001455	.061768					
A_2018	.005419	-.000418	.002549	.10315	-.575792	-.078288	.001635	-.008369	.006733	.0122	-.014814	.013579	-.001154	-.017844	.007792	.00024	.002549	-.011303	-.013852	-.006349	-.019046	.205467				
A_2019	.001443	.006556	.006934	.152224	-.708617	.003267	-.012265	.017675	-.005411	-.006333	-.003126	.009379	-.001363	.009579	-.007335	-.000802	.001924	.000401	-.002325	-.007495	-.022485	-.098116	.22485			
A_2020	.010966	-.009998	-.002413	-.008385	1.49146	.118372	.013804	-.001739	-.012064	-.001635	.013114	-.017699	.00287	.000858	.008184	-.005691	-.003415	.001042	.002373	-.006261	-.018782	-.081956	-.096754	.203752		
D_Year_1	.012265	-.00157	-.00018	-.015711	.261323	.023113	.001964	.001944	-.003908	.001283	-.001483	-.000441	-.000441	-.000741	-.002224	.0002	-.000681	.001403	-.000721	-.000581	-.003747	-.010341	-.018637	.033307	.238377	
D_Year_2	-.006236	-.006986	.00087	-.010854	.222365	.017293	.002108	.000557	-.002665	-.001475	-.001355	-.001659	.000457	-.000076	-.001832	.000281	-.000633	.001162	-.000529	-.000493	-.003483	-.009186	-.017275	.030437	-.150642	.237479
D_Year_3	-.006028	.002555	-.000689	.026565	-.483687	-.040405	-.004072	-.002501	.006573	-.002758	-.002838	.0021	-.000898	.000818	.004056	-.000481	.001315	-.002565	.001251	.001074	.00723	.015927	.035912	-.063743	-.087535	-.086637	.174172

Sample dimension: 500 observations

Figure 8.12 - Covariance-variance matrix for the revenues hypothesis.



	Cap_Raise	Profess~S	Patents	Age	Employees	Collect~t	SME	INSME	INSU	Altri_AT	ATECO_J	ATECO_C	ATECO_K	ATECO_M	ATECO_G	ATECO_F	SB	SRL	SpA	A_2016	A_2017	A_2018	A_2019	A_2020	D_Year_1	D_Year_2	D_Year_3
Cap_Raise	1.0000																									
Profession~S	0.1391	1.0000																								
Patents	0.0626	-0.1004	1.0000																							
Age	0.1739	0.0215	-0.0523	1.0000																						
Employees	0.0326	-0.0137	-0.0382	0.0397	1.0000																					
Collected_~t	-0.0321	0.0076	0.1492	-0.0124	-0.0297	1.0000																				
SME	-0.0422	-0.0038	-0.0175	0.0656	-0.0060	-0.0285	1.0000																			
INSME	0.2670	0.0169	-0.0022	0.4165	-0.0024	0.0008	-0.0824	1.0000																		
INSU	-0.2256	-0.0138	0.0103	-0.4144	0.0051	0.0128	-0.3990	-0.8089	1.0000																	
Altri_AT	-0.0426	0.0050	-0.1125	-0.0308	-0.0052	0.0237	0.2077	0.0597	-0.1536	1.0000																
ATECO_J	-0.1307	0.0977	-0.2654	-0.2185	0.0643	-0.0258	-0.1382	-0.1337	0.1886	-0.2106	1.0000															
ATECO_C	0.0452	-0.0317	0.3589	0.1578	-0.0293	0.0690	-0.0413	-0.0432	0.0593	-0.1109	-0.4631	1.0000														
ATECO_K	0.0803	-0.0275	-0.0378	-0.0105	-0.0005	-0.0315	-0.0122	-0.0270	0.0307	-0.0142	-0.0594	-0.0313	1.0000													
ATECO_M	0.0898	0.0027	0.0398	0.1642	-0.0337	0.0148	0.0869	0.1522	-0.1813	-0.1002	-0.4184	-0.2203	-0.0283	1.0000												
ATECO_G	0.0717	-0.0937	0.0331	-0.0155	-0.0135	-0.0481	0.0446	0.0457	-0.0633	-0.0740	-0.3892	-0.1627	-0.0209	-0.1471	1.0000											
ATECO_F	-0.0247	-0.0620	0.0123	-0.0204	-0.0199	-0.0626	-0.0276	0.0182	-0.0036	-0.0321	-0.1340	-0.0705	-0.0091	-0.0637	-0.0471	1.0000										
SB	0.0263	0.0290	-0.0239	0.1498	-0.0116	0.0588	-0.0213	0.0548	-0.0403	0.2330	-0.1034	-0.0544	-0.0070	0.0989	-0.0363	-0.0157	1.0000									
SRL	-0.0429	-0.1475	0.0739	-0.0799	0.0064	-0.0171	-0.0416	-0.0322	0.0494	-0.0615	0.0344	0.1247	-0.2508	-0.1136	-0.0017	0.0361	-0.4362	1.0000								
SpA	0.0343	0.1491	-0.0700	0.0129	-0.0012	-0.0110	0.0571	0.0079	-0.0343	-0.0504	0.0144	-0.1109	0.2822	0.0758	0.0204	-0.0321	-0.0247	-0.8888	1.0000							
A_2016	-0.1184	0.2202	0.0037	-0.1140	-0.0191	-0.1433	-0.0290	-0.0640	0.0726	-0.0337	0.0779	0.0290	-0.0095	-0.0669	-0.0494	-0.0214	-0.0165	-0.1343	0.1577	1.0000						
A_2017	-0.0774	-0.0252	-0.0668	-0.0883	-0.0120	-0.0289	-0.0514	-0.0465	0.0671	-0.0597	-0.0072	-0.0704	-0.0168	0.1195	-0.0876	0.1922	-0.0293	-0.1364	0.1664	-0.0399	1.0000					
A_2018	0.0246	-0.0064	0.0128	0.0530	-0.0354	-0.1124	0.0193	-0.0511	0.0378	0.1258	-0.0654	0.0754	-0.0403	-0.1057	0.0578	0.0038	0.0516	0.1049	-0.1428	-0.0954	-0.1691	1.0000				
A_2019	0.0063	0.0978	0.0332	0.0748	-0.0417	0.0045	-0.1387	0.1032	-0.0291	-0.0624	-0.0132	0.0498	-0.0455	0.0542	-0.0520	-0.0121	0.0372	0.0036	-0.0229	-0.1076	-0.1908	-0.4565	1.0000			
A_2020	0.0499	-0.1540	-0.0121	-0.0456	0.0922	0.1707	0.1640	-0.0107	-0.0681	-0.0169	0.0582	-0.0987	0.1006	0.0051	0.0609	-0.0900	-0.0694	0.0097	0.0246	-0.0945	-0.1674	-0.4006	-0.4520	1.0000		
D_Year_1	0.0516	-0.0224	-0.0008	-0.0075	0.0149	0.0308	0.0216	0.0110	-0.0204	0.0123	0.0061	-0.0023	0.0143	-0.0041	-0.0153	0.0029	-0.0128	0.0121	-0.0059	-0.0081	-0.0309	-0.0467	-0.0805	0.1511	1.0000	
D_Year_2	-0.0263	-0.0141	0.0041	-0.0052	0.0127	0.0231	0.0232	0.0032	-0.0139	0.0141	0.0056	-0.0086	0.0148	-0.0004	-0.0126	0.0041	-0.0119	0.0100	-0.0051	-0.0069	-0.0288	-0.0416	-0.0748	0.1384	-0.6340	1.0000
D_Year_3	-0.0297	0.0427	-0.0038	0.0148	-0.0323	-0.0630	-0.0523	-0.0166	0.0401	-0.0309	-0.0136	0.0127	-0.0340	0.0053	0.0327	-0.0082	0.0289	-0.0259	0.0140	0.0175	0.0697	0.1032	0.1815	-0.3384	-0.4296	-0.4260	1.0000

Sample dimension: 500 observations

Figure 8.13 - Correlation matrix for the revenues deviation hypothesis.

8.6 Reduced and super-reduced-form financial statements

Reduced-form financial statements are disciplined by Italian Civil Code (Art. 2435-bis c.c subsequently modified by "D.Lgs. n. 139/2015"), in particular it allows companies that did not issued securities traded on regulated market and that satisfy at least two of the following constraints:

- total assets value (evaluated as sum of balance sheet classes: A, B, C and D) lower than € 4.400.000 .
- revenues (evaluated as A1 point of the income statement) lower than € 8.800.000.
- average number of employees during the year lower than 50 units.

The right of drawn up such kind of balance sheet expires when two or more of the previous constraint are unsatisfied for the second consecutive year.

The reduced-form balance sheet just includes the voices characterized by capital letters and Roman numbers.
Additionally, the voices A ("Crediti verso soci per versamenti ancora dovuti" – receivables from shareholders for payments still due) and D ("Ratei e risconti" – accruals and deferrals), could be included in the voice C.II ("Crediti" – receivables.), and in the same way for liabilities, the voice E ("Ratei e risconti" – accruals and deferrals), could be included in the section D ("Debiti" – debt).
Voices C.II and D must be only divided between those due within the current financial year and the ones subsequent to them.
Companies drawing up such kind of balance sheet could just indicate the net value of tangible and intangible assets without specifying their composition, just accounting for depreciation and amortization.

For what regard the income statement many more aggregations are possible but nothing that influence the work done in this dissertation.

Additionally, companies with the possibility to adopt the reduced form have the possibility to not drawn up any cashflow statement, while they are still obliged to present the note to the financial statements.

There is even a more peculiar kind of balance sheet, and it is called the “super-reduced form”. Companies eligible for drawing up such kind of financial statements are not obliged to present both the cashflow and the note to the statement, presenting instead the total amount of guarantees and commitments and the total amount paid to directors statutory auditors.
In particular, in order to have the possibility to use this scheme, the companies must respect two of the following constraint:

- Total asset value lower than € 175.000
- Revenues lower than € 350.000
- average number of employees during the year lower than 5 units.

Again, the right of drawn up such kind of balance sheet expires when two or more of the previous constraint are unsatisfied for the second consecutive year.

In particular, these company can avoid indicating the depreciation and amortization for tangible and intangible assets (however, valued keeping it in consideration) in the balance sheet.

For the income statement, instead, there is a higher possibility to aggregate, and the elimination of the extraordinary part classified under the point E (“Proventi e oneri straordinari” – extraordinary gains and losses).

Chapter 9
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