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Impact investing in private equity

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Author: Annemari Kirppu		ABSTRACT OF MASTER'S THESIS
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<p>Responsibility in investing has become a major trend among professional investors in the past decade. Sustainability and corporate responsibility are increasingly important to companies and individuals alike and therefore there is an increasing amount of demand for sustainable and responsible investing opportunities. Following that trend a more ambitious approach has also emerged: impact investing. In impact investing the goal is to not only avoid investing in harmful industries or companies but to invest in those that do good – either socially or environmentally.</p> <p>This study focuses on private equity impact investments and the methods and practices PE investors use when investing for impact. The literature review provides a clarification of the definition of impact investing, presents the impact modelling and measuring methods available and discusses the specific challenges related to impact investing in private equity. The quantitative analysis is conducted combining survey responses gathered from European private equity impact fund managers with the portfolio company data of those funds. The data of the portfolio companies and their respective investors is collected using Preqin and Crunchbase and together with the collected survey data it forms the sample of the regression analyses conducted in this study.</p> <p>The effect that the investors' financial and impact targets, modelling and measuring methods and compensations arrangements have on the net impact and the financial performance of the investments was tested in the regression analysis. The findings indicate that focusing only on social impacts and linking GP compensation to impact targets, might decrease the financial performance of investments. Moreover, using own modelling methods was found to improve the financial performance of investments. Some specific impact measuring methods on the other hand were found to increase the achieved net impact while others were found to decrease the financial performance of investments.</p>		
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<p>Vastuullisesta sijoittamisesta on tullut merkittävä trendi ammattimaisten sijoittajien keskuudessa. Kestävän kehityksen periaatteet sekä yritysvastuu ovat yhä tärkeämpiä asioita niin yrityksille kuin kuluttajillekin, minkä vuoksi myös vastuullisille sijoitusmahdollisuuksille on yhä enemmän kysyntää. Vastuullisuustrendin myötä on kehittynyt vielä kunnianhimoisempikin ilmiö: vaikuttavuussijoittaminen. Vaikuttavuussijoittamisessa strategiana ei ole vain välttää sijoittamista haitallisiin toimialoihin tai yrityksiin, vaan sijoittaa niihin, jotka saavat aikaan jotain hyvää joko sosiaalisesti tai ympäristön näkökulmasta.</p> <p>Tämä tutkimus keskittyy pääomasijoitusten muodossa tehtyjen vaikuttavuussijoitusten tutkimiseen sekä niihin toimintatapoihin ja menetelmiin, joita kyseisten sijoitusten tekemisessä on käytetty. Kirjallisuuskatsaus selvittää vaikuttavuussijoittamisen määritelmää, esittelee erilaisia vaikuttavuuden mallinnus- ja mittausmenetelmiä ja pohtii vaikuttavuussijoittamiseen liittyviä erityisiä haasteita pääomasijoituslalla. Kvantitatiivinen analyysi toteutettiin yhdistämällä eurooppalaisilta vaikuttavuussijoittajilta kerättyyn kyselydataan tietoja kyseisten sijoittajien portfolioyhtiöistä. Portfolioyhtiökohtainen data on kerätty Preqin- ja Crunchbase-tietokannoista ja se muodostaa yhdessä kyselydatan kanssa tämän tutkimuksen regressioanalyysien otoksen.</p> <p>Regressioanalyysillä tutkittiin eri taloudellisten tavoitteiden ja vaikuttavuustavoitteiden, mallinnus- ja mittausmenetelmien käytön sekä kompensatorakenteiden yhteyttä sijoitusten vaikuttavuuteen ja tuottoon. Tulokset viittaavat siihen, että sosiaalisten vaikutusten tavoitteluun keskittyminen sekä GP:n kompensaaion sitominen saavutettuihin vaikutuksiin saattavat heikentää sijoitusten taloudellista tuottoa. Lisäksi tulokset osoittavat, että omien mallinnusmenetelmien käyttö parantaa sijoitusten taloudellista tuottoa. Jotkin tietyt vaikutusten mittausmenetelmät saattavat myös parantaa sijoitusten vaikuttavuutta, kun taas toiset saattavat heikentää niiden taloudellista tuottoa.</p>		
Asiasanat: vaikuttavuussijoittaminen, pääomasijoittaminen, vastuullinen sijoittaminen, vaikuttavuuden mittaaminen, vaikuttavuus, taloudellinen tuotto		

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Abbreviations

PE	Private equity
VC	Venture capital
CVC	Corporate venture capital
GP	General partner (fund manager)
LP	Limited partner
SRI	Socially responsible investing
ESG	Environmental, social, governance
BoP	Bottom of the Pyramid
GIIN	Global Impact Investing Network
IOOI	Input, output, outcome, impact
IRIS	Impact Reporting and Investment Standards
GIIRS	Global Impact Investment Rating System
SROI	Social return on investment
SDG	Sustainable development goal
IMP	Impact Management Project

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1 Introduction

1.1 Background

Responsibility in investing has become hugely popular; according to some estimates almost one fourth of all wealth under professional management is invested following some kind of a socially responsible investing (SRI) strategy (Singh, 2018). Initially, the core idea of responsible investing was to avoid investing in companies that operate in undesirable industries such as tobacco, alcohol or weapons, also known as “negative screening”, but nowadays it can also include what is known as “positive screening” i.e. emphasizing investing in companies that operate in industries generally regarded as good such as green energy or recycling (Combs, 2014).

ESG investing i.e. considering environmental, social and governance factors in investment risk analysis is a more sophisticated form of responsible investing than simple screening strategies. It has also gained huge momentum; in Europe the use of ESG integration strategies have grown at a CAGR of 27 % between 2015 and 2017 measured in total assets under management (Eurosif, 2018). Furthermore, the growth is only expected to continue as the European Union’s Commission has set out an agenda for creating a common ESG framework and measurement system for all professional investors in Europe. Disclosing how ESG factors are considered in the risk analysis process will become part of obligatory regulation for institutional investors and asset managers and it is expected to take effect already in 2020 (European Commission, 2018).

What is the driver behind these trends? Why are investment banks and wealth managers suddenly so interested in sustainability and social issues? First of all, people are becoming more and more aware of the gravity of the environmental and social issues we face and the negative effects they have on the planet and our lives. Secondly, it has become widely accepted that the complex and even wicked environmental and social challenges we face cannot be solved solely by philanthropy or governmental funding – market forces need to be included in some way (Bell, 2013; Jackson, 2013).

This thinking applies especially to the younger generations: according to a study conducted by Deloitte (2018), 39 % of millennials think that one of the main objectives of business should be to improve society and 33 % feel that businesses should aim to protect the environment while only 24 % responded that generating profits should be the main goal. Thus, as the younger

generations slowly gain control over the world's total wealth, bankers and fund managers are suddenly facing an increasing demand for responsible investing from their investors who want that their investments generate some positive societal impacts instead of great financial returns only (Ernst & Young, 2017).

Last, but not least by any means, the interest in responsible investing has been increased by recent studies that have indicated that responsibility and sustainability can in fact improve financial performance. It has been shown in many studies that integrating ESG factors into investment decision-making outperforms non-ESG strategies, and that considering ESG factors through active ownership improves target companies' operational performance, increases stock prices and reduces risks (Clark, Feiner, & Viehs, 2015).

Another way to look at the profitability of responsible and sustainable investing, is to think of the risks and opportunities presented by environmental and social issues. As stated in the European Commission's Action Plan on sustainable finance (European Commission, 2018) climate change already causes huge financial losses to companies in the form of natural disasters, which will decrease their profitability in the long-run. Thus, it is clear that mitigating these environmental risks is crucial, but also that the companies not only mitigating risks but actually taking advantage of the business possibilities by solving these issues have huge potential in terms of financial upsides. That is where impact investors step in.

The term impact investing was originally coined in 2007 at an event organized by the Rockefeller foundation's initiative where some of the world's leaders in finance, philanthropy and development gathered together with the aim of figuring out new ways to use investments for social and environmental good (Höchstädter & Scheck, 2014; World Economic Forum, 2013). Since then, there has been much talk about impact investing among practitioners and academics alike and the idea has gained good traction. According to the Global Impact Investing Network (GIIN), impact investing has grown rapidly to be a USD 502 billion industry and has been growing with a CAGR of 61 % in 5 years as can be seen in Figure 1 (Mudaliar, Schiff, & Bass, 2016; Mudaliar, Schiff, Bass, & Dithrich, 2017; Mudaliar, Bass, & Dithrich, 2018; Mudaliar, Bass, Nova, & Dithrich, 2019; Saltuk, El Idrissi, Bouri, Mudaliar, & Schiff, 2014; Saltuk, El Idrissi, Bouri, Mudalier, & Schiff, 2015). Therefore, some of the most conservative estimates stating that impact investing could become a USD 400 billion industry by 2020 have already been surpassed and based on this growth trend, the bolder estimates stating that impact investing is on track to become a USD 1 trillion industry by 2020, may well be realized (O'Donohoe, Leijonhufvud, Saltuk, Bugg-Levine, & Brandenburg, 2010).

However, despite the remarkable growth in the past, there are still some challenges to overcome in order to enable that growth track to continue. First of all, there is some terminological ambiguity regarding the definition of impact investing and what it stands for (Höchstädter & Scheck, 2014; Mendell & Barbosa, 2013). Because of the lack of a uniform definition related terms, such as responsible investing, are sometimes used interchangeably with impact investing (Harji & Jackson, 2012).

Secondly, it is clear that the challenges of modelling and measuring impact have not been solved yet, as they continue to be a hot topic in the impact investing industry in more ways than one; impact measurement is simultaneously where most of the criticism seems to be aimed at as well as where most of the development efforts take place. The critics say that measuring diverse social and environmental impacts in different environments in a comparable way is simply impossible (Kroeger & Weber, 2014). On the other hand, many major actors in the financial sector such as the World Economic Forum, the Global Impact Investing Network and the Impact Management Project are currently making great efforts to bring the measuring of impact to a good standardized level (Reisman & Olazabal, 2016; Ruff & Olsen, 2018).

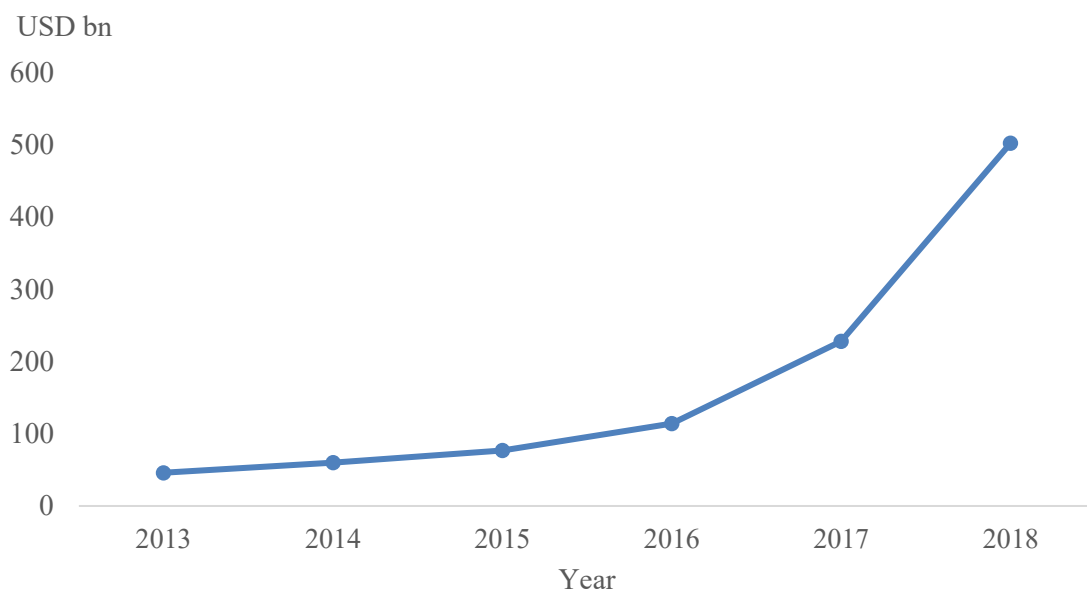


Figure 1. Impact investing assets under management (AUM) globally in 2013-2017 (Mudaliar et al., 2016; Mudaliar et al., 2017; Mudaliar et al., 2018; Mudaliar et al., 2019; Saltuk et al., 2014; Saltuk et al., 2015)

A third controversial topic in impact investing is that of the financial returns. The proponents of impact investing claim that striving for impact does not mean sacrificing financial returns but that

in fact it can even increase them (Grabenwarter & Liechtenstein, 2011). Many however, refuse to believe that such a correlation could exist and instead assert that achieving impact can only be done by compromising profits (Cheng, 2011; Evans, 2013; Mitchell, Kingston, & Goodall, 2008).

All in all, it can be said that impact investing is a nascent industry that has gained incredible traction and growth in the past decade. It follows and further develops the ideas previously related to concepts such as responsible investing and ESG investing and can therefore be viewed as the next step of the evolution in the trend of sustainability in financing. However, there are still many challenges to be resolved especially in terms of definition, measuring and profitability. This study addresses these existing challenges and aims to provide answers to them in order to promote the development of the impact investing industry.

1.2 Research objective and questions

The general objective of this study is to produce useful knowledge and benchmarking data about impact investing that could help advance and grow the industry. More specifically, the aim is to find out how impact investors currently carry out their activities in private equity, which methods and practices they use and ultimately which of them lead to the best results both in terms of impact and financial returns.

However, in order to be able to produce benchmarking data, the definition of impact investing needs to be clarified first. According to the latest Annual Impact Investor Survey by GIIN, 77 % of the respondents think that the lack of a common understanding and segmentation of impact investing is a significant or moderate challenge to the industry's growth (Mudaliar et al., 2019).

Höchstädter and Scheck (2014) conclude in their assessment of academics and impact investing practitioners that there is indeed some confusion between impact investing and related concepts such as responsible investing and themed investments. However, they also note that regarding the core elements of impact investing, there is actually less disagreement than expected (Höchstädter & Scheck, 2014). Still, as the impact investing industry is constantly developing, the understanding of the term, especially by practitioners, has most likely evolved and maybe converged more in the past few years. Therefore, the topic merits further research.

(1) How is impact investing defined by practitioners? How does it relate to and differ from related concepts such as socially responsible investing and ESG investing?

A common topic of debate regarding the definition of impact investing is the profitability of it: can investors generate market rate returns while also helping people or the environment? Some claim that is impossible to make money while having a real impact (Cheng, 2011; Evans, 2013; Mitchell et al., 2008), while others state that in the right business models positive impacts and profit in fact correlate (Grabenwarter & Liechtenstein, 2011). Thus, it is interesting to study, what kind of financial targets do impact investors have and do they have to compromise on profits in order to achieve positive impact.

In addition to financial targets, the impact targets are also an interesting topic of research. Initially impact investing was mostly associated with social impacts and the environmental aspect was taken into account only later on. According to my knowledge, the specific impact targets that investors have, have not been studied previously and the share of socially focused and environmentally focused investors has not been studied. Thus, the impact targets of impact investors form an interesting research question along with the financial targets.

(2) What kinds of financial targets and impact targets do private equity impact investors have? Are they willing to compromise on profits?

The evident impact modelling and measurement challenges are clearly also interesting and relevant topics to study further. According to the Annual Impact Investor Survey by GIIN, 75 % of the respondents think that the lack of sophistication in measurement practices of impact investing is a significant or moderate challenge to the industry's growth (Mudaliar et al., 2019). Many academics even claim that measuring different impacts in different environments in a comparable way is an impossible task (Kroege & Weber, 2014).

It is evident that there are still a lot of open questions and challenges in the field of impact measurement. Finding out how impact investors measure and model their impact and what benefits and drawbacks the different methods have, would be a useful benchmark and starting point for budding impact investors.

(3) What methods of impact modelling and impact measurement are used by private equity impact investors and how satisfied are they with them?

In addition to modelling and measuring, Höchstädter and Scheck (2014) note that there is still room for future research in studying the practicalities of impact investing more closely. In their opinion, interesting research topics could be for example how are the impact business models

assessed and what constitutes as an investable business model, how do the impact investors gain their share of the profits and how is risk management handled.

The challenge is of course that these practicalities depend largely on the asset class that is used to conduct impact investments. While social impact bonds (SIB) and other asset classes used in impact investing have been studied to some extent (Liang, Mansberger, & Spieler, 2014; Männistö, 2016), interestingly enough, private equity, the most commonly used asset class by impact investors (Mudaliar et al., 2018) has not gained similar dedicated research. Furthermore, as the private equity industry has some unique characteristics stemming from the LP-GP structure and the distribution of profits among them (Fenn, 1996), it is especially interesting to study how impact investing is executed in practice through private equity funds.

(4) What are the challenges related to LP-GP relationships in private equity impact funds and how is profit sharing arranged?

Finally, it is of course interesting to know how all of these factors affect the performance of a private equity impact fund, both in terms of financial returns and impacts achieved. Are there some measurement or modelling methods that lead to improved results or can additional impact be achieved by clever incentivizing? These questions have not been studied before and therefore they are the topic of the fifth research question of this study.

(5) How do targets, modelling and measurement methods and GP compensation structures affect the financial and impact performance of an impact investing fund?

Table 1. Research questions

No.	Question
1	How is impact investing defined? How does it relate to and differ from related concepts such as socially responsible investing and ESG investing?
2	What kinds of financial targets and impact targets do private equity impact investors have? Are they willing to compromise on profits?
3	What methods of impact modelling and impact measurement are used by private equity impact investors and how satisfied are they with them?
4	What are the challenges related to LP-GP relationships in private equity impact funds and how is profit sharing arranged?
5	How do targets, modelling and measurement methods and GP compensation structures affect the financial and impact performance of an impact investing fund?

1.3 Research design, methodology and scope

1.3.1 Research design and methodology

The research consists of two parts: the theoretical and the empirical part. The theoretical part is a literature review on academic research about impact investing and private equity from a GP's point of view. Because there is a limited amount of academic research conducted about impact investing, the review will also include findings from practitioner reports and surveys. The aim of the literature review is to get a good understanding and overview of the state of the impact investing industry especially in terms of its definition, the different modelling and measuring methods available as well as what kind of compensation structures are currently used. Additionally, the aim is to understand the special characteristics of private equity that might affect the execution of an impact strategy. All in all, the goal is to gain a good understanding of how an impact investing strategy could be implemented by a private equity fund manager and what are the challenges related to that. The findings and conclusions from this theoretical part are then used to form the research hypotheses.

Secondly, an empirical study is conducted to test the hypotheses. A quantitative approach is used to analyse data from several sources: deal level data and portfolio company data from Preqin and Crunchbase databases and survey data gathered from European impact investors. The deal data from Preqin includes venture capital and buyout deals made by European investors since 1980 and the portfolio company data from Crunchbase includes company specific information. The gathered survey data on the other hand consists of information on the fund manager targets, practices and overall approach to impact investing.

These data sources are then combined on a fund manager level to link the survey answers to the attributes and performance metrics of the individual deals. A multiple linear regression analysis is completed on the resulting data set using statistical software Stata. The aim of the regression analysis is to answer the fifth research question, whereas the first four questions will be answered by the literature review and the survey data.

1.3.2 Scope

Most of the impact investing research made to date have not been limited to any single asset class. However, the structures, practices and stakeholders involved in different asset classes such as bonds, loans and equity are so varied that executing an impact investing strategy would be quite

different through each of them. To my knowledge, there aren't any studies conducted specifically on impact investing in private equity. Therefore, the scope of this study is limited to private equity investors and their possibilities of executing an impact investing strategy.

Furthermore, even though the boundaries between impact investing and related concepts such as responsible investing and ESG strategies are somewhat blurred, this study focuses strictly on GPs that manage at least one impact focused fund. An impact fund is defined here as one that is identified and labelled specifically as an impact investing fund instead of "sustainable", "green" or anything of that sort.

Finally, the geographical scope of the study is limited to Europe due to two reasons. Firstly, even though impact investing is booming in the US, the private equity industry there is quite different from its European counterpart in terms of size of the industry, its structures and practices. Secondly, the term impact investing is understood and used quite differently outside of the European context. In some regions it is common to use impact investing as a marketing word, without actually having any impact modelling or measurement practices in place. Therefore, in order to eliminate the effects of regional differences, only European investors are included.

2 Literature review

2.1 Definition of impact investing

In the past 12 years since the inception of the term *impact investing* in 2007, many academics and practitioners alike have made numerous attempts to define the term. Most definitions seem to be somewhat aligned, but still there remains some ambiguity as well as outright disagreement about the definition.

In their visionary article, Bugg-Levine & Emerson (2011) state that impact investing is about pursuing financial returns while also intentionally having a positive social or environmental impact. They introduce the term *blended value* to refer to this double objective. Furthermore, they note that actively managing and measuring the impact is essential as well as the intentionality of the investor. As it can be argued that in fact all investments have some kind of an impact (whether it be positive or negative), it is important to distinguish impact investments as those that have been made intentionally to pursue a specific measurable and positive impact and where the non-financial part is also managed.

Most attempts to define impact investing seem to be in line with this definition. Grabenwarter & Liechtenstein (2011) determine that impact investing consists of profit orientation, correlation between impact and financial returns, intentionality, measurability and a positive effect on society. Similarly, at JPMorgan Chase impact investing is seen as funding market-based approaches to solving social and environmental challenges that can simultaneously generate market rate returns (Bell, 2013). The most simple definitions settle for simply stating that impact investing is about targeting both financial returns and social or environmental impact (Clarkin & Cangioni, 2016; Combs, 2014; Hebb, 2013; O'Donohoe et al., 2010; Roundy, Holzhauer, & Dai, 2017).

Moreover, Höchstädter & Scheck (2014) conclude in their analysis of views from both practitioners and academics that there is actually less disagreement on the definition of impact investing than expected. In their sample most practitioners and academics share the views of Bugg-Levine & Emerson (2011) that impact investing targets both financial and non-financial returns. Importantly, they note that the level of financial returns does not need to be limited in any way. There seems to be an understanding that whether it be below, at or above market rates, the financial targets don't matter as long as they exist alongside the impact targets.

While this definition seems quite straightforward and easy to accept, many sceptics have voiced their concerns regarding the details of it. First of all, many questions have been raised about the viability of achieving non-financial impact without compromising the financial returns. Some claim that there is an inevitable trade-off between high impact and financial return and that expecting to achieve both is unrealistic (Cheng, 2011; Evans, 2013; Mitchell et al., 2008). Brest and Born (2013) on the other hand argue that it all comes down to the additionality the impact investor can provide: if there is an investment possibility that generates market rate returns while also making a positive impact, it would get funded anyway by the traditional investors seeking only returns and thus the impact investor wouldn't achieve any *additional* impact value. However, they do admit that in new and emerging markets, "in imperfect markets", the impact investor might see opportunities that traditionally thinking investors miss and therefore they are in a good position to promote and grow the market and thus generate a positive impact.

Contrarily to these opposing views, Grabenwarter & Liechtenstein (2011) claim that environmental or social impact in fact correlates positively with financial profits. They state that in impact investing impact should be an inherent part of the business logic so that when the company is performing well, it generates both impact and profits. In other words, impact should not be thought of as an additional element of the business model that is independent of the

financial business logic. Thus, in the same way as in economies of scale the production costs are lower for each additional unit, each new “unit of impact” costs less than the previous and therefore, the more impact is generated, the more profits ensue (Grabenwarter & Liechtenstein, 2011).

In addition to profitability, another area of ambiguity is how impact investing relates to and differs from other similar concepts such as socially responsible investing (SRI), sustainable finance and the ESG (environmental, social and governance) principles. Some argue that impact investing is a sub-category of responsible investing while others claim that impact investing is a broader term for social investing and still some insist that impact investing is a synonym for implementing the ESG principles into mainstream investment processes (Hebb, 2013; Höchstädter & Scheck, 2014). The terms are used as synonyms, as broader concepts and as sub-categories to one another.

In their study of academics and practitioners Höchstädter & Scheck (2014) address this terminological ambiguity. They conclude that impact investing is considered to be something that goes beyond SRI, sustainable finance or ESG principles. These terms have traditionally been used to describe investment strategies where the negative risks related to environmental, social and governance factors are screened in the investment process and some ethical guidelines are followed in order to avoid certain types of investments (traditionally meaning alcohol, weapons, tobacco etc.) or to minimize the overall negative effects on a portfolio level. Impact investors don't feel that these terms adequately represent the activities they are doing as they refer to avoiding harm and risks whereas impact investors target disruptive change and seek to find new solutions with positive impact on the society (Bugg-Levine & Emerson, 2011).

Moreover, impact investing differs from SRI in the size and nature of the investments (Höchstädter & Scheck, 2014). Impact investments are typically direct, often equity-based investments in early-stage companies, whereas responsible investing is typically executed through a wide portfolio of smaller investments into established companies that promote desirable corporate practices (Roundy et al., 2017).

All in all, responsible investing, ESG investing and impact investing all consider similar aspects in the investment process, but the approach to those aspects varies in terms of the level of rigor in investment analysis as well as in expected outcomes. In Figure 2, these investment strategies are presented on a spectrum of transparency, measuring and reporting, commitment, impact and intentionality.

As can be seen, negative screening or exclusion of certain industries or companies is at the far left of the spectrum. That means that the levels of measuring and reporting, commitment, impact and intentionality are the lowest. Second on the spectrum, there is positive screening, which means focusing on the best performing companies or industries as measured by the ESG or corporate responsibility matters. The next step from that is complete ESG integration, where the ESG matters (both risks and opportunities) are integrated as an essential part of the investment analysis and decision-making processes. This level of sophistication already requires quite high transparency, measuring and reporting tools and commitment from the investor.

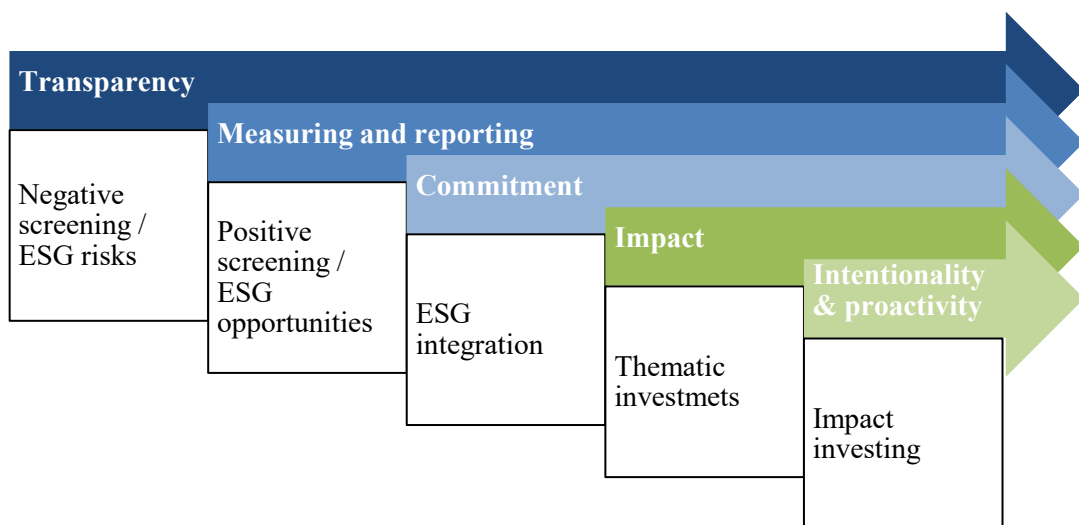


Figure 2. Spectrum of responsible investing and impact investing (modified from FVCA, Sitra, & Deloitte, 2017)

Finally, so-called thematic investments and impact investing are situated at the far right of the spectrum. They are distinguished mainly by the fact that unlike the other investing strategies they don't revolve around assessing the internal processes and operations of the target companies but instead focus mostly on the external impact the companies have. Therefore, they are in a class of their own when it comes to the overall impact of the strategies. What differentiates impact investing from thematic investments are the notions of intentionality and proactivity in the investment activities. Whereas thematic investments are a simple way of focusing investments around a certain theme such as preventing global warming, impact investing takes a rigorous approach to setting measurable impact targets and intentionally striving towards them.

2.2 Impact modelling

Most of the discussion around impact investing focuses around the question of measurement. Often modelling is overlooked even though it is at least as important, if not more, than measuring. Investors are realizing that modelling the desired impacts is an important part of their investment strategy and that in order to know which metrics to measure, the desired impact should be modelled first (Hehenberger & Harling, 2018).

The Finnish Innovation Fund Sitra has done a lot of research on impact investing and they strongly highlight the importance of modelling before investing. According to them, there can be many ways to achieve certain impacts and all actions towards those impacts can have multiple effects on other areas (Heliskoski, Humala, Kopola, Tonteri, & Tykkyläinen, 2018; Männistö, 2016). Therefore, it is important to include specialists from different fields to the modelling process.

Theory of change is one useful tool in mapping one's impact targets. Jackson (2013) claims that a theory of change is actually a core component of the very definition of impact investing along with intent and impact itself. If an investment is intended to have a certain impact on the world, the dynamics of the situation need to be understood first (Jackson, 2013). What outputs are expected to ensue from the investment and how are they expected to generate the desired impact?

Hehenberger and Harling (2018) also note that whereas earlier many impact investors tended to just define an area that they focus on, nowadays it has become increasingly common for the investors to have developed their own theory of change. A theory of change defines the specific impact targets that the investor aims to achieve and what actions are expected to lead to the desired outcomes.

A helpful tool for creating a theory of change is the so called IOOI-chain i.e. the chain of inputs, outputs, outcomes and impact (see Figure 3) (Heliskoski et al., 2018). The general idea behind the chain is that inputs such as money, time and human resources are required in order to generate outputs (e.g. hours spent on education or number of products produced). The outputs can then lead to outcomes like children being educated or fossil fuels being replaced by solar energy. The outcomes are not yet impact but instead they enable the impact to happen; educated children have better chances of being employed, which improves their quality of life and replacing fossil fuels with solar panels reduces the CO₂ emissions generated and thus prevents climate change and preserves nature and wildlife.

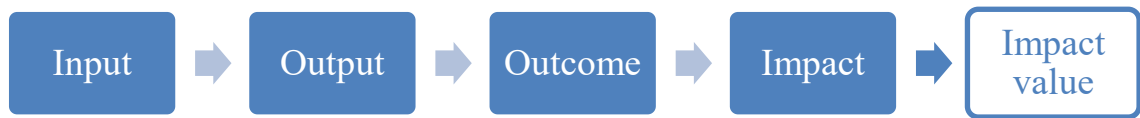


Figure 3. The IOOI chain (modified from (Männistö, 2016))

Sitra also adds the measurement of impact value to the IOOI-chain. If the impacts are modelled precisely, deducting the savings and financial benefits that accrue from them is feasible. For example, Sitra has modelled the financial savings gained from investing in the prevention of social exclusion in comparison to only doing corrective work afterwards (Männistö, 2016).

2.3 Impact measurement

There is a growing need for impact measurement tools as impact investing is gaining more momentum and as responsibility and sustainability concerns in general are becoming more mainstream. Investors want to know how their investments are performing on the social return scale compared to their financial returns, but traditional measurement analyses typically disregard social value creation and focus only on financial returns. This calls for methods that could quantify social returns similarly to how financial returns are quantified (Bengo, Arena, Azzone, & Calderini, 2016).

Emerson (2003) notes that many people active in the social sector appeal to the seemingly believable claim that quantifying impact is impossible because “some things simply can’t be measured” and therefore disregard any attempt to do so. Many academics share the view that comparing different impacts in different target groups and environments is not possible (Kroeger & Weber, 2014). However, there are many ways to triangulate and estimate the worth of different things and actions even though it may not be easy (Emerson, 2003).

Contrarily to financial profits that are mutually understood and straightforward to measure, measuring impact is a slightly more challenging issue. There are a myriad of different views and opinions on how impact should be defined and what measurements should be used. Already at the very beginning of the impact investment industry, there were a great deal of different measurement frameworks provided by different organizations and rating agencies (Olsen & Galimidi, 2008). However, in more recent years there has been some consolidation and the issue of diverging methods has been addressed (Barby, 2019).

2.3.1 Impact Reporting and Investment Standards

Despite the various opinions on measurement in the impact investing industry, there is also some common ground. The Impact Reporting and Investment Standards (IRIS), an initiative by GIIN, can be considered as somewhat of an industry standard as they are the most widely used as a base for impact measurement (Reisman & Olazabal, 2016). According to the Annual Impact Investor Survey, 49 % of respondents use metrics that are aligned with IRIS to measure their impact (Mudaliar et al., 2019).

The IRIS consists of hundreds of generally accepted and publicly available standardized metrics to measure social, environmental and financial performance (Reisman & Olazabal, 2016). The idea is that each organization can choose the metrics that suit their goals (e.g. a clean energy company would choose some environmental metrics whereas an organization increasing girls' education possibilities would choose among the list of social metrics).

The clear benefits of IRIS are that they are so widely adopted among the industry. It is a commonly known and accepted catalogue of objective metrics that are easy to understand (Reisman, Olazabal, & Hoffman, 2018). It also offers flexibility as it provides such a wide range of metrics to choose from. Some however claim that there aren't enough metrics in IRIS to represent the myriad of different social and environmental impacts (Kroege & Weber, 2016). On the other hand, the huge number of metrics available can also be seen as the most significant challenge related to IRIS; it can be difficult to decide which indicators to use (Hehenberger & Harling, 2018).

Furthermore, some see the bottom-up approach of the IRIS metrics as a possible issue saying that it might restrict the inclusion of top-down approaches that are more subjective and tailored to each case. Even though in some cases objectivity can be seen as a positive attribute, it can also be considered too restrictive and therefore not adjustable enough for all cases (Reeder & Colantonio, 2013).

2.3.2 Global Impact Investment Rating System

As IRIS provides a great starting point for measuring impact, it is used as a basis for many rating and measurement systems. One of the most well-known ratings is the Global Impact Investment Rating System (GIIRS) provided by B Analytics. The rating is based on analysing three components in light of the IRIS metrics: an overall impact business model rating, an overall operations rating and a fund manager assessment. These components are then compared against given thresholds, to determine the relative performance of a fund (B Analytics, 2019).

GIIRS rating's most prominent benefit is that it provides an objective and standardized third-party rating, that is comparable and transparent. It is analogous to the Morningstar investment analysis system, that is well-known and widely used for analysing and comparing traditional investments, which makes GIIRS easily approachable (Jackson, 2013). It is best-suited for evaluating the impact of funds that make equity and debt investments (Clarkin & Cangioni, 2016).

On the downside, GIIRS has some integrated weightings in the rating system that affect the maximum amount of points a certain company can obtain. These weightings cannot be changed by the user even though they might not be suitable for all cultures or value systems (Kroegeer & Weber, 2016).

2.3.3 Social Return on Investment

Social return on investment (SROI) is, as its name indicates, a modification of the conventional return on investment (ROI) that compares the input, i.e. the money invested, to the output, i.e. the financial returns to measure the efficiency of an investment (Davis & Pett, 2002). Similarly, the SROI is calculated as the monetary value of the social returns gained compared to the amount of money invested (Polonsky & Grau, 2011).

The monetization of the social value is estimated case by case based on the theory of change of a social enterprise (Kroegeer & Weber, 2014). The process consists of three parts: 1) identifying the key stakeholders, 2) assessing the change in outcomes that can be attributed to the impact creator and 3) estimating the financial value of the outcomes (Reeder & Colantonio, 2013).

The main benefit of this analysis is that it is focused on the theory of change of the enterprise and therefore offers case-specific understanding of the impacts. Additionally, as the value of the impacts is monetized it simplifies the metrics and makes it suitable for use even in financial analyses (Kroegeer & Weber, 2016).

However, these benefits also present the major challenges. As the SROI is customized based on the theory of change, the challenge is defining monetary values of social returns so that they are comparable between different types of social impacts. The more different the social aims and target groups are the more difficult it is to compare their monetary value. One way to overcome this monetization issue is to measure the subjective impact generated based on the stakeholders' own opinions since comparing the amount of subjective improvements achieved is easier than defining exact values for the changes (Kroegeer & Weber, 2014; Reeder & Colantonio, 2013).

While the subjective measurement case by case may be accurate, a clear downside of the SROI is that it is too arduous and time consuming to implement in full (Reeder & Colantonio, 2013). As a response to this critique some lighter methods for calculating SROI have been presented such as SROI Lite that only focuses on the single most important outcome that is targeted and the unit cost of achieving it (Olsen & Galimidi, 2008). However, this method clearly involves such heavy simplifications that it might defeat the whole purpose of such a rigorous approach.

2.3.4 Sustainable Development Goals

Another commonly used framework for measuring impact are the Social Development Goals (SDGs) introduced by the UN in their 2030 Agenda for Sustainable Development (United Nations, 2015). The SDGs consist of 17 separate targets such as eliminating poverty and hunger and promoting equality and responsible consumption (see Figure 4). According to the impact investor survey, 62 % of respondents track some or all of their impact investments' performance to the UN SDGs (Mudaliar et al., 2019).



Figure 4. UN Sustainable Development Goals (United Nations, 2015)

The main benefits of the SDGs are that they bring concreteness to the issues of sustainability and inequality and therefore make it easier to envision solutions and business models to tackle them. Hehenberger and Harling (2018) recommend impact investors to use the SDGs more as they have been specifically designed to define the 17 most important areas where funding and actions are sorely needed.

Furthermore, Ruff and Olsen (2018) tout the SDG indicators for their flexibility as they allow for regional differences in the definitions to be considered. For example, poverty is defined through national definitions instead of universal limits. However, not all of the indicators are as flexible. For example, youth is defined as people aged 15-24 years, which might be restricting in some countries if the concept of youth does not follow that exact definition. Therefore, some adjustments might be required to make the impacts aligned with the SDGs (Ruff & Olsen, 2018).

2.3.5 Responsible investing metrics

Other common sustainability and responsibility reporting and measuring frameworks include the Principles of Responsible Investing (PRI), Global Reporting Initiative (GRI) and perhaps most prominently Environmental, Social and Governance principles (ESG) for which there are several specialized ratings agencies. All of these are intended for all investors to follow, not just impact investors and they have gained significant momentum in the past 10 years. For example, the number of signatories to the PRI and the assets managed under these signatories have increased over ten-fold since its launch in 2006 as can be seen in Figure 5 (UN PRI, 2017).

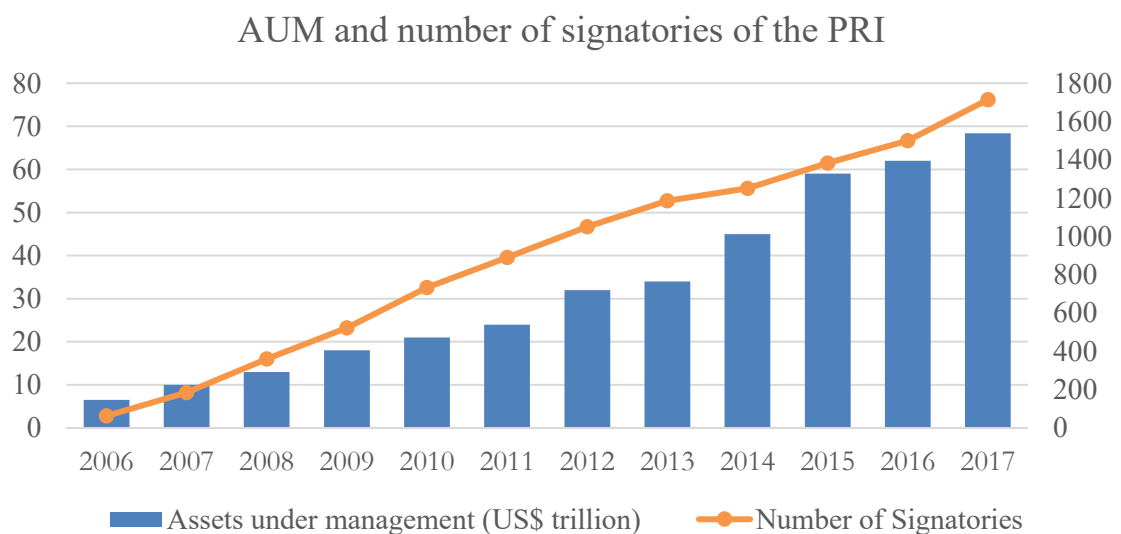


Figure 5. AUM and number of signatories of the PRI (UN PRI, 2017)

However, as they are aimed for all investors to use, they don't necessarily measure the *impact* of a company, but rather whether their actions are *sustainable* and *responsible*. For example, a tobacco company might take good care of its employees and in that sense act responsibly but its overall impact on the world is still negative as it causes rainforest loggings and health hazards. Furthermore, the responsible investing metrics don't measure any additionality that the investor

achieves, since responsible practices or actions towards sustainability are generally not caused by any specific investment but rather they are part of the normal development and improvement of the company.

All in all, responsible investing metrics might serve as proxies for some specific impacts and they might be useful in some measurement challenges, but they do not fully represent the objective of impact measurement where the impact should be intentional and, in some way, attributable to the investment (Bugg-Levine & Emerson, 2011).

2.3.6 Upright Project

A recent and quite ambitious initiative is the Upright Project. Founder and CEO of the Upright project Annu Nieminen states (personal communication, Feb 21, 2019) that their aim is to measure the net impact of companies using a neural network for natural language processing. Thus, the approach is, contrarily to other impact measurement methods, very top-down focused and science-based: their AI scans through a database of scientific articles and looks for mentions of specific products and impacts. Then the neural network categorizes the findings as either positively or negatively correlating. This process creates a mapping of all possible products, how they are linked to each other and what impacts does each product cause.

The net impact of companies is then calculated as an aggregated measure of their products' impacts on four dimensions: environment, health, society and knowledge. The approach is clearly very data heavy and would be impossible to implement by using human resources only. Therefore, the clear benefit of the Upright model is that it is based on a machine learning method and can be scaled to analyse virtually an unlimited amount of companies. Hence, it is good at providing a good idea of the big picture, i.e. the total net impact of a fund quickly and efficiently (Nieminen, A., personal communication, Feb 21, 2019).

Moreover, one of the major differences of the Upright model compared to other impact measurement models is that it provides a net analysis instead of focusing on a few metrics chosen by an analyst or the company itself. It takes into account also the harm caused by producing something that is seemingly good and beneficial and compares their magnitude to achieve a net analysis. This is important because, while many energy companies for example might look bad on some traditional scales of environmental activity where only the GHG emissions produced are considered, the Upright model also considers the benefits they generate to the entire society by providing the necessary electricity to schools, hospitals and households (Nieminen, A., personal communication, Feb 21, 2019).

On the downside, the model isn't very good at comparing companies that are in the same business. For example, if two companies that are of the same size and produce very similar products, they would most likely have the same net impact in the Upright model even though their operating model might be different (Nieminen, A., personal communication, Feb 21, 2019).

Finally, an interesting feature of the model is that it forces the user to make choices about how should the model weigh different impact dimensions based on their personal values. The user can choose to value each dimension equally or they can choose for example to put more weight on environmental factors than knowledge creation (Nieminen, A., personal communication, Feb 21, 2019). This can be seen both as a negative and a positive feature because on the other hand it provides the user with the opportunity to use their own values rather than imposing values decided by someone else, but on the other hand, it means that there is no universal solution and that the user has to decide which is more important – environment or knowledge, health or society?

2.3.7 Impact Management Project

Even though there are similarities and a lot of common ground between the different impact measurement systems and methods, having so many different approaches to measurement reduces the credibility of the industry and slows down its growth. In the impact investor survey 75 % of the respondents think that sophistication of impact measurement practices is a moderate or significant challenge to the growth of the impact investment industry (Mudaliar et al., 2019).

The Impact Management Project (IMP) aims to tackle precisely this challenge. The project has brought together over 2000 practitioners in the impact investment industry globally to establish common norms for impact measurement. As a result, they suggest a framework based on five essential dimensions of impact: what, who, how much, contribution and risk. They imply that whichever measurement method is used, the impact analysis should contain these five dimensions in some form or another: *what* is the outcome, *who* experiences the outcome, *how much* of the outcome occurs, what is the investor's *contribution* to the outcome and what is the *risk* that the outcome does not occur as expected (Barby, 2019) .

This framework could be applied to any of the existing methods for impact measurement to ensure that the measurement is extensive. The additionality and risk factors are often omitted from many analyses as they are hard to estimate even though they are important elements of the achieved impact. However, the IMP framework does not include consideration for the net impact aspect that is promoted for example by the Upright Project.

2.3.8 Academic metrics

Despite these efforts to unify and standardize metrics, many academics still have concerns that the lack of sophisticated evaluation methods is a severe threat to the development of the industry and call for emphasis on the evaluators' role (Clarkin & Cangioni, 2016; Reisman et al., 2018). However, Ruff and Olsen (2018) note that there is a disparity between the investors' and the evaluators' objectives: investors want to simplify and standardize metrics as much as possible so that comparing and analysing investments is as easy as possible – evaluators on the other hand believe that uniform measures lack sufficient relevance because they are too generalized.

Ruff and Olsen (2018) propose a three part solution to this dilemma: harnessing operational data, using constructs with bounded flexibility and engaging a cadre of impact analysts capable of interpreting impact reports. In essence their suggestion consists of gathering low-level operational data, setting loose standards on what data is relevant to which industries and then involving professional evaluators to do the analysis so that it is coherent and comparable. Hehenberger and Harling (2018) develop this viewpoint even further and suggest that with the help of evaluators impact investors could actually report an *impact-adjusted return*, similarly to the notion of risk-adjusted return that is commonly used in finance.

2.4 Impact in private equity

While O'Donohoe et al. (2010) claim in their pioneering report that impact investing is a new and emerging asset class in itself, most academics and practitioners note that impact investing is a strategy that can be applied to many asset classes such as debt or equity (Höchstädter & Scheck, 2014). O'Donohoe et al. (2010) also admit that impact investing can sometimes be executed through these traditional asset classes. In a report about impact investing by the World Economic Forum (World Economic Forum, 2013), it is explicitly stated that impact investing is not an asset class but rather an investment strategy.

Setting the definitional debate aside, it is clear that impact investing can be implemented in private equity as an investment approach. In fact, according to the annual impact investor survey by the Global Impact Investor Network (GIIN) even though private debt has the greatest share of AUM allocated to it, private equity is the most commonly used instrument – 71 % of all respondents have allocated at least some of their AUM to private equity. Furthermore, in their survey for-profit fund managers comprise 47 % of the sample and manage 30 % of the combined AUM (Mudaliar et al., 2018). Thus, private equity is clearly a relevant outlet for impact investing.

2.4.1 Private equity characteristics

The global private equity (PE) market is huge, managing over \$2.8 trillion of assets at the end of 2017 (Prequin, 2018). The industry provides funding for entrepreneurs, startups, companies looking to expand their business, companies in financial distress, private middle-market companies as well as public companies looking for a buyout investment (Fenn, 1996).

In general, the private equity industry is considered to consist of two types of investors: venture capital (VC) investors who make minority investments in scalable early stage companies that have very small or even no revenues and buyout investors who make majority investments in more mature companies that have the potential to grow and expand their business significantly. The typical holding period of an investment is only 3-7 years, which means that private equity investors aim to increase the value of their investment target companies in quite a short period of time and then cash-in the profits.

The PE industry has been booming for decades, keeping in mind that in 1980 it had only \$5 billion in assets under management (Fenn, 1996) compared to the current \$2.8 trillion. The enormous growth of the industry has been largely enabled by the adoption of limited partnerships in the late 1970s (Fenn, 1996). Limited partnerships are a vehicle for institutional investors – referred to as limited partners (LPs) – such as family-offices and financial institutions to invest into funds managed by investment professionals – referred to as general partners (GPs) – instead of having to manage the direct investments themselves (Fenn, 1996).

This LP-GP structure has since become a ubiquitous feature of the private equity industry (Fenn, 1996). GPs try to attract LPs to invest in their fund and then invest their funds in a profitable way in order to ensure future funding from them. The GPs also have to manage the possibly varied expectations of the different LPs and meet their requirements.

The lifespan of a fund is typically 10 years, during which investments are made and committed capital is drawn from the LPs as needed (Metrick & Yasuda, 2010). The fund's lifespan ends when it is liquidated, and the returns to the LPs are realized only then. An essential question regarding this setting is of course how the fund manager compensation and the profit sharing among fund managers and investors are organized.

Typically, the fund manager compensation consists of a management fee that is around 2 % and a carried interest that refers to a share of the net gains, which is generally 20 % (Litvak, 2009; Metrick & Yasuda, 2010; Robinson & Sensoy, 2013; Sahlman, 1990; Schmidt & Wahrenburg,

2003). Some compensation schemes include also a so-called hurdle rate, which is an interest rate that must be paid to the investor before the fund manager earns the carried interest (Metrick & Yasuda, 2010; Schmidt & Wahrenburg, 2003). GP remuneration policies are also regulated in the EU under the alternative investment fund managers directive (AIFMD) (ESMA final report: Guidelines on sound remuneration policies under the AIFMD.2013).

Deciding on the compensation structure is crucial because as agency theory suggests, there might be conflicting interests of the fund managers (“agents”) and investors (“principals”) (Eisenhardt, 1989). In order to align these interests, some restrictions to the compensation structures can be set. One common requirement is that the fund managers must invest in their own fund so that they have an ownership of at least 1 % (Robinson & Sensoy, 2013; Sahlman, 1990).

In addition to certain structural traits, private equity investments are also strongly characterized by their exceptional risk and return profile. Especially venture capital (VC) investments that are made into early-stage companies have high risks but also extremely high returns: according to a study of venture investments in the US 30 % of direct investments fail completely, i.e. do not generate any returns, while about 10 % of the investments provide over 10x returns (Cochrane, 2005; Weidig & Mathonet, 2004). However, investing into a VC fund is not nearly as volatile as direct investments since the fund provides diversification. The probability of a total loss in a VC fund is just 1 % but on the other hand, the portion of fund investments providing over 10x returns is also much smaller, just under 2 % (Cochrane, 2005; Weidig & Mathonet, 2004).

Buyout investment that target more established companies are also risky, but the risk profile of buyout funds is more evenly distributed than that of VC funds. They have the same probability of total loss, 1 %, but the portion of extremely well performing investments having over 10x returns is much smaller, less than 0.5 %. The losses are not as drastic as in VC funds, but neither are the returns: the average loss given a loss in a buyout fund is -23 % compared to -29 % in a VC fund but the risk-to-return ratio is 0.8 in a buyout fund and 0.4 in VC fund. All in all, buyout might be slightly less risky, but it also has lower returns compared to the risks. (Weidig & Mathonet, 2004)

2.4.2 Impact strategies in private equity

The special characteristics of the PE industry set some challenges on how impact investing can be executed in private equity. The LP-GP structure means that decision-making and operative management are in different hands; GPs manage the funds and need to decide how they want to pursue impact, but LPs hold the power to decide whether they’ll invest into a fund. This means

that in addition to structuring their impact strategies the GPs must convince the LPs of those strategies in order for them to invest in their funds.

Convincing a socially neutral LP who is only looking for market rate returns, to invest in an impact fund, can be challenging for the fund managers. As many doubts have been voiced regarding the viability of generating impact while achieving market rate returns (Cheng, 2011; Evans, 2013; Mitchell et al., 2008), the financially oriented LPs might not be willing to give impact investing a chance at first. Indeed, according to the impact investor survey, 67 % of the fund managers receive capital from family-offices or high net-worth individuals, who generally have also other than financial interests, whereas just 46 % receive capital from banks, who are likely to be financially focused (Mudaliar et al., 2019). However, an investment from a respected institution can help alleviate the doubts of the financially oriented investors (Brest & Born, 2013).

On the other hand, there are an increasing number of signals indicating that investors have a growing demand for investment vehicles that “do good”. 51 % of the respondents in the Annual Impact Investor Survey say that client demand is a “very important” motivation for them to do impact investments (Mudaliar et al., 2019). Furthermore, impact focused GPs can also help socially neutral LPs realize that there are good impact investment possibilities that can provide returns while also having a positive impact (Brest & Born, 2013).

However, having financial first and impact first LPs in the same fund could lead to conflicts of interest in an impact fund. If the LPs are motivated by different things and have different levels of expectations for returns, the GP might find it challenging to meet everyone’s requirements. The effects of different LPs’ motivations and varied LP demands in impact investing have not been studied much.

Similar to private equity in general, impact investment opportunities are typically considered quite risky due to their disruptive nature and the fact that they often operate in completely new and emerging markets. 46 % of impact investment professionals agree that good impact investing targets are typically situated within high-risk markets (Mudaliar et al., 2018). However, 66 % also note that impact investment opportunities are perceived to be riskier because of the unfamiliar nature of new business models or untested markets (Mudaliar et al., 2018). Thus, while impact investments might be riskier than average, a lot of the perceived riskiness might actually stem from prejudices and concerns against the new and unknown.

Furthermore, lack of appropriate capital across the risk/return spectrum is seen as the most significant challenge to the growth of the impact investing industry by practitioners who call out

for more early-stage, high-risk capital (Mudaliar et al., 2019). Thus, there is a clear need for risk-taking private equity investors in the impact investing industry.

Fund manager compensation in impact investing has not been studied much although it does raise some interesting questions. If the compensation is purely based on financial performance as in traditional private equity, aren't the fund manager's incentives misaligned with the impact targets?

Typically, impact fund managers incentives are still tied only to the financial targets. However, with the emergence of more numerous and more sophisticated impact measurement methods some impact investors are adopting ways to incorporate impact performance into the compensation of their fund managers. While the exact implementations vary, most impact-based incentive structures seem to be organized around adjusting the carried interest percentage depending on whether the impact targets are achieved and to what extent (GIIN, 2011; Leytes & Abello, 2016).

Another option to tie fund manager compensation to impact performance is an impact hurdle that refers to its financial counterpart in traditional private equity. Similar to a financial hurdle rate, an impact hurdle rate is paid to the investors before the fund manager gets the carried interest of the profits. However, unlike the financial hurdle, an impact hurdle is based on level of impact targets achieved. In other words, for the fund manager to receive carried interest, a predetermined level of impact must be achieved (Männistö, 2016).

On the other hand, one could also argue that if the impact targets are truly aligned with the financial targets, and if impact and returns do in fact correlate as Grabenwarter & Liechtenstein (2011) claim, the financial incentives should be enough for the fund manager to achieve both impact and return. In that case compensation tied to impact results could lead to sub-optimizing and thus decrease financial and/or social/environmental returns.

2.5 Hypotheses

2.5.1 The effects of financial and impact targets on investment performance

The very definition of impact investing states that impact investing is about targeting both financial returns and positive impacts, but it doesn't specify the level of returns that should be targeted. Some impact investors might intentionally target below market rate returns because they want to focus on impact, whereas others may consider the financial returns equally important as the impacts and are not willing to compromise on their financial returns at all. It is logical to

assume that those investors, who set their financial targets high and are not willing to compromise on profits in exchange for impact, perform financially better than those that do the opposite.

Moreover, in impact investments impact and financial returns correlate and support one another, because impact investors look for companies whose business models inherently combine impact and financial returns and thus as revenue increases, the amount of impact generated also increases (Grabenwarter & Liechtenstein, 2011). In other words, the more profits the company generates, the more it will also have generated positive impacts. Therefore, it can be expected that targeting higher return targets should also drive greater impact results.

H1: Targeting higher returns improves the financial and impact performance of investments.

Some impact investors focus solely on generating environmental or social impacts, while others target both. The performance of socially or environmentally focused impact investors has not been studied or compared previously. However, studies have shown that PE investors (both VC and buyout investors) who have a clear industry focus generally perform better than those that do not as they are able to gain specialist expertise (Cressy, Munari, & Malipiero, 2007; Gompers, Kovner, Lerner, & Scharfstein, 2008). An investor with only environmental or social targets is likely to invest in selected industries whereas an investor targeting both doesn't have a similar industry focus. Thus, using industry as an analogy to different types of impacts, it is likely that impact investors who focus on either social or environmental impact perform better than those that target both.

H2: Targeting only environmental or social impacts instead of both improves the financial and impact performance of investments.

Furthermore, the general assumption is that there are more high-impact, high-return possibilities within the environmental sector than the social one. Cleantech is often used as an example of a highly profitable industry that also generates major positive impacts as the positive impacts are so clearly aligned with financial interests e.g. through energy savings, emission reductions and more efficient use of natural resources. Social sector investments on the other hand are sometimes regarded more as philanthropy than investing since the link between social impact and high financial returns is not so clearly perceived. This view is also supported by the findings of Pandit and Tamhane (2018). Their study of 48 impact PE exits split by industry concluded that investments into cleantech and agriculture (environmental) were among the top performers while investments into education and healthcare (social) lagged behind. Therefore, it can be expected that environmentally focused investors perform better financially than the socially focused ones.

H3: Targeting environmental impacts improves the financial performance of investments.

On the other hand, the positive impact in social impact investments is in some ways more tangible than in environmental impact investments. It is relatively easy to accept the value and positive impact that for example employing people at the bottom of the pyramid (BoP) or advancing people's health generates, whereas environmental benefits are not so inherently obvious as there are varying studies and opinions about what is beneficial to the environment and what is not. Pandit and Tamhane (2018) also emphasize the social impact the investments in their study generated stating that they have affected the lives of 60 to 80 million people in India. Therefore, it is likely that socially focused investors perform better in terms of impact results than the environmentally focused ones.

H4: Targeting social impacts improves the impact performance of investments.

2.5.2 The effects of impact modelling and measuring on investment performance

Studies have shown that good ESG performance and the use of ESG practices improve the operational performance of firms, which in turn increases firm valuation (Clark et al., 2015). Consequently, incorporating ESG analysis to investment processes and thus investing into companies that rank highly in ESG matters leads to higher overall ESG ranking of the portfolio which in turn has been shown to improve the financial performance of the portfolio (Clark et al., 2015). So, in other words, using ESG tools in the investment process improves both the ESG performance and the financial performance of investments.

The effects of modelling impacts before investing on the investment's financial and impact performance has not been studied previously. However, using the results from ESG studies as analogous to impact investments, it can be assumed that incorporating impact modelling in the investment decision-making process is likely to improve the financial and impact performance of impact investments.

H5: Modelling impact improves the investments' financial and impact performance.

Similarly as in impact modelling, the effects that using impact measurement methods after investing has on investment performance have not been studied previously. However, using ESG factors again as analogous to impact, studies have shown that reporting actively on ESG matters and setting clear ESG targets for portfolio companies, leads to improved ESG performance (Clark et al., 2015). Through active ownership and regular reporting, investors can drive better ESG

performance for the company which leads to better financial performance as well (Clark et al., 2015). Therefore, it can be expected that using an impact investing strategy that involves measuring impact regularly after investing improves the investments' financial and impact performance.

H6: Measuring impact improves the investments' financial and impact performance

2.5.3 The effects of linking compensation to impact on investment performance

It has not been studied in previous research whether tying impact performance to fund manager compensation is likely to improve the fund's performance either financially or impact-wise. It could be argued either way. The opinion that linking compensation to impact would not improve performance is based on the logic that as impact investments are made into companies that have impact ingrained to their business model, the impact targets should naturally ensue from the financial returns (Grabenwarter & Liechtenstein, 2011). Therefore, sub optimizing separately for impact targets might lead to ineffectiveness in both financial terms and impact-wise.

On the other hand, in corporate venture capital (CVC) studies it has been shown that compensation and incentive schemes do affect investment practices; CVC investors target earlier stage investments and higher syndication, i.e. higher return opportunities when awarded a performance-based pay (Dushnitsky & Shapira, 2010).

CVC investments can be used as an analogy to impact investments as the CVCs also have two separate objectives: financial returns and strategic fit of investment targets. CVCs aim to find the most potential ventures with the additional criteria that they fit their company's strategy. Similarly impact investors aim to find the most potential ventures with the additional criteria that they generate a positive impact. Thus, using Dushnitsky and Shapira's (2010) findings as analogous to impact investing, it can be expected that when rewarded based on the achieved impacts, the fund manager aims for more impact.

Furthermore, it has been shown that performance-based pay affects not only investment decisions and practices but the actual performance as well: those CVCs that are compensated based on performance, achieve higher returns than those that are not (Dushnitsky & Shapira, 2010). Therefore, it can be expected that the same applies also to impact investors and linking compensation to impact targets leads to improved impact performance.

When it comes to the effects that linking compensation to impact targets has on financial performance, following Grabenwarter and Liechtenstein's (2011) view on economies of scale in impact companies, the more impact that is generated the more profitable it is. Thus, incentivizing fund managers by impact-based pay, is expected to improve the investments' financial performance as well.

H7: Tying fund manager compensation to impact targets improves the investments' financial and impact performance.

2.5.4 Summary of hypotheses

Hypotheses that are to be examined in this study are mainly formed based on the findings of the literature review. However, as the performance of impact investments has been studied only to very limited extent, some hypotheses also rely on findings on related or similar phenomena. These hypotheses aim to provide answers to the fifth research question of this study, i.e. to determine how the pre-set targets, modelling methods used, measuring methods used and linking compensation to impact affect the financial and impact performance of private equity impact investments. All of the hypotheses of this study are presented in Table 2.

Table 2. Hypotheses

No.	Hypothesis
H1	Targeting higher returns improves the financial and impact performance of investments.
H2	Targeting only environmental or social impacts instead of both improves the financial and impact performance of investments.
H3	Targeting environmental impacts improves the financial performance of investments.
H4	Targeting social impacts improves the impact performance of investments.
H5	Modelling impact improves the investments' financial and impact performance.
H6	Measuring impact improves the investments' financial and impact performance.
H7	Tying fund manager compensation to impact targets improves the investments' financial and impact performance.

3 Data and methods

3.1 Data

The data used in this study comprises of two parts: survey data gathered from European impact fund managers and portfolio company data of the survey respondents, which is collected from Preqin and Crunchbase databases. These data are combined and then used to answer the research questions and test the hypotheses.

The sample of the survey consists of 160 PE firms with impact focused funds, who are located in Europe. These firms have been found from several different sources. Firstly, from all the members of the GIIN, those who were labelled as asset managers and are based in Europe were selected to the sample. Secondly, from the Preqin database, a keyword search with “impact” among European fund managers resulted in a list of fund managers that mention impact on their website or elsewhere. Thirdly, the Toniic directory for impact investors was checked and a few additional fund managers were identified from their list. Finally, personal contacts and general knowledge of the industry was used to find a few more impact investors in Europe that were not listed in any of the previously mentioned sources. As GIIN membership is open to all investors interested in impact investing and the keyword search from Preqin wasn’t very restricting, the original resulting list of fund managers included some fund managers that don’t actually identify themselves as impact investors or don’t have any impact focused funds yet. Some fund managers also use the term “impact” to refer to financial or other impacts that don’t align with the definition of impact investing that is used in this study. Therefore, all of the fund managers in the list were individually checked to ensure that they are indeed impact investors and manage at least one impact fund. Those that didn’t meet these requirements were excluded from the list.

This procedure resulted in the final sample of 160 European PE firms with impact funds. About 33 % of them are based in the UK while Netherlands has the second highest representation with 18 % of the total. France (12 %), Switzerland (11 %) and Germany (7 %) also have several impact focused PE investors among the total population. The rest are scattered across the Nordics and Western Europe. Out of the total population 33 % are general PE investors that engage in VC, growth and buyout investments. Similarly, 43 % identify as VC investors whereas just 19 % are buyout investors. About half of the VC and the buyout investors also report doing growth investments in addition to the 6 % who identify as purely growth investors.

All 160 PE firms were sent a detailed survey containing fund specific questions about the fund's focus, impact and financial targets, modelling and measuring methods used, compensation structure as well as some questions about the fund managers' opinions on the definition of impact investing, the LP-GP relationship in impact funds and the future of impact investing. Two reminders were sent to all of the firms and some individual reminders were also sent with the help of personal contacts.

Out of the total sample, 26 persons from 22 private equity firms responded to the survey, which corresponds to a 14 % firm level answer rate. In terms of the countries the firms are based in, the sample is very representative of the total sample population: 32 % of the respondents are UK-based and 23 % are from the Netherlands. However, Germany, Denmark, Norway and Spain are all slightly overrepresented each with 9 % of the total, while France and Switzerland both represent only 5 % of the total sample. Regarding their investment focuses, general PE investors form just 18 % of the sample, while VC focused investors are the clear majority at 68 %. Buyout investors are just 9 % of the sample and those that focus solely on growth investments are 5 % of the total. Additionally, clearly over half of the VC and buyout investors also report making growth investments. Thus, it is clear that VC and growth investors are quite strongly overrepresented among the respondents compared to the total sample population.

Some of the 22 survey respondents focus solely on impact investing and might have several funds dedicated to impact whereas others have a myriad of different funds out of which only one is dedicated to impact investments. Therefore, there are several responses for some firms as each impact fund manager answered the survey separately for their fund. On the other hand, some fund managers answered on behalf of several funds stating that they have the same practices in place in all of their firm's impact funds. In total, these 22 firms have invested in 415 portfolio companies through their impact focused funds. The company and deal specific information for these companies is collected from Preqin and Crunchbase.

Preqin is the largest global database for the alternative investments industry including private equity and debt, real estate, hedge funds, infrastructure and secondaries. It includes information about fund managers, deals and performance and it is used by industry professionals, researchers and the press. The data is sourced directly from the asset managers themselves.

The deal data from Preqin includes most of the deals executed by European private equity investors since 1980. They are divided into venture capital deals and buyout deals. In total, there are 58 438 VC deals out of which 988 are made by the 160 impact investors identified in this

study, and 31 324 buyout deals out of which 482 are made by the impact investors. The majority of the impact investments made by the 22 survey respondents are included in Preqin data, but not all. Some investors are excluded from Preqin altogether and therefore Crunchbase data is used to fill in the missing information.

Crunchbase is a data platform that gathers information about private and public companies globally. For each company they report, among other things, their founders, founding year, headquarters, employee count and all investments and funding the company has received. Ergo, they have more detailed information about the portfolio companies than Preqin that only tracks investment activity.

Thus, combining data from Preqin and Crunchbase, the final data set including 415 impact investor and portfolio company pairs is formed. The information collected of each company includes company name, country, industry, first year of investment by the impact investor and the total amount of funding rounds they have had. Each company is also linked to the answers that their impact investor has given in the survey regarding the targets set and the modelling and measuring methods used to execute that investment among other things.

3.2 Variables

3.2.1 Dependent variables

Financial performance

Impact investing was coined only in 2007 and started gaining momentum a few years after that, which means that the clear majority of impact funds are less than 10 years old. That in turn means that they haven't reported any final results yet as the lifespan of a fund is typically at least 10 years. Some interim results exist for the oldest funds, but as they are not available for the majority of funds and since interim results are not very meaningful in private equity funds because of the J curve effect (Weidig, Kemmerer, & Born, 2005), it is not feasible to use them in this study. This makes studying the financial performance of the investments challenging, as the widely used metrics of performance such as net IRR and average multiple are not available.

Due to this lack of reported financials, a binary variable representing the existence of a second funding round is used in this study to indicate the financial success of an investment. It has been used similarly in previous studies to measure the financial performance of a VC investment using a logistic regression model (Ter Wal, Alexy, Block, & Sandner, 2016). The logic in using the occurrence of a second funding round as an indicator of financial performance is that if a company

receives later funding rounds from other investors, it means that it has most likely been successful and therefore the initial investment is likely to generate good returns. Some of the portfolio companies in the sample of this study have received many additional funding rounds, up to 17, but for the purposes of achieving more comparative results for the older and the more recent investments, they are coded into a binary variable that only indicates whether there has been an additional funding round or not.

However, this indicator works only for VC investments and therefore buyout investments are excluded from this analysis. Also, in using the existence of a second funding round as an indicator of financial success, it is important to note that it doesn't apply very well to recent investments as companies are not likely to need additional funding so soon. Hence, there might be a bias towards older investments being more successful. In order to overcome this issue, investments made in 2018 and 2019 are excluded from the regression model, when analyzing financial performance.

Impact performance

As there are not any specific impact metrics included in the Preqin or Crunchbase databases, the impact performance has to be estimated by other available variables. In this study the Upright model is used to define the net impact of all the portfolio companies. The Upright method is chosen instead of the other measuring methods presented in chapter 2, because it is the only one that enables a quick and comparable analysis of the portfolio companies. The Upright model is readily available for anyone to study online and the impacts of different activities can be searched directly from their database.

For the purposes of this study, each portfolio company is linked to the impact value that corresponds best to their core activities. For example, according to the Upright model, computer programming lessons and courses have a net impact value of 75.30 and thus, all the portfolio companies that offer programming lessons to consumers as their main business activity are given this impact value. Similarly, wholesale of fruits has a net impact values of 8.60 in the Upright database and so all the companies whose business focuses on selling fruits to businesses and retailers are given this net impact value.

Normally in the Upright model, the net impact of each company is scaled with its revenue to account for the size of the company in estimating its net impact: larger companies naturally have larger impacts than smaller companies operating in the same industry. However, the revenue information is not available for the clear majority of the 415 portfolio companies in the sample of this study since it mostly comprises of very early stage companies whose revenues are not

reported in any databases and therefore revenue can't be used to scale the impacts. On the other hand, precisely because most of the companies are very early stage, their revenues are likely to be in the same ballpark and therefore, scaling the net impact values with revenues, would not create huge differences between the companies.

The Upright model also allows for weighting the four aspects considered in the model (environment, health, society and knowledge) differently based on personal preferences and values, but for the purposes of this study all of them are given equal weights and the net impact is defined as the combined values of these factors for each portfolio company. This resulting net impact value for each portfolio company is used as the net impact variable of the regression analyses.

3.2.2 Independent variables

Impact targets

The impact targets of the GP are used in this study to examine the effect they have on the investments' actual financial and impact performance, e.g. whether pursuing environmental targets leads to higher returns or impact results than pursuing social targets or vice versa. The survey allowed GPs to choose one of three options as their impact target: social, environmental or both. Thus, the impact targets are measured with n-1 binary variables: social targets (1=yes, 0=no) and environmental targets (1=yes, 0=no). Having both social and environmental targets is used as the base category.

Financial targets

The financial targets of the GP are also used in this study to determine whether they affect the financial performance or the impact results of the investments. The general targets are measured with a categorical variable including three possible target return levels: 1) below market rate, 2) at market rate and 3) above market rate. The higher the value, the higher the financial targets of the investor.

Financial compromise

The willingness to compromise on profits for the sake of maximizing impact is used as an independent variable to study the effects it has on the financial and impact results of the investments. It is also measured on a three-step scale: 1) yes, in all investments, 2) yes, in some investments and 3) no. The higher the value, the stricter the financial targets of the investor.

Modelling methods

Whether or not a GP uses some impact modelling methods is studied to analyze the effects it has on the financial and impact results. Modelling is defined as the pre-investment analysis of the impacts that are expected to occur from an investment. The use of modelling methods is measured on a scale of 1 to 3: 1) not used at all, 2) used in some investment decisions or 3) used in all investment decisions. Thus, the higher the value, the more the modelling methods are used.

Additionally, for the subset of GPs that do use some modelling methods before investing, the effects of specific methods are studied as well. Three binary variables measure whether the investor uses theory or change, some other commonly available method or a modelling method developed by themselves (1=yes, 0=no). These variables are used in additional regression models analyzing only the subset of investors in question.

Measuring methods

The use of some kind of formal impact measuring methods is studied to see whether it affects the impact and financial performance of investments. Impact measuring is defined as measuring that takes place after the investment has been made. In this study the use of measuring methods is depicted on a scale of 1 to 3: 1) not used at all, 2) used in some investment decisions or 3) used in all investment decisions. Thus, the higher the value, the more rigorously the investments are measured after investing.

In case the GP does measure the impact after investing, there are various different impact measuring methods that could be used. In this study, for the subset of GPs that use some measuring methods, all the different methods are represented with separate binary variables that determine whether or not that specific method is used or not (1=yes, 0=no). These variables are used in additional regression models analyzing only the subset of investors who reported using at least some measurement methods after investing.

Third-party measuring methods

The use of third-party measuring methods is also studied in order to see whether or not it affects the financial or impact results of an investment. The use of third-party measuring is represented with a categorical variable on a scale of 1 to 3: 1) not used at all, 2) used in some investment decisions or 3) used in all investment decisions. Thus, the higher the value, the more the investor relies on third-party impact evaluators in their impact measuring efforts.

Compensation structure

The effects that linking fund manager compensation to achieved impact targets has on the impact and financial performance of investments is also examined in this study. The link of compensation to impact is measured with a simple binary variable that measures whether the GP's compensation depends on impact in some way or not (1=yes, 0=no).

3.2.3 Control variables

Investment region

The geographical location of the portfolio companies is likely to affect especially the financial performance of the investments as some regions are more volatile while some are growing faster than others. For example, Europe is a relatively stable and low risk region, whereas Asia has had a very fast-growing economy. These differences naturally effect the financial circumstances in which the portfolio companies operate and can have major effects on their performance. Therefore, portfolio company region is used as a control variable in this study. The regions of the investments are classified into either Europe, Americas, Asia or Africa and they are measured with n-1 binary dummy variables. Europe is used as the base category.

Investment industry

The industry in which the portfolio company operates is likely to affect the performance of the investment since different industries have different growth expectations at different times. For example, the dot com bubble accelerated the growth of internet companies at the turn of the century whereas the paper industry has seen a steep decline due to the digital revolution. So, the portfolio company industry is likely to affect the performance of investments and therefore it is used as a control variable in this study. The investments are classified into 9 different industries based on Preqin's industry classification: Consumer Discretionary & Business services, IT, Marketing & Telecoms, Industrials & Transportation, Energy & Utilities, Food & Agriculture, Healthcare, Education and Real Estate. The industries are measured with n-1 binary dummy variables. Consumer Discretionary & Business Services is used as the base category.

Investment year

The year when the investment has been made is also used as a control variable in this study. The economic situation of a given year naturally affects all investments made then; investments made during an economic downturn perform systematically worse than those made during an upturn.

Moreover, investments made long ago are more likely to have raised additional funding than more recent investments. Therefore, the year has to be accounted for in order to compare the performance of investments made in different years. Investment year is grouped into four five-year periods (2000-2004, 2005-2009, 2010-2014 and 2015-2019) and measured with n-2 binary dummy variables. The first two year ranges contain very few investments and therefore they are both used as the reference category.

Investment stage

Investments made into companies in different stages of development have different success expectations. As mentioned in previously, VC investments are riskier than buyout investments (Weidig & Mathonet, 2004). Therefore, the stage of the investments as specified in Preqin or Crunchbase is also used as a control variable in this study. The four different stages (VC, growth, buyout, unspecified) are represented with n-1 binary dummy variables with “unspecified” used as the base category.

3.2.4 Summary of variables

There are two dependent variables that measure investments’ financial and impact performance and 8 independent variables that measure the targets set and methods used by the fund. Additionally, 9 independent variables measuring the use of specific impact modelling and measuring methods are used in additional regression models. Several control variables are also used in all of the regression models to account for such variation in the funds’ performance which is not caused by the independent variables. All of the variables are presented in Table 3.

Table 3. Variables of regression analysis

Variable	Variable type	Metric	Value range
Second-round	Dependent variable	Binary	
Net impact	Dependent variable	Continuous	-50.07 – 193.44
Environmental targets	Independent variable	Binary	
Social targets	Independent variable	Binary	
Financial targets	Independent variable	Categorical	1=below, 2=at, 3=above
Financial compromise	Independent variable	Categorical	1=yes, 2=sometimes, 3=no
Modelling	Independent variable	Categorical	1=no, 2=sometimes, 3=yes
Modelling: Theory of change	Independent variable	Binary	

Modelling: Other common	Independent variable	Binary	
Modelling: Own methods	Independent variable	Binary	
Measuring	Independent variable	Categorical	1=no, 2=sometimes, 3=yes
Measuring: IRIS	Independent variable	Binary	
Measuring: GRI	Independent variable	Binary	
Measuring: IMP	Independent variable	Binary	
Measuring: SDG	Independent variable	Binary	
Measuring: Own methods	Independent variable	Binary	
Measuring: Qualitative	Independent variable	Binary	
Third-party measuring	Independent variable	Categorical	1=no, 2=sometimes, 3=yes
Compensation	Independent variable	Binary	
Investment region	Control variable	Categorical	4 regions
Investment industry	Control variable	Categorical	9 industries
Investment year	Control variable	Categorical	4 five-year periods 2000-2019
Investment stage	Control variable	Categorical	VC, growth, buyout, unknown

3.3 Methods

3.3.1 Multiple linear regression

In this study, a multiple linear regression analysis is performed in order to study how the GP's targets, modelling methods, measuring methods and compensation structure affect the financial and impact performance of investments. Linear regression is a predictive analysis method that is used to study how one or more independent variables affect the selected dependent variable. Multiple linear regression refers to a linear regression that includes more than one independent variable. The mathematical form of a multiple linear regression model is presented in equation (1) (Myers, 1990).

$$Y_i' = \beta_0 + \beta_1 x_1 + \dots + \beta_n x_n + \varepsilon, \text{ where} \quad (1)$$

Y_i' = prediction of dependent variable

$x_1 \dots x_n$ = independent variables

β_0 = constant term

$\beta_1 \dots \beta_n$ = regression coefficients

ε = error term

Using the ordinary least squares (OLS) method, the parameters of the independent variables are estimated so that the sum of the squared deviations between the predicted values Y_i' and the actual values Y_i (see equation (2)) is minimized.

$$\sum_{i=1}^N (Y_i - Y_i')^2 \quad (2)$$

The multiple linear regression analysis model includes five major assumptions: 1) weak exogeneity, 2) linearity, 3) constant variance (a.k.a homoscedasticity), 4) independence of errors and 5) lack of perfect multicollinearity (Myers, 1990). Firstly, weak exogeneity means that the independent variables can be assumed as fixed values rather than random variables. This entails that the independent variables are error-free, which is often not a fully realistic assumption, but it leads to sufficiently accurate estimates. Secondly, the requirement of linearity implies that the mean of the dependent variable is a linear combination of the regression coefficients. This, however, does not restrict the independent variables in any way – only their coefficients. Thirdly, homoscedasticity means that different values of the dependent variables have the same variance in their errors. This assumption does not apply if the scale of the variables is very large since variance generally depends on the predicted values as is the case in this study. Fourthly, the errors of the dependent variables must not correlate, i.e. they must be independent of each other. It is important to note, that this assumption does not require independence of the dependent variables – only their errors. Finally, the lack of perfect multicollinearity assumes that there are no independent variables that correlate perfectly with each other. This kind of a situation could ensue for example from having two independent variables that measure the same thing.

3.3.2 Clustered robust standard errors

The sample of this study does not conform to all of the built-in assumptions of the ordinary least squares method: the data points of the sample are not independent of each other nor identically distributed, because each GP in the survey has several portfolio companies and the GP's answers linked to the companies are the same for all of their portfolio companies.

In order to account for this heteroscedasticity in the sample a robust standard errors method is used in this study in examining the effect the variables have on net impact. The robust standard errors method otherwise follows the regular OLS method with the exception of calculating the covariance matrix of the regression coefficient matrix (see equation (3)) (Rousseeuw & Leroy, 1987). This is done to prevent the standard errors from being biased and inconsistent.

$$cov(B) = (X^T X)^{-1} X^T S X (X^T X)^{-1} \quad (3)$$

Another method for countering the side effects of using OLS on a heteroscedastic data is clustering. As in this case the portfolio companies of different GPs form subgroups within the sample, clustering can help to compensate the biases. In addition to the robust standard errors, clustering is also used in the regression model that analyses the effects on net impact so that the data points of the sample are clustered by their respective GP.

3.3.3 Logistic regression

As the measure for the existence of a second funding round is a binary variable derived from the number of funding rounds, a logistic regression analysis is performed to examine its relationship to the independent variables. A logistic regression model is often used instead of a linear regression analysis when the dependent variable to be studied is discrete or binary because the linear regression model assumes that the prediction of the dependent variable can take any values and therefore it does not fit the nature of a binary dependent variable (Hosmer & Lemeshow, 2008). The mathematical form of the logistic regression model is presented in equation (3).

$$logit(\pi(x)) = \beta_0 + \beta_1 x_1 + \dots + \beta_n x_n \quad (3)$$

$$\Leftrightarrow \pi(x) = \frac{e^{\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n}}{1 + e^{\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n}}, \text{ where}$$

$\pi(x)$ = prediction of dependent variable

$x_1 \dots x_n$ = independent variables

β_0 = constant term

$\beta_1 \dots \beta_n$ = regression coefficients

3.3.4 Winsorization

In order to account for outlier values in the data, winsorization is performed on selected variables. Winsorization is a method for limiting the extreme values of a variable so that for example the smallest 5 % and the largest 5 % of the values are scaled down or up to the nearest limit. In this study as all of the independent and control variables are either binary or categorical variables, winsorization is only applicable to the net impact variable, and a 1 % and 99 % winsorization is performed on it.

4 Results

4.1 Descriptive analysis

4.1.1 Descriptive statistics

All of the descriptive statistics of the variables of this study are presented in Table 4. The net impact values are presented as they were before winsorizing and the absolute numbers of funding rounds is presented instead of the binary second-round variable.

The average net impact score of the analyzed portfolio companies is 22.94, with a standard deviation of 35.76. Thus, the average impact of the portfolio companies is clearly net positive. In the Upright database, the average net impact of all possible activities is 3.67, which is significantly lower than the average of the sample of this study. This means that at least in this sample, impact investors do seem to achieve a higher than average net impact in their portfolio companies.

The lowest net impact value in the sample is -50.07 (selling unpackaged chicken meat) while the highest is 193.44 (offering microloans to impoverished borrowers). In comparison, in the Upright database, the absolute lowest value is -153 (weapons and ammunition) and the highest is 193.44 (microloans). Thus, the sample is skewed towards the higher end of the possible net impact values.

The mean of the funding rounds is 2.57 with a standard deviation of 2.55. This is typical for count data. Even though there are some companies that have had a very high number of funding rounds (up to 17), the mode of the number of funding rounds is 1. This is due to most of the investments being fairly recent: the average investment year is 2014. Therefore, it is reasonable that most of the companies have not received additional funding yet.

Table 4. Descriptive statistics

Variable	Mean	SD	Min	Max	N
1. Net impact	22.939	35.756	-50.070	193.440	415
2. Funding rounds	2.588	2.617	1.000	17.000	415
3. Target: Social	0.289	0.454	0.000	1.000	415
4. Target: Environmental	0.149	0.357	0.000	1.000	415
5. Financial target	1.988	0.474	1.000	3.000	415
6. Financial compromise	2.692	0.544	1.000	3.000	415
7. Modelling	2.617	0.565	1.000	3.000	415
8. Modelling: Theory of change	0.733	0.443	0.000	1.000	415
9. Modelling: Other common methods	0.120	0.326	0.000	1.000	415
10. Modelling: Own methods	0.306	0.461	0.000	1.000	415
11. Measuring	2.930	0.351	1.000	3.000	415
12. Measuring: IRIS	0.308	0.462	0.000	1.000	415
13. Measuring: GRI	0.031	0.174	0.000	1.000	415
14. Measuring: SDG	0.388	0.488	0.000	1.000	415
15. Measuring: IMP	0.480	0.500	0.000	1.000	415
16. Measuring: Own methods	0.839	0.368	0.000	1.000	415
17. Measuring: Qualitative methods	0.682	0.466	0.000	1.000	415
18. Third-party measuring	1.212	0.438	1.000	3.000	415
19. Compensation	0.573	0.495	0.000	1.000	415
20. Region: Africa	0.101	0.302	0.000	1.000	415
21. Region: Americas	0.060	0.238	0.000	1.000	415
22. Region: Asia	0.089	0.285	0.000	1.000	415
23. Region: Europe	0.749	0.434	0.000	1.000	415
24. Industry: Consumer Disc. & Business Services	0.176	0.381	0.000	1.000	415
25. Industry: IT	0.214	0.411	0.000	1.000	415
26. Industry: Marketing & Telecoms	0.029	0.168	0.000	1.000	415
27. Industry: Industrials & Transportation	0.053	0.224	0.000	1.000	415
28. Industry: Energy & Utilities	0.116	0.320	0.000	1.000	415
29. Industry: Food & Agriculture	0.147	0.355	0.000	1.000	415
30. Industry: Healthcare	0.140	0.347	0.000	1.000	415
31. Industry: Education	0.101	0.302	0.000	1.000	415
32. Industry: Real Estate	0.024	0.154	0.000	1.000	415
33. Years: 2000-2004	0.024	0.154	0.000	1.000	415
34. Years: 2005-2009	0.075	0.263	0.000	1.000	415
35. Years: 2010-2014	0.330	0.471	0.000	1.000	415
36. Years: 2015-2019	0.571	0.496	0.000	1.000	415
37. Deal stage: Unspecified	0.311	0.463	0.000	1.000	415
38. Deal stage: VC	0.593	0.492	0.000	1.000	415
39. Deal stage: Growth	0.060	0.238	0.000	1.000	415
40. Deal stage: Buyout	0.036	0.187	0.000	1.000	415

Table 5. Pearson correlation table

1. Net impact	1																			
2. Funding rounds	-0.032	1																		
3. Target: Social	-0.210*	-0.229*	1																	
4. Target: Environmental	-0.087	0.195*	-0.267*	1																
5. Financial target	0.086	0.138*	-0.388*	0.468*	1															
6. Financial compromise	0.115*	-0.069	0.000	-0.397*	0.295*	1														
7. Modelling	-0.027	0.105*	0.414*	0.189*	-0.306*	-0.118*	1													
8. Modelling: Theory of change	0.049	-0.279*	0.265*	-0.235*	-0.476*	-0.133*	0.120*	1												
9. Modelling: Other common methods	0.012	0.053	-0.236*	-0.155*	-0.194*	-0.035	0.251*	0.224*	1											
10. Modelling: Own methods	0.001	0.349*	-0.308*	0.132*	0.282*	0.338*	0.256*	-0.709*	0.268*	1										
11. Measuring	0.020	0.063	0.051	0.084	-0.354*	0.191*	0.450*	0.330*	0.074	0.058	1									
12. Measuring: RIS	0.160*	-0.178*	-0.403*	-0.031	0.061	0.158*	-0.601*	0.345*	-0.167*	-0.432*	0.133*	1								
13. Measuring: GRI	-0.074	-0.062	-0.115*	0.429*	0.005	-0.229*	0.122*	0.109*	-0.067	-0.119*	0.036	0.269*	1							
14. Measuring: SDG	0.248*	-0.094	-0.497*	0.110*	0.219*	0.297*	-0.441*	0.001	-0.097*	-0.099*	0.159*	0.635*	-0.143*	1						
15. Measuring: IMP	0.138*	-0.293*	0.207*	-0.402*	-0.108*	0.385*	-0.237*	0.580*	-0.089	-0.637*	0.191*	0.497*	-0.173*	0.394*	1					
16. Measuring: Own methods	0.119*	-0.009	0.265*	-0.569*	-0.385*	0.221*	0.004	-0.341*	-0.099*	-0.107*	0.361*	0.095	-0.410*	-0.202*	0.251*	1				
17. Measuring: Qualitative methods	0.176*	-0.224*	0.367*	-0.367*	-0.313*	0.155*	0.041	0.698*	0.046	-0.433*	0.218*	0.243*	-0.263*	0.055	0.521*	0.642*	1			
18. Third-party measuring	-0.044	-0.132*	0.104*	0.121*	-0.127*	-0.485*	-0.061	-0.093	-0.179*	-0.167*	-0.281*	-0.049	0.324*	-0.149*	-0.465*	-0.162*	-0.201*	1		
19. Compensation	-0.005	-0.073	-0.342*	-0.486*	-0.351*	-0.032	-0.335*	0.238*	0.319*	-0.125*	-0.102*	0.386*	-0.209*	-0.209*	0.247*	0.077	0.165*	0.112*	0.039	1
20. Region: Africa	-0.230*	-0.100*	0.438*	-0.118*	-0.532*	-0.309*	0.228*	0.058	-0.100*	-0.067	-0.047	-0.224*	-0.060	-0.251*	-0.322*	0.147*	0.195*	0.440*	0.176*	
21. Region: Americas	-0.009	0.083	0.062	-0.021	0.028	0.069	0.064	-0.007	0.031	0.030	0.050	-0.059	-0.046	-0.035	0.041	0.029	-0.023	-0.053	-0.027	
22. Region: Asia	0.108*	0.324*	-0.181*	0.106*	0.008	-0.149*	0.123*	-0.308*	-0.116*	0.251*	0.062	-0.172*	-0.056	-0.076	-0.283*	0.114*	-0.095	0.022	-0.106*	
23. Region: Europe	0.094	-0.189*	-0.220*	0.024	0.350*	0.276*	-0.274*	0.166*	0.129*	-0.135*	-0.036	0.302*	0.104*	0.244*	0.388*	-0.193*	-0.061	-0.292*	-0.038	
24. Industry: Consumer Disc. & Business Services	0.119*	0.138*	0.068	0.019	0.012	-0.087	0.145*	-0.021	-0.113*	-0.018	0.020	-0.185*	-0.083	-0.108*	-0.000	-0.098*	0.151*	-0.229*	-0.229*	
25. Industry: IT	0.128*	0.006	-0.243*	-0.021	0.088	0.189*	-0.228*	0.037	-0.013	-0.041	0.104*	0.299*	-0.094	0.379*	0.239*	-0.026	0.029	-0.227*	0.130*	
26. Industry: Marketing & Telecoms	-0.079	0.016	-0.015	-0.032	0.004	0.045	0.015	0.007	0.069	0.010	0.034	0.009	-0.031	0.010	0.065	-0.002	-0.006	-0.084	0.003	
27. Industry: Industrials & Transportation	-0.139*	0.037	-0.080	0.233*	0.188*	-0.024	0.065	-0.124*	-0.021	0.100*	-0.014	-0.088	0.019	0.054	-0.098*	-0.218*	-0.162*	-0.041	-0.122*	
28. Industry: Energy & Utilities	-0.133*	-0.021	-0.114*	0.229*	0.216*	-0.128*	-0.102*	-0.156*	-0.064	-0.011	-0.100*	0.052	0.194*	-0.010	-0.151*	-0.230*	-0.287*	0.221*	-0.069	
29. Industry: Food & Agriculture	-0.306*	-0.148*	0.321*	-0.059	-0.421*	-0.253*	0.185*	0.020	-0.091	-0.039	-0.053	-0.159*	0.121*	-0.275*	-0.289*	0.053	0.050	0.359*	0.110*	
30. Industry: Healthcare	0.074	0.053	0.004	-0.130*	-0.034	0.114*	0.052	0.055	0.235*	0.139*	0.041	-0.043	-0.033	-0.107*	0.003	0.101*	0.051	-0.148*	0.095	
31. Industry: Education	0.288*	-0.048	-0.055	-0.141*	0.042	0.117*	-0.154*	0.094	0.048	-0.049	-0.070	0.122*	-0.060	0.077	0.126*	0.060	0.075	-0.053	0.112*	
32. Industry: Real Estate	-0.100*	-0.071	0.212*	-0.066	-0.029	0.060	0.107*	0.095	-0.010	-0.104*	0.031	-0.105*	-0.028	-0.093	0.164*	0.026	0.074	-0.076	-0.150*	
33. Years: 2000-2004	-0.091	-0.043	0.142*	-0.022	0.004	0.031	0.107*	0.024	-0.058	-0.036	0.031	-0.105*	-0.028	-0.125*	0.069	0.069	0.040	-0.076	-0.119*	
34. Years: 2005-2009	-0.021	-0.046	0.183*	0.189*	0.220*	0.060	0.063	-0.077	-0.105*	-0.030	0.057	-0.110*	-0.051	-0.000	0.058	-0.050	-0.022	0.051	-0.329*	
35. Years: 2010-2014	0.021	-0.130*	0.106*	-0.064	-0.069	0.078	0.086	0.046*	0.055	-0.088	0.067	0.053	0.050	-0.012	0.147*	0.029	0.127*	-0.071	-0.006	
36. Years: 2015-2019	0.019	0.135*	-0.242*	-0.033	-0.053	-0.116*	-0.148*	-0.106*	0.022	-0.073	-0.103*	0.041	-0.012	0.051	-0.191*	-0.023	-0.121*	0.064	0.217*	
37. Deal stage: Unsuspected	-0.177*	-0.167*	0.433*	-0.019	-0.247*	-0.280*	0.299*	0.076	0.071	-0.073	-0.119*	-0.381*	-0.061	-0.396*	-0.176*	0.040	0.112*	0.210*	-0.084	
38. Deal stage: VC	0.136*	0.201*	-0.542*	-0.010	0.155*	0.252*	-0.380*	-0.091	-0.010	0.114*	0.129*	0.490*	0.093	0.469*	0.118*	-0.030	-0.124*	-0.170*	0.237*	
39. Deal stage: Growth	-0.010	-0.034	0.129*	0.064	0.113*	-0.005	0.136*	0.016	-0.063	-0.036	-0.007	-0.169*	-0.046	-0.118*	0.021	-0.027	-0.023	-0.030	-0.171*	
40. Deal stage: Buyout	0.093	-0.073	0.190*	-0.009	0.059	0.039	0.086	0.030	-0.072	-0.073	-0.035	-0.129*	-0.035	-0.101*	0.098*	0.015	0.077	-0.035	-0.198*	

p < 0.05

* $p < 0.05$

1. Net impact	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
2. Funding rounds																					
3. Target: Social																					
4. Target: Environmental																					
5. Financial target																					
6. Financial compromise																					
7. Modelling																					
8. Modelling: Theory of change																					
9. Modelling: Other common methods																					
10. Modelling: Own methods																					
11. Measuring																					
12. Measuring: IRIS																					
13. Measuring: GRI																					
14. Measuring: SDG																					
15. Measuring: IMP																					
16. Measuring: Own methods																					
17. Measuring: Qualitative methods																					
18. Third-party measuring																					
19. Compensation																					
20. Region: Africa																					
21. Region: Americas																					
22. Region: Asia																					
23. Region: Europe																					
24. Industry: Consumer Disc. & Business Services																					
25. Industry: IT																					
26. Industry: Marketing & Telecoms																					
27. Industry: Industrials & Transportation																					
28. Industry: Energy & Utilities																					
29. Industry: Food & Agriculture																					
30. Industry: Healthcare																					
31. Industry: Education																					
32. Industry: Real Estate																					
33. Years: 2000-2004																					
34. Years: 2005-2009																					
35. Years: 2010-2014																					
36. Years: 2015-2019																					
37. Deal stage: Unsolicited																					
38. Deal stage: VC																					
39. Deal stage: Growth																					
40. Deal stage: Buyout																					

$p < 0.05$

The Pearson correlations of the variables is presented in Table 5. There are clearly quite a lot of significant correlations between the variables, which are caused by the nature of the binary variables. For example, all of the different modelling methods correlate positively with the use of modelling methods in general and the different measuring methods correlate positively with the use of measuring methods in general – if the GP uses a specific method (i.e. the value for that variable is 1) they must also have answered yes to the question of whether or not they use any modelling/measuring methods (i.e. the value of that variable is also 1). So, there are inevitably a lot of correlations among the independent variables and therefore the specific modelling and measuring methods are studied in separate regression models.

4.1.2 Sample characteristics

4.1.2.1 Survey sample characteristics

In terms of the investment stage focus of survey respondents, the sample is very concentrated on venture and especially growth investments with 19 out of 26 mentioning growth as one of their focus areas. The survey allowed for choosing more than one focus area. Buyout or mezzanine investments were reported as an investment focus by only two respondents. Some reported that they invest also in real estate, energy assets and financial institutions which are out of the scope of this study and were thus excluded. The full distribution can be seen in Figure 6, which clearly shows the overemphasis on VC and growth investors as compared to the total sample population as discussed in section 3.1.

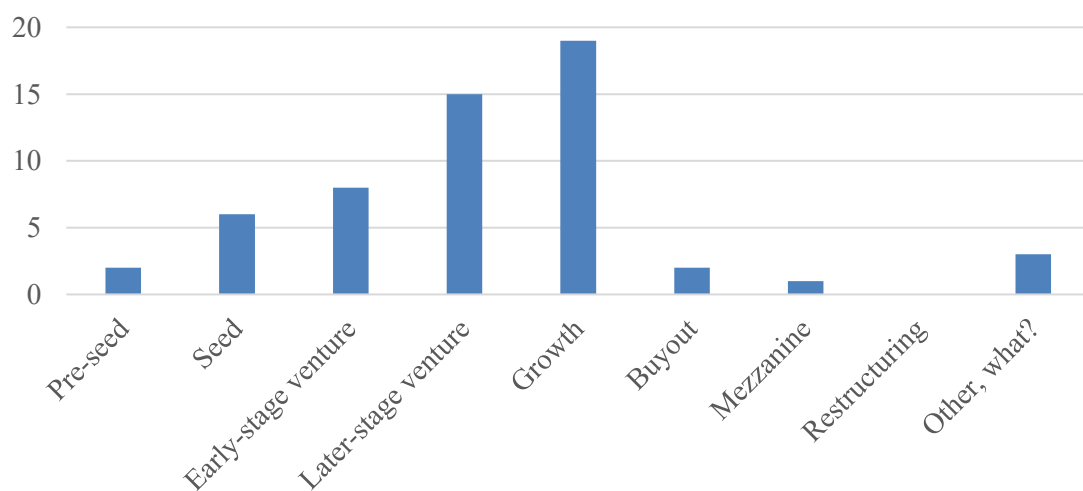


Figure 6. Distribution of investment stage focuses by survey respondents

Similarly, in the regional focuses mentioned by the survey respondents, there is a clear emphasis on Europe as can be seen in Figure 7. It is understandable that Europe is the most popular region to invest in, since the scope of this study is limited to European impact investors. However, there is also a significant share of respondents who report Africa or Asia as their target region. This is likely to be a special characteristic of the impact investors since especially Africa is typically not favored by private equity investors as a target region. South and North America are targeted by a few respondents, while Australia is not targeted by anyone. It was possible to choose several regions as target areas.

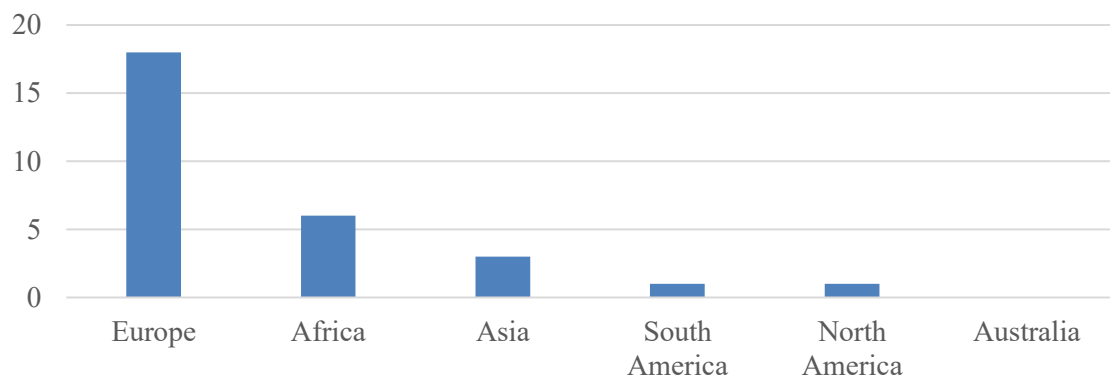


Figure 7. Distribution of investment region focuses by survey respondents

The survey respondents were also asked about their views on the definition of impact investing. Everyone agreed with the statement that simply put, impact investing is about targeting both financial returns and impact. They were also fairly unanimous about financial returns and impact results being equally important and that there is a requirement of net positivity in impact investing. However, regarding measuring and intentionality, the opinions varied a bit more: 16 % disagreed on measuring and 12 % disagreed on intentionality being a requirement for impact investing. Still, most of the respondents agreed with those statements as well. The full distribution of the opinions can be seen in Figure 8.

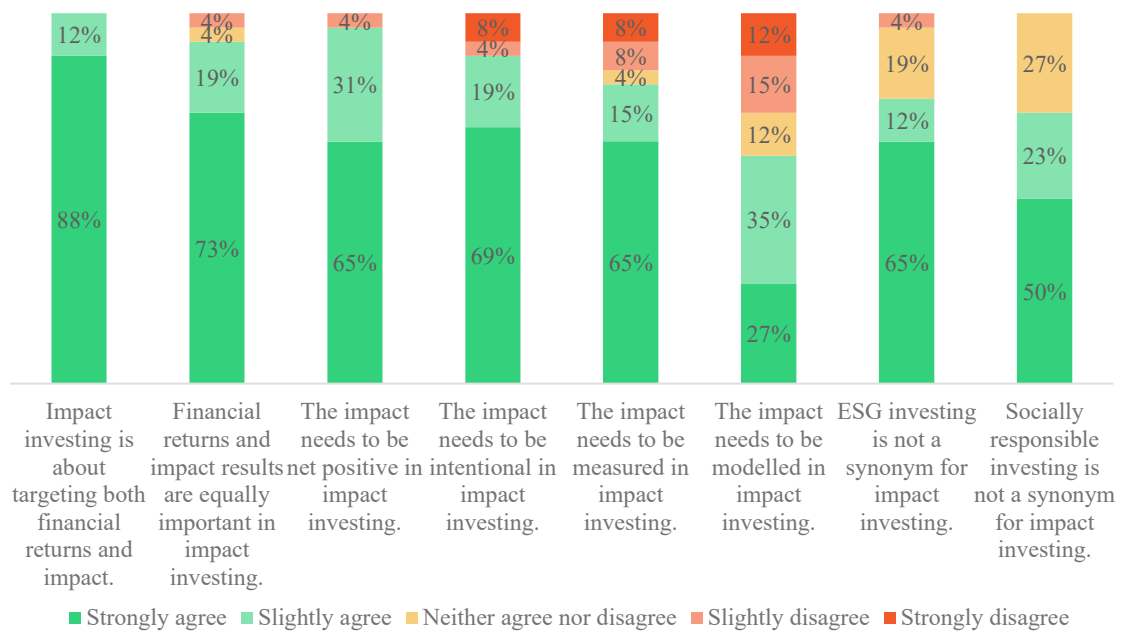


Figure 8. Survey respondents' view on the definition of impact investing

Regarding the impact targets of the GPs, there is a clear emphasis on targeting both environmental and social targets: half of all respondents report to be targeting both kinds of impacts. Among those that focus only on one kind of impact targets, social impacts were somewhat favored: 35 % of all the respondents focus solely on social targets whereas 15 % focus on environmental targets alone. The distribution of the responses is presented in Figure 9.

When it comes to financial targets, there is an even stronger emphasis: 73 % of the respondents state that they target market rate returns. There is a small minority targeting below market rate returns (15 %) but similarly there is also a minority targeting above market rate returns (12 %). This indicates that even though some private equity impact investors settle for lower returns, the clear majority aim for good financial returns.

On the other hand, in Figure 11 it can be seen that almost half (46 %) of the respondents state that they are willing to compromise on their financial targets in some cases in order to maximize impact. The other half (46 %) note that they are not willing to budge at all from their financial targets even if it would increase the achieved impact. Only very few (8 %) are willing to do so in all cases.

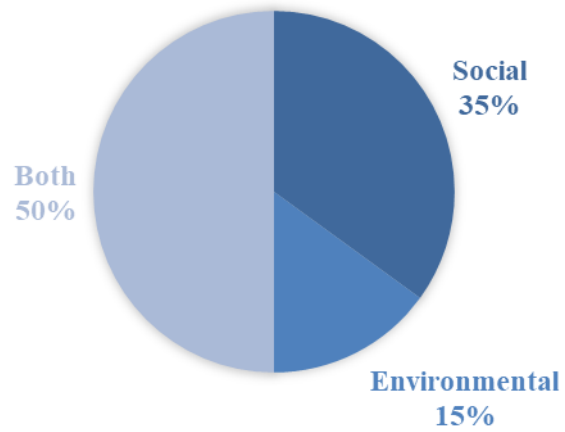


Figure 9. Impact targets reported by survey respondents

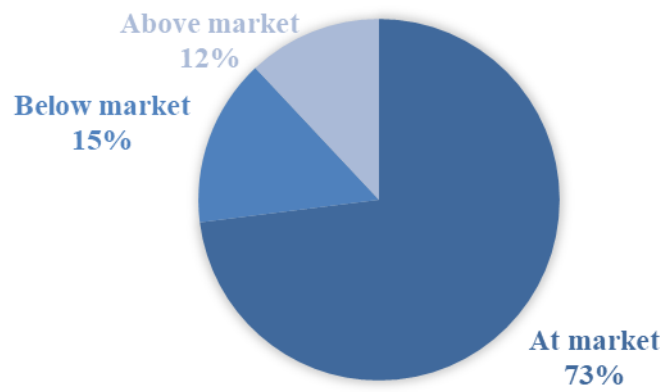


Figure 10. Financial targets reported by survey respondents

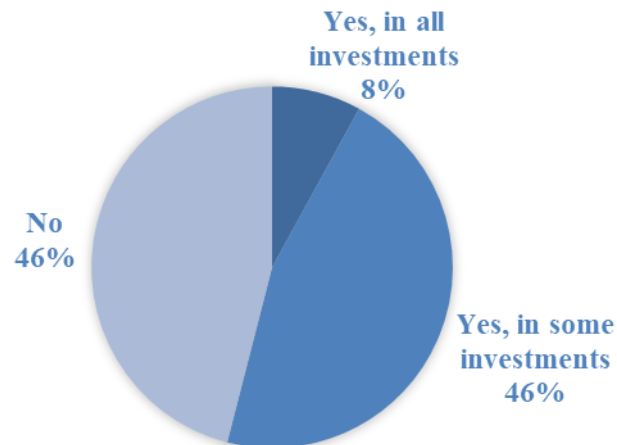


Figure 11. Survey respondents' willingness to compromise profits for impact

In terms of modelling impacts before investing, the clear majority does use some formal methods to do that in all or at least some investment decisions as can be seen from Figure 12. Among them, the most popular method is theory of change (70 %), but self-developed modelling methods are also used by half of them. Only 12 % of the respondents state that they do not use any formal methods in modelling impact before investing and do not plan to do so in the future either (see Figure 13).

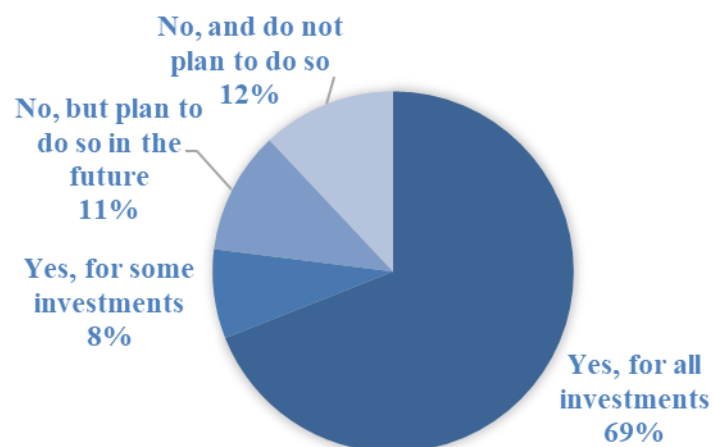


Figure 12. Survey respondents' use of impact modelling methods

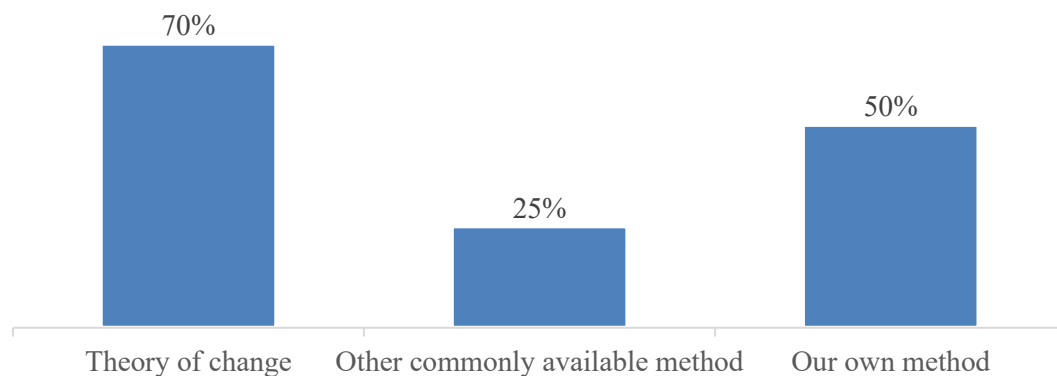


Figure 13. Survey respondents' preferred modelling methods

Those respondents who do use some impact modelling methods before investing, were also asked about their satisfaction of the modelling methods they use in terms of five aspects: time efficiency, cost efficiency, level of detail, sophistication and accuracy. Over half of the respondents are satisfied with all of these aspects of their modelling efforts. The aspect that they are the least satisfied about is accuracy of the modelling (see Figure 14).

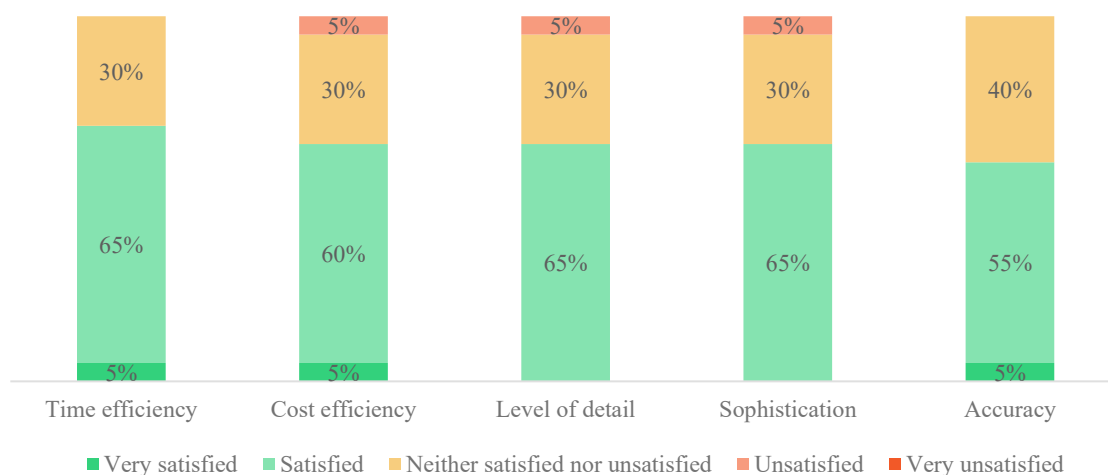


Figure 14. Survey respondents' satisfaction with their modelling methods

Measuring impact after investing is even more common (see Figure 15). 88 % report that they measure impact in all cases. One of the respondents (4 %) does not currently use any measuring

methods but is planning on using them in the future. This respondent is a very new fund manager, who has just started operations and does not have any portfolio companies yet. One respondent does not use any impact measuring method and does not plan on it either. This GP reported that they rely solely on third-party evaluators in their impact measurement.

Among those who do use some impact measuring methods themselves, own quantitative measuring methods are clearly the most popular. Qualitative methods are also used by over half of them. Out of the commonly known measurement methods SDGs and the IRIS are the most commonly used. IMP is preferred by 21 % and the GRI is referenced by 4 %. The rest of the measuring methods were not used by any of the survey respondents. The full distribution can be seen in Figure 16.

Out of the respondents using some measuring methods, most are satisfied with their efforts. No one is unsatisfied with the time or money it takes to measure their impacts and only one respondent is unsatisfied with the level of detail in their measurement methods. The respondents are least satisfied with the accuracy and sophistication of the methods they use. The satisfaction rates for all aspects can be seen in Figure 17.

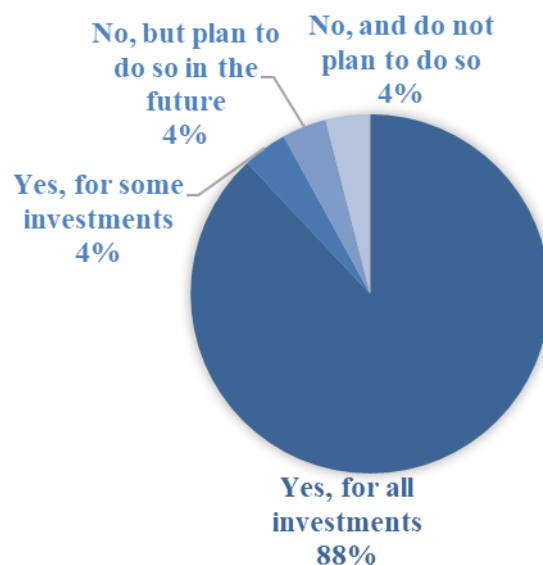


Figure 15. Survey respondents' use of impact measuring methods (excluding third-party evaluators)

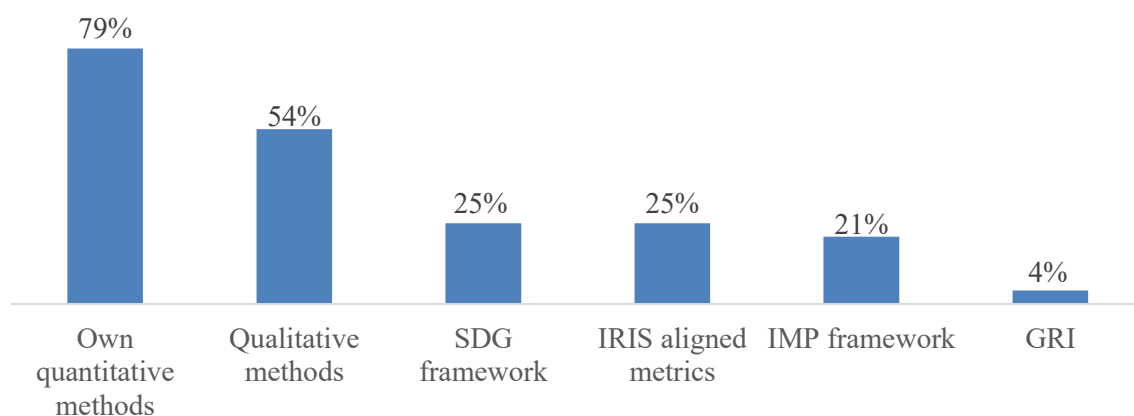


Figure 16. Survey respondents' preferred measuring methods



Figure 17. Survey respondents' satisfaction with their measurement methods

Third-party evaluators in impact measurement get a mixed review: 54 % report that they do not use any third-party evaluators, whereas 46 % use third-party evaluators in all or at least some cases. As all of the respondents except one, were either using measurement methods already or planning to measure impacts themselves, it is evident that third-party evaluators are used to supplement and enhance the GPs own measurement efforts instead of being a complete outsourcing option. The exact figures are presented in Figure 18.

Among those respondents who do use third-party evaluators, the satisfaction rates are very high in all aspects except for cost efficiency. However, even in terms of costs 58 % are either satisfied or very satisfied. The satisfaction rates in all aspects is presented in Figure 19.

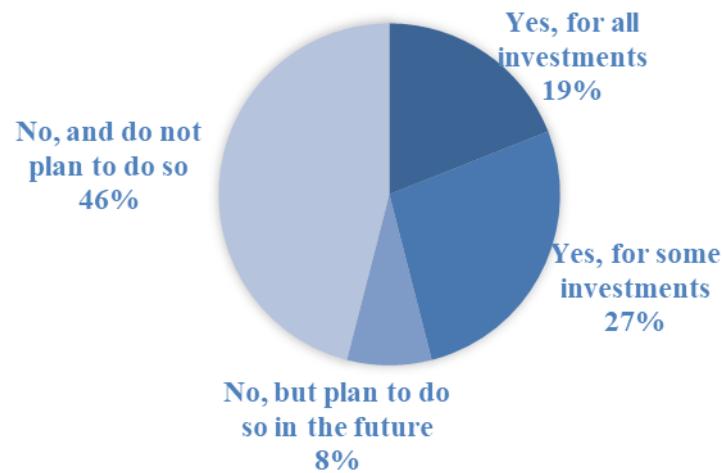


Figure 18. Survey respondents' use of third-party evaluators in impact measuring

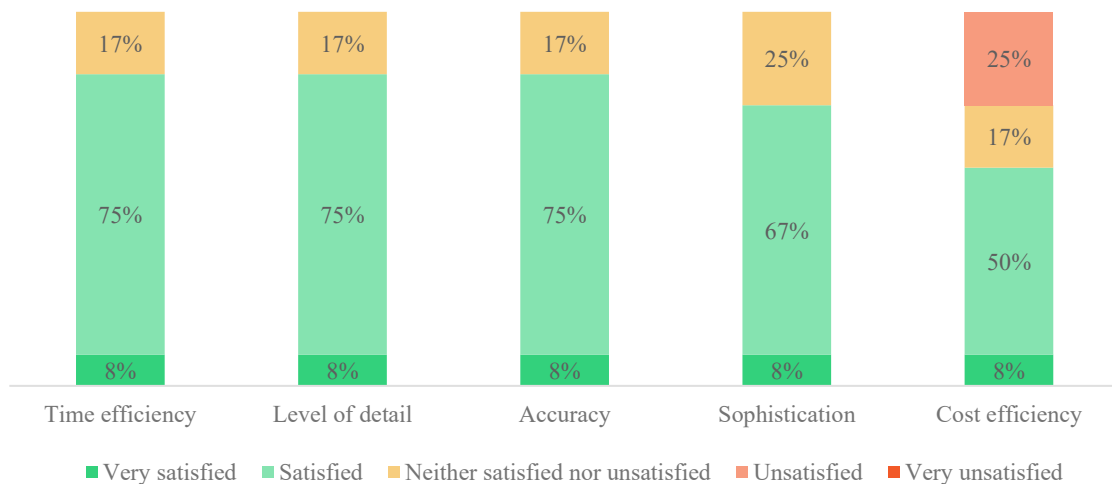


Figure 19. Survey respondents' satisfaction with their third-party impact evaluators

Linking compensation to impact results is another subject that divides the fund managers: 58 % report that their compensation depends on impact in some way whereas 42 % receive their

compensation and fees regardless of the impact results achieved. This is an interesting division, since linking compensation to impact has not been studied in any previous studies and there isn't much information available on how to implement it.

Looking at the answers given in the free-text field, it is also evident that there aren't any established methods of linking compensation to impact yet. Those who have linked their compensation to impact have implemented it in various different ways: for some, the compensation depends 50/50 on achieving impact targets and financial targets, some have a dual hurdle rate (financial and impact), some have arranged an annual funding scheme so that if impact targets are not achieved, additional funding is not granted, some receive a bonus if they achieve their impact targets and some are still just figuring out how exactly impact achievements will affect their compensation. Some respondents are part of European Investment Fund's (EIF) Social Impact Accelerator (SIA) program, which requires all fund managers to have their compensation linked to impact depending on their impact KPIs.

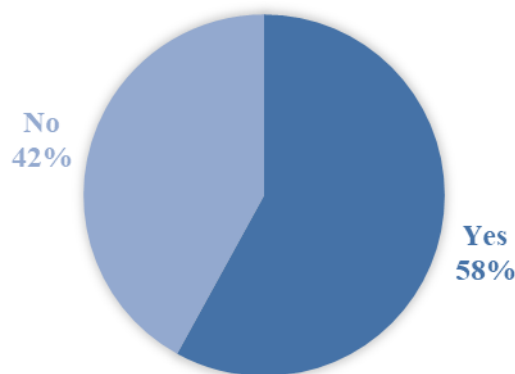


Figure 20. Survey respondents' compensation linking to impact

The respondents were also asked about their opinions on the LP-GP relationship in an impact investing fund. Most feel that LPs are interested in impact matters and that the interest has increased in recent years. Furthermore, everyone agrees that it will only increase in the future. However, that interest doesn't seem to translate to actual investment commitments quite yet as over 50 % disagree or strongly disagree with the statement that raising an impact fund is easier than raising a regular fund. Statements about LP motivations and conflicts of interest between

financial first and impact first LPs divide the opinions of the respondents. All of the opinions are presented in Figure 21.

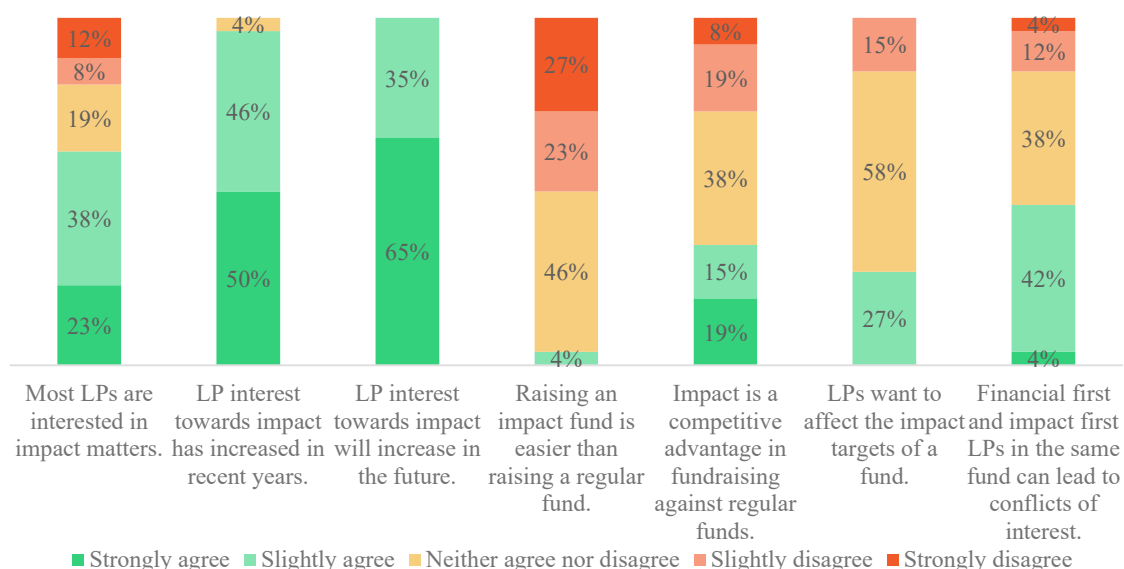


Figure 21. Survey respondents' view on the LP-GP relationships in impact PE funds

4.1.2.2 Deal sample characteristics

The final sample includes 415 deals made by 19 European impact investors. 3 GPs that participated in the survey didn't have any deals reported yet in either Preqin or Crunchbase. There are 246 deals that are classified as venture investments, 25 growth investments and 15 buyout investments. Deal type is not specified for 129 deals, which makes analyzing the representativeness of the sample quite challenging. All in all, it is clear that venture investments form the clear majority of the sample (see Figure 22).

Comparing that to what the GPs announced as their investment focuses in the survey as presented in Figure 6, the responses and the reality are fairly aligned but there are also some differences. In the reported investment focuses there was a strong emphasis on venture deals (pre-seed, seed, early-stage venture and later-stage venture combined) whereas buyout or mezzanine investments were reported as an investment focus by only two GPs. This is in line with the actual deal sample. However, growth was reported as the most popular investment type in the survey by far: 19 respondents out of 26 reported growth as one of their investment focuses whereas in the actual sample there are only 25 growth investments. Therefore, it is probable that either a large portion of the unspecified investments are actually growth investments, or if that's not the case, then there

seems to be a lack of growth investment targets even though impact investors are keen to invest in them.

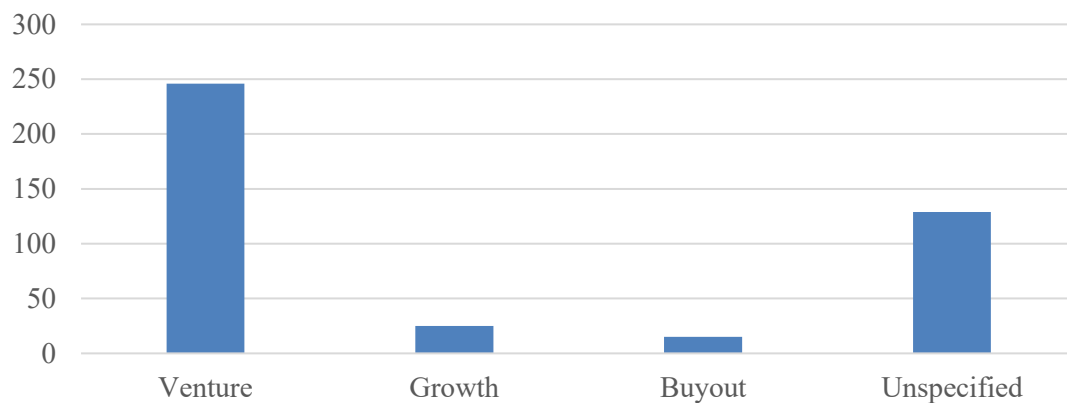


Figure 22. Distribution of deals by investment type

The sample of the deals is skewed also in other ways. Firstly, even though there are a few investments made before 2006 and a fairly large amount made in 2007-2013, the majority of deals are made in 2014 or after. This skewed distribution actually represents the overall growth trend of impact investing fairly well: impact investing was coined in 2007 and started gaining momentum a few years after that. In the last few years, it has grown and become a slightly more mature industry. Thus, the sample can be considered a good representation of impact investor portfolio companies. The full distribution of the deals by investment year is presented in Figure 23.

Secondly, as it can be seen from Figure 24, the distribution of the number of funding rounds is heavily dominated by the smaller values, which is typical for count data. Over half of the target companies have only had one funding round thus far. However, there is a long tail in the distribution going up to 17 funding rounds, which is also typical for count data.

Contrarily to deal types, investment years and the number of funding rounds, the net impacts of the portfolio companies are fairly evenly distributed as can be seen in Figure 25. The vast majority of the net impact values fall between -20 and 40, with 0-20 being the most common range. However, the distribution is centered towards the higher net values, especially so by a small group of companies with exceptionally high net impact values between 180 and 200. These companies with net impacts over 180 are practically all lenders offering microloans to disadvantaged people.

The concentration of the values towards the higher end of the scale means that the portfolio companies in the sample represent a subset of companies that have a higher than average net impact. Therefore, it can be considered a good representation of impact investor portfolio companies as impact investors aim to find companies that have a net positive impact.

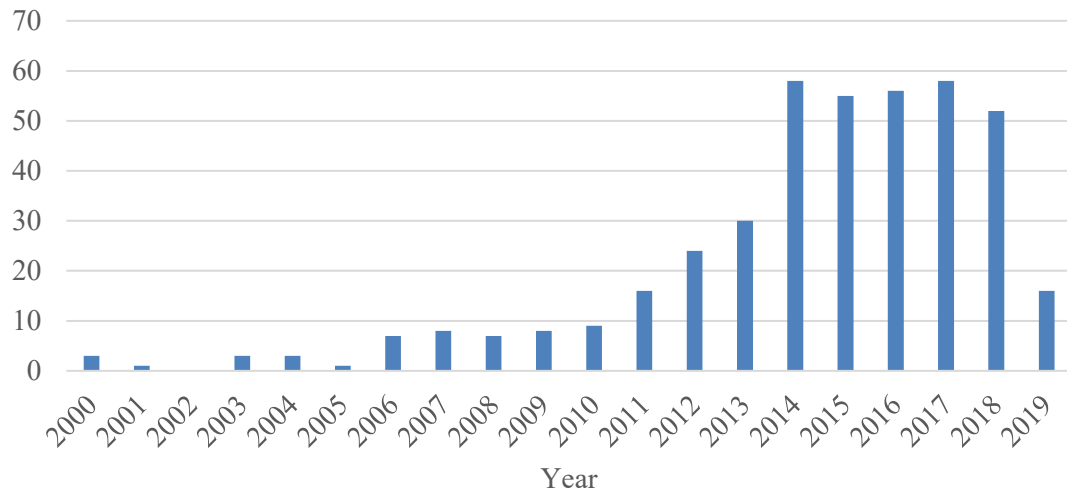


Figure 23. Distribution of the sample by year of first investment by impact investor

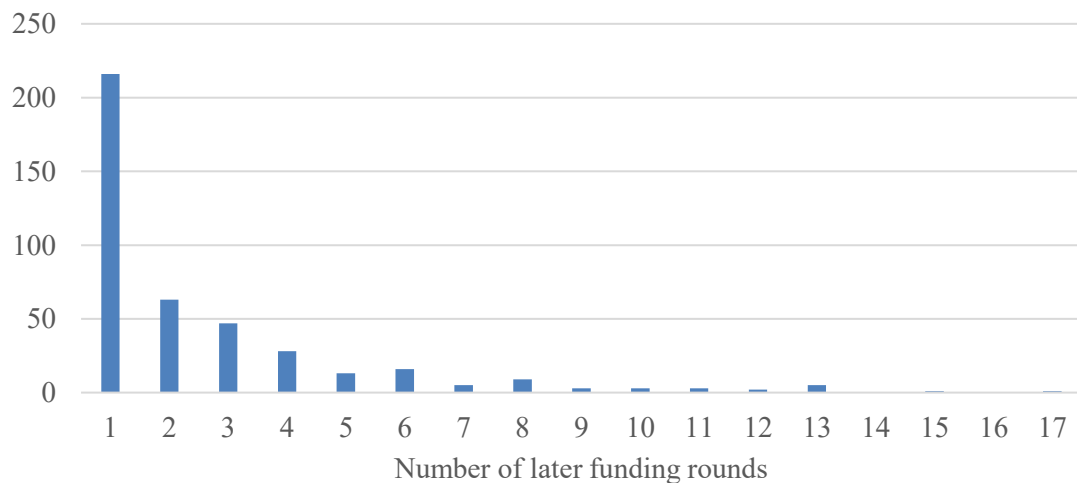


Figure 24. Distribution of the sample by number of funding rounds

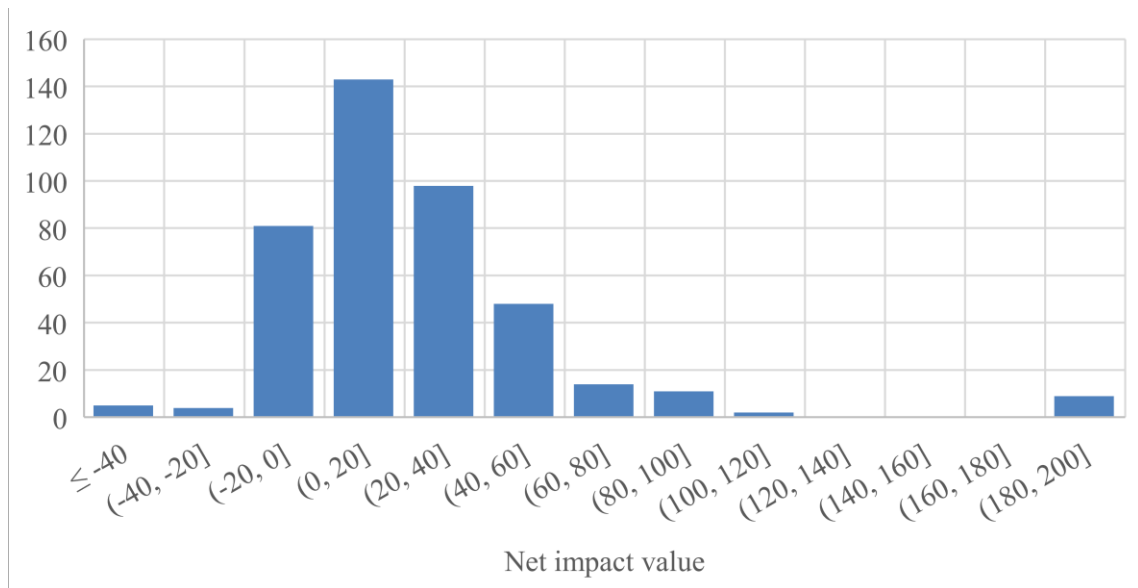


Figure 25. Distribution of net impacts of the sample

4.2 Regression analysis

The main results of the regression analyses are presented in Table 6, which includes models 1 and 2. In model 1 the relationships between net impact and the independent and control variables is examined with a clustered robust regression model. In model 2, the second-round variable is studied with regards to the independent and control variables using a logistic regression model.

The first dependent variable of this study, the net impact of the portfolio companies, does not seem to correlate with any of the studied independent variables in a statistically significant way. However, among the control variables, some portfolio company industries correlate with net impact in some respects. Investments into companies in the education sector correlate positively with the achieved net impact on a $p=0.02$ significance level, while investments into food and agriculture, industrials and transportation, energy and utilities and real estate have a negative correlation with the net impact on $p=0.02$, $p=0.02$, $p=0.05$ and $p=0.00$ levels respectively. All of the industries were compared to the base category, which was consumer discretionary and business services.

The second dependent variable examined in this study, financial performance, correlates with two of the independent variables: social targets and compensation. Firstly, in terms of impact targets, there is a negative correlation between having social targets and financial performance on a significance level of $p=0.01$. In other words, investments made with a social impact target seem

to have performed worse than those made with an environmental or dual target. Secondly, linking compensation to impact seems to correlate negatively with financial performance on a $p=0.03$ significance level.

Financial performance correlates also with some of the control variables. In terms of investment region, it seems that investments into Africa and Americas perform better in terms of the existence of a second round than the base category Europe. This could be due to small sample sizes in those regions as compared to Europe, where most of the investments were directed. Out of all the industries, investments into IT and healthcare sectors correlate positively with the existence of a second round on $p=0.03$ and $p=0.02$ levels. Regarding the investment year, investments made in 2010-2014 perform worse than other time periods on a $p=0.02$ significance level. Moreover, VC investments correlate positively with the existence of a second round as compared to the other categories, which makes sense since follow-on funding rounds are more common in VC than in other types of investments.

Table 6. Regression models 1 and 2

	Model 1		Model 2	
	Net impact		Second round	
	b/se	p	b/se	p
Impact target: Social	-28.31 (18.43)	[0.14]	-1.71 (0.70)	[0.01]
Impact target: Environmental	-21.34 (16.83)	[0.22]	-0.89 (1.18)	[0.45]
Financial target	-3.58 (8.11)	[0.66]	0.82 (0.72)	[0.26]
Financial compromise	-0.35 (7.10)	[0.96]	-0.29 (0.57)	[0.62]
Modelling	-3.18 (6.46)	[0.63]	0.81 (0.48)	[0.09]
Measuring	6.44 (6.59)	[0.34]	0.33 (0.66)	[0.62]
Third-party measuring	13.95 (9.38)	[0.15]	0.15 (0.45)	[0.74]
Compensation	-20.82 (16.52)	[0.22]	-1.30 (0.60)	[0.03]
Region: Africa	8.91 (14.14)	[0.54]	1.88 (0.60)	[0.00]
Region: Americas	1.07 (2.36)	[0.66]	0.68 (0.32)	[0.03]
Region: Asia	6.91 (6.57)	[0.31]	0.92 (0.61)	[0.13]
Industry: IT	4.89 (8.99)	[0.59]	1.37 (0.65)	[0.03]
Industry: Marketing & Telecoms	-18.00 (8.93)	[0.06]	0.90 (1.03)	[0.38]
Industry: Industrials & Transportation	-24.38 (9.27)	[0.02]	0.97 (0.68)	[0.15]

Industry: Energy & Utilities	-22.95 (10.98)	[0.05]	0.43 (0.52)	[0.41]
Industry: Food & Agriculture	-30.32 (11.31)	[0.02]	-0.37 (0.55)	[0.50]
Industry: Healthcare	5.56 (6.67)	[0.42]	1.39 (0.59)	[0.02]
Industry: Education	26.43 (10.46)	[0.02]	1.17 (0.92)	[0.20]
Industry: Real Estate	-19.64 (4.45)	[0.00]	0.51 (0.68)	[0.45]
Year: 2010-2014	7.84 (6.76)	[0.26]	-0.83 (0.37)	[0.02]
Year: 2015-2019	2.41 (5.23)	[0.65]	-0.35 (0.40)	[0.38]
Deal stage: VC	-3.43 (3.16)	[0.29]	1.09 (0.42)	[0.01]
Deal stage: Growth	3.42 (8.23)	[0.68]	0.91 (0.57)	[0.11]
Deal stage: Buyout	24.19 (21.03)	[0.27]		
Constant	27.15 (35.51)	[0.45]	-4.19 (2.93)	[0.15]
<i>N</i>	415		334	

In addition to the statistical significances, it is also important to study effect sizes. Even though model 1 didn't reveal many significant correlations, the average marginal effects of the independent variables on net impact in model 1 are very large as can be seen in Figure 26. Especially for the social and environmental target variables and the compensation variable, the effect sizes are extremely large; more than -20. As the social and environmental targets are compared against the baseline of having both targets, this indicates that having both kinds of impact targets seems to outperform focusing on only one kind of impact target in terms of net impact achieved. On the other hand, the 95 % confidence intervals of those effect sizes are also very large, which makes them less reliable.

Additionally, there are also other variables that have large average marginal effects in the model. Using some measuring methods has an average marginal effect of over 5 and using third-party measuring has an effect of more than 10. However, both of their confidence intervals are fairly narrow, which increase their importance.

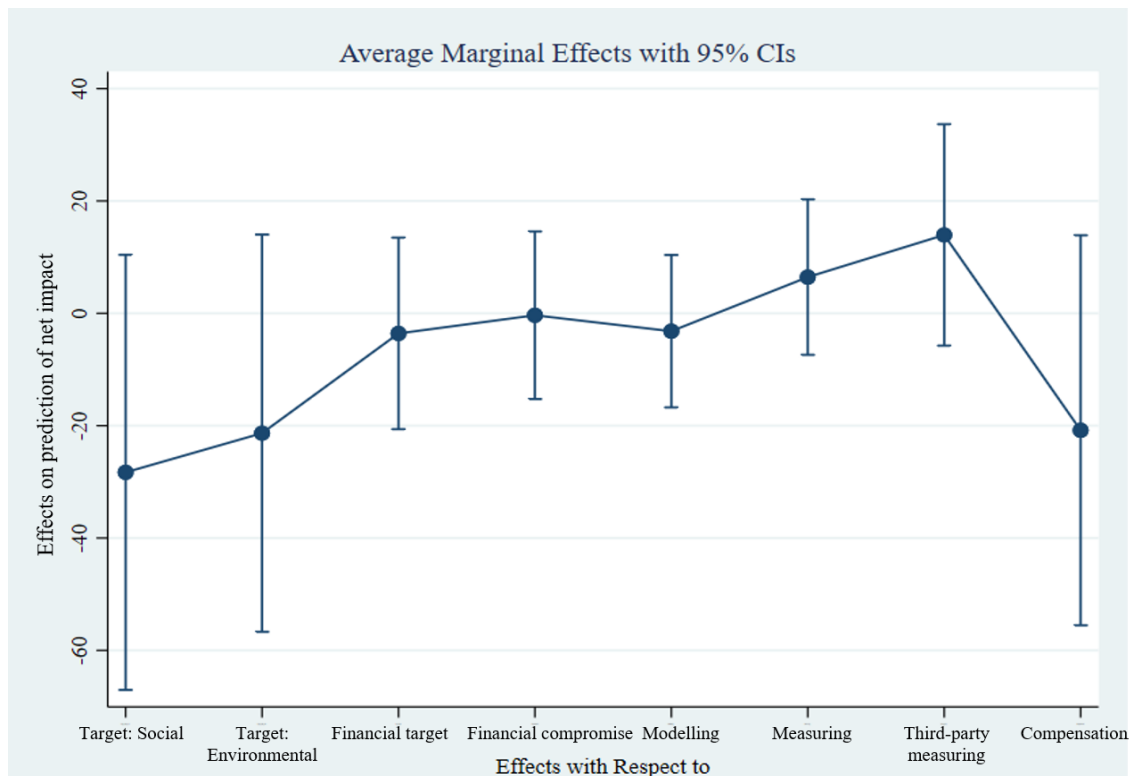


Figure 26. Average marginal effects and confidence intervals for prediction of net impact

The average marginal effects in model 2 for the second-round variable are not nearly as big as for net impact, but still there are quite many that are notable as can be seen in Figure 27. Firstly, the two variables that showed statistically significant correlations in the regression analysis – having social targets and linking compensation to impact – have also large effect sizes of more than -2. Both of their confidence intervals are also entirely below zero, which reinforces the findings of the regression analysis that these two variables are very likely to have a negative correlation with the occurrence of a second funding round. Having environmental targets as compared to having both social and environmental targets also has an average marginal effect of more than -1.5, but the confidence interval of that is so wide that very reliable conclusions cannot be drawn from that.

Secondly, having high financial targets and using some modelling methods have a fairly large effect on the existence of a second round, with fairly narrow confidence intervals: both have an average marginal effect of over 1.5 and the confidence intervals stay almost completely above zero. Thus, it is quite likely that they have a positive effect on the occurrence of a second round. The other independent variables have quite small average marginal effects on the second-round variable, and therefore they are not as meaningful.

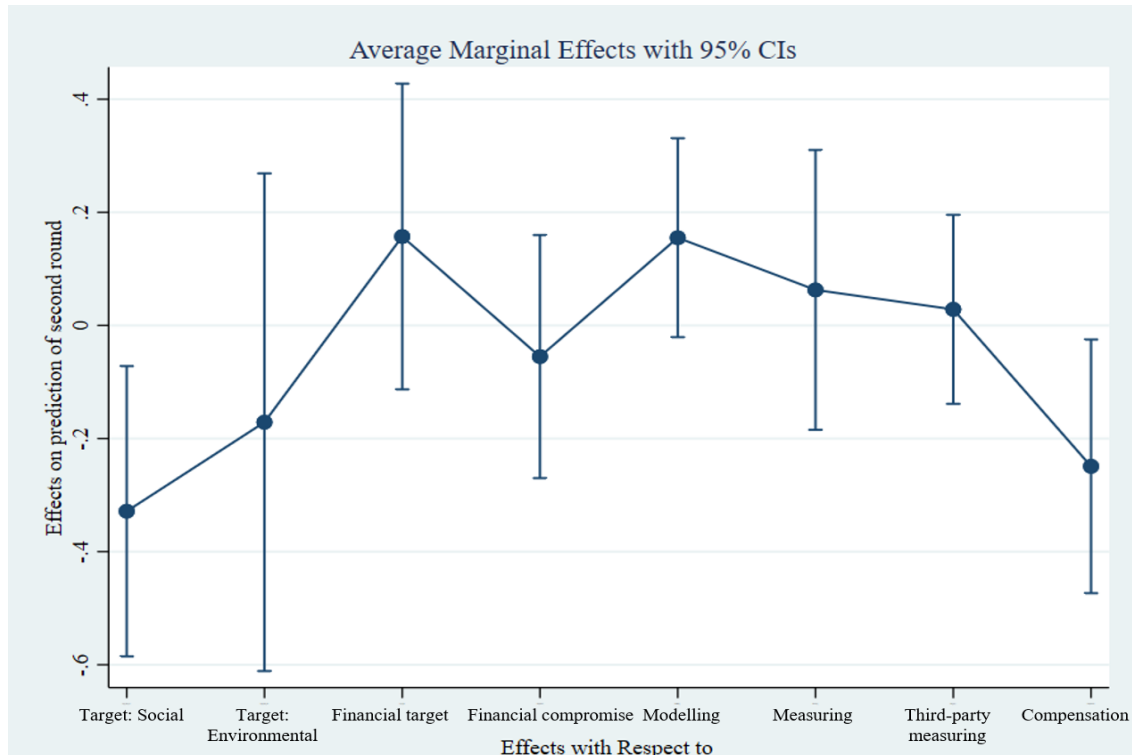


Figure 27. Average marginal effects and confidence intervals for prediction of second round

In order study that there is no multicollinearity in the model, an analysis of the variance inflation factors of the variables in model is also conducted. The average of the variance inflation factors (VIF) of all the variables used in model 1 is 2.81, which can be considered acceptable. However, regarding the impact and financial target variables the VIFs are quite high. Still as all values are under 10, there aren't likely any major multicollinearity issues in the model. The VIFs for all of the variables used in model 1 are presented in Table 7.

Table 7. Variance inflation factors in model 1

	Model 1 Net impact VIF
Impact target: Social	3.90186
Impact target: Environmental	7.186234
Financial target	8.323383
Financial compromise	5.217407
Modelling	2.26997
Measuring	3.46067
Third-party measuring	1.801015
Compensation	3.250926
Region: Africa	3.023306

Region: Americas	1.108622
Region: Asia	1.351903
Industry: IT	2.378629
Industry: Marketing & Telecoms	1.25459
Industry: Industrials & Transportation	1.395314
Industry: Energy & Utilities	1.772516
Industry: Food & Agriculture	2.603253
Industry: Healthcare	1.927837
Industry: Education	1.651376
Industry: Real Estate	1.243667
Year: 2010-2014	3.60739
Year: 2015-2019	4.008931
Stage: VC	2.106137
Stage: Growth	1.27452
Stage: Buyout	1.244609
Constant	
<i>Mean VIF</i>	2.806836

In addition to the main models presented in Table 6, additional analyses of the specific measuring methods and modelling methods were performed on subsets of the total sample including only those deals in which some modelling or measuring methods were used. The results of these analyses are presented in Table 8 for modelling methods and in Table 9 for measuring methods. Same kind of regression models were used in studying modelling and measuring methods as the ones used in the main analysis: a clustered robust regression for net impact and a logistic regression for the second-round variable.

In terms of the specific impact modelling methods it seems that none of them have a significant correlation with impact performance. Nonetheless, it seems that the use of own modelling methods somewhat increases the financial performance at a p-level of $p=0.00$ as can be seen in Table 8. There are also several significant correlations between the dependent variables and the control variables in models 3 and 4.

Table 8. Regression models 3 and 4

	Model 3		Model 4	
	Net impact		Second round	
	b/se	p	b/se	p
Theory of change	0.66 (10.04)	[0.95]	0.57 (0.48)	[0.23]
Other common methods	-2.71 (3.48)	[0.45]	-0.21 (0.29)	[0.47]
Own methods	-0.18 (2.83)	[0.95]	1.97 (0.20)	[0.00]

Region: Africa	-0.29 (10.25)	[0.98]	0.50 (0.62)	[0.42]
Region: Americas	-2.56 (2.61)	[0.34]	0.33 (0.40)	[0.41]
Region: Asia	13.22 (9.82)	[0.20]	1.16 (0.75)	[0.12]
Industry: IT	2.02 (12.78)	[0.88]	1.11 (0.69)	[0.11]
Industry: Marketing & Telecoms	-20.02 (12.32)	[0.12]	0.86 (1.15)	[0.46]
Industry: Industrials & Transportation	-27.49 (14.23)	[0.07]	0.80 (0.73)	[0.27]
Industry: Energy & Utilities	-22.10 (14.37)	[0.14]	0.67 (0.59)	[0.26]
Industry: Food & Agriculture	-32.04 (16.05)	[0.06]	-0.67 (0.72)	[0.36]
Industry: Healthcare	1.04 (10.86)	[0.92]	0.83 (0.62)	[0.18]
Industry: Education	20.63 (13.77)	[0.15]	0.60 (0.90)	[0.51]
Industry: Real Estate	-25.83 (8.95)	[0.01]	0.44 (0.64)	[0.50]
Year: 2010-2014	11.64 (7.69)	[0.15]	-0.84 (0.31)	[0.01]
Year: 2015-2019	7.05 (4.60)	[0.15]	-0.42 (0.35)	[0.24]
Deal stage: VC	3.60 (2.59)	[0.19]	1.10 (0.27)	[0.00]
Deal stage: Growth	2.55 (8.10)	[0.76]	0.94 (0.55)	[0.09]
Deal stage: Buyout	24.10 (22.99)	[0.31]		
Constant	17.86 (16.83)	[0.31]	-2.05 (0.92)	[0.03]
<i>N</i>	398		323	

Regarding the specific impact measuring methods there are some correlations with both impact performance and financial performance as can be seen in Table 9. Firstly, the use of the GRI or SDG framework and using qualitative measuring methods correlate positively with the net impact of the portfolio companies on $p=0.05$, $p=0.03$ and $p=0.04$ significance levels. Secondly, the use of the SDG framework and the IMP framework correlate negatively with financial performance on $p=0.00$ significance levels.

Table 9. Regression models 5 and 6

	Model 5		Model 6	
	Net impact		Second round	
	b/se	p	b/se	p
IRIS	-32.10 (19.14)	[0.11]	0.10 (0.37)	[0.79]
GRI	81.87 (39.48)	[0.05]	-0.92 (0.71)	[0.19]

SDG	47.29 (20.52)	[0.03]	-0.80 (0.26)	[0.00]
IMP	-9.32 (6.60)	[0.18]	-1.69 (0.15)	[0.00]
Own methods	41.93 (21.70)	[0.07]	-0.43 (0.77)	[0.57]
Qualitative methods	10.92 (4.87)	[0.04]	0.14 (0.56)	[0.80]
Region: Africa	-9.44 (6.97)	[0.19]	-0.51 (0.44)	[0.24]
Region: Americas	-0.47 (2.29)	[0.84]	0.31 (0.36)	[0.39]
Region: Asia	6.90 (7.01)	[0.34]	0.69 (0.60)	[0.25]
Industry: IT	4.99 (9.20)	[0.59]	1.44 (0.80)	[0.07]
Industry: Marketing & Telecoms	-12.22 (6.45)	[0.08]	0.98 (1.22)	[0.42]
Industry: Industrials & Transportation	-21.60 (8.54)	[0.02]	0.71 (0.74)	[0.34]
Industry: Energy & Utilities	-12.60 (8.70)	[0.17]	0.54 (0.68)	[0.42]
Industry: Food & Agriculture	-24.57 (9.72)	[0.02]	-0.96 (0.67)	[0.16]
Industry: Healthcare	5.41 (5.36)	[0.33]	1.08 (0.66)	[0.10]
Industry: Education	23.07 (9.93)	[0.03]	0.96 (1.01)	[0.35]
Industry: Real Estate	-18.73 (4.15)	[0.00]	0.57 (0.63)	[0.37]
Year: 2010-2014	8.61 (7.23)	[0.25]	-0.88 (0.39)	[0.02]
Year: 2015-2019	3.86 (4.21)	[0.37]	-0.51 (0.35)	[0.14]
Deal stage: VC	-2.23 (2.83)	[0.44]	1.43 (0.37)	[0.00]
Deal stage: Growth	3.58 (8.44)	[0.68]	0.88 (0.57)	[0.12]
Deal stage: Buyout	21.99 (21.67)	[0.32]		
Constant	-29.18 (17.29)	[0.11]	0.38 (0.94)	[0.69]
<i>N</i>	403		327	

Based on the results of the regression analyses presented in Table 6 for the main findings, Table 8 for modelling methods and Table 9 for measuring methods as well as the average marginal effect analyses, it can be concluded that some of the hypotheses outlined in section 2.5 are not supported while some are supported partially.

Firstly, H1 is not supported by the results, since targeting higher returns does not seem to affect the impact performance nor the financial performance of investments. Furthermore, not being

willing to compromise on financial targets in any situation does not correlate significantly with either of the dependent variables.

Secondly, the results show no evidence that targeting only social or environmental impacts would lead to better financial or impact results than targeting both. In fact, there is some contrary support that targeting only social impacts could decrease the financial performance and according to the average marginal effect analysis having social or environmental targets has a negative effect on net impact as compared to having both targets. Also, there does not seem to be any indication that targeting social or environmental impacts would lead to better financial or impact performance than the other. Therefore, H2, H3 and H4 are not supported by the results.

Thirdly, the use of modelling or measuring methods per se does not seem to correlate with the financial or impact results of the investments in the main regression models. However, there are some signals in the additional regression models that some specific methods might affect the performance in some ways. Using own modelling methods seems to increase the financial performance. Moreover, in the average marginal effect analysis, modelling in general also seemed to have a positive effect on financial performance. Thus, hypothesis 5 is partially supported by the results – modelling might improve financial performance, but it does not seem to affect impact results.

Furthermore, using the GRI or SDG frameworks or some qualitative methods to measure the achieved impact seems to increase the achieved net impact. On the other hand, using the SDG or IMP frameworks decreases the financial performance according to the additional regression model. So, the results are quite conflicted and thus hypothesis 6 is supported only partially – some measuring methods might improve the net impact of investments while others could decrease the financial performance of investments.

Finally, linking compensation to some impact targets or results does not seem to have any statistically significant results in terms of the impact performance of investments. Regarding the financial performance however, the results from the logistic regression model and the average marginal effect analysis indicate that linking impact to compensation could in fact decrease the financial performance of investments as measured by the occurrence of a second funding round. Hence, H7 is not supported by the results in any way.

A summary of the hypothesis results in terms of the regression analyses is presented in Table 10. However, as a concluding remark, it is important to keep in mind when interpreting these results that due to the relatively small sample size, the newness of the phenomenon and the general lack

of previous studies on impact investing in, the results are only indicative and therefore the hypotheses cannot be considered comprehensively validated based on these results alone.

Table 10. Summary of hypothesis results

<i>No.</i>	<i>Hypothesis</i>	<i>Result</i>
H1	Targeting higher returns improves the financial and impact performance of investments.	<i>Not supported</i>
H2	Targeting only environmental or social impacts instead of both improves the financial and impact performance of investments.	<i>Not supported</i>
H3	Targeting environmental impacts improves the financial performance of investments.	<i>Not supported</i>
H4	Targeting social impacts improves the impact performance of investments.	<i>Not supported</i>
H5	Modelling impact improves the investments' financial and impact performance.	<i>Partially supported</i>
H6	Measuring impact improves the investments' financial and impact performance.	<i>Partially supported</i>
H7	Tying fund manager compensation to impact targets improves the investments' financial and impact performance.	<i>Not supported</i>

5 Discussion and conclusions

5.1 Discussion of the results

This aim of this study was to gain insight on the impact investing industry especially from the point of view of private equity investors. As impact investing is a fairly new phenomenon among the private equity industry, it hasn't been studied extensively yet. Therefore, the research questions of this study were focused on addressing the most prominent unresolved questions and challenges that impact investing faces: 1) the definition of impact investing, 2) the financial and impact targets of impact investors, 3) the impact modelling and measuring methods that are used,

4) the GP-LP relationship and the extent to which GP compensation depends on impact results and finally 5) how all of these affect the financial and impact performance of investments.

The theoretical part of the study was a literature review that aimed to address the first four research questions. Regarding the definition of impact investing, it was found that most definitions are fairly aligned and that there is a unanimous understanding of the core elements of impact investing. Practically all definitions state that impact investing is about targeting both financial returns and positive social or environmental impacts. The level of ambition in the financial targets is not limited in any way, as long as there are some financial targets, which set it apart from charity. Furthermore, most definitions additionally include the requirements of intentionality and measurability meaning that the investments need to be made to intentionally target positive impacts and that the impacts need to be measurable and verifiable in some way (Bell, 2013; Bugg-Levine & Emerson, 2011; Clarkin & Cangioni, 2016; Combs, 2014; Hebb, 2013; Höchstädter & Scheck, 2014; O'Donohoe et al., 2010; Roundy et al., 2017).

Based on the literature, disagreement and debate on the definition focuses mostly on profitability and additionality. Some critics question the viability of generating market rate returns while creating positive impacts that would not have happened anyway. Therefore, the critics feel that the definition that allows any level of financial returns is not feasible, because there is an inevitable trade-off between impact added by the investor and financial returns (Brest & Born, 2013; Evans, 2013).

Additionally, it was found that even though the terms are sometimes used interchangeably responsible investing, ESG investing and similar concepts differ clearly from impact investing. The major differences are that whereas the approach in responsible investing and others is to avoid doing harm and minimizing the harm that is currently done, impact investing is all about maximizing the positive impact and searching for companies that do good, instead of those that do the least amount of bad possible (Bugg-Levine & Emerson, 2011; FVCA, Sitra, & Deloitte, 2017; Höchstädter & Scheck, 2014; Roundy et al., 2017).

The third research question was focused on finding out what impact modelling and measuring methods there are available to investors. It was found that impact modelling has not induced a lot of research nor attention of the practitioners, even though it can be considered an extremely important aspect in impact investing. Especially in social impact bonds (SIB), careful modelling of the expected impacts was found to be crucial for the success of the operation (Männistö, 2016).

However, regarding impact modelling methods, there aren't many options to choose from. Theory of change is practically the only method that was mentioned in literature.

Contrarily to impact modelling, it was found that there is a myriad of different impact measuring methods. The IRIS metrics have been created by the GIIN and are therefore regarded by many as the industry standard. Besides IRIS, the following impact measurement methods were mentioned in the literature review: GIIRS, SROI, SDG, IMP and several responsible investing metrics. All of these methods rely on bottom-up thinking and finding the right metrics for each case. They are flexible and allow for a lot of tailoring, which makes them hard to compare. In addition to these findings, the Upright Project was discovered through discussions. Unlike the others, the Upright method is top-down focused and science-based. It produces highly comparable values, and the only tailoring that is allowed is adjusting the weighting of the values.

Finally, regarding the fourth research question the literature review addressed some special characteristics of PE and how they affect impact investing. It was found that regarding GP compensations the PE industry is quite set in its ways: GP compensation is in most cases structured in exactly the same way consisting of a management fee of around 2 % and a carried interest of about 20 %, which makes it challenging for impact focused GPs to suggest other structures to profit sharing (Litvak, 2009; Metrick & Yasuda, 2010; Robinson & Sensoy, 2013; Sahlman, 1990; Schmidt & Wahrenburg, 2003).

The empirical part of the study was used to test and further clarify the findings from the literature review and to answer the fifth research question. The survey answers provide some insights to the first four research question and the regression analysis made with the combined data from the survey and the portfolio data from the databases focuses on the fifth research question.

From the survey responses it can be concluded that PE impact investors agree to a large extent with the definition of impact investing that was found in the literature review. Everyone agreed on the core elements of the definition, but the more detailed requirements of intentionality and measurability raised some disagreement among the respondents as well. Regarding the related terms such as socially responsible investing and ESG investing, there was also a quite clear understanding that they are not synonyms for impact investing.

Regarding the targets of the GPs, a clear majority targeted at market rate returns but there were two smaller minorities that opted for either below or above market rate returns. Half of the respondents were however willing to compromise on the financial targets in some cases while

half were not willing to do so in any cases. Having social targets was a bit more common than environmental targets but on the other hand about half of all respondents targeted both.

Impact modelling was done by most respondents and most of them used theory of change. However, own modelling methods were also used by many. Impact measuring was done by a clear majority and among the commonly available methods IRIS and the SDG framework were used the most. However, the majority also used their own measuring methods and over half also reported using qualitative methods to measure their impacts. Most of the respondents were also quite satisfied with all aspects of their impact modelling and measuring efforts.

Finally, regarding the GP-LP relationship, it was found that even though most feel that LPs are interested in impact matters and that that interest is only going to increase, there are still challenges in raising impact focused funds. In terms of compensations, a bit over half of all respondents have their compensation linked to impact in some way whereas the rest don't. The implementation of the link between impact and compensation was arranged in various ways ranging from a strict policy of 50 % of total compensation depending on achieving impact targets to impact performance affecting bonuses in some way.

After linking the survey responses to the portfolio companies invested in by each respondent, the regression analysis was conducted to test the hypotheses and to answer the fifth research question as a whole. It was found that having social targets might decrease the financial performance of investments as opposed to having both social and environmental targets. Also, it was found that linking GP compensation to the achieved impacts might decrease the financial performance of investments.

Regarding impact modelling it was found that the use of modelling methods before investing, and especially methods created by the investors themselves, might increase financial performance. In terms of impact measuring, it was found that the use of some measuring methods can lead to higher net impact while others could decrease the financial performance. Specifically, the use of SDGs or the GRI as a measuring framework as well as using qualitative methods to measure impact were found to increase net impact while simultaneously, the use of SDGs or the IMP framework seemed to decrease financial performance. It could be concluded that perhaps using less detailed impact measuring methods are still more efficient in impact measuring than very detailed metrics but that they can also compromise the financial profits. The development of more accurate and comprehensive impact measuring methods could change this in the future though.

Furthermore, it was found that in some industries a higher net impact score seems to be easier to achieve than in others. Especially education sector, which can be considered more as a social impact sector than an environmental one, scored highly in the Upright model, whereas more environment-related sectors such as food and agriculture, energy and utilities, industrials and transportation and real estate scored poorly in the model. The Upright model considers three aspects that can be regarded as more social (health, society and knowledge) and only one aspect that is environmental and they were all given equal weights, which might be one explanation as to why the social enterprises scored better.

5.2 Implications

This study has many practical implications as it is the first study that evaluates the performance of impact investments in private equity. The implications are relevant for three groups: 1) GPs who either have an impact fund or aim to have one in the future, 2) LPs looking for the best impact funds and 3) academics studying impact investing.

For the GPs the implications can be divided into two categories. Firstly, for those planning their first impact fund, the findings of the literature review and the survey results act as a good benchmarking guide on how to create an impact fund in practice, what kind of targets can be set, what modelling and measuring tools there are and what do others use, how can compensation be arranged etc. The survey results also highlight the growing importance and interest towards impact investing from the LPs' side, which makes it a relevant consideration for all GPs.

Secondly, the results of the regression analysis, provide some insight into which methods and practices lead to the best results. It might be more advisable to aim for both kinds of impacts than to focus solely on social targets and to not link the compensation to achieved impacts just yet as there aren't any best practices on how to do it yet. Additionally, when choosing which impact measuring methods to use, the GP should note that a simple method such as tracking the Sustainable Development Goals might be more useful than a more complex method. However, it is too early to recommend any measuring method over others as the methods are constantly improving and new methods are being developed.

For the LPs, the implications are simple, yet significant. Impact investing is maturing fast and there is an increasing amount of impact-focused private equity funds for the LPs to choose from. It is good to keep an open mind in terms of different GP compensation structures even though they differ from the norm. LPs can also shape the impact investing industry by setting new

standards to it and demanding more measuring and setting ambitious financial and impact targets for the GPs that increase their net impact.

Finally, for the academics, this study is a starting point for future impact investing studies. All of the findings of the regression models need to be further investigated to understand the phenomena fully. As more sophisticated impact measuring methods emerge and as the impact funds report their actual financials, the analysis can be continued on a more detailed level.

5.3 Reliability and validity

The reliability of a study is measured in the extent to which the study can be repeated with the same results (Heale & Twycross, 2015). In the case of a quantitative study, this depends largely on the extent to which the chosen variables measure the intended outcome in a consistent manner. In this study, the two dependent variables, impact and financial performance, were measured with net impact values from Upright and the existence of a second round of funding, which is derived from the overall number of funding rounds. The net impact values are a very consistent metric and they can be accessed freely by anyone on the Upright website. Thus, the results related to net impact can be considered reliable. The financial performance was measured with the overall occurrence of a second round as other generally used metrics of financial performance were not available. The occurrence of a second funding round has been used as a performance metric in similar situations in previous studies (Ter Wal et al., 2016) and so, it can be considered reliable as well.

The validity of a quantitative study is measured in terms of internal and external validity. Internal validity means the extent to which the causal relationships are valid i.e. that the variations in the dependent variables are indeed caused by the independent variables and not by other factors (Ihantola & Kihn, 2011). Control variables also play an important role in capturing the full nature of the correlations.

As the performance of impact investing in terms of net impact or financial results has not been studied previously, there wasn't much foundation from which to select the most relevant independent variables. Thus, the group of independent variables was selected to be quite broad in order to not miss any significant correlations. The selected control variables also support this objective. However, the possible endogeneity of the independent variables was not studied and therefore, the internal validity cannot be completely assured.

External validity on the other hand means the extent to which conclusions can be drawn from the results and how well they can be generalized to other samples, time periods and environments. Therefore, external validity can be threatened by biases in the sample population, by dependence of the point in time in which the study was conducted and by biases in the environment or setting of the study (Ihantola & Kihn, 2011).

The first concern related to population bias is somewhat relevant in this case. Even though the total population was collected from several public sources and the process of forming the population is carefully explained in chapter 3, the final sample of 22 private equity firms is relatively small and therefore, the results might not be generalizable to other samples from the population. As discussed in section 3.1, even though the different countries were fairly well represented in the sample as compared to the total population, VC and growth investors were overrepresented in the sample. Thus, it is possible that the sample is somewhat biased and does not represent opinions and practices of the total population completely.

The second concern about time dependency is also fairly valid in this study. As impact investing is a nascent industry, it is probable that the methods and practices used by impact investors evolve and develop as time passes and that the investors themselves get better at what they are doing. Thus, it is possible that in the future a similar study might lead to overall higher impact results and better financial performance, which in turn might reveal more about the differences between different modelling and measuring methods etc.

Thirdly, also the concern about environmental generalizability is a relevant concern in this case. As the scope is limited to European GPs, the results might not be replicable in other geographical regions. Also, since the sample consists mostly of VC investments, the results might not be applicable to other investment types.

5.4 Limitations and further research

As most studies do, this study also has its limitations. First of all, as the scope was limited to European PE impact investors, the results are not directly generalizable to other regions or to other asset classes. Furthermore, the sample consisted mostly of VC investments with only a few buyout and growth investments in the mix. The results might look a bit different with a buyout or growth focused sample.

Additionally, the survey sample is likely to be slightly biased also in other ways than the VC investors' overrepresentation. As the message that was sent to the GPs mentioned that the survey

focuses on impact definition, modelling, measuring and compensation practices, it is likely that it interested those who do use some modelling, measuring or compensation methods more than the others. On the other hand, as it was also mentioned in the message that the results will be shared with all respondents and that the aim of the study is to produce benchmarking data, it might have interested GPs who feel that they need to improve their practices. In fact, a few respondents had just started their operations and were likely intrigued by the promise of benchmarking data.

In the data collection process, some personal reminders were also sent to selected GPs to which I had some connection through my personal network. That might have influenced the final sample of the survey respondents as well.

These limitations form some of the potential topics for future research. Firstly, it would be interesting to study investors in other regions to see if the methods and practices used by them differ from the European sample. Secondly, it would be interesting to study whether these results could be replicated on other samples e.g. buyout investment focused samples.

Furthermore, as the impact performance of the investments didn't show any statistically significant correlations with the independent variables in this study, it remains an interesting topic for future research. Impact investments could also be compared to traditional PE investments to study the differences between them in terms of financial performance and impact. Moreover, as the impact funds mature and liquidate their funds to the LPs, the financial performance can be studied to a much deeper extent as well in order to further validate the initial findings of this study.

As a conclusion, as impact investing is a fairly new phenomena, a lot of future research is needed to understand the causal relationships behind the methods and practices applied by impact investors. Specifically, impact investing in private equity requires more research as to my knowledge this is the first study about impact investing that focuses on private equity.

6 References

B Analytics. (2019). GIIRS funds.

Barby, C. (2019). *What is the impact management project - an introduction to our work.*

Bell, A. (2013). Why impact investing is an emerging paradigm shift in philanthropy. Retrieved from <https://www.forbes.com/sites/skollworldforum/2013/07/30/why-impact-investing-is-an-emerging-paradigm-shift-in-philanthropy/>

Bengo, I., Arena, M., Azzone, G., & Calderini, M. (2016). Indicators and metrics for social business: A review of current approaches. *Journal of Social Entrepreneurship*, 7(1), 1. doi:10.1080/19420676.2015.1049286

Brest, P., & Born, K. (2013, Aug 14,). Unpacking the impact in impact investing. *Stanford Social Innovation Review*, 11, 22. Retrieved from https://ssir.org/articles/entry/unpacking_the_impact_in_impact_investing#

Bugg-Levine, A., & Emerson, J. (2011). *Impact investing: Transforming how we make money while making a difference* (1st ed ed.). San Francisco: Jossey-Bass.

Cheng, P. (2011). *The impact investor's handbook: Lessons from the world of microfinance*. London: CAF Venturesome.

Clark, G. L., Feiner, A., & Viehs, M. (2015). From the stockholder to the stakeholder: How sustainability can drive financial outperformance. *SSRN Electronic Journal*, doi:10.2139/ssrn.2508281

Clarkin, J. E., & Cangioni, C. L. (2016). Impact investing: A primer and review of the literature. *Entrepreneurship Research Journal*, 6(2), 135-173. doi:10.1515/erj-2014-0011

- Cochrane, J. H. (2005). The risk and return of venture capital. *Journal of Financial Economics*, 75(1), 3. doi:10.1016/j.jfineco.2004.03.006
- Combs, K. (2014). More than just a trend: The importance of impact investing. *Corporate Finance Review*, 18(6), 12. Retrieved from <https://search.proquest.com/docview/1548696618>
- Cressy, R., Munari, F., & Malipiero, A. (2007). Playing to their strengths? Evidence that specialization in the private equity industry confers competitive advantage. *Journal of Corporate Finance*, 13(4), 647-669. doi:10.1016/j.jcorpfin.2007.04.007
- Davis, P. S., & Pett, T., L. (2002). Measuring organizational efficiency and effectiveness. *Journal of Management Research*, 2(2), 87.
- Deloitte. (2018). *2018 deloitte millennial survey*. Deloitte. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/gx-2018-millennial-survey-report.pdf>
- Dushnitsky, G., & Shapira, Z. (2010). Entrepreneurial finance meets organizational reality: Comparing investment practices and performance of corporate and independent venture capitalists. *Strategic Management Journal*, 31(9), 990. doi:10.1002/smj.851
- Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review*, 14(1), 57. doi:10.5465/amr.1989.4279003
- Emerson, J. (2003). The blended value proposition: Integrating social and financial returns. *California Management Review*, 45(4), 35-51.

- Ernst & Young. (2017). *Sustainable investing: The millennial investor*. London, UK: Ernst & Young. Retrieved from [https://www.ey.com/Publication/vwLUAssets/ey-sustainable-investing-the-millennial-investor-gl/\\$FILE/ey-sustainable-investing-the-millennial-investor.pdf](https://www.ey.com/Publication/vwLUAssets/ey-sustainable-investing-the-millennial-investor-gl/$FILE/ey-sustainable-investing-the-millennial-investor.pdf)
- ESMA final report: Guidelines on sound remuneration policies under the AIFMD. (2013, Mar 6). *Mondaq Business Briefing*
- European Commission. (2018). *Action plan: Financing sustainable growth*. Brussels: European Commission. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0097&from=EN>
- Eurosif. (2018). *European SRI study*. Eurosif. Retrieved from <http://www.eurosif.org/wp-content/uploads/2018/11/European-SRI-2018-Study.pdf>
- Evans, M. (2013). Meeting the challenge of impact investing: How can contracting practices secure social impact without sacrificing performance? *Journal of Sustainable Finance & Investment*, 3(2), 138-154. doi:10.1080/20430795.2013.776260
- Fenn, G. W. (1996). The economics of the private equity market. *Federal Reserve Bulletin*, 82, 26.
- FVCA, Sitra, & Deloitte. (2017). *Vaikuttavuussijoittamisen mahdollisuudet pääomasijoittamisessa: Työkalu tulevaisuuden kestävään liiketoimintaan*. FVCA, Sitra, Deloitte. Retrieved from <https://media.sitra.fi/2017/06/05133212/FVCA-raportti-web-FINAL.pdf>
- GIIN. (2011). *Impact-based incentive structures: Aligning fund manager compensation with social and environmental performance*. Ottawa, Ontario: GIIN.

- Gompers, P., Kovner, A., Lerner, J., & Scharfstein, D. (2008). Venture capital investment cycles: The impact of public markets. *Journal of Financial Economics*, 87(1), 1. doi:10.1016/j.jfineco.2006.12.002
- Grabenwarter, U., & Liechtenstein, H. (2011). *In search of gamma - an unconventional perspective on impact investing*. Rochester, NY: doi:10.2139/ssrn.2120040 Retrieved from <https://papers.ssrn.com/abstract=2120040>
- Harji, K., & Jackson, E. T. (2012). Accelerating impact: Achievements, challenges and what's next in building the impact investing industry. *International Journal of Project Management*, 12(2), 68-74.
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence Based Nursing*, 18(3), 66-67. doi:10.1136/eb-2015-102129
- Hebb, T. (2013). Impact investing and responsible investing: What does it mean? *Journal of Sustainable Finance & Investment*, 3(2), 71-74. doi:10.1080/20430795.2013.776255
- Hehenberger, L., & Harling, A. (2018). Moving toward “Impact-adjusted” financial returns. *American Journal of Evaluation*, 39(3), 408-412. doi:10.1177/1098214018778899
- Heliskoski, J., Humala, H., Kopola, R., Tonteri, A., & Tykkyläinen, S. (2018). *Vaikuttavuuden askelmerkit: Työkaluja ja esimerkkejä palveluntuottajille*. Sitra.
- Höchstädter, A., & Scheck, B. (2014). What’s in a name: An analysis of impact investing understandings by academics and practitioners. *Journal of Business Ethics*, 132(2), 449-475. doi:10.1007/s10551-014-2327-0

- Hosmer, D. W., & Lemeshow, S. (2008). *Applied logistic regression* (2. ed., [Nachdr.] ed.). New York [u.a.]: Wiley.
- Ihantola, E., & Kihn, L. (2011). Threats to validity and reliability in mixed methods accounting research. *Qualitative Research in Accounting & Management*, 8(1), 39-58.
doi:10.1108/11766091111124694
- Jackson, E. T. (2013). Interrogating the theory of change: Evaluating impact investing where it matters most. *Journal of Sustainable Finance & Investment*, 3(2), 95-110.
doi:10.1080/20430795.2013.776257
- Kroeger, A., & Weber, C. (2014). Developing a conceptual framework for comparing social value creation. *Academy of Management Review*, 39(4), 513-540.
doi:10.5465/amr.2012.0344
- Kroeger, A., & Weber, C. (2016). Routledge handbook of social and sustainable finance. (pp. 1-732) Routledge. doi:10.4324/9781315772578
- Leytes, M., & Abello, O. P. (2016). *Tying fund manager compensation to impact outcomes*. Transform Finance Investor Network. Retrieved from
<https://static1.squarespace.com/static/54cfca5be4b06d2d0d7c0f1d/t/57e285d1bebafeb329d4a71fa/1474463185846/TFIN+Issue+Brief+-+Tying+Carry+to+Impact+2016-09-12+v3.pdf>
- Liang, M., Mansberger, B., & Spieler, A. C. (2014). An overview of social impact bonds. *Journal of International Business & Law*, 13(2), 267-281. Retrieved from
<https://scholarlycommons.law.hofstra.edu/cgi/viewcontent.cgi?article=1256&context=jibl>
- Litvak, K. (2009). Venture capital limited partnership agreements: Understanding compensation arrangements. *The University of Chicago Law Review*, 76(1), 161-218.

- Männistö, H. (2016). *Vaikuttavuusinvestoimisen opas sijoittajille*. Sitra.
- Mendell, M., & Barbosa, E. (2013). Impact investing: A preliminary analysis of emergent primary and secondary exchange platforms. *Journal of Sustainable Finance & Investment*, 3(2), 111-123. doi:10.1080/20430795.2013.776258
- Metrick, A., & Yasuda, A. (2010). The economics of private equity funds. *The Review of Financial Studies*, 23(6), 2303-2341. doi:10.1093/rfs/hhq020
- Mitchell, L., Kingston, J., & Goodall, E. (2008). *Financing civil society: A practitioner's view of the UK social investment market*. london: CAF venturesome. London: CAF Venturesome.
- Mudaliar, A., Bass, R., & Dithrich, H. (2018). *Annual impact investor survey 2018*. GIIN. Retrieved from https://thegiin.org/assets/2018_GIIN_Annual_Impact_Investor_Survey_webfile.pdf
- Mudaliar, A., Bass, R., Nova, N., & Dithrich, H. (2019). *Annual impact investor survey 2019*. GIIN. Retrieved from https://thegiin.org/assets/GIIN_2019%20Annual%20Impact%20Investor%20Survey_webfile.pdf
- Mudaliar, A., Schiff, H., & Bass, R. (2016). *Annual impact investor survey 2016*. GIIN. Retrieved from https://thegiin.org/assets/2016%20GIIN%20Annual%20Impact%20Investor%20Survey_Webfile.pdf

- Mudaliar, A., Schiff, H., Bass, R., & Dithrich, H. (2017). *The annual impact investor survey 2017*. GIIN. Retrieved from https://thegiin.org/assets/GIIN_AnnualImpactInvestorSurvey_2017_Web_Final.pdf
- Myers, R. H. (1990). *Classical and modern regression with applications* (2. ed. ed.). Belmont, Calif: Duxbury Press.
- O'Donohoe, N., Leijonhufvud, C., Saltuk, Y., Bugg-Levine, A., & Brandenburg, M. (2010). *Impact investments: An emerging asset class*. J.P. Morgan, The Rockefeller Foundation.
- Olsen, S., & Galimidi, B. (2008). *Catalog of approaches to impact measurement - assessing social impact in private ventures*. Social Venture Technology Group.
- Pandit, V., & Tamhane, T. (2018, Feb). A closer look at impact investing. *McKinsey Quarterly*, Retrieved from <https://www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/a-closer-look-at-impact-investing>
- Polonsky, M., & Grau, S. L. (2011). Assessing the social impact of charitable organizations—four alternative approaches. *International Journal of Nonprofit and Voluntary Sector Marketing*, 16(2), 195-211. doi:10.1002/nvsm.407
- Preqin. (2018). *2018 preqin global private equity and venture capital report*. Preqin. Retrieved from <http://docs.preqin.com/reports/2018-Preqin-Global-Private-Equity-Report-Sample-Pages.pdf>
- Reeder, N., & Colantonio, A. (2013). *Measuring impact: Critical overview of concepts and practice* LSE Cities, London School of Economics and Political Science. Retrieved from <https://www.openaire.eu/search/publication?articleId=od206::6b1ba06da573f8ae7a93f3b0e003046d>

- Reisman, J., & Olazabal, V. (2016). *Situating the next generation of impact measurement and evaluation for impact investing*. Aschaffenburg: The Rockefeller Foundation. Retrieved from <https://assets.rockefellerfoundation.org/app/uploads/20161207192251/Impact-Measurement-Landscape-Paper-Dec-2016.pdf>
- Reisman, J., Olazabal, V., & Hoffman, S. (2018). Putting the “Impact” in impact investing. *American Journal of Evaluation*, 39(3), 389-395. doi:10.1177/1098214018779141
- Robinson, D. T., & Sensoy, B. A. (2013). Do private equity fund managers earn their fees? compensation, ownership, and cash flow performance. *The Review of Financial Studies*, 26(11), 2760. doi:10.1093/rfs/hht055
- Roundy, P., Holzhauer, H., & Dai, Y. (2017). Finance or philanthropy? exploring the motivations and criteria of impact investors. *Social Responsibility Journal*, 13(3), 491-512. doi:10.1108/SRJ-08-2016-0135
- Rousseeuw, P. J., & Leroy, A. M. (1987). *Robust regression and outlier detection*. New York u.a: Wiley.
- Ruff, K., & Olsen, S. (2018). The need for analysts in social impact measurement. *American Journal of Evaluation*, 39(3), 402-407. doi:10.1177/1098214018778809
- Sahlman, W. A. (1990). The structure and governance of venture-capital organizations. *Journal of Financial Economics*, 27(2), 473. doi:10.1016/0304-405X(90)90065-8
- Saltuk, Y., El Idrissi, A., Bouri, A., Mudaliar, A., & Schiff, H. (2014). *Spotlight on the market: The impact investor survey*. GIIN, J.P. Morgan. Retrieved from <https://thegiin.org/assets/documents/pub/2014MarketSpotlight.PDF>

- Saltuk, Y., El Idrissi, A., Bouri, A., Mudalier, A., & Schiff, H. (2015). *Eyes on the horizon: The impact investor survey*. GIIN, J.P. Morgan. Retrieved from <https://thegiin.org/assets/documents/pub/2015.04%20Eyes%20on%20the%20Horizon.pdf>
- Schmidt, D., & Wahrenburg, M. (2003). Contractual relations between european VC funds and investors: The impact of bargaining power and reputation on contractual design.
- Singh, J. (2018). Building an impact investing business that makes a real difference. Retrieved from <https://knowledge.insead.edu/economics-finance/building-an-impact-investing-business-that-makes-a-real-difference-8901>
- Ter Wal, A., Alexy, O., Block, J., & Sandner, P. G. (2016). The best of both worlds: the benefits of open-specialized and closed-diverse syndication networks for new ventures' success. *Administrative Science Quarterly*, 61(3), 393-432. doi:10.1177/0001839216637849
- UN PRI. (2017). Global AUM 2006-2017. Retrieved from <https://www.unpri.org/signatories>
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. United Nations General Assembly. Retrieved from http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- Weidig, T., Kemmerer, A., & Born, B. (2005). The risk profile of private equity funds of funds. *The Journal of Alternative Investments*, 7(4), 33-41. doi:10.3905/jai.2005.491499
- Weidig, T., & Mathonet, P. (2004). The risk profile of private equity. *SSRN Electronic Journal*, doi:10.2139/ssrn.495482
- World Economic Forum. (2013). *From the margins to the mainstream: Assessment of the impact investment sector and opportunities to engage mainstream investors*. World

Economic Forum. Retrieved from

https://thegiin.org/assets/2018_GIIN_Annual_Impact_Investor_Survey_webfile.pdf