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## **Essays on Philanthropic Investors in Private Capital Markets**

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## Summary

This thesis investigates philanthropic investors' motivations, actions, and performance in private capital markets. In three essays, I explore the hypothesis that return maximization motives do not exclusively influence philanthropic organizations' investment decisions. The first essay investigates the motives and portfolio investment preferences of charitable nonprofit foundations in Germany. I map foundations' heterogeneous approaches to asset allocation and develop a novel framework of orientations in charitable organizations that accounts for two motivational dimensions in their asset allocation, a commercial and mission orientation. I next derive an explanatory framework for both motivational dimensions, among them the founder's will, the management team's professional background, and the legacy capital of the organization. The second essay analyzes venture capital investments of charitable foundations and university endowments in the United States and the United Kingdom. I document that direct investments of foundations and endowments tend to be clustered in sectors adjacent to their philanthropic fields of activity, i.e., mission-related investments (MRIs). It turns out that MRIs have a lower performance when compared to the same organizations' non-mission-related investments. However, MRIs do not have a lower likelihood of success when compared to the other venture capital investors' financing rounds in my sample. The third essay explores the phenomenon of university venture capital and investigates whether investments in faculty- and student-founded startups are a commercially successful investment proposition. The results support the hypothesis that direct investments in university-affiliated ventures have a lower likelihood of success than investments in unaffiliated ventures, supporting previous case-based evidence.

## **Zusammenfassung**

Diese Dissertation untersucht die Motive, Entscheidungen und Renditen philanthropischer Investoren in privaten Kapitalmärkten. In drei Studien gehe ich der Hypothese nach, dass Renditemaximierung nicht der ausschließliche Entscheidungsfaktor bei Investitionsentscheidungen philanthropischer Organisationen ist. Die erste Studie untersucht die Investitionsmotive und Portfoliopräferenzen von gemeinnützigen Stiftungen in Deutschland. Ich erfasse die heterogenen Ansätze von Stiftungen bei der Kapitalallokation und entwickle ein neues Rahmenwerk für die Investitionsorientierung gemeinnütziger Organisationen, welches auf zwei Motivationsdimensionen aufbaut: der kommerziellen und der missionsbezogenen. Ein neu entwickeltes Modell erfasst die Einflussfaktoren dieser Motivationsdimensionen, zu denen der Stifterwille, der berufliche Werdegang des Managementteams und das Bestandskapital der Organisation gehören. Die zweite Studie analysiert Venture Capital Investitionen von gemeinnützigen und Universitätsstiftungen in den USA und Großbritannien. Ich zeige, dass sich die direkten Investitionen dieser Stiftungen in Sektoren konzentrieren, die an ihre philanthropischen Tätigkeitsbereiche angrenzen, d.h. missionsbezogene Investitionen (MRIs) sind. Die Analysen zeigen, dass diese MRIs eine geringere Erfolgswahrscheinlichkeit haben, als die nicht-missionsbezogenen Investitionen dieser Stiftungen. Im Vergleich zu den Finanzierungsrunden anderer Venture Capital Investoren in der Stichprobe haben MRIs jedoch keine signifikant niedrigere Erfolgswahrscheinlichkeit. Die dritte Studie befasst sich mit dem Phänomen des universitären Venture Capital und untersucht, ob Direktinvestitionen in von Fakultätsangehörigen und Studierenden gegründete Start-ups ein kommerziell erfolgreiches Investitionsvorhaben sind. Die Ergebnisse unterstützen die Hypothese, dass Direktinvestitionen in universitätsnahe Unternehmen eine geringere Erfolgswahrscheinlichkeit haben als Investitionen in nicht-universitätsnahe Unternehmen, was die Ergebnisse vorangegangener Fallstudien unterstützt.

# Overview

- Table of Contents ..... V**
- List of Figures ..... VII**
- List of Tables..... VIII**
- List of Appendices .....IX**
- List of Abbreviations..... X**
- Acknowledgments.....XI**
- 1. Introduction ..... 1**
- 2. Put Your Money Where Your Heart is – Investor Orientations and Endowment  
Portfolio Investments in Germany’s Charitable Foundations ..... 12**
- 3. Doing Good or Doing Well? – Venture Capital Mission Investments by  
Charitable Foundations and University Endowments..... 47**
- 4. University Venture Capital – The Promise and Pitfalls of University Direct  
Investments ..... 81**
- 5. Conclusion..... 112**
- References ..... 120**
- Appendix ..... 134**

# Table of Contents

- Table of Contents ..... V**
- List of Figures ..... VII**
- List of Tables..... VIII**
- List of Appendices .....IX**
- List of Abbreviations..... X**
- Acknowledgments.....XI**
- 1. Introduction ..... 1**
  - 1.1.Motivation and research background ..... 1**
  - 1.2.Thesis structure and main findings .....7**
- 2. Put Your Money Where Your Heart is – Investor Orientations and Endowment Portfolio Investments in Germany’s Charitable Foundations ..... 12**
  - 2.1.Introduction ..... 13**
  - 2.2.Theoretical background..... 15**
    - 2.2.1. The charitable investor and nonprofit entrepreneur ..... 16
    - 2.2.2. Prior empirical research ..... 17
  - 2.3.Data and methods..... 19**
    - 2.3.1. Sampling approach .....20
    - 2.3.2. Data sources ..... 20
    - 2.3.3. Data analysis ..... 23
  - 2.4.Findings ..... 23**
    - 2.4.1. Typology of investment orientation ..... 23
    - 2.4.2. Antecedents of foundation orientation ..... 37
  - 2.5.Discussion and conclusion ..... 40**
    - 2.5.1. Implications for entrepreneurial orientation research ..... 42
    - 2.5.2. Implications for related literature ..... 43
    - 2.5.3. Limitations and opportunities for future research ..... 44

<b>3. Doing Good or Doing Well? – Venture Capital Mission Investments by Charitable Foundations and University Endowments.....</b>	<b>47</b>
<b>3.1. Introduction .....</b>	<b>48</b>
<b>3.2. Data construction .....</b>	<b>54</b>
3.2.1. Financing round sample .....	54
3.2.2. Foundation and university endowment financing round sample .....	55
3.2.3. Key variables.....	57
<b>3.3. Results .....</b>	<b>61</b>
3.3.1. Patterns of direct investing .....	61
3.3.2. Investment outcomes.....	67
<b>3.4. Discussion and conclusion .....</b>	<b>77</b>
<b>4. University Venture Capital – The Promise and Pitfalls of University Direct Investments .....</b>	<b>81</b>
<b>4.1. Introduction .....</b>	<b>82</b>
<b>4.2. Data construction .....</b>	<b>87</b>
4.2.1. Data sources .....	87
4.2.2. University affiliations.....	88
4.2.3. Variables.....	90
<b>4.3. Results .....</b>	<b>97</b>
4.3.1. Descriptive statistics.....	97
4.3.2. Econometric estimations .....	101
<b>4.4. Discussion and conclusion .....</b>	<b>107</b>
<b>5. Conclusion.....</b>	<b>112</b>
<b>5.1. Summary of results .....</b>	<b>112</b>
<b>5.2. Theoretical implications .....</b>	<b>114</b>
<b>5.3. Managerial implications .....</b>	<b>116</b>
<b>5.4. Future research and outlook .....</b>	<b>117</b>
<b>References .....</b>	<b>120</b>
<b>Appendix .....</b>	<b>134</b>

## List of Figures

Figure 1: Asset allocation of reporting US endowments in 2020 .....	2
Figure 2: Two-dimensional matrix of investment orientation.....	30
Figure 3: Model of investment orientation in charitable foundations .....	38
Figure 4: Time trend of foundation and endowment VC direct investments.....	62
Figure 5: Time trend of university VC direct investments.....	98
Figure 6: University VC direct investments across sectors.....	99

## List of Tables

Table 1: Performance of US endowments and reference portfolios for German foundations (30.06.2000 – 30.06.2017) .....	4
Table 2: Essay overview .....	8
Table 3: Interviewee sample characteristics.....	22
Table 4: Typology of investment orientations in charitable foundations.....	25
Table 5: Summary of investor characteristics .....	57
Table 6: Descriptive statistics .....	64
Table 7: Predictors of investment decision .....	66
Table 8: Implications on investment outcomes – Bivariate analysis .....	68
Table 9: Investor types and successful exits – Multivariate regressions.....	71
Table 10: Unmatched and matched sample characteristics.....	74
Table 11: Implications for investment success – CEM-weighted regression .....	76
Table 12: Universities involved in venture financing .....	89
Table 13: Definitions of main variables .....	91
Table 14: Descriptive statistics and correlations.....	96
Table 15: Descriptive statistics on university affiliations .....	100
Table 16: Descriptive statistics on portfolio company outcomes .....	101
Table 17: Performance implications of university-affiliated vs. non-university-affiliated portfolio companies.....	104
Table 18: Implications of university quality indicators on portfolio company performance.	106



## **List of Appendices**

Appendix 1: Essay 1 interview guide (German original).....	134
Appendix 2: Essay 2 variable definitions.....	135
Appendix 3: Essay 2 key variables correlation matrix.....	137

## List of Abbreviations

CEM	Coarsened exact matching
cf.	Confer
CFO	Chief Financial Officer
CIO	Chief Investment Officer
EUR	Euro
e.g.	exempli gratia
et al.	et alii
FE	Fixed effect
FAGF	Federal Association of German Foundations
GP	General partner
i.e.	id est
IPO	Initial public offering
IRC	Internal Revenue Code
LN	Natural logarithm
LP	Limited partner
MBA	Master of Business Administration
MRI	Mission-related investment
NACUBO	National Association of College and University Business Officers
Non-MRI	Non-mission-related investment
OLS	Ordinary least squares
PE	Private equity
PhD	Doctor of Philosophy
UK	United Kingdom
US	United States
USD	US Dollar
VC	Venture capital
VS	VentureSource
WTP	Willingness to pay

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*For my parents*



# Chapter 1

## 1. Introduction

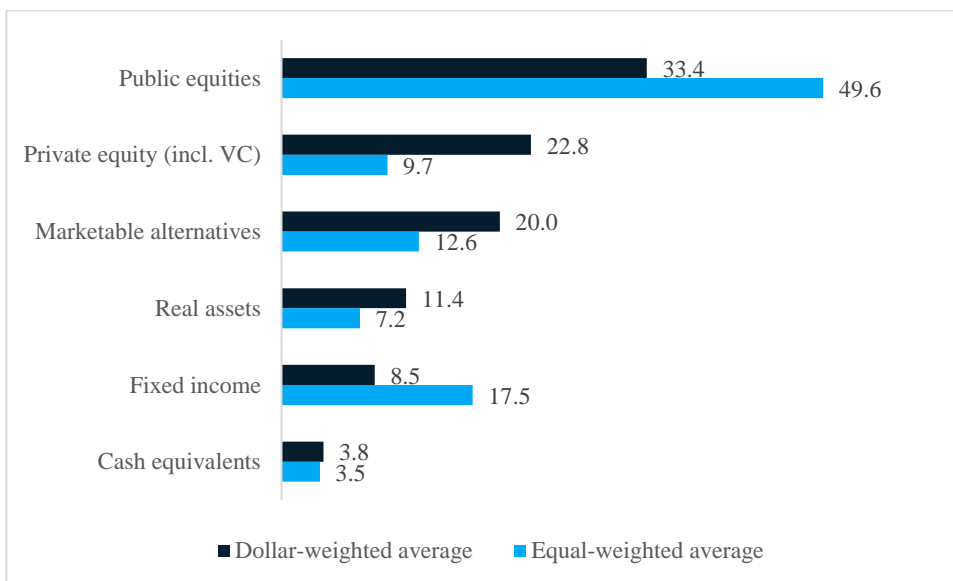
### 1.1. Motivation and research background

The engagement of the philanthropic sector plays an indispensable role in addressing the societal and economic challenges of democratic societies of our time. In the Anglo-Saxon sphere and Germany, the philanthropic sector has a long-standing tradition and has played an increasingly important role in recent years. For example, the Bill & Melinda Gates Foundation has committed over USD 2 billion to the global Covid-19 response to date, among that USD 920 million in at-risk financing to private-sector partners from the foundation's strategic investment fund (Bill & Melinda Gates Foundation, 2022a). In Germany, the RAG-Stiftung manages an endowment capital of EUR 20 billion and distributes EUR 300 million annually to cover the perpetual obligations of the German hard coal mining industry, like purifying and monitoring the groundwater in former mining sites (RAG-Stiftung, 2022). International and German private and public universities such as Stanford University, the colleges of the Universities of Oxford and Cambridge, ESMT Berlin, WHU, or TU Munich receive support in their educational mission by charitable foundations.

While pursuing their philanthropic purposes, institutions such as charitable foundations, university endowments, and philanthropic family offices have become significant institutional capital allocators, moving them in the focus of scholarly interest (Barber & Wang, 2013; Dimmock, Wang, & Yang, 2019). At the center of this debate have been US foundations and endowments, which have increased their portfolio performance with significant allocations to illiquid alternative asset classes in private markets, such as private equity (PE) and venture

capital (VC) (NACUBO, 2021b). David Swensen pioneered this investment at Yale University in the 1980s (Lerner, 2015). The idea behind Swensen’s approach is to make use of the long investment horizon of an endowment or foundation for significant portfolio allocation to illiquid alternative assets, which can offer an illiquidity premium and diversification from the public markets (Dimmock et al., 2019; Swensen, 2009). The Yale endowment’s continuously strong financial performance has inspired large parts of the financially endowed nonprofit sector to follow its lead and propelled the US venture ecosystem and VC as an asset class (Bermiss, Hallen, McDonald, & Pahnke, 2017). Figure 1 gives an overview of this development, reporting dollar-weighted and equal-weighted average asset allocations in US endowments in 2020. The juxtaposition shows that while allocations to PE, marketable alternatives, and real assets are significant in the entire sector, these allocations are even higher for the largest institutions, which dominate the comparison in dollar-weighted averages. Equal-weighted averages, which give more weight to the asset allocation of smaller organizations, show a more substantial reliance on public equities and fixed income instruments.

**Figure 1: Asset allocation of reporting US endowments in 2020**



Source: NACUBO (2021b)

The documentation and explanation of the strong financial performance of endowments and foundations, especially as Limited Partner (LP) investors in private markets, is the subject of an ongoing academic debate. Lerner, Schoar, & Wongsunwai (2007) were the first to draw attention to the excess returns these investors realized from PE fund investments compared to other institutional investors. On average, private equity funds to which endowments committed capital generated nearly 21% higher financial returns than other investors. The outperformance is still significant for investments in new fund managers, suggesting endowments' access to established funds does not primarily drive the results. The authors conclude that "investors vary in their sophistication and potentially their investment objectives" (2007, p. 1). In a follow-up paper, Lerner, Schoar, & Wang (2008) show that investment performance is related to the size of the endowment and quality of the student body, besides alternative asset strategies. This finding implies that the investment strategies of the largest and most prominent endowments may not be replicable by smaller organizations, as philanthropic capital is highly concentrated in several large organizations (NACUBO, 2021a). In a different study, Sensoy, Wang, & Weisbach (2014) reassess the data and find that the superior performance of endowments during the 1990s stems from their access to top-performing venture capital funds in this time. As the PE industry matures in the time after, endowments no longer exhibit better selection skills and no longer outperform. However, their PE investments still outperformed public markets during the period observed.

These findings from the US also have implications for the German philanthropic sector. As of 2020, there are over twenty-three thousand charitable foundations in Germany, managing assets of at least EUR 107 billion (FAGF, 2020a).<sup>1</sup> As in the US, a large share of the

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<sup>1</sup> The cumulative capital stock of 107 billion Euro must be seen as a lower end approximation as it only includes foundations reporting to the Federal Association of German Foundations and is largely based on the book value of assets, while market values are often considerably higher.



philanthropic capital is concentrated in a limited number of large organizations (such as the RAG-Stiftung, the Volkswagen Stiftung, or the Joachim Herz Stiftung), whereas the large majority of organizations operate with small sums of capital (FAGF, 2021). This dispersion makes it difficult for the sector to emulate strategies deployed by the largest US institutions. Nevertheless, Burger and colleagues (2018) identify reference portfolios<sup>2</sup> for German foundations and model exemplary yields and performance gaps to Yale, Harvard, and the NACUBO average. They find that between 2000 and 2017, German foundations have only slightly underperformed the NACUBO average. However, they significantly underperformed the top-performing endowments of Yale and Harvard, both in terms of returns generated and Sharpe ratios, explained by the allocations of these institutions to alternative investments. Their findings are displayed in Table 1. Achleitner, Braun, Behrens, & Lange (2019) identify VC as a potentially attractive asset class for German foundations to diversify their portfolio, generate attractive long-term yields, and promote their mission through direct investments in startups in industries that align with their goals. However, the Federal Association of German Foundations (FAGF) survey records show that only a small number of foundations have already invested in PE and VC (2020c).

**Table 1: Performance of US endowments and reference portfolios for German foundations (30.06.2000 – 30.06.2017)**

	US endowments			German foundations <sup>2</sup>		
	Yale	Harvard	NACUBO	Large	Medium	Small
Average return	10.21%	7.57%	5.10%	4.46%	4.69%	5.39%
Standard deviation	12.15%	12.43%	10.21%	8.07%	5.62%	13.48%
Sharpe ratio	0.70	0.47	0.33	0.34	0.53	0.27

Source: Burger and colleagues (2018)

<sup>2</sup> The authors constructed reference portfolios (RPs) for large, medium and small foundations in Germany, based on the data of the FAGF: the RP for large foundations contains 40% equities, 40% bonds and 20% real estate. The RP for medium sized foundations contains 25% equities, 60% bonds, and 15% real estate. The reference portfolio for small foundations contains 70% real estate and 30% cash. The authors used index funds to model performance.

While the investment performance of philanthropic organizations has received ample attention, their investment objectives have only recently moved into the focus of research, and the academic debate is still in the early stages. The first objective of nonprofit organizations' asset allocation comprises the funding of charitable causes. For US philanthropic organizations, Internal Revenue Code (IRC) Section 4942 requires private, nonoperative foundations to make qualifying distributions of at least five percent of the fair market value of the investment assets. These qualifying distributions include expenditures targeted to accomplish "a religious, charitable, scientific, literary, educational, or other permitted public purpose [or] grants to public charities or private operating foundations" (IRC, 1969). While this standard does not explicitly apply to university endowments, the similarity of fiduciary laws results in most endowments adhering to this regulation (Kochard & Rittereiser, 2007). This legal requirement, which is unique in its form to the US, incentivizes a return-oriented investment approach that allows charitable organizations to meet their distribution targets while maintaining their financial endowments for times to come. Goetzmann & Oster (2014) argue that university endowments' asset allocation decisions and diffusion of innovative investment approaches have also been driven by competition among universities to attract top students through a high-quality education offering financed through endowments' portfolio returns.

More recently, researchers and practitioners have begun to focus on the non-financial objectives of investment decisions (Geczy, Jeffers, Musto, & Tucker, 2021; Hartzmark & Sussman, 2019; Pandit & Tamhane, 2018). Barber, Morse, & Yasuda (2021) were the first to differentiate and document a willingness to pay (WTP) for non-pecuniary utility among institutional investors in a seminal study. Building on a sample of VC funds, the authors find that investors accept 2.5–3.7 ppts lower IRRs ex-ante for impact funds. They ascribe a high WTP to organizations with mission objectives, such as foundations and development organizations, among others. Henriques, Nath, Cote-Ackah, & Rosqueta (2016) determined that

foundations with a larger endowment are more likely to engage in so-called program-related investments (PRIs), a particularly tax-incentivized form of mission-related investment (MRI) in the US. So far, there is little empirical evidence on mission objectives and how they influence the investment decisions of charitable foundations in Germany and Europe (Stühlinger, 2018). However, industry reports and case examples suggest that European foundations are increasingly trying to allocate capital according to their mission purpose (cf. Praum, 2018; Then & Schmidt, 2020).

The mission of universities and their endowments is threefold (Rothaermel, Agung, & Jiang, 2007): besides their teaching and research mission, the so-called “third mission, [referring to] knowledge transfer to industry and society” (Croce, Grilli, & Murtinu, 2014), has increasingly attracted interest from scholars. Within the extended universe of technology transfer mechanisms such as science parks (Link & Scott, 2017; Löfsten & Lindelöf, 2002), industry collaborations (D’Este & Perkmann, 2011; Morandi, 2013), and technology licensing agreements (Bercovitz & Feldman, 2006; Markman, Gianiodis, Phan, & Balkin, 2005), direct investments in academic startups stand out as the most direct form of capital allocation towards new venture creation. These direct university investments are typically administered through their endowments (in the US) or dedicated university-managed funds (in Europe). Croce and colleagues (2014) performed a first, primarily descriptive study of university-managed funds and their investing performance. Munari, Pasquini, & Toschi (2015) used a sample of university-oriented seed funds and analyzed performance on the portfolio company level, though existing work remains geographically and thematically fragmentary. Evidence on foundation and endowment investments outside the established GP-LP fund relationship is scarce. However, such direct investments (or co-investments) are of increasing importance to institutional investors and can be an attractive tool to generate portfolio exposure to the PE and VC asset class (Black & Lee, 2015; Braun, Jenkinson, & Schemmerl, 2020; Fang, Ivashina, &

Lerner, 2015; Lerner, Mao, Schoar, & Zhang, 2022). This approach gains importance, especially against the backdrop of recent literature questioning the outperformance of PE and VC fund managers against the public market net of fees (Hammond, 2020; Phalippou, 2020; Stafford, 2022).

The diverse nature of prior studies illustrates that while charitable organizations have received ample scholarly attention, the academic debate is constantly evolving. Extensive empirical evidence on the nature and role of differing investment objectives in portfolio selection is limited, particularly concerning investments outside the conventional PE fund structures. Therefore, the status-quo gives rise to the need for a more thorough investigation of the investment objectives, portfolio selection choices, and performance implications of charitable organizations in the Anglo-Saxon sphere and continental Europe. This thesis aims to help address this need.

## **1.2. Thesis structure and main findings**

The guiding thought of this thesis is that return maximization motives do not exclusively determine philanthropic investors' actions in public and private markets. Therefore, the three essays presented in the following examine the non-pecuniary elements to philanthropic investors' utility functions and how they interrelate with portfolio selection choices on the macro and micro level: Essay 1 focuses on German charitable foundations, exploring motives, rationales, and portfolio investment preferences. Essay 2 builds on these findings and analyzes the investment preferences and performance of charitable foundations' and university endowments' VC direct investments. Lastly, essay 3 focuses on universities in the US and the UK, analyzing whether direct investments in faculty- and student-founded venture companies can be a commercially successful investment proposition. Table 2 provides an overview of the three essays.

**Table 2: Essay overview**

	<b>Essay 1</b>	<b>Essay 2</b>	<b>Essay 3</b>
<i>Title</i>	Put Your Money Where Your Heart is – Investor Orientations and Endowment Portfolio Investments in German Foundations	Doing Good or Doing Well? - Venture Capital Mission Investments by Charitable Foundations and University Endowments	University Venture Capital – The Promise and Pitfalls of University Direct Investments
<i>Research questions</i>	<p>(1) What are the primary categories of orientations for charitable foundations?</p> <p>(2) To what extent do charitable foundations' orientations influence preferred asset classes and investment processes?</p> <p>(3) What are the drivers of different investor orientations in charitable foundations?</p>	<p>(1) Do charitable foundations and university endowments directly invest VC in mission-related industries in the US and the UK?</p> <p>(2) How do mission-related investments (MRIs) perform compared to non-mission-related investments (Non-MRIs)?</p>	<p>(1) How do US and UK university VC investments in university-affiliated startups perform compared to investments in unaffiliated startups?</p> <p>(2) What organizational characteristics explain university VC investment performance?</p>
<i>Data collection &amp; methods</i>	<p>Semi-structured interviews with 26 managers, investment professionals, and advisors to German charitable foundations</p> <p>Open coding approach (aided by MAXQDA) following Strauss &amp; Corbin (1998)</p>	<p>Sample of over 50.000 VC financing rounds from the VentureSource database, incl. over 1.000 with foundation or endowment participation</p> <p>Bivariate analysis, multivariate logistic and OLS regressions, CEM-matching</p>	<p>Sample of 706 university portfolio companies, sourced from the VentureSource database.</p> <p>Bivariate analysis, multivariate logistic, and OLS regressions</p>
<i>Main results</i>	<p>(1) Charitable foundations in Germany exhibit a commercial and mission orientation in investing</p> <p>(2) Commercial and mission orientations influence German foundations' asset classes and specific investment decisions</p> <p>(3) The founder's will, the management team's professional background, and the legacy capital of the organization shape foundations' orientations</p>	<p>(1) Charitable foundations' and university endowments' direct investments tend to be clustered in sectors adjacent to their philanthropic fields of activity</p> <p>(2) MRIs have a lower success likelihood when compared to the same organizations' Non-MRIs yet not when compared to other VC investors' financing rounds in our sample</p>	<p>(1) University VC investments in affiliated startups have a significantly lower likelihood of success than investments in unaffiliated startups</p> <p>(2) Proximity to a top VC ecosystem is a performance-relevant characteristic for universities, while reputation, academic excellence, and financial resources only deliver a fundraising advantage to portfolio companies</p>
<i>Summary of contributions</i>	The study advances the empirical understanding of what motivates charitable investors' portfolio choices. It delivers the first application of entrepreneurial orientation theory to charitable foundations' investment decisions and develops a novel antecedent model to explain orientations within foundations	The study delivers the first systematic investigation of mission-related VC direct investments by charitable organizations, indicating that they seek a direct investing mission dividend. It also adds to the growing literature analyzing the trade-off between mission impact and financial returns in VC investments	The study extends prior case-based evidence that investments in faculty and student-led start-ups rarely pay off commercially for universities. Furthermore, it delivers the first systematic empirical assessment of the organizational characteristics that impact university VC investing performance

In Essay 1, I<sup>3</sup> explore the motives, rationales, and portfolio investment preferences of charitable foundations in Germany. I use a qualitative research design and semi-structured interviews with 26 CIOs, General Managers, or investment advisors to foundations in Germany to explore and map their heterogeneous approaches to asset allocation. Building on entrepreneurial orientation theory, I develop a novel framework of investor orientations in charitable organizations that account for two motivational dimensions in asset allocation, a commercial and mission orientation. The commercial orientation typically determines the investors' asset class choices, whereas the mission orientation influences the subset of assets considered within an asset class. On both dimensions, I employ my empirical findings to distinguish a conservative and entrepreneurial orientation and characterize their attributes: Foundations with an entrepreneurial orientation are keener to invest in risky assets, are more proactive in their approach to portfolio management, and are more innovative in building portfolio solutions suited to their needs. Subsequently, I derive an explanatory model that improves understanding differences in foundations' investment orientation. The main antecedents I identify are the founder's will, the management team's professional background, and the legacy capital<sup>4</sup> of the foundation. From a theory-building perspective, my findings extend the scope of applying established concepts of entrepreneurial orientation theory in nonprofits and open up new avenues for empirical inquiry and theory development. On a practical level, my model enables a more structured knowledge of the sources of capital for differing commercial and social endeavors.

In essay 2, I research the preferences and outcomes of VC direct investment of charitable foundations and university endowments in the US and the UK. The study builds on my findings

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<sup>3</sup> In the introduction and conclusion of this thesis, I use the term "I." However, all three essays are based on joint work with my co-authors.

<sup>4</sup> Legacy capital refers to sizeable and historically entrenched direct share- and bond holdings within a foundation's portfolio, e.g., equity stakes in the founder's firm (Scheck & Spiess-Knafl, 2018).

from essay 1, especially regarding commercial and mission motives in investment decisions, and explores how these motives materialize in VC direct investment decisions and subsequent portfolio company outcomes. I base my analysis on a sample of over 50,000 VC equity financing rounds from the US and UK markets, including over 1,000 financing rounds with foundation or university endowment participation. I utilize a hand-collected dataset of philanthropic fields of activity for every foundation and endowment investor in my sample, matching the industries and business models of financed ventures. First, I show that foundations' and endowments' VC direct investments tend to be clustered in sectors adjacent to their fields of activity, i.e., mission-related investments (MRIs). These mission-related industries primarily include health, education, environment/sustainability, scientific technology transfer, and human services/culture. The data also reveals that MRIs have a lower likelihood of success and take longer to exit when compared to the foundations' and endowments' non-mission-related investments (Non-MRIs). However, MRIs do not have a statistically lower likelihood of success when compared to my total sample of over 50,000 other investors' VC financing rounds. These findings indicate that charitable organizations are experiencing reduced financial returns in exchange for mission impact, while there is no evidence that MRIs underperform the broader market.

My third essay is interested in the phenomenon of university VC investments in faculty- and student-founded startups. Motivated by the prospect of participating in the economic wealth created by start-ups, universities in industrialized countries have increasingly become active as VC financiers. I investigate whether investments in university-affiliated portfolio companies, referring to an institutional-personal relation between the university and the founders, are a commercially successful investment proposition. I use a hand-collected data set including the academic and professional backgrounds of founders of 706 university portfolio companies in the US and the UK. I find highly significant evidence that direct investments in university-

affiliated ventures have a lower likelihood of success than unaffiliated ventures concerning intermediate and final portfolio company outcomes. My work extends previous case-based evidence, supporting put-forward arguments that investments in faculty and student-led startups are an “elusive promise” (Lerner, 2005) for universities hoping to generate significant financial returns through these types of investments. Furthermore, I analyze which university characteristics correlate with VC investing success and provide evidence that geographic proximity to a top venture capital ecosystem is a highly performance-relevant characteristic.

The thesis proceeds as follows: chapters 2, 3, and 4 contain essays 1, 2, and 3, respectively. Chapter 5 delivers a synthesis, outlook, and concluding remarks.



# Chapter 2

## **2. Put Your Money Where Your Heart is – Investor Orientations and Endowment Portfolio Investments in Germany’s Charitable Foundations**

### **Abstract**

Germany benefits from an especially lively philanthropic sector, with over twenty-three thousand active charitable foundations. An empirical assessment of the portfolio preferences of German foundations yields fundamental intragroup differences in their approach to asset allocation. We build on entrepreneurial orientation theory to explore these differences in motives, rationales, and portfolio investment preferences and extract a typology along with a commercial and mission orientation in charitable foundations’ investment orientation. We derive an explanatory model that improves our understanding of the observed differences foundations exhibit in their investment orientation. Our model shall enable a more structured knowledge of the sources of capital for differing commercial and social endeavors.

*Keywords:* Foundations; Endowments; Entrepreneurial Orientation; Mission Investing

*JEL Codes:* L26, L31, L33, G11

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## 2.1. Introduction

Philanthropy is an essential tool to address humanity's most pressing challenges, shaping our lives in broad ways (Payton & Moody, 2008). Germany benefits from an especially lively philanthropic sector, with over twenty-three thousand foundations with a cumulative capital stock of EUR 107 billion, as observed by the Federal Association of German Foundations (FAGF) (2020b).<sup>5</sup> Charitable foundations, which constitute over 90% of all known foundations in Germany (FAGF, 2020b),<sup>6</sup> are nonprofit institutions established by their founders to serve a philanthropic cause. One of the primary forms of financing their activities is through yields on their investment portfolio. Typically, the foundations themselves or different sector-focused intermediaries administer these portfolios.

This study examines German charitable foundations' investment preferences, decision processes, and asset allocation choices, so far less studied in economic research. To this end, we build on the established literature that explores entrepreneurial orientation theory in the nonprofit sector (Austin, Stevenson, & Wei-Skillern, 2006; Helm & Andersson, 2010; Lurtz & Kreutzer, 2017; Morris, Webb, & Franklin, 2011). Publications on this topic argue that the decision-making of nonprofit organizations is multi-dimensional and not solely limited to commercial goals. Entrepreneurial orientation is also a key determinant of risk attitudes, innovativeness, proactiveness, autonomy, and competitive aggressiveness in organizations (Dess & Lumpkin, 2005). It has a positive, albeit moderately large, performance impact (Rauch, Wiklund, Lumpkin, & Frese, 2009). We explore the possible scope of application to the less examined group of German charitable foundations, which rely on capital market investing as

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<sup>5</sup> The cumulative capital stock of EUR 107 billion must be seen as a lower end approximation as it only includes foundations reporting to the Federal Association of German Foundations and is largely based on the book value of assets, while market values are often considerably higher.

<sup>6</sup> Other forms of non-charitable foundations include commercial and family foundations, which are created with the purpose of serving the interest of an organization or one or many families and their members (Hosseini-Görge & Hirschmann, 2020).

their primary source of income (in the following called ‘charitable investors’). We propose that entrepreneurial orientation theory can serve as a valuable platform and framework by which we can understand diverging motivations and rationales with which charitable investors approach their portfolio management regarding the commercial and mission orientation of their investments.

Preceding research has either focused on the performance and corporate governance of foundation-owned firms (Block, Jarchow, Kammerlander, Hosseini, & Achleitner, 2020; Draheim & Franke, 2018; Thomsen & Rose, 2004) or investment management in US foundations and endowments (J. R. Brown, Dimmock, Kang, & Weisbenner, 2014; Lerner et al., 2008, 2007), which operate in a different legal and cultural environment. The investment orientation and decision factors in German foundations remain largely unaddressed. Building on entrepreneurial orientation theory, we address this gap and investigate the critical dimensions of investment orientation and subsequent portfolio allocation choices and investment processes.

We have conducted a qualitative, exploratory interview study with investment decision-makers in a sample of 22 foundations and four sector intermediaries from Germany. Each of our interviewees is directly involved in managing an endowment portfolio or providing investment intermediary services to foundations. We analyzed the data collected in our interviews through an inductive, multi-step methodology building on the suggestions by Strauss & Corbin (1998) and Gioia, Corley, & Hamilton (2013).

By identifying, analyzing, and collating the differing motives and rationales of the decision-makers in their investment choices, we conceptualize two key dimensions, a *commercial* and a *mission orientation*, which we then differentiate by their motivations and rationales. The findings of our study reveal that German foundations’ investment orientations are not homogeneous but instead show a substantial variance along the two identified

dimensions. This variance translates into preferences regarding asset classes and products. It also impacts the investment processes. Lastly, we discuss which structural characteristics or *antecedents* motivate commercial and mission orientation in a model of investment orientation in charitable foundations.

Our study challenges the notion that the prospect of financial returns purely drives institutional investors' decisions. Our investigation contributes to the discussion in this area: firstly, we observed significant heterogeneity in the investment orientations of charitable foundations. Secondly, we provide a novel, empirically derived conceptual frame to explore this heterogeneity and corresponding motivations, rationales, and investor behavior in asset class preferences and investment processes. Lastly, we propose an explanatory model that can be empirically tested, linking the identified antecedents in foundations, namely, the *founder will*, the *management's professional background*, and *legacy capital*, to the two dimensions of commercial and mission orientation and the resulting investment decision. The findings of our study extend the scope of the applicability of entrepreneurial orientation theory in charitable organizations and open up new avenues for empirical inquiry and theory development.

The remainder of our paper proceeds as follows: in chapter 2.2, we present the theoretical background to our study and a short literature review, while chapter 2.3 explains our data collection and analytical methods. Chapter 2.4 presents the results, and chapter 2.5 finishes with a discussion of our findings, including limitations and avenues for future research.

## **2.2. Theoretical background**

To begin our investigation of charitable foundations' investment activity, we show multiple analogies between foundations and nonprofit entrepreneurs. For this purpose, we build on the rich literature around entrepreneurial orientation theory (Covin & Slevin, 1989; Miller,

1983) and its adoptions in the nonprofit sector to define and characterize foundations and orientations regarding their investment preferences, their decisions, and processes.

### **2.2.1. The charitable investor and nonprofit entrepreneur**

Charitable organizations such as foundations or endowments often take prominent roles in capital markets. However, to the best of our knowledge, literature does not offer a comprehensive theory and clear distinction of charitable investors to date.

To shape our idea of what makes a charitable investor, we will build on the definitions of nonprofit entrepreneurship. These definitions follow a two-step logic: firstly, nonprofit entrepreneurship has been characterized as pursuing economic value creation to fulfill "an embedded social purpose" (Austin et al., 2006, p. 1). Moreover, in nonprofit entrepreneurship, benefits are not distributed, e.g., as dividends but are ultimately re-invested in fulfilling the targeted social purpose or mission (Morris et al., 2011). In this logic, a charitable foundation, much like the nonprofit entrepreneur, acts as a capital market investor against the backdrop of fulfilling a particular mission purpose, be it human, economic, or cultural development, scientific advancement, or an educational institution's funding (Kochard & Rittereriser, 2007). Moreover, foundations do not distribute excess returns as dividends, but ultimately utilize all resources to advance a social mission, typically through funding a portfolio of projects or grants.

Different motives come to mind for the charitable investor to engage in risk-taking absent the opportunity to distribute financial returns to shareholders and accumulate personal wealth. Morris and colleagues (2011) have aptly described the primary motives for nonprofit entrepreneurial activity as either driven by the desire to be able to (1) financially sustain their operations; (2) expand the scale of operations to meet the increasing demand for their social mission or (3) expand the scope of their activities to seize novel opportunities to pursue their social mission, typically created by changes in their operating environment. In similar ways,

charitable investors find incentives for economic risk-taking to continue funding activities related to their social purpose. For example, they are providing continuous funding of university education or the desire to strengthen the societal impact through new activities or investments in either a proactive or reactive manner (e.g., increasing funding to react to adverse environmental events or proactively funding new technologies to expand geographically and support educating more people on a particular cause).

From our discussion of the constitution and motives of charitable investors, it becomes clear that their commercial and mission goals are often profoundly entangled. The given examples show that one type of goal often conditions the other. Indeed, social and nonprofit entrepreneurship studies show the possibility of distinct dual objectives in organizations, such as a social and commercial motive (Morris et al., 2011; Moss, Short, Payne, & Lumpkin, 2011). These motives inform the objectives and rationales surrounding strategy and decision-making processes and critical entrepreneurial attributes. They will ultimately shape the organizational decisions and outcomes (Morris, Coombes, Schindehutte, & Allen, 2007). Therefore, observing different motives, associated objectives, and rationales can advance our understanding of charitable investors' decision-making processes and outcomes.

### **2.2.2. Prior empirical research**

The concept of different organizational motives and implications is understandable in most detail in the scope of entrepreneurial orientation theory (Covin & Slevin, 1989; Miller, 1983) with applications in the fields of corporate entrepreneurship and firm performance (Dess & Lumpkin, 2005; Rauch et al., 2009). Public and scholarly interest in socially responsible and impact investing has skyrocketed over the past two decades (Hand, Dithrich, Sunderji, & Nova, 2020), and one would expect investor orientations to have been the focus of scholarly research. However, investors' mission motives have only recently attracted increased attention, and we have observed only a few studies that discuss their implications on investment decision-making.

Previous research on charitable organizations as investors has overwhelmingly focused on US university endowments as the most influential and prominent investor group (Lerner et al., 2008, 2007). Research on this particular charitable investor group was motivated by the eye-catching financial returns of large university endowments in the mid-1990s and significant portfolio allocations to alternative investment classes. In an empirical study, Lerner and colleagues (2008) examine the stimuli of US endowment returns. They find that investor performance is closely related to the endowment size in terms of assets under management and organizational features such as investment committee structure and investing experience. Moreover, the portfolio allocation to often illiquid, alternative investments has been a driver of financial returns for endowments from 1993 to 2005. Lerner and colleagues touch on investor motives and explicitly raise how endowment office organizational attributes influence portfolio choices and financial returns. Beyond the US endowment sector, an exciting application of stewardship and entrepreneurial orientation theory to the family office sector is by Welsh and colleagues (2013), who relate perceptions of entrepreneurship in different generations of the family to commercial entrepreneurship in the family office and new investments made. In a qualitative study and by conducting interviews with a sample of 32 families operating a family office, they develop a variance model that explores the link of family member attributes to entrepreneurial perceptions and organizational entrepreneurship in family offices.

Extant research relating nonprofits with socially responsible and impact investing<sup>7</sup> focuses on the relationship between social impact and financial returns, applying an established financial theory perspective to investigate if and how investors weigh pecuniary and non-pecuniary returns. Achleitner, Heister, and Stahl (2007) pointed out the broad continuum ranging from impact-first investors and entrepreneurs who aim for a maximum social dividend

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<sup>7</sup> While *socially responsible investment*-approach is screening to try to avoid portfolio allocations to socially or environmentally harmful investments, the *impact investment*-approach is focused on actively screening for positive impact (Wendt, 2018).

by adhering to a minimum financial return to commercial-first investors who define a minimum social impact subsequently optimized for financial returns. Wendt (2018) stressed that impact investing as an approach is not limited to certain investor groups. These ideas have been carried forward in empirical work. For instance, Barber, Morse, & Yasuda (2021) built on the idea of investor attributes to examine WTP for social or mission impact. Focusing on the global venture capital industry, they categorize funds as either single-objective or dual-objective, whereby dual-objective funds aim for a positive externality. They find that impact investors accept 2.5-3.7 ppts lower internal rates of return ex-ante for impact funds, implying a non-pecuniary element to the utility function. Examining investor attributes, they ascribe a WTP to investor groups with mission objectives (e.g., development organizations and foundations), whereas those subject to specific legal restrictions exhibit a lower enthusiasm to pay for impact.

Considering the state of research, we find support for the idea that examining investor orientations and attributes can help advance our scholarly understanding of charitable investors and how orientations interrelate with investment decision-making processes and outcomes. In this respect, the present study explores three main research questions:

- (1) What are the primary categories of orientations for charitable foundations?
- (2) To what extent do charitable foundations' orientations influence preferred asset classes and investment processes?
- (3) What are the drivers of different investor orientations in charitable foundations?

### **2.3. Data and methods**

Our study employs a qualitative, exploratory research design supported by the literature for studying novel phenomena (Strauss & Corbin, 1998). Qualitative research sometimes draws criticism for lacking scholarly rigor, yet its strength lies in the potential to uncover trends and opinions that might not be immediately visible with quantitative methods. Fortunately, it also



allows venturing into new fields of empirical study where a quantitative approach might initially not be fruitful due to the lack of accessible quantitative data (Gephart, 2004).

### **2.3.1. Sampling approach**

Based on the purpose of our research to explore and describe a broad scope of existing investment motives and orientations, we opted for a maximum variation sampling approach, a form of purposeful sampling (Patton, 1990). Therefore, we defined the criteria for involvement with minimal restrictions: An actively managed investment portfolio of over EUR 1 million and an income model that is at least partially (albeit not necessarily exclusively) focused on financial market investing. We selected the EUR 1 million financial endowment minimum as our initial research indicated a typical minimum amount for a foundation to engage in active portfolio management activity. The FAGF indicates that approximately 20% of German foundations control over EUR 1 million in assets, yet their cumulative capital exceeds small foundations with fewer assets (FAGF, 2020a).

We continue to collect data until we reach theoretical saturation when no new insights from further data collection are generated (Eisenhardt, 1989; Strauss & Corbin, 1998). Reaching this point meant that we could clearly and distinctively describe the different orientations according to their objectives and rationales and corresponding attributes and outcomes.

### **2.3.2. Data sources**

As interviews are generally considered one of the best ways for qualitative exploratory research (Allen, 2017), we organized a series of semi-structured interviews with general managers, board members, CFOs, and CIOs of German charitable foundations and sector-focused investment service providers, such as asset managers. Additionally, we rely on reports and website data to contextualize and complement the interviews.

*Interviews:* We conducted 22 interviews with CFOs, CIOs, board members, and general managers of German foundations or their investment offices and four interviews with investment service providers to foundations in Germany. The interviews were conducted between February and August 2020. A detailed anonymized description of our sample, including characterization of the field of activity, legal form, and primary income model, is summarized in Table 3.<sup>8</sup> We collected additional primary data through informal interviews at sector conferences and roundtables, which we do not count in our interview statistics, but which did help to complement and contrast our interviews. Below, we briefly describe our approach in identifying interview partners.

*Introduction from the FAGF and conferences:* The first interview partners were introduced to us by the FAGF, a Berlin-based umbrella organization and think-tank to facilitate the dialogue and exchange of ideas and experiences among foundations. We also participated in sector conferences (such as the "Symposium on Capital and Impact") to gather contacts, make introductions to potential interview partners, and search publicly available sources and websites.

*Snowball sampling:* We identified additional interview partners through the technique of snowball sampling, in which we asked interviewees to recommend potential additional interviewees (Denzin & Lincoln, 2005), a technique widely used in interview-based qualitative research, such as Fauchart & Gruber (2011).

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<sup>8</sup> The interview guide in its German original version is included in Appendix 1.

**Table 3: Interviewee sample characteristics**

This table summarizes our sample of interviewed organizations. Fields of activity describe the philanthropic areas in which the foundation is active. The legal form describes the legal form of incorporation of the organization. The primary income model refers to the primary source of funds through which the foundation finances its operating activities. All organizations are based in Germany, and interviews were conducted between February and August 2020.

Organization	Fields of Activity	Legal Form <sup>9</sup>	Primary Income Model
<i>Foundations</i>			
FO 1	Education, Society, International, Science	SbR	Market
FO 2	Education, Science	gGmbH	Market
FO 3	Science	SbR	Market, Public Grants
FO 4	Culture, Environment, Science	SbR	Market
FO 5	Education	kirchl. Stiftung d. ÖR	Market
FO 6	Environment, Education, Science, Culture	SbR	Market
FO 7	Education, Science	SbR	Market
FO 8	Culture, Science	SbR	Corporate Holding, Market
FO 9	Education, Society, International, Culture, Science	SbR	Corporate Holding, Market
FO 10	Education, Society, Health, International, Culture, Environment, Science	SbR	Market
FO 11	Education, Society, Health, International, Culture, Environment, Science	SbR	Market
FO 12	Education, Society, Health, International, Culture, Science	SbR	Market, Donations
FO 13	Health, Science	SbR	Market, Donations
FO 14	Education, Society, Culture	SbR	Market
FO 15	Education, International	SbR	Market, Donations
FO 16	Education, Society, International	SbR	Market, Donations
FO 17	Education, International, Science	SbR	Market
FO 18	Culture	SbR	Market, Donations
FO 19	Health, Culture, Science	SbR	Market
FO 20	Education, Society, Health, Culture, Environment, Science	SbR	Market
FO 21	Science	SbR	Market, Donations
FO 22	Education, International, Science	SbR	Market
<i>Investment Intermediaries</i>			
Int 1	Investment Services, Other	GmbH	Market, Grants, Donations
Int 2	Asset Management	GmbH	Market
Int 3	Investment Services, Other	gGmbH	Market, Grants, Donations
Int 4	Asset Management	GmbH	Market

<sup>9</sup> Legal form abbreviations: (1) SbR stands for foundation under civil law; (2) kirchl. Stiftung d. ÖR stands for ecclesiastical foundation under public law; (3) GmbH stands for limited liability company; (4) gGmbH stands for nonprofit limited liability company.

### **2.3.3. Data analysis**

With the interviewees' consent, we recorded and subsequently transcribed all interviews. We then aggregated and performed an initial reading of the interview data with the help of MAXQDA. Following Strauss & Corbin (1998), we employed an open coding approach to categorize our data. After several reviews of our initial codes, we followed a two-step thematic coding approach.

In response to the discussed critiques of qualitative research, Gioia, Corley, & Hamilton (2013) presented a refined approach to theory development that aims at a more rigorous analysis and presentation of qualitative data and analytic induction. Building on their suggestions, we proceeded by identifying *first-order concepts* where we tried to adhere to the informant's narrative. This step was followed by aggregating *second-order themes*, seizing similarities and differences between the first-order concepts. For example, we began by coding the different explicit or implicit objectives that interviewees described as underlying their investment approach, e.g., ensuring capital preservation over a three-year horizon or, in another instance, ensuring that particular investments do not conflict with mission goals. We subsequently clustered these objectives into second-order themes, e.g., capital preservation or direct mission-related impact, as overarching themes of objectives. Finally, we iterated through these steps several times to integrate our themes into a coherent framework of investment orientations, outcomes, and drivers.

## **2.4. Findings**

### **2.4.1. Typology of investment orientation**

Our analysis identifies two primary forms of entrepreneurial orientation that underlie charitable foundations' investment behavior, namely a *commercial* and *mission orientation*.

Table 4 presents an overview of the results of our analyses. We present four dimensions of variance: (1) in the *fundamental motivation*, we focus on what the foundation intends to achieve with its investment strategy and identify distinct objectives along the different axes of entrepreneurship; (2) the *primary rationale* underlying an investment objective and justifying a specific course of action; (3) the *preferred asset classes* that describe the types of investment classes, assets, and impact requirements foundations select and apply to the investment portfolio. Lastly, (4) the *investment processes* that characterize the charitable foundations' asset allocation and investment decision-making processes.

**Table 4: Typology of investment orientations in charitable foundations**

This table summarizes our findings regarding investment orientations. Fundamental motivation and primary rationale describe the objectives and logic behind the organizations' investment strategy. Preferred asset classes and investment processes describe observed decisions and corresponding processes within each cluster.

<i>Categories</i>	<b>Commercial orientation</b>		<b>Mission orientation</b>	
	Commercial entrepreneurship	Commercial conservatism	Mission entrepreneurship	Mission conservatism
<i>Fundamental motivation</i>	<i>Capital accumulation and financial returns</i> Maximize long-term investment returns used to build up capital stock and further mission goals	<i>Capital preservation and stable yields</i> Preserve current capital stock in the near and mid-term with a stable, predictable cash-flow	<i>Generate mission-related impact</i> Combine financial and mission-related goals in investment strategy	<i>Fund operating activities</i> Keep income model separate from the use of funds
<i>Primary rationale</i>	<i>Investment professionalism</i> Highly professional behavior that is in line with state-of-the-art portfolio management practices	<i>Regulatory compliance</i> Ensure capital preservation in the near and mid-term to stay within regulatory guidelines  Avoid reputational risks associated with a (partial) capital loss	<i>Socially responsible behavior</i> Contributing to a mission-related cause as a critical complementary goal to financial returns	<i>Professionally responsible behavior</i> Commercial goals are potentially in conflict with mission goals and must not be compromised by introducing mission-related purposes in investments
<i>Preferred asset classes</i>	<i>Equity and equity-related instruments</i> Diversified portfolios with a high allocation to equity/equity-related instruments via public or private market holdings  Inclusion of alternative asset classes as part of strategic asset allocation	<i>Fixed-rate and fixed income instruments</i> Limited diversification and high allocation to fixed-rate and fixed income instruments via public or private market holdings  Alternative assets not included in strategic asset allocation	<i>Selection of impact-certified instruments</i> Above-average representation of impact criteria in the investment portfolio  Modest to substantial sums allocated to dedicated impact investments (e.g., direct or fund investments)	<i>No selection of impact-certified instruments</i> Low/no representation of impact criteria in the investment portfolio  No dedicated allocations to impact investments
<i>Investment processes</i>	<i>High sophistication in commercial processes</i> Autonomous and proactive perspective on commercial value creation strategies  Independent investment processes and tools; aligned with commercial objectives	<i>Low sophistication in commercial processes</i> Commercial perspective often tied to advisor or status-quo (non-autonomous)  Investment know-how and processes outsourced or aligned with the third-party advisor	<i>Screening for social impact in the investment process</i> Autonomous and proactive perspective on social value creation strategies  Independent investment processes and tools; aligned with social impact objectives	<i>No prioritization of social impact in the investment process</i> Perspective on social value creation non-autonomous  No tailored processes to social impact objectives

#### 2.4.1.1. Fundamental motivation and primary rationale

**Commercial orientation:** The first identified dimension of variance is the degree of commercial entrepreneurship that foundations exhibit in their investment decisions. Here, we distinguish between an *entrepreneurial* and a *conservative* commercial orientation.

**Commercial entrepreneurship:** Foundations with a high orientation towards commercial entrepreneurship generally exhibit the mindset associated with profit-oriented investors. Their main objective lies in generating financial returns to accumulate capital and strengthen the financial basis of the organization for the long run. As the following interview quotes exemplify, managers of such foundations perceive themselves as entrepreneurial actors and typically hold a fundamental belief in market mechanisms and the necessity to take commercial risks to generate a return:

"We are entrepreneurially oriented; it is not without reason that we believe there are higher returns for higher risks. The investment triangle still works today. Even at zero interest rates, the triangle of liquidity, profitability, and risk still holds." (FO 9, Director of asset management)

In line with the belief in market mechanisms, the rationale underlying the commercially entrepreneurial investor's objective is financial professionalism. They believe that in order to ensure the long-term financial viability of their organizations, one must prioritize managing the foundation's endowments with high commercial professionalism and state of the art portfolio management methods:

"To derive our strategic asset allocation, we draw on professional support from the financial services division of our founding company. We have tested our asset allocation using Markowitz's methods and the like." (FO 11, Chief Financial Officer)

**Commercial conservatism:** Commercially conservative investors drive the opposing end of the commercial orientation spectrum. They prioritize capital preservation with a stable yield over higher yet potentially more risky and volatile returns. In contrast to the commercially entrepreneurial investor, these organizations tend to take on the role of a portfolio administrator and tend not to behave as entrepreneurial risk-takers.

"Our investment objectives give rise to a certain expectation of return or, let us say, at least a minimum expectation of return. They imply that we have a strong capital preservation mandate. This means that we are obliged to preserve the assets for an unlimited time and long term [...]. That is why there is a strict capital preservation mandate, which means that we must compensate for inflation." (FO 5, Managing Director)

The rationale for this orientation is strongly focused on regulatory compliance and risk avoidance or minimization. In line with the historically entrenched German regulatory obligations for foundations to preserve their financial endowment, the commercially conservative foundation is strongly focused on complying with these regulatory guidelines and avoiding economic or legal risks. Potential reputational risks associated with a partial capital loss also play a role.

"We are a community foundation, which means that not one person has contributed [our full endowment], but rather we meanwhile have over 100 donors who are committed. We certainly feel a responsibility to manage these endowments carefully. This responsibility means that one is not keen on taking risks and would rather accept a few percentage points less in return." (FO 12, Deputy Head of Fundraising)



**Mission orientation:** The second identified core dimension relates to the degree of mission entrepreneurship that foundation managers exhibit in their investment decisions. Again we differentiate between an *entrepreneurial* and a *conservative* orientation.

**Mission entrepreneurship:** Foundation managers with a high orientation towards mission entrepreneurship aim for an immediate mission-related return through their investment portfolio. Their objective is to combine financial and mission-related goals in a holistic approach to their investment strategy to maximize the positive impact on their environment.

"Sustainability has played a major role in our investments since 2005 already. In this respect, this is not a new trend for us now. For others, it may be new. We have been making impact investments for 15 years. The question is, how does one define impact? A power plant for producing renewable energy, which is used to generate environmentally-friendly electricity, is of course also a piece of impact investing for an environmentally oriented foundation." (FO 4, Deputy Secretary-General & Head of Finance)

The rationale for this investment approach is one of socially responsible behavior. These investors perceive a moral obligation to deploy their capital in a way in line with the foundation's mission. They exhibit an increased sensitivity and awareness for potential conflicts between the source of funds and the use of funds within the context of their organization.

"From a position of strength, I do not think much of achieving a mission impact through the foundation's portfolio of funded projects and counteracting that impact on the capital allocation side." (FO 10, Executive Director)

**Mission conservatism:** Finally, the mission-conservative foundation deliberately wants to keep the source of their funds and use of funds separated. The merging of the purpose of the

portfolio of funded projects with the capital allocation is neither direct nor explicit. The main objective is to run portfolio management that can generate the yields needed to fund the mission-oriented project activities of the foundation. Thus, the foundation only has an *indirect mission impact* through its investing activities, as it invests to fund its projects.

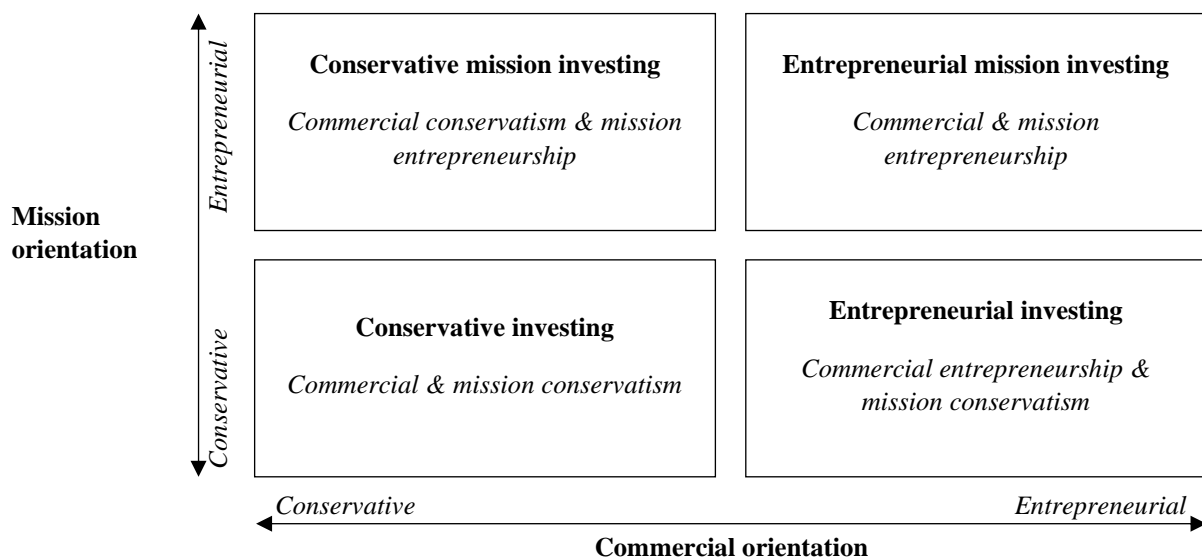
"Every foundation already pursues a social impact because of its mission. Now you want to achieve a kind of "doppler effect" here. However, this is very difficult if the foundation is not allowed to make any substantial losses from a regulatory perspective on the one hand but should achieve a reasonable return on its assets on the other hand. If you now place an additional burden on the foundation in the already challenging investment environment, I do not think this is appropriate. The impact must come from the primary interest, the project portfolio, and the operating activities of the foundation. The investment only serves this purpose and is a secondary interest that must serve the primary interest." (FO 13, Chairman of the Council)

As the statement above indicates, this approach's rationale draws on what we can call *commercially responsible* behavior. The predominant perception of such orientation is that for a foundation to behave commercially responsible, it cannot pursue financial and mission-related goals simultaneously and be successful, even if it wanted to do so. The following statement illustrates this perceived dilemma further:

"We have discussed mission-related investments internally, but the current focus is put entirely on generating returns for the funding and the implementation of the foundation's mission through projects. Due to the current difficult capital market situation, we cannot pursue both objectives simultaneously. However, in a different market environment, such a setup could be attractive for us." (FO 11, Chief Financial Officer)

As outlined above, commercial and mission orientation are not mutually exclusive in a foundation. Instead, two independent dimensions should be considered to map their different organizational characteristics. In combining the two dimensions and their respective attributes, we arrive at a matrix structure of investment orientations, displayed in Figure 2: commercial and mission orientation can combine to *conservative investing* (commercial & mission conservatism), *entrepreneurial investing* (commercial entrepreneurship & mission conservatism), *conservative mission investing* (commercial conservatism & mission entrepreneurship) and, finally, *entrepreneurial mission investing* (commercial & mission entrepreneurship).

**Figure 2: Two-dimensional matrix of investment orientation**



**2.4.1.2. Preferred asset classes and investment processes**

This section describes the observed preference and decision processes corresponding to the differing orientations. Again, the same logic of combining the commercial and mission entrepreneurship axes applies, and findings are summarized in Table 4.

In the second research question, we asked to what extent charitable investor motivations influence preferred asset classes and investment processes. In line with the arguments made by entrepreneurial orientation theory in nonprofit organizations, we expected that the discussed orientations and rationales do have guiding power over the investment strategies and decision-making processes specific to portfolio management and investment decisions. To give an example, we expected that a foundation exhibiting strong commercial entrepreneurship would make portfolio and investment decisions and adopt tools and processes that align with this orientation. In keeping with this assumption, our findings suggest that foundations with different degrees of commercial and mission orientation can be distinguished systematically across *preferred asset classes* and *investment processes*.

**Preferred investment asset classes:** We find that foundations with a high disposition towards commercial entrepreneurship tend to exhibit higher *risk tolerance* and *long-term orientation* concerning their strategic asset allocation. This disposition often leads to significant allocations to equity and equity-related instruments within a diversified portfolio covering a broad basket of asset classes. Aligned with their objective of solid financial returns and capital accumulation, they prefer proportionally higher allocation to these more volatile asset classes that exhibit higher long-term expected returns. In turn, they negate allocation to fixed-rate and fixed income instruments. However, many gained experience with and often have significant portfolio exposure to alternative asset classes, such as real estate, private equity, and venture capital.

"Our investments are predominantly entrepreneurial, meaning that we mainly invest in companies, in productive capital, in real estate and related asset classes. Therefore, we have never had a lot of fixed-income investments; in the medium term, we will have very little or none at all." (FO 7, Member of the Management Board)

To a certain degree, this approach is inspired by what is commonly referred to as the Endowment Model, the portfolio management approach initially pioneered by the late Yale endowment manager David Swensen (2009) and subsequently adopted by many US university endowments. One interviewee explicitly acknowledged this source of inspiration:

"From the very beginning, we have followed a rather Anglo-Saxon investment approach [...]. Accordingly, we have invested a large portion in alternatives and illiquid assets - the endowment model, if you would like to use the term. This way has been our intention from the very beginning, and thus, we have invested a large part of our assets in illiquid asset classes. We have invested globally, and we have invested a relatively high proportion in emerging markets. There is hardly a sector that we fundamentally exclude." (FO 21, Chief Investment Officer)

In contrast, commercially conservative foundations exhibit much higher *risk-aversion* and are more prone to invest significant portfolio shares in fixed-income and interest-bearing securities. These asset classes correspond to their preference for lower *short-term* risk and volatility and are more conducive to their objective of short-term capital preservation and stable, predictable yields. While they typically do have some portfolio exposure to equity instruments, it is often modest and in the order of magnitude of one-third of the foundation's total portfolio:

"The umbrella term [to describe our investments] would be fixed-interest or investments secured via a deposit guarantee, i.e., fixed-term deposits and savings bonds, for two-thirds. The remaining third was gradually and step-by-step made available for equities and equity funds. However, we are still reluctant to invest in individual stocks, but we have now invested in five mutual stock funds." (FO 12, Deputy Head of Fundraising)

"Roughly speaking, [our investments are in] interest-bearing assets in different variations, across different segments. These include almost no government and

mortgage bonds anymore, but many corporate bonds and many promissory notes, some of them subordinated [...]. Of course also some equities, real estate and renewable energy investments." (FO 4, Deputy Secretary-General & Head of Finance)

On the other hand, the mission-entrepreneurial foundations focus on *impact-oriented products* when building their investment portfolio. Hereby, impact orientation often takes the form of strict sustainability criteria. Rather than selecting particular asset classes based on their risk-return profile, they focus on the subset of products within an asset class that complies with the defined standard (e.g., green bonds or renewables infrastructure). Although not explicitly mentioned, this approach finds inspiration within the social finance model (cf. Nicholls, Paton, & Emerson, 2015). The quote below shows that this approach is not limited to one particular asset class:

"We first cooperated with an independent financial services provider who had a close relationship to the group of founders. Apart from equities and fixed interest investments, we have invested more in equities than foundations usually do. We also ventured into a direct investment [...], which were funds of direct investments. From the beginning, we included a sustainability guideline with strict exclusion criteria and the idea that once we find the opportunity, we would pursue mission-oriented investing." (FO 16, Founder and Board Member)

"We have a strong match between our mission and capital investments. As a matter of principle, we only invest in green bonds that meet the highest standards of sustainability ratings. In this respect, we are primarily targeting OEKOM<sup>10</sup> and IMUG<sup>11</sup> issued by the rating agencies." (FO 10, Executive Director)

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<sup>10</sup> OEKOM is a sustainability-oriented German publishing house and provider of information on the social and environmental performance of companies, industries and countries.

<sup>11</sup> IMUG ("Institut für Markt-Umwelt-Gesellschaft") is a German sustainability rating agency.

In line with the objectives and rationales outlined in section 2.4.1, the mission-conservative foundation does not deploy any sustainability, impact, or screening criteria to select its investments or asset classes. Instead, they remain focused on the pecuniary merits of each investment and define sustainability as "economic sustainability" (FO 9, Director of asset management), as one interviewer explained.

**Investment processes, tools, and capabilities deployed:** Foundations also differ in their investment processes depending on their orientation. Commercially entrepreneurial foundations show a high degree of *independence* and *autonomy* in their investment decision-making. As expected, their processes are tailored towards commercial value creation. Suppose they partner with external service providers or experts. In that case, these partnerships tend to be execution-focused, carefully scoped, and aligned with a particular commercial process, e.g., outsourcing parts of commercial due diligence or strategic asset allocation calculations to a service provider. In terms of the deployed capabilities, actions and outcomes of commercially entrepreneurial foundations often speak of a high degree of financial literacy and capital-market affinity in the organization:

"We believe and try to keep away from any large capital accumulators to which we would give broad mandates, which then practically execute the whole process for us. So, we do not go to any of the large investment banks and say: "Why don't you come to us for private equity, public equity, or all of it together?" This is not what we believe in." (FO 20, Managing Director)

"Within the asset classes, we have generated forecast values for the respective asset classes, which are forecast values concerning the return. We also have forecast values concerning volatility. From this, we create a portfolio reflecting the foundation's risk-bearing capacity. We do not follow an approach to generate a 4% return and model the portfolio based on this value. We do it the other way around: First, we calculate the

foundation's risk-bearing capacity and then model a portfolio based on the calculated risk." (FO 6, Deputy Head of Asset Management)

The commercially conservative foundation, on the other hand, tends to show *less autonomy* and much more rigid guidelines in its processes and tools, for example, by restricting the set of available options and portfolio choices through limits on risk-bearing asset classes or mandating a minimum share of secured assets in the portfolio. These guidelines and processes are often closely targeted towards minimizing the risk of capital losses and ensuring stable yields. This approach also reflects in their capabilities: as their priorities are much more tailored to capital preservation, they do not target an accumulation of financial literacy and capital-market affinity in the organization that is comparable to entrepreneurial foundations, often just assigning one or two people to the task or outsourcing the processes altogether.

"Our investment guidelines are not public. However, to give an example, we have stated in our statutes that we preferably invest in interest-bearing assets. In our case, this means that a minimum of 50 % of our capital must always be in interest-bearing assets. For the other asset classes, we have agreed on limits. The operational implementation within these limits is the management team's responsibility." (FO 4, Deputy Secretary-General & Head of Finance)

"I am a natural scientist by university training. Moreover, I am not a hobby investor either. So I admit that I still have to understand exactly how these things work. I will not become an expert anymore, which means we have to have an eye on it. Just recently, there were articles about ETFs. If you look at it, it seemed to me, as a non-professional, that it is something that many people who trade with it themselves no longer quite understand." (FO 17, Managing Director)



The mission entrepreneurial foundation mirrors *independence* and *autonomy*, yet these processes are tailored towards social impact goals. For example, they identify and adhere to the criteria put forward by independent authorities regarding sustainability and mission impact throughout the portfolio building process, not relying on financial intermediaries alone. In several cases, they also partnered with external experts to garner advice and an independent perspective on mission impact criteria definition and measurement issues. Lastly, they are also *proactive* in improving and refining their standards, e.g., through regular portfolio reviews and assessments of the applied impact assessment framework. A key aspect of their internal capabilities is that most leading staff does neither have a pure business and finance nor a pure nonprofit background, but they combine both perspectives:

"I always assumed that if you commissioned OEKOM<sup>12</sup> or others, or the asset manager commissioned them, that you can simply rely on them. Over the last two years, we have learned to use our investment guidelines to set clear instructions for impact and sustainability guidelines and check that they are being adhered to. OEKOM can adjust to what the customer wants. This means that it is not sufficient to say that OEKOM is behind this, but I have the following investment guidelines that are suitable for us." (INT 3, Managing Director)

"The decision of the investment advisory board ultimately opted for variant two [i.e., not to invest in private equity and private debt]. Primarily because neither the council nor the investment advisory board considered private equity and private debt compatible with enforcing and controlling the relatively strict and ecclesiastically motivated sustainability criteria that we have, that was the main reason we decided against it. As I said, the risk-return structure would have been in favor." (FO 5, Managing Director)

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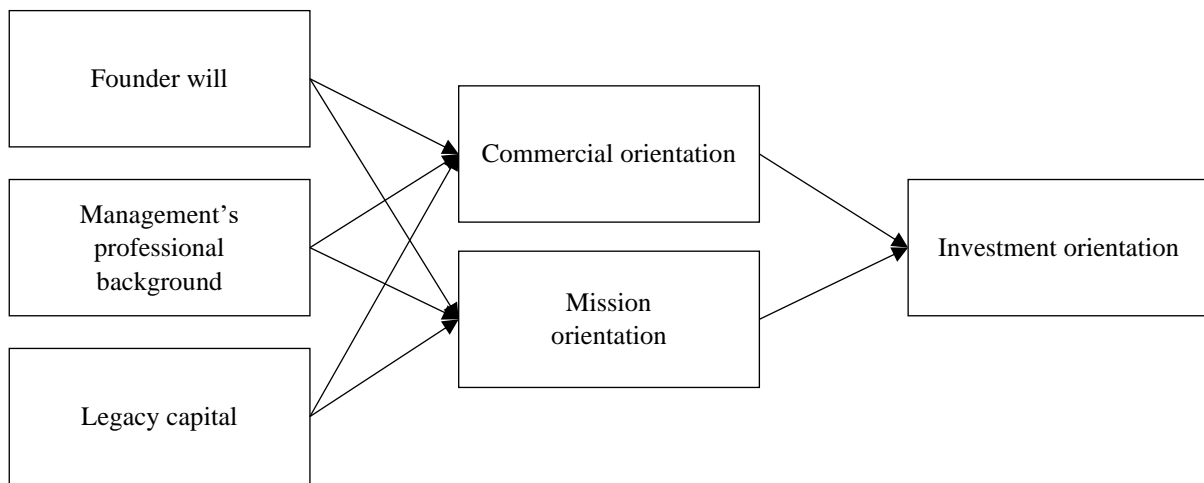
<sup>12</sup> OEKOM is a sustainability-oriented German publishing house and provider of information on the social and environmental performance of companies, industries and countries.

Lastly, we find that the mission-conservative foundation often does not hold a staked-out position on the matter, which inhibits the development of any processes that would permit the implementation of an impact strategy. Their processes are often not opposed to mission impact, but it takes no priority throughout the investment decision-making. Direct, investment-related mission impact would only be considered in case of a high certainty of no incremental risks to the income model but is left aside in most decision-focused discussions.

#### **2.4.2. Antecedents of foundation orientation**

The third question we explored during our interviews focuses on the drivers or antecedents of varying investment orientations in foundations. This question is of obvious importance, as it allows us to assess how orientations form and whether they are time-independent or might evolve along with a change in the framework of antecedents. By forming an explanatory framework, we can link our model of investor orientations to organization-specific characteristics of the foundation, shown in Figure 3. Based on our observations, we propose an explanatory model of investment orientation in foundations that links investment managers' perceptions of *founder identity*, *management's professional background*, and *legacy capital* to different manifestations of investment orientation. These orientations, in turn, affect the preferred investment asset class(es), investment processes, and capabilities.

**Figure 3: Model of investment orientation in charitable foundations**



**Founder identity and will:** Several of the foundation executives we interviewed mentioned the formative impact that the founders and their particular identity and will had on the investment orientation of their organizations. For example, several foundations with a commercially entrepreneurial orientation appeared to derive their approach from the entrepreneurial legacy that the founder bestowed upon the foundation. Upon reviewing publicly available documents, we found that in some instances, this entrepreneurial legacy was explicitly stated in the charter and imprinted in the project portfolio. In contrast, in other cases, it seemed to be derived implicitly by understanding who the founder was and what values the founder embodied.

"We see ourselves as an entrepreneurial investor, we want to invest in companies, we want to invest in growth, and we want to invest in productive capital. [...]. That is our ambition. We also strive to foster entrepreneurship through our founding purpose, projects, and programs. We also have projects that address entrepreneurship." (FO 7, Member of the Management Board)

"This foundation has been set up from the very beginning as a community foundation. At previous conferences, a group of women met called "women inherit differently." So it was about the inheritance issue itself. And these women were the ones who said we want to do things differently. [...] So that is what we tried to implement under my lead. We went through the usual ethical rating criteria in a strongly feminist way. And as we were able to prioritize it by ourselves at the time, we did. And nowadays, this is becoming more and more important." (FO 16, Founder and Member of the Board of Directors)

**Management's professional background:** The professional and educational background of the management board of the foundation is a second determining factor. We observed that in multiple cases where there had been a recent change in the foundations' management, incoming managers expressed the desire to change the investment approach of the foundation. This development seemed linked to the incoming managers' prior professional experiences and educational background. What stood out was that managers with a background in business and finance advocated a more commercially entrepreneurial investment approach, while managers with a social sector background advocated a more socially entrepreneurial investment approach.

"At the beginning of my tenure, I exchanged ideas with other executives and realized that the exchange was relatively futile, as many foundations think and work completely differently from what we do now. Most of them had 70-80% bonds in their portfolio and 20-30% equities. Why do we do things completely differently? This is primarily due to Mr. X., who was and still is the foundation director, and to Mr. Y., who sits on the foundation board. Mr. Z. gained experience as an advisor in a family office and got to know this investment approach. He decided to implement it from the very beginning." (FO 21, Chief Investment Officer)

"In the long term, we would like to pursue an investment approach that is both impact-oriented and return-oriented in the foundation. My commitment here and what we achieve is a matter of passion. Philanthropy and doing well motivate me personally very strongly. I put my heart and soul into this effort and consider it deeply fulfilling." (FO 14, Chairman of the Foundation)

*Legacy capital.* Lastly, we identified so-called "legacy capital" (Scheck & Spiess-Knafl, 2018), sizeable and historically entrenched direct share- and bond holdings as a significant influencer of foundations' investment orientation. Even though we sampled foundations for our interviews that actively manage and invest a large share of their financial endowment, some of the foundations had parts of their portfolio invested in assets with a meaningful historical affiliation to the organization, such as a meaningful stake in a public or private business. This circumstance emerged because the founder either directly contributed these assets to the financial endowment of the foundation or because another historical affiliation ties the assets to the foundation, e.g., a bond holding in the founder's company.

These three factors inform both the commercial and mission orientation, which form the investor orientation of an individual foundation. As shown in chapters 2.4.1 and 2.4.2, investment orientation can have different manifestations, affecting preferences, processes, and capabilities. Our model links these pieces to the organizational characteristics driving investor orientation, closing the loop on our findings.

## **2.5. Discussion and conclusion**

Our study contributes to the fundamental challenge of the paradigm that the prospect of financial returns purely drives institutional investors' decisions (Barber et al., 2021; Geczy et al., 2021; Hartzmark & Sussman, 2019). We carried out an empirical study of the motivations of charitable investors and how they shape their investment orientation along two primary

dimensions: the commercial orientation, allowing us to differentiate the (pecuniary) financial objectives of an investor between an entrepreneurial, return-oriented, and a conservative, capital-preservation-oriented posture, and the mission orientation – by which we can classify the (non-pecuniary) mission objectives of an investor. We find that these two dimensions define independent axes that, through their combination, allow us to identify four distinct investment orientations: entrepreneurial investing, entrepreneurial mission investing, conservative investing, and conservative mission investing.

Beyond the documentation of motives and rationale behind charitable investors' commercial and mission orientation, we connect these dimensions with distinct investor behavior, particularly how they shape preferred asset classes and investment processes. We show that these crucially depend on the type of orientation, whereby commercial orientation determines the types of asset classes the investor has chosen, whereas mission orientation determines the subset of assets considered and chosen within an asset class. We conclude by proposing a model of investment orientation in charitable foundations linking key antecedents. These antecedents are the *founder will*, *management's professional background*, and *legacy capital* to the identified dimensions of investment orientation.

The most fundamental and main contribution of the present study is that it offers a novel, two-dimensional framework to conceptualize charitable investor orientations and links these differing philosophies to investor preferences and processes and a model to explain the determinants of these processes with the help of organizational characteristics.

We could identify significant heterogeneity in German charitable foundations' orientations from an empirical perspective. However, it would be undue to expect that foundations' orientations are uniformly distributed within our matrix and thus empirically equally important, even more so in other geographies, where historical or cultural reasons might also influence the foundations' predispositions. Indeed, our findings suggest that particularly

among German foundations with an asset base above one billion Euro, a commercially entrepreneurial is more common than a conservative posture. However, multiple examples show this relation is not definitive, and the underlying drivers seem to be *founder will*, *management's professional background*, and, where applicable, *legacy capital* investments. Specifically, founders of the largest foundations often were entrepreneurs themselves and thus tend to transpire their legacy into the foundation. Larger organizations also tend to be more professionalized and often hire financial professionals in their management teams who favor a commercially entrepreneurial posture over others.

It would neither be correct to expect that investor orientations are completely static over time. Our explanatory model points out determining factors that are not time-invariant. We mainly observe a re-orientation in investor behavior in foundations where there had been a recent change in the management team. Incoming executives with a business management or financial services background often desire to become more entrepreneurial in their portfolio allocation approach. Likewise, some founders' opinions evolved, making the organization more inclined to prioritize a mission-entrepreneurial posture in the investment selection process. These observations point towards a theory of change and have practical implications regarding how changes in organizational orientations occur.

### **2.5.1. Implications for entrepreneurial orientation research**

Our findings critically extend the scope of applying established concepts of entrepreneurial orientation theory in charitable organizations and open up new avenues for empirical inquiry and theory development. First and foremost, our results show that entrepreneurial orientation theory can serve as a platform to extend our understanding of charitable organization investment behavior. This expansion in the application of entrepreneurial orientation to investor behavior opens up the potential for a new range of inquiries into how investor orientations manifest and shape preferences and decision making.

Our investigation of German foundations is the first step in this direction, with other investor groups from the nonprofit and for-profit universe to follow.

We also garner evidence that the key attributes characteristic of entrepreneurial orientation, namely *risk-taking*, *proactiveness* and *innovativeness* (Rauch et al., 2009) as well as *autonomy* (Dess & Lumpkin, 2005), can also be observed in both commercially and mission entrepreneurial foundations, the very first validation of these attributes to date in charitable investors. However, interestingly, the fifth prominent attribute, *competitive aggressiveness* (Dess & Lumpkin, 2005), seems to be largely absent. While this might seem startling at first, it is not altogether surprising, as, within the presented set of investment decision-making, there is no element of direct competition comparable to the entrepreneurial sphere.

Finally, the model of investment orientation in German foundations presented in this study contributes to and expands research of the drivers or antecedents of entrepreneurial orientation in organizations. Earlier studies have linked organizational structure, leadership style, and control systems to entrepreneurial orientation in nonprofit organizations (Morris et al., 2007). The structural characteristics of the founder will, management's professional background, and legacy capital offer an altogether novel perspective on how entrepreneurial orientation comes to rise in German foundations. Again, these findings are specific to the ecosystem of German foundations and need to be further tested and contextualized in a broader landscape of institutional investors, where actors such as family offices could provide interesting supporting or contradicting evidence.

### **2.5.2. Implications for related literature**

Our study also adds to the growing body of evidence that investor motives are not limited to the sole prospects of financial returns as has been widely assumed by classical economic theory but can reach well beyond, e.g., Barber and colleagues (2021); Glac (2009)



Krueger, Sautner, & Starks (2020). We examined how non-pecuniary utility from investing in dual-objective instruments is derived and how it interrelates with broader organizational characteristics. This finding aligns well with recent research on impact investing (Barber et al., 2021), revealing that different investor groups exhibit varying willingness to pay for impact. Our findings go beyond assuming investor groups as homogenous blocks within this context and offer novel insight into how heterogeneity arises in a particular investor group. We show that this heterogeneity is not limited to the asset class preferences but also discloses itself in processes. A different yet auspicious body of literature is beginning to examine how these investor preferences translate into corporate governance and decision making, thus shaping the strategies and tactics adopted in the business world (Krueger et al., 2020; McCahery, Sautner, & Starks, 2016). We see this as a promising avenue for future research.

Moreover, our study provides interesting insights and links for stewardship theory (Davis, Schoorman, & Donaldson, 1997). Our empirical evidence and proposed model show starting points to the interesting case where organizations and managers align with their founders' interests. We show that a stewardship approach might be particularly relevant in nonprofit foundations, as employees might have high intrinsic motivation. The fulfillment of the foundation's mission could be valued higher than individual career goals, which are typically strongly linked to a narrower form of economic performance.

### **2.5.3. Limitations and opportunities for future research**

Our work does face several limitations: first, we deliberately limited our study's sample to one investor group and geography, charitable foundations in Germany. This choice was essential to keep environmental factors such as legal and regulatory frameworks and broader cultural settings constant. However, although we did in a first approach cross-check our results with charitable organizations in other European countries such as Switzerland, for example, it would be fascinating to extend our investigations and test the findings of this study on a larger

sample of foundations from different countries and regions. Scandinavia could provide a good starting point due to its ecosystem of foundations and partly similar sector structure (Block et al., 2020). In a cross-country comparison, the role of regulatory frameworks and cultural background in the evolution of investor orientations should be included as a further analysis criterion. From such studies, insights regarding the potential impact of regulatory reforms on investment behavior in a country and sector could emerge.

Furthermore, while we aimed our sampling approach at maximizing heterogeneity, the randomness of our sampling can ultimately not be guaranteed as we relied on introductions from intermediaries and individuals' willingness to participate in our interviews. Although we guaranteed all participants and organizations anonymity and secretiveness, a self-selection bias could exist since managers and foundations could be more reluctant to speak to us if they feel comparatively weakly positioned with their investment approach vis-à-vis their peers.

This study provides an entry for deeper investigations into the different dimensions of investor orientation and how they manifest themselves in investment decisions. Further research should investigate the link between the investor and comprehensive organizational orientation in charitable organizations such as foundations, including project funding and grant-making strategies. Specifically, do investor and overall organizational posture condition one another and correlate strongly, or do they move more particularized and independently from each other? Another exciting avenue for further research could be how different manifestations of charitable organizational orientation shape employee motivation, satisfaction, and sense of belonging and whether any formative or selection effects of an entrepreneurial vs. conservative posture can be observed.

Lastly, an open question is whether the findings of this study extend beyond the foundation sector. One potentially exciting application area could be the family office sector, which is another significant source of philanthropically oriented capital (Hand et al., 2020),

likely expanding further in the future (Arizton, 2022). We would expect the investment orientation of single-family offices to be shaped similarly by the founding family's identity and management's professional background. One could speculate that we can also observe family offices' commercial or philanthropic orientation in their preferred asset classes and investment processes, which would be an exciting transfer of our model.

To conclude, entrepreneurial orientation theory has become a central concept of explaining organizational entrepreneurship both in the for-profit and nonprofit sectors. However, understanding how different orientations shape investors' motivations and decision-making is still in its early stages. Our study provides a first step in conceptualizing a typology of charitable investors, deriving insights from a particular ecosystem: charitable foundations in Germany. It supports the hypothesis that applying entrepreneurial orientation theory to charitable investors provides the opportunity to obtain novel and seminal insights into investor behavior and how it emerges.

# Chapter 3

## 3. Doing Good or Doing Well? – Venture Capital Mission Investments by Charitable Foundations and University Endowments

### Abstract

We research the preferences and outcomes of direct venture capital investment of charitable foundations and university endowments in the United States and the United Kingdom. Our analysis provides evidence that foundations' and endowments' venture capital (VC) direct investments are clustered in sectors adjacent to their fields of activity, i.e., mission-related investments (MRIs). We also show that these MRIs have a lower likelihood of success and take longer to exit when compared to the same organizations' non-mission-related investments (Non-MRIs). We base our analysis on a sample of VC equity financing rounds from the US and UK markets and a hand-collected dataset of philanthropic fields of activity for every foundation and endowment investor, matching the industries and business models of financed ventures. Moreover, we use coarsened exact matching to demonstrate that whereas there is a performance delta between MRIs and Non-MRIs, there is no evidence that MRIs underperform in terms of success likelihood compared to financing rounds by other VC investors in our sample.

*Keywords:* Venture capital performance, Institutional investors, Impact investing, Mission-related investments

*JEL Codes:* G11, G23, G24, H41, M14

*Authors:* Maximilian Kremer, Ann-Kristin Achleitner, Reiner Braun

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*Status:* Working Paper (Available on SSRN)

*Presentations:* Research in Entrepreneurship Conference (RENT) 2021

### 3.1. Introduction

Mission or impact investing as an asset class has been rising over the last decade and reached USD 715 billion in assets under management in 2020, according to the Global Impact Investing Network (Hand et al., 2020). The demand from charitable foundations and university endowments continues to be a significant growth driver in this regard (Schor, 2020; Wood, 2020). In pursuing their philanthropic purpose, these organizations are significant institutional capital allocators, especially in the United States (US) and the United Kingdom (UK) (Council on Foundations–Commonfund, 2021). Within the ongoing academic debate around foundation and endowment portfolio allocation (Barber & Wang, 2013; Dimmock et al., 2019; Goetzmann & Oster, 2014), particular attention has been paid to the role of illiquid alternative assets in their portfolios, among them being private equity (PE) and venture capital (VC) fund investments (K. C. Brown, Garlappi, & Tiu, 2010; Lerner et al., 2007; Sensoy et al., 2014). However, direct portfolio company investments, especially mission or impact investments, have received much less attention from scholars (Henriques et al., 2016; Qu & Osili, 2017), making them a novel and enticing field of research.

Direct investments refer to portfolio company investments outside the conventional fund structure and are increasingly relevant for institutional investors wishing to build exposure to the PE and VC asset class (Fang et al., 2015). However, the skills required differ from those necessary in fund investing (Braun et al., 2020). Large philanthropic organizations and industry advisors have recognized the potential of direct investing to pursue mission purposes (Godeke & Bauer, 2008). For charitable organizations in the United States, program-related investments (PRIs) and mission-related investments (MRIs) are two common forms to pursue mission purposes beyond grantmaking (Qu & Osili, 2017). They allow charitable organizations to support philanthropic causes where conventional grants are an insufficient tool while potentially earning a moderate to significant financial return (Qu & Osili, 2017), i.e., doing well

by doing good. From a legal perspective, an MRI is "an investment that also furthers an organization's mission [and describes] any investment in which the investor intends to generate both a social (including educational or environmental) return as well as a financial return" (Levitt, 2011). PRIs, on the other hand, are investments made primarily to achieve a program objective with only a moderate financial benefit to the investor and are therefore eligible to count against the 5% payout that foundations need to make each year to retain their tax-exempt status in the US (IRC, 1969; Levitt, 2011).<sup>13</sup> For practical purposes, this study follows the Council on Foundations' definition (2021) and refers to MRIs as all "investments by mission-based organizations that are designed to generate both a social and a financial return."

The academic discourse on mission investing is still beginning, and only a few empirical studies on mission investments of foundations and endowments have appeared. Qu and Osili (2017) focus on US foundations and analyze the internal and external factors influencing PRI activities, including motivators and obstacles to adopting PRIs. They find that foundations' total assets and staff size positively relate to the organizations' likelihood of engaging in PRIs and the committed financing amounts. They also find that older foundations invest less money in PRIs than younger ones. While laying the vital groundwork, the authors' study does not differentiate between PRI-types (e.g., loans and equity investments) and does not analyze the performance or returns of PRIs compared to other investments. Barber, Morse & Yasuda (2021) are among the first to cover the performance of mission investments by institutional investors in their analysis of VC impact funds. The authors show that investors accept 2.5-3.7 ppts lower internal rates of return ex-ante for impact funds. They also demonstrate that mission goals in charitable organizations such as foundations are associated with a significant willingness to pay (WTP) for social impact. However, as most research covering institutional investors' PE and

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<sup>13</sup> While the 5% payout requirement does not explicitly apply to US university endowments, the similarity of fiduciary laws results in most endowments adhering to this regulation (Kochard & Rittereiser, 2007).

VC activities (Lerner et al., 2007; Sensoy et al., 2014), their study analyzes the fund level and does not employ a deal-level perspective. To the best of our knowledge, there is no study to date that examines the characteristics and performance of foundation and university VC mission investments with an individual deal-level perspective.

In this study, we contribute to the debate on VC mission investing with the first perspective to date on VC direct investments by foundations and endowments, drilling down to the deal-level view. We build on existing impact and mission-investing literature to test two sets of complementary hypotheses in this paper. First, we address the questions of direct investing and mission-related investment performance: there is clear evidence that non-pecuniary motives such as sustainability notably influence institutional investors' investment decisions (Geczy et al., 2021; Hartzmark & Sussman, 2019). Barber and colleagues (2021) show that mission-based organizations are willing to trade off some prospective financial returns for mission-related impact in their investments. However, other empirical studies provide mixed evidence regarding the economic outcomes of non-mission-aligned investments, necessitating further empirical research for a clear verdict (Gray et al., 2015; Kovner & Lerner, 2015; Pandit & Tamhane, 2018). In the case of direct investments, we also need to consider the specific tax advantages in the US that make PRIs comparatively more attractive than conventional direct investments (Levitt, 2011). Therefore, we hypothesize that tax advantages and apparent dual investment objectives materialize in a lower likelihood for MRIs' commercially successful outcomes (i.e., successful exits) than Non-MRIs. This hypothesis supports the idea that foundations and endowments are willing to pay a premium (i.e., sacrifice some return) to align investments to their organizational mission. However, we do not necessarily expect a lower likelihood of success of MRIs compared to the VC market at large, as indicated by prior studies (Gray et al., 2015; Pandit & Tamhane, 2018). Focusing on exit

likelihoods as an indicator of investor returns is a common approach in VC research (Gompers, Mukharlyamov, & Xuan, 2016; Hochberg, Ljungqvist, & Lu, 2007).

*Hypothesis 1a: foundations' and endowments' mission-related direct investments have a lower likelihood of a successful exit than their non-mission-related investments*

*Hypothesis 1b: foundations' and endowments' mission-related direct investments do not have a lower likelihood of a successful exit than other VC investors' investments*

Our second hypothesis concerns the portfolio company age at the successful exit. Time to payout is another vital constituent of investor returns. By analyzing age correlations, we can discern whether the patient capital often attributed to foundations and endowments (Ivashina & Lerner, 2019) materializes in the selection or treatment of portfolio companies. Because foundations and endowments are patient capital, we expect that their investments exit at an older age than other investors' portfolio companies. We also hypothesize that MRIs exit later than Non-MRIs, motivated by the assumption that the investment thesis in MRIs is more focused on complex technologies with a longer time to commercialization, as is indicated by case examples researched by the authors (Bill & Melinda Gates Foundation, 2022b; Michael & Susan Dell Foundation, 2022; The Abell Foundation, 2022). In contrast, conventional VC has become more focused on innovations with a relatively rapid and cheap validation cycle over the past decade (Ewens, Nanda, & Rhodes-Kropf, 2018), which should give rise to a gap in the time to successful exit between MRIs and conventional direct investments (Non-MRIs).

*Hypothesis 2a: foundations' and endowments' investments have a higher age at successful exit than other VC investors' investments*

*Hypothesis 2b: foundations' and endowments' mission-related direct investments have a higher age at successful exit than their non-mission-related investments*



We evaluate these hypotheses by building on a VC financing round sample compiled from several large commercial and new proprietary data sets. Our primary sample is sourced from the Dow Jones VentureSource (VS) database and includes more than 50,000 rounds between 1998 and 2014 to ventures based in the US and the UK. We identify 1,099 financing rounds in which at least one foundation or endowment participated as a direct investor. Investments in our sample are made as direct equity investments – not grants<sup>14</sup> – and are held and managed on the organizations’ balance sheets as investment capital. We match and manually verify financing rounds in industries adjacent to foundations’ and endowments’ fields of activity (e.g., healthcare, education, or culture & human services) and categorize financing rounds into these ventures as mission-related investments (MRIs). We classify other foundation and endowment financing rounds that do not align with their fields of activity as non-mission-related (Non-MRIs). Our identification process draws inspiration from corporate VC research, where scholars have used industry-based matching to identify a technological fit between the parent company and portfolio companies (Chemmanur, Loutskina, & Tian, 2014). To the best of our knowledge, we are the first to apply such a categorization approach to address the question of mission-related venture investments with a comprehensive, financing round-based dataset.

We add to the current understanding of the performance of mission investments by charitable organizations as VC investors. Our findings in this regard are nuanced: We document no apparent underperformance of foundations and endowments regarding VC direct investments, even though they require a different skill set to fund investing (Braun et al., 2020). We also find a statistically significant delta between MRIs and Non-MRIs, confirming our

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<sup>14</sup> Grants as a charitable instrument do certainly play a role for foundations and endowments, also with regard to venture financing, yet these are not the focus of this study, as they are pure giveaways without the intention to generate a return.

hypothesis 1a. This finding indicates that scholars and practitioners should consider the apparent trade-off between MRIs and Non-MRIs within this institutional investor group. However, MRIs do not necessarily come at a lower likelihood of success when compared to the US and UK venture financing universe at large, which is in line with our hypothesis 1b. While perhaps puzzling, value-adding capabilities and foundations' expertise in a venture's particular industry could be at play, much in the same fashion as sector-oriented independent or corporate VC funds do (cf. Chemmanur et al., 2014). Moreover, we confirm our hypothesis 2b that MRIs correlate with later successful exits of portfolio companies, compared to Non-MRIs and our total sample of other VC investors' financing rounds. Hypothesis 2a, on the other hand, only holds for the sub-group of endowments, yet not for foundations, although both could be considered patient capital providers (Ivashina & Lerner, 2019). This finding raises interesting questions concerning the investment objectives of both investor groups.

Lastly, we find that foundations' and endowments' Non-MRI investments are significantly more likely to lead to a successful exit than other VC investors' financing rounds in our sample. We rationalize this finding by observing co-investment patterns, particularly in non-mission-related investments. We show that foundations and endowments are less likely to act as lead investors in purely commercial investments, indicating a more substantial reliance on a potentially passive co-investor role. As has been reported by Sensoy, Wang & Weisbach (2014), endowments often have access to top-performing VC fund managers, giving rise to the possibility of lucrative co-investment opportunities, allowing them to leverage the skillset and reputation of these fund managers (Braun, Jenkinson, & Stoff, 2017).

Our paper proceeds as follows: Chapter 3.2 describes our data collection approach and variables. Chapter 3.3 presents the results, split into a descriptive study of foundation and endowment investment patterns and a statistical analysis of investment outcomes. Chapter 3.4 finishes with a discussion of our findings, including limitations and avenues for future research.

## 3.2. Data construction

### 3.2.1. Financing round sample

Our primary data set on VC financing rounds comes from the Dow Jones VentureSource (VS) database, one of two predominantly used databases in VC research. This database provides a comprehensive overview of VC markets, especially concerning venture outcomes (Kaplan & Lerner, 2016; Retterath & Braun, 2020). We include all VC equity financing rounds to ventures with headquarters in the US or the UK. We choose these two countries because they have a well-established venture ecosystem (accounting for 62% of the entire database) and a track record of direct investments by foundations and endowments.

We are interested in venture equity financing rounds to young, high-growth ventures labeled in the database as Venture Capital/VC. We exclude buyouts, debt financing, angel investments, and grants from our sample. Furthermore, we exclude financing rounds to portfolio companies older than ten years at their first VC round since we consider such companies more mature with a different investment rationale. Lastly, we remove financing rounds for which the investors or the invested USD capital amount are unavailable. Therefore, our condensed sample includes US- and UK-based venture financing rounds with disclosed investors and a disclosed investment amount between 1998 and 2014. This design leaves over six years to observe eventual exits after the last observed financing round, which is in line with other research in the field.<sup>15</sup> We do not include deals before 1998, as VS's completeness of coverage of European startups is not confirmed for that period (Retterath & Braun, 2020). In summary, our sample contains 52,840 venture financing rounds to 26,052 US and UK ventures between 1998 and 2014.

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<sup>15</sup> Nahata (2008) and Gompers et al. (2016), Braun et al. (2019) and Nanda et al. (2020) leave 4, 6, 6 and 8 years of time between investment and observed exit, respectively.

### **3.2.2. Foundation and university endowment financing round sample**

Our focus is on investment rounds with direct foundation or university endowment participation. We define foundations as private nonprofit organizations pursuing a charitable cause (e.g., the Abell Foundation, the Bill & Melinda Gates Foundation, or the Michael & Susan Dell Foundation). These organizations exist to aid charitable purposes via grantmaking or funding a service to society and are tax-exempt in the US and the UK (Silk & Lintott, 2011). We also include corporate foundations such as the Goldman Sachs Foundation, as they operate as nonprofit organizations, independently of their parent company's commercial interests with their distinct philanthropic mission (Hornstein & Zhao, 2018; Westhues & Einwiller, 2006). We define university endowments as nonprofit organizations or funds that manage assets on behalf of a college or university to support its educational and research activities, including the "third mission, i.e., knowledge transfer to industry and society" (Croce et al., 2014). This group includes investors like Cambridge, Yale, or Stanford University and their respective endowments. It also contains foundations that aid a university, such as the Oklahoma University Foundation or the Wisconsin Alumni Research Foundation. We also include in this category several university-managed venture funds (e.g., the University of Michigan's Wolverine Venture Fund or Cambridge's University Challenge Fund), which exist to conduct VC investments on behalf of and (co-)funded by the university (Croce et al., 2014).

We identify foundation and endowment financing rounds based on the VS categorization of investor profiles, including manual verification. Within our sample, we identify 496 rounds with a direct foundation investor and 603 rounds with a direct endowment investor, in a total of 1,099 rounds or 2.1% of our entire sample. We manually collected additional variables for the 204 charitable organizations to create an investor profile. Firstly, we identified organizational philanthropic fields of activity. Charitable foundations typically explicitly outline their philanthropic fields of activity in a purpose statement on their website.

Where available, we additionally used funding information in annual reports to verify fields of activity. In the case of university endowments, we looked at the institution's educational mission and different research fields, typically represented by the various academic departments and scientific technology transfer. To contextualize our sample, we collected information on the organization's primary income model, referring to the primary source of revenue from which the organization finances its activities (e.g., market investing, donations, or grants), and additional contextual information such as headquarter location. We source this information from organizational financial statements, annual reports, and websites, supplemented by nonprofit directories and sector information aggregator platforms such as Guidestar.org and Foundation Directory Online. Table 5 contains an overview of our sample's distribution of the described organizational characteristics.

**Table 5: Summary of investor characteristics**

This table summarizes the distribution of foundation and endowment organizational characteristics. Organizations appear along with their fields of activity (most organizations have multiple fields of activity). The primary income model refers to the primary source of funds through which the foundation finances its operating activities. Location is uniquely determined and describes the organization’s headquarter location.

	Number of foundations	% total	Number of universities	% total
<i>Fields of activity</i>				
Education/academia	55	63%	107	92%
Human health	45	51%	93	80%
Science/technology transfer	32	36	109	94%
Environment/sustainability	17	19%	41	35%
Culture/arts	22	25%	70	60%
Human services	36	41%	5	4%
<i>Primary income model</i>				
Market investing	51	58%	102	88%
Donations/grants	16	18%	10	9%
Other/unknown	21	24%	4	5%
<i>Location</i>				
US	68	77%	72	62%
UK	8	9%	36	31%
Other	12	14%	8	9%
Total	88		116	

### 3.2.3. Key variables

This section presents the variables used in our analysis. All variables are also defined in Appendix 2, and the reader finds a correlation table of the main variables used in our analysis in Appendix 3.

#### 3.2.3.1. Mission-related investments

Our first question is whether charitable organizations seek a non-pecuniary *mission dividend* by financing ventures in mission-related industries. We define mission-related industries as matches between the organizational philanthropic purpose, e.g., furthering human

health, education, or enabling scientific-technological transfer (by investing in academic entrepreneurs), and the respective industries, e.g., the healthcare industry or educational services. With the help of the identified organizational philanthropic fields of activity, we define topical areas to categorize portfolio companies, enabled by detailed industry identifiers and company descriptions provided in the VS database. In our total sample, 21% of financing rounds are in the topical area of healthcare, 6% in the environment/sustainability sector, 2% in education/academia, and 1% in culture and human services.<sup>16</sup> Additionally, 11% of financing rounds go to portfolio companies where at least one founder has a scientific background, i.e., holding a doctoral degree, PhD, or university professor position.<sup>17</sup>

Next, we classify all foundation and endowment deals into *mission-related investments* (MRIs) and *non-mission-related investments* (Non-MRIs) with the help of a dummy variable. Our approach matches the organizations' philanthropic fields of activity with the ventures' industry classifications. It shows parallels to the logic applied by Chemmanur, Loutskina, & Tian (2014) to identify technological fit between the parent company and corporate venture capital portfolio companies.<sup>18</sup> We manually review all 1,099 foundation and endowment financing rounds to ensure maximum consistency, making 20 manual adjustments.<sup>19</sup> For example, we would classify the financing round as MRI if a charitable organization categorized in the field of activity "human health" participated in financing a venture in the healthcare, life

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<sup>16</sup> A key limitation of this approach is that we cannot control for the field of activity: entrepreneurship, as venture capital investing is by definition the backing of an entrepreneurial venture.

<sup>17</sup> This view excludes financing rounds to healthcare startups, as the large majority of founders in these startups hold at least a doctoral degree and healthcare is a distinct topical area in our analysis.

<sup>18</sup> In the case of corporate VC investments, technological fit between the parent and portfolio company is taken as an indicator of potential technological synergies. The authors find that CVC-backed firms with a technological fit are more innovative than CVC-backed firms without a technological fit (Chemmanur et al., 2014).

<sup>19</sup> Manual adjustments are only made in cases where the relation to the field of activity is obvious from the company description but inadequately captured by the industry classification. For example, we reclassified a provider of sensor and electrode components for medical devices that monitor human vital signs to healthcare (from information technology). Another example includes a provider of apprenticeship programs for the construction sector, which we reclassified into the education category.

science, or biopharmaceuticals industry. An environmentally-focused MRI would occur between an environmentally-focused organization and a venture operating in renewable/green energy or cleantech. MRIs in scientific technology transfer would occur between a foundation dedicated to scientific advancement or a university endowment and a venture where at least one founder is an academic turned entrepreneur. This definition applies to a founder who has a scientific background in the form of a doctoral degree or professor position, as described above (irrespective of whether the founder's degree is from the same university that invested). Via this approach, we categorize 645 financing rounds as MRIs and 454 as Non-MRIs – accounting for 59% and 41% of the sub-sample, respectively.

### **3.2.3.2. Measures of success**

We determine the investment outcome for each financing round by observing whether it led to a successful exit. Financing rounds are considered successful if the portfolio company goes public (IPO) or is acquired at a multiple of at least 1.0x total capital raised. We use VS to determine the investment outcomes and match them with the Refinitiv VentureXpert IPO database.<sup>20</sup> Brander, Amit, & Antweiler (2002), Hochberg, Ljungqvist, & Lu (2007), Gompers, Mukharlyamov, & Xuan (2016), and others used similar approaches to evaluate the success of portfolio companies. Hochberg and colleagues (2007) show that exits accurately simulate VC portfolio returns. We acknowledge that acquisition exits without a reported valuation or at a nominal sum may be disguised failures (cf. Korteweg, (2019), Puri & Zarutskie (2012) and Gompers, Gornall, Kaplan & Strebulaev (2020)). Therefore, we refine our measure and only consider acquisition exits successful if the acquisition occurs at a multiple of at least one times the total reported VC raised (in 2015 USD), an approach also used by Gompers and colleagues (2016). As a result, we identify successful exits for 19% of financing rounds and 16% of

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<sup>20</sup> We match portfolio companies based on company name and geographical location, including all IPOs until the end of 2020. In the case of similar but not identical matches, we manually verify the match via web research.



portfolio companies in our sample, positioning our sample's success rate between studies that use IPOs and all types of acquisitions (Hochberg et al., 2007; Nahata, 2008), and studies that focus only on IPOs (Gompers, Kovner, Lerner, & Scharfstein, 2010). Additionally, we include the portfolio company's age at the time of exit, defined as the time between the start of the company and the exit event, as reported in VS.

### **3.2.3.3. Venture and deal characteristics**

To control for the underlying deal quality, we construct four variables to account for company and deal characteristics: serial entrepreneur, financing round number, amount of capital raised, and financing round syndicate size.

Serial entrepreneurship is a company characteristic observable to a potential investor before investing (Gompers et al., 2016). There is substantial evidence that entrepreneurs with an established track record are more likely to succeed than first-time founders (Gompers et al., 2010). Therefore, we assign a dummy variable equal to one if at least one of the venture's founders was already previously involved as a founder in another VC-backed company, based on the available founder profiles in VS. Furthermore, companies in earlier stages of their existence and at earlier financing rounds typically are riskier investments with a less-proven track record and, correspondingly, a lower likelihood of success (Gompers et al., 2016). Therefore, we account for the financing round number of the company. We consider the amount of capital raised (in 2015 USD) and syndication size concerning deal-specific characteristics. The more financing a venture can acquire, the higher are investors' perceptions of the venture's potential, operational flexibility, and exit opportunities (Braun, Weik, & Achleitner, 2019). Brander, Amit, and Antweiler (2002) show that syndicated VC deals show a superior performance, which they attribute to the managerial value-added by additional co-investors. The authors also consider risk-sharing and diversification as potential drivers of syndication

decisions. We control for the implications of syndication by measuring the size of the VC syndicate (i.e., the number of investors involved) in each financing round, like prior research in the field (Brander et al., 2002; Nahata, 2008).

### **3.3. Results**

#### **3.3.1. Patterns of direct investing**

##### **3.3.1.1. Time dynamics**

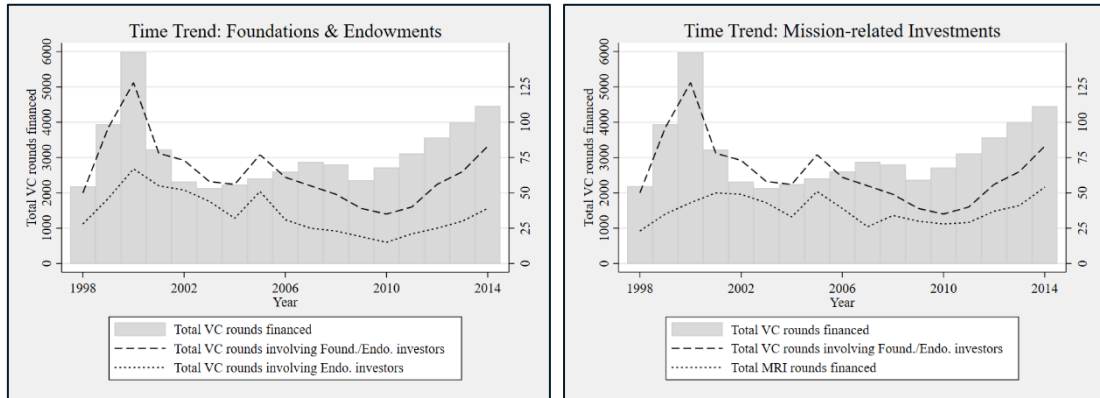
Figure 4 plots the trends of VC investment activity in the US and UK between 1998 and 2014. Panel A shows the familiar macro-cycle of investment activity in the US and UK market, with a peak in 2000, primarily driven by the US market. We find that foundation and endowment financing round participation moves cyclically with an early peak in round participation in 1999/2000 (121 rounds or 2.1% of all rounds financed in 2000), followed by a persistent decline throughout the 2000s. After a minimum in 2010 (34 rounds or 1.4% of all rounds financed), foundation and endowment direct investments increased, in absolute numbers, and as a percentage (81 rounds or 1.9% of all rounds financed in 2014).

In contrast, there is no such pronounced cyclicity in MRIs. There was no proportional increase in MRIs during the 1999/2000 period. This finding seems intuitive because venture investing at the height of the dot-com bubble was likely primarily driven out of commercial motives. Instead, MRI activity has increased after 2010, in line with the broader investment in the asset class (Hand et al., 2020). Considering Panel B and Panel C, we observe that US activity drives the increase in mission-related investing. UK mission investing has also increased since 2010, yet overall activity levels still lag behind the 2000s. Also, while there is intense market participation from foundations in the US, Figure 4 highlights that university activity drives direct investments in the UK.

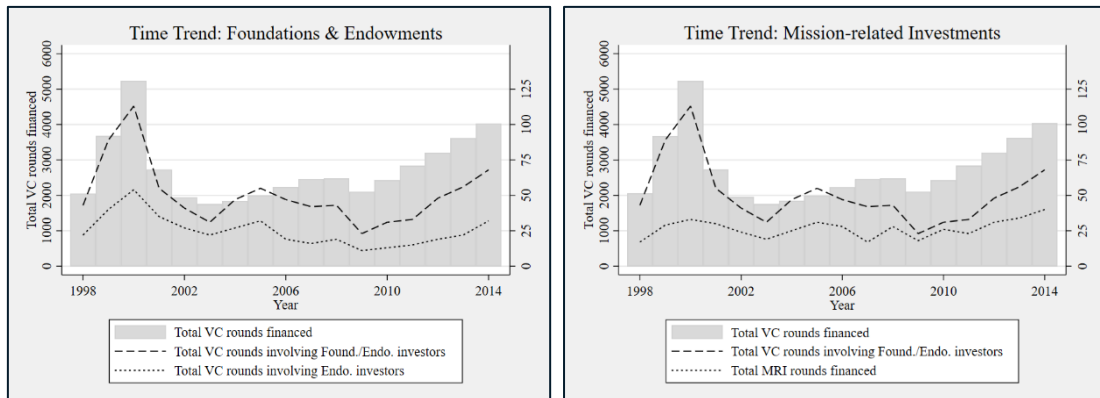
**Figure 4: Time trend of foundation and endowment VC direct investments**

The graphs display foundation and endowment investment activity in the US and UK between 1998 and 2014. We show total VC rounds financed as the count of all VC rounds closed per year and country. Total VC rounds involving Found./Endo. investors and total VC rounds involving Endo. investors plots all rounds involving a foundation or endowment investor in comparison. Total MRI rounds plots all rounds categorized as a mission-related investment.

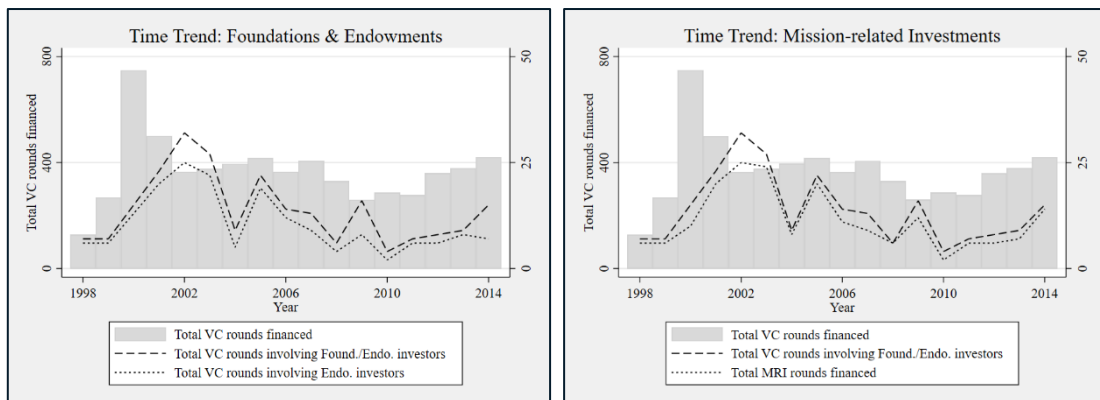
**Panel A: Full sample time trends**



**Panel B: United States**



**Panel C: United Kingdom**



### 3.3.1.2. Financing round characteristics

Next, we consider whether charitable organizations invest in structurally different financing rounds than other investors. Table 6 reports descriptive statistics on financing rounds. We split our sample into financing rounds without foundation or endowment participation (51,741 rounds or 98%), rounds involving one or more foundations (496 rounds or 0.9%), and those involving one or more endowments (603 rounds or 1.1%).

We assert apparent differences: foundations and endowments tend to finance younger companies with fewer sales and employees, indicating a smaller and less mature organization. These differences are economically and statistically significant (at the 1% level). Additionally, the share of serial entrepreneurs in endowment-backed financing rounds is significantly lower than all other groups, on average 7% vs. 12% for foundations and 10% for all other investors. The same holds for MRIs: these portfolio companies exhibit fewer sales and employees at the time of financing, with statistical significance at the 1% level.

Secondly, foundations and endowments rely on large syndications as a direct investment strategy. Both engage in rounds with more co-investors, as is indicated by larger syndicate sizes. In our sample, foundations take the lead in 15% of financing rounds and universities in 7% of financing rounds, indicating that the latter might take on a passive co-investor role more often. A similar trend becomes apparent when comparing MRIs and Non-MRIs. However, MRI syndicates are slightly smaller compared to Non-MRI syndicates (4.5 vs. 4.8 investors, on average), and the investing foundation or endowment is in the lead much more frequently, in 16% of the MRIs compared to only 4% of Non-MRIs,<sup>21</sup> indicating a more passive co-investment approach for the MRI category of investments.

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<sup>21</sup> However, lead investors are only explicitly identified for 55% of all financing rounds within our sample.

**Table 6: Descriptive statistics**

This table compares variable means and medians of the full sample of VC-backed financing rounds with those including a direct foundation and endowment investor. Z-test scores from a non-parametric Dunn-Bonferroni test for pairwise comparisons are reported. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels.

	<b>Panel A: Breakdown by foundation and endowment investment</b>									Test for difference	
	Other investors			Direct foundation			Direct endowment			(z-statistic)	
	Mean	Median	Obs.	Mean	Median	Obs.	Mean	Median	Obs.	Found.	Endo.
<b>Deal characteristics</b>											
Financing round no.	2.5	2.0	51,741	2.6	2.0	496	2.5	2.0	603	-1.7	-1.1
Syndicate size	2.9	2.0	51,741	4.6	4.0	496	4.7	4.0	603	-16***	-17.3***
Amount raised (USD m)	14.3	6.5	51,741	17.8	7.5	496	12.1	5.9	603	-3.7***	3.3***
Pre-money valuation (USD m)	44.4	19.3	47,951	42.4	17.4	460	39.8	14.5	537	-0.5	6***
<b>Venture characteristics</b>											
Serial entrepreneur (in %)	10.0%	0.0%	51,741	11.5%	0.0%	496	6.8%	0.0%	603	-1.1	2.6**
Age (Years)	3.6	2.7	51,741	3.2	2.4	496	3.1	2.5	603	2.3**	3.2***
Sales in the year of round (USD m)	494.1	4.7	6,399	8.2	1.2	53	6.6	0.9	75	3.1***	4.8***
Employees at transaction	61.9	21.0	17,518	31.6	18.0	160	24.9	10.0	153	2.7***	6.7***
	<b>Panel B: Breakdown by mission-related investment</b>									Test for difference	
	Other investors			Non-mission-related			Mission-related			(z-statistic)	
	Mean	Median	Obs.	Mean	Median	Obs.	Mean	Median	Obs.	Non-MRI	MRI
<b>Deal characteristics</b>											
Financing round no.	2.5	2.0	51,741	2.4	2.0	454	2.7	2.0	645	-0.9	-2.6**
Syndicate size	2.9	2.0	51,741	4.8	4.0	454	4.5	4.0	645	-17.2***	-16.4***
Amount raised (USD m)	14.3	6.5	51,741	13.8	7.3	454	15.3	5.7	645	-1.7	1.3
Pre-money valuation (USD m)	44.4	19.3	47,951	46.2	20.1	414	37.3	14.5	583	0.2	5.1***
<b>Venture characteristics</b>											
Serial entrepreneur (in %)	10.0%	0.0%	51,741	7.7%	0.0%	454	9.8%	0.0%	645	1.6	0.2
Age (Years)	3.6	2.7	51,741	2.7	1.9	454	3.5	2.8	645	6.2***	-0.1
Sales in the year of round (USD m)	494.1	4.7	6,399	11.2	2.0	38	5.5	0.8	90	1.2	6***
Employees at transaction	61.9	21.0	17,518	28.1	12.0	120	28.4	15.0	193	4.2***	5.1***

### 3.3.1.3. Industry and topical preferences

Lastly, we examine the industry selection of foundations and endowments and investigate whether these align with their identified fields of activity, displayed in Table 5. We use logistic regressions to fit models with binary dependent variables – whether a foundation or endowment participated in the financing round.<sup>22</sup>

Table 7 summarizes our results: we focus our MRI analysis by grouping financing rounds along with the most frequently identified fields of activity: (1) human health, (2) education/academia, (3) scientific technology transfer, (4) culture/human services and (5) environment/sustainability. Our regression fits reveal a highly significant effect of mission-related industries in investment decisions for both foundations and endowments, suggesting that they disproportionately finance companies in industries related to their mission goals. By breaking the effect up into clusters, we find highly significant effects for (1) human health, (2) education/academia, and (4) culture/human services for foundations. For endowments, we see highly significant effects for (1) human health, (2) education, (3) scientific technology transfer, and (5) environment/sustainability. For both groups, these findings correspond with the fields of activity most frequently reported by the individual organizations, as depicted in Table 5. We note that while the coefficients for (1) human health and (2) education/academia are similar in size and significance in both groups, university endowments appear to put a particular financing focus on ventures that further scientific technology transfer – the so-called "third-mission" of university investors (Croce et al., 2014). On the other hand, foundations are particularly active investors in ventures relating to culture and human services. The regressions confirm that

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<sup>22</sup> In this and all following analyses, we cluster robust standard errors by portfolio company as we typically observe multiple financing rounds per company, repeated follow-on investments, and significant within-group correlations of company characteristics (Abadie, Athey, Imbens, & Wooldridge, 2017).

foundations and endowments invest in younger companies and engage more co-investors. All empirical findings are robust to including financing round observations from 2015 to 2020.

**Table 7: Predictors of investment decision**

This table reports marginal effects of logit regressions for the probability of direct investment by a foundation or endowment in a financing round. The dependent variable is a dummy variable that equals one if an investment occurred and zero otherwise. Mission-related industries is a dummy variable equal to one if the company operates in a sector relevant to the identified mission goals of foundations and endowments, human health, education/academia, science/technology transfer to industry and society, culture/human services, and environment/sustainability. Robust standard errors clustered at the portfolio company level are used in the regressions. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels.

	Direct foundation investment			Direct endowment investment		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Mission-related industries</i>	0.976*** (0.123)			1.237*** (0.119)		
Human health		1.330*** (0.132)			1.386*** (0.132)	
Education/academia		0.905*** (0.310)			0.732** (0.326)	
Science/technology transfer		0.313 (0.208)			1.230*** (0.156)	
Culture/human services		2.243*** (0.334)			0.159 (0.552)	
Environment/sustainability		0.382 (0.278)			0.492** (0.212)	
<i>Control variables</i>						
Serial entrepreneur	0.0382 (0.203)	0.106 (0.204)	0.0992 (0.204)	-0.256 (0.213)	-0.259 (0.214)	-0.181 (0.215)
Amount raised (LN)	-0.178*** (0.0498)	-0.170*** (0.0492)	-0.175*** (0.0492)	-0.539*** (0.0398)	-0.545*** (0.0397)	-0.533*** (0.0393)
Financing round	-0.128*** (0.0331)	-0.138*** (0.0329)	-0.127*** (0.0328)	-0.120*** (0.0359)	-0.124*** (0.0360)	-0.126*** (0.0361)
Syndicate size (LN)	1.419*** (0.1000)	1.416*** (0.0994)	1.419*** (0.0997)	2.013*** (0.0919)	1.998*** (0.0929)	2.029*** (0.0917)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Observations	52,840	52,840	52,789	52,840	52,840	52,840
Pseudo R2	0.0783	0.0955	0.0886	0.161	0.167	0.153

### **3.3.2. Investment outcomes**

This chapter studies this paper's central questions and hypotheses: the performance implications of mission-related VC investments. First, we investigate the descriptive evidence. We then apply a multivariate regression framework to control observable deal quality characteristics and fixed effects. We use coarsened exact matching (CEM) to approximate a potential treatment effect apart from the deal selection (King & Nielsen, 2019).

#### **3.3.2.1. Bivariate comparison**

Panel A in Table 8 displays the relative frequencies of successful exits. We find that foundations and endowments invest in companies with a higher rate of successful exits. This effect is significant at the 5% level. This result is somewhat unexpected at first, as we have seen that these organizations tend to finance younger and earlier stage companies, which would typically be riskier. While the percentage of successful exits is 19% across the entire sample, we find a successful exit frequency of 23% for foundations and endowments. Moreover, our descriptive statistics suggest that endowment-financed ventures are significantly older at the time of a successful exit (9.3 vs. 8.5 years). We do not detect such a significant difference in the case of foundations (8.2 vs. 8.5 years). The observed effect aligns with hypothesis 2a in the case of endowments, yet not in the case of foundations.



**Table 8: Implications on investment outcomes – Bivariate analysis**

This table reports results from the bivariate comparison of foundation and endowment-backed financing rounds (Panel A) and mission and non-mission related financing rounds (Panel B) with all other rounds in our sample. We followed exits until the end of Q1 2021. Z-test scores from a non-parametric Dunn-Bonferroni test for pairwise comparisons are reported. Asterisks denote statistical significance at the 1% (\*\*\*) , 5% ( \*\*), or 10% ( \*) levels.

	<b>Panel A: Breakdown by foundation and endowment investment</b>									Test for difference (z-statistic)	
	Other investors			Direct foundation			Direct endowment			Found.	Endo.
	Mean	Median	<i>Obs.</i>	Mean	Median	<i>Obs.</i>	Mean	Median	<i>Obs.</i>		
Successful exit	19.3%	0.0%	51,741	23.4%	0.0%	496	22.7%	0.0%	603	-2.6**	-1.8**
Age at successful exit (Years)	8.5	7.9	9,794	8.2	7.7	113	9.3	8.6	137	1	-2.4**
	<b>Panel B: Breakdown by mission-related investment</b>									Test for difference (z-statistic)	
	Other investors			Non-mission-related			Mission-related			Non-MRI	MRI
	Mean	Median	<i>Obs.</i>	Mean	Median	<i>Obs.</i>	Mean	Median	<i>Obs.</i>		
Successful exit	19.3%	0.0%	51,741	24.9%	0.0%	454	21.7%	0.0%	645	-3.1***	-0.9
Age at successful exit (Years)	8.5	7.9	9,794	7.9	7.6	112	9.6	8.9	138	0.7	-2***

Panel B in Table 8 presents relative frequencies of successful exits for foundations' and endowments' MRIs and Non-MRIs. We observe that the likelihood of a successful exit is significantly higher for Non-MRIs than MRIs and other investor financing rounds. The effect is significant at the 1% level. However, we do not see a significantly lower likelihood of successful exits for MRIs than our total financing round sample (the difference being non-significant). In percentages, we observe a likelihood of successful exits of 22% for MRIs vs. 25% for Non-MRIs and only 19% in other financing rounds. Upon closer examination, the most likely explanation is that a majority (61%) of MRIs are clustered in the healthcare industry, where successful exits are more frequent than in other industries: successful exits occur for 28% of all healthcare financing rounds, compared to 19% across the entire sample. This result underlines the importance of including industry-fixed effects in our multivariate regressions.

### 3.3.2.2. Multivariate regressions

We choose a multivariate regression design to analyze the relationship between organizational mission-fit and our variables of interest. We use regression equation (1) to tie our variables of interest to the dependent variables, i.e., probability of a successful exit and age at successful exit:

$$Y_i = \alpha_1 + \beta_k X_i + \gamma_l Z_i + \delta_{C(i)} + \delta_{I(i)} + \delta_t + \varepsilon_{1i} \quad (1)$$

$X_i$  refers to  $k$  independent variables of interest: foundation and endowment financing round participation and whether the round classifies as MRI or Non-MRI, respectively. Each variable takes the form of a dummy. The omitted group comprises all other financing rounds. Therefore, the coefficients represent the effects on successful exits relative to other investor groups. Next, we take  $Z_i$  to control for the effect of  $l$  venture and financing round characteristics, including serial entrepreneur, financing round number, amount of capital raised, and syndicate size. We use logarithms to minimize the effect of outliers in the dependent

variable age at the successful exit and the independent variables amount raised and syndicate size. We also control for country ( $\delta_{C(i)}$ ), industry ( $\delta_{I(i)}$ ) and year of investment ( $\delta_t$ ) fixed effects. The unit of observation is the individual VC financing round  $i$ .

Table 9 presents our regression results for both equations next to each other. Specification (2) shows a negative correlation between MRIs and a positive correlation between Non-MRIs and the probability of a successful exit, which is significant at the 5% level. The F-statistic indicates that the delta between  $\beta_1$  (*MRIs*) and  $\beta_2$  (*Non\_MRIs*) is significant at the 5% level. This finding aligns with our hypothesis 1a that MRIs have a lower likelihood of successful exit than Non-MRIs. The MRIs coefficient is negative yet not statistically significant, supporting our hypothesis 1b. Specification (1) shows no statistically significant correlation of foundation and endowment investments concerning successful exits. These results indicate that foundations and endowments do not underperform compared to other investor groups. However, a significant gap arises if we account for dual investment objectives and differentiate their deals into mission-related and non-mission-related. Nevertheless, we find underperformance of MRIs only against the counterfactual Non-MRIs but not our total venture financing round sample, which includes all types of VC investors active between 1998 and 2014.

**Table 9: Investor types and successful exits – Multivariate regressions**

This table reports marginal effects on an investment’s outcome and exit characteristics by a foundation or endowment. We use logit regressions in the case of outcome - the dependent variable is a dummy variable that equals one if the investment is successful and zero otherwise. OLS regressions are used for age at the exit. Foundation and endowment are dummy variables equal to one if a foundation participated in a financing deal. MRI and Non-MRI are dummy variables equal to one if the investment was mission-related or not. We followed exits until the end of Q1 2021. Robust standard errors clustered at the portfolio company level are used in the regressions. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels.

	Outcome: successful exit		LN age: successful exit	
	(1)	(2)	(3)	(4)
Foundation ( $\beta_1$ )	0.0434 (0.154)		-0.0631 (0.0735)	
Endowment ( $\beta_2$ )	0.141 (0.153)		0.148*** (0.0469)	
Mission-related investment ( $\beta_1$ )		-0.124 (0.154)		0.107** (0.0505)
Non-mission-related investment ( $\beta_2$ )		0.324** (0.163)		-0.0255 (0.0784)
Serial entrepreneur	0.267*** (0.0676)	0.268*** (0.0677)	-0.125*** (0.0262)	-0.125*** (0.0262)
Amount raised (LN)	0.399*** (0.0142)	0.399*** (0.0142)	-0.0148** (0.00638)	-0.0148** (0.00638)
Financing round	0.0735*** (0.00942)	0.0734*** (0.00942)	0.0879*** (0.00350)	0.0879*** (0.00350)
Syndicate size (LN)	0.0232 (0.0251)	0.0243 (0.0251)	-0.0719*** (0.0110)	-0.0719*** (0.0110)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
F-statistics ( $\beta_1 = \beta_2$ )	0.21	4.10**	4.99**	2.15
Observations	52,840	52,840	10,042	10,042
R-squared	0.0876	0.0877	0.211	0.210

Specification (3) in Table 9 shows a significant positive correlation between age at the successful exit and endowment investments. The effect is statistically significant at the 1% level. This correlation suggests that endowment-backed ventures exit at a higher age, potentially supporting the idea of investing patient capital in technology transfer via scientific spin-offs,

which we would expect to be more research-intensive with a longer runway before an exit (cf. Mathisen & Rasmussen, 2019). This interpretation aligns with the fact that the significantly positive effect is only visible in the case of endowments and not for foundations. Foundations also do not show an evident investment preference for scientific technology transfer in Table 7. Therefore, we must at least partly reject hypothesis 2a, which formulated a higher expected successful exit age for both investor types. We find supporting evidence concerning hypothesis 2b: MRIs positively correlate with age at a successful exit, significant at the 5% level. However, the gap between MRIs and Non-MRIs is positive but not statistically significant. Furthermore, we can only observe correlations and not draw causal conclusions from Table 9. The question remains whether the observed effects are due to treatment or deal selection.

We conduct robustness checks to validate our findings: our MRI vs. Non-MRI delta (F-statistics) size and significance remain relatively unaffected if we exclude some or all of our deal quality control variables. The delta remains significant at the 5% level in all combinations. The same holds for the foundation and endowment deal coefficients – they remain insignificant in all tested combinations. We also extend our analysis to the industry level. For this purpose, we looked at our results if we exclude the healthcare industry, as it is found to have higher probabilities of successful exits and is a focus area of foundations and endowments with 42% of all financing rounds. The delta between MRIs and Non-MRIs increases if we exclude healthcare investments, and the coefficient on Non-MRIs is still positive with a 5% statistical significance. The coefficient on MRIs for age at successful exit also becomes statistically significant at the 1% level in this case (from the 5% level previously).

### **3.3.2.3. Matched sample analysis**

Our analysis of structural characteristics in Tables 6 and 7 revealed that foundation and endowment financing rounds have distinct structural characteristics. Therefore, we conduct a

matched sample analysis to confirm our findings' robustness and disentangle potential treatment from selection effects. We leverage the large size of our sample control group to match a counterfactual sample with minimal observable differences. Matching is a common technique in entrepreneurial finance used, e.g., by Pahnke, Katila, and Eisenhardt (2015), Chemmanur, Loutskina, and Tian (2014), and Hallen, Bingham, and Cohen (2014) to discern selection and treatment effects of investors on their portfolio company outcomes. The rationale is that by matching a counterfactual of structurally similar financing round observations, observed differences in the dependent variable are more likely attributable to portfolio company development post-selection (Blackwell, Iacus, King, & Porro, 2009).

We carry out coarsened exact matching (CEM), which is based on the measurement characteristics of the variables and therefore has advantages over other matching techniques such as propensity score matching (Blackswell, Iacus, King, & Porro, 2009; King & Nielsen, 2019). To implement CEM, we choose the variables on which to match our deals, discretize any continuous variables and create *cells* representing all possible combinations of values of the coarsened variables. Every cell containing treatment and control observations is assigned a weight while other cells are discarded. We matched our sample on the quality indicators of portfolio companies: founding team composition (serial entrepreneur), equity financing round number, size of the investment syndicate, amount of capital raised, and the company industry. This selection yields a sample of 27,620 observations, of which 1,058 (3.8%) are foundation or endowment investments. Table 10 summarizes our pre-matched and post-matched sample in comparison. It reveals that no statistically significant differences remain across our control variables of interest, i.e., significantly improving the balance of covariates in the treated and control groups.

**Table 10: Unmatched and matched sample characteristics**

The table reports summary statistics for the unmatched (Panel A) and matched sample (Panel B) of the full sample of VC-backed financing rounds with those including a direct foundation and endowment investor. The Test for diff column shows the results of a standard t-test. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels.

	Other investors			Foundation/endowment investors			Test for diff. (t-stat)
	Mean	Median	Count	Mean	Median	Count	
<i>Panel A: Full sample</i>							
<i>CEM-matched variables</i>							
Amount of financing (USD m)	14.3	6.5	51,741	14.7	6.6	1,099	0.27
Syndicate size (#)	2.9	2.0	51,741	4.6	4.0	1,099	26.06***
Serial entrepreneur (in %)	0.1	0.0	51,741	0.1	0.0	1,099	-1.21
Company age (Years)	3.6	2.7	51,741	3.2	2.5	1,099	-4.22***
Industry: Healthcare	0.2	0.0	51,741	0.4	0.0	1,099	17.55***
Industry: Information Tech.	0.4	0.0	51,741	0.3	0.0	1,099	-7.86***
<i>Non-CEM-matched variables</i>							
Pre-money valuation (USD m)	44.4	19.3	47,951	41.0	16.7	997	-0.3
Sales in year of round (USD m)	494.1	4.7	6,399	7.2	1.1	128	-0.21
<i>Startup outcomes</i>							
Company IPO	0.1	0.0	51,741	0.1	0.0	1,099	2.71**
Successful exit	0.2	0.0	51,741	0.2	0.0	1,099	3.12***
<i>Panel B: Matched sample</i>							
<i>CEM-matched variables</i>							
Amount of financing (USD m)	13.9	6.5	26,562	13.5	6.6	1,058	-0.54
Syndicate size (#)	4.4	4.0	26,562	4.5	4.0	1,058	1.17
Serial entrepreneur (in %)	0.1	0.0	26,562	0.1	0.0	1,058	0
Company age (Years)	3.1	2.5	26,562	3.1	2.5	1,058	0.11
Industry: Healthcare	0.4	0.0	26,562	0.4	0.0	1,058	0
Industry: Information Tech.	0.3	0.0	26,562	0.3	0.0	1,058	0
<i>Non-CEM-matched variables</i>							
Pre-money valuation (USD m)	38.6	17.9	24,814	37.7	16.7	957	-0.27
Sales in year of round (USD m)	2048.7	2.5	2,796	7.3	1.1	120	-0.44
<i>Startup outcomes</i>							
Company IPO	0.1	0.0	26,562	0.1	0.0	1,058	-0.04
Successful exit	0.2	0.0	26,562	0.2	0.0	1,058	1.33

We re-run our regression equation (1) in the matched sample. Table 11 displays our results and confirms the effects found in Table 9. As in the simple multivariate regressions, our F-statistic discloses that the difference between coefficients on MRI and Non-MRI is significant at the 5% level, shown in the specification (2). We find a negative yet insignificant correlation

between the MRI coefficient  $\beta_1$  and successful outcome probabilities. Our Non-MRI coefficient  $\beta_2$  is positive and significant at the 5% level. In specification (1), we find no significant positive or negative correlation between foundation or endowment investments and a successful portfolio company exit probability. We interpret these findings as robust evidence for a performance gap between MRIs and Non-MRIs. Non-MRIs also appear to outperform the entire sample (significance at the 5% level). Based on our methodology, both effects are likely grounded in post-selection portfolio company development.

In Table 11 specification (3), we again observe a highly significant positive correlation between endowment investments and portfolio company age at the successful exit (at the 1% level). However, while the effect has a clear direction and significance, the results need to be read with caution regarding causality. The VS database does not allow to observe (and therefore match) a venture's research intensity, and such data is also not easily collected via other databases or approximated via observable variables. Lastly, specification (4) provides evidence of a significant positive correlation between MRIs and portfolio company age at the successful exit (with significance at the 1% level), confirming the robustness of our earlier findings and regarding our hypothesis 2b (while the same caveat regarding causality applies).



**Table 11: Implications for investment success – CEM-weighted regression**

This table presents CEM-weighted regression results. Logit regressions are used in the case of outcome - the dependent variable is a dummy variable that equals one if the investment is successful and zero otherwise. OLS regressions are used for age at the successful exit. Foundation and endowment are dummy variables equal to one if a foundation participated in a financing deal. Mission-related investment and Non-mission-related investment are dummy variables equal to one if the investment is an MRI or Non-MRI, respectively. The omitted group is financing rounds without foundation or endowment participation. Serial entrepreneur, amount raised, financing round number, and syndicate size appear as control variables. Robust standard errors clustered at the portfolio company level are used in the regressions. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels.

	Outcome: successful exit		LN age: successful exit	
	(1)	(2)	(3)	(4)
Foundation ( $\beta_1$ )	0.0848 (0.159)		-0.0461 (0.0786)	
Endowment ( $\beta_2$ )	0.210 (0.158)		0.162*** (0.0516)	
Mission-related investment ( $\beta_1$ )		-0.0769 (0.159)		0.150*** (0.0522)
Non-mission-related investment ( $\beta_2$ )		0.387** (0.168)		-0.0263 (0.0818)
Control variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
F-statistics ( $\beta_1 = \beta_2$ )	0.32	4.19**	4.22**	3.56*
Observations	27,620	27,620	4,837	4,837
R-squared	0.0977	0.0979	0.183	0.183

Therefore, the conclusion from this chapter must be clear statistical evidence that foundation and endowment MRIs are less likely to succeed than Non-MRIs, supporting our hypothesis 1a. The comparative outperformance of Non-MRIs is likely not only attributable to deal selection but also due to a treatment effect that could originate from the co-investment strategies with commercially oriented fund managers. On the contrary, MRIs are not less likely to succeed when compared to other investors' financing rounds, neither in terms of selection nor treatment, which we hypothesized in 1b. We find no statistical evidence in the US and UK

VC market that foundations and endowments are less successful VC direct investors than other investor groups such as independent VCs, corporate VCs, or other institutional direct investors. Moreover, we find evidence pointing towards a highly significant correlation of endowment investments on portfolio company age at the exit, supporting the idea that by supplying patient capital, endowments enable potentially research-intensive portfolio companies to extend their runway and stay private longer. This effect is not visible for foundations, so we can only partly confirm our hypothesis 2a. Lastly, hypothesis 2b is confirmed, as MRIs also exhibit a significantly higher age at the time of the exit compared to Non-MRIs and our total sample.

### **3.4. Discussion and conclusion**

This paper analyzes the characteristics and outcomes of foundation and endowment VC direct investments, focusing on MRIs. We find that foundation and endowment direct investments are significant in philanthropically highly developed markets such as the US and the UK. Based on our analysis of 52,840 venture financing rounds to 26,052 US and UK ventures between 1998 and 2014, we demonstrate that foundations and endowments participated in about 2% of all financing rounds between 1998 and 2014, a small but significant share that has fluctuated cyclically over time. While commercial interests have driven activity in the dot-com boom, we show that mission investing has become an increasing motivation for charitable organizations to engage in direct investments since 2010.

Our analyses show that portfolio companies financed by foundations and endowments are younger and earlier stage ventures on average. These findings align with Kovner & Lerner (2015), who make similar observations for community development VC funds. Foundations and endowments also rely heavily on co-investing as a direct investment strategy. There is strong evidence that foundations and endowments disproportionately invest in mission-related industries, preferably in the topical areas of human health, education & academia, scientific-

technological transfer, environment/sustainability, and culture/human services. Our findings support Barber and colleagues' (2021) findings, who observed that mission-driven organizations prefer social or environmental impact in their screening process for VC fund vintages. We contribute to this discussion by showing that the validity of these findings extends beyond fund selection to portfolio company investments, an avenue to directly further an organization's philanthropic mission through capital allocation.

We add to the discussion about the performance of impact investments with the very first analysis of mission-related direct investments. Scholars have consistently argued a trade-off between financial returns and pursuing additional non-financial objectives (Barber et al., 2021; Kovner & Lerner, 2015; Rangan, Appleby, & Moon, 2011). Barber and colleagues (2021) showed that impact VC funds, defined as funds that aim to generate a positive social or environmental return alongside financial returns, underperform compared to purely commercial funds. Building on prior methodological work by Chemmanur and colleagues (2014), our study contributes to the debate by defining a novel approach to identifying MRIs by looking for overlap in the investors' organizational mission and portfolio company industry and business models. Our findings are nuanced: Firstly and in line with our hypothesis 1b, we do find a significant performance delta between MRIs and Non-MRIs, indicating that investments made in alignment with a philanthropic mission have a lower likelihood of a successful outcome than investments that were allocated independently thereof: both in our multivariate regression and CEM-weighted sample regression framework, the delta between MRIs and Non-MRIs is significant at the 5% level. However, compared to our counterfactual sample of all US and UK venture equity financing rounds between 1998 and 2014, we find that MRIs do not underperform financing rounds made by other VC investors. We show that these effects are more likely attributable to portfolio company development than selection through a matching approach.

A possible explanation for this finding could be that a mission-overlap between a charitable investor and the portfolio company might benefit the company's prospects under certain circumstances, e.g., because the organization can support the portfolio company through access to their facilities and network topical expertise, or project portfolio. Fang, Ivashina, and Lerner (2015) argued that direct investment performance relies on settings where institutions can exploit their specific information advantage, which could be the case in charitable organizations' fields of programmatic activity (e.g., a foundation funding or operating a hospital naturally accumulates topical expertise in the health industry). This mechanism could help explain why our findings regarding performance are different from those of Kovner & Lerner (2015), who looked at impact investments by community development VC funds, where no such specific information advantages can be assumed. Further research should disentangle potential information (dis-)advantages and selection biases, for example, by focusing on whether endowments finance their university's spin-offs, which would constitute a viable source of information advantage or potentially a preferential deal-access opportunity.

Lastly, we show that foundations and endowments can be very successful commercially oriented investors and that some are persistently more successful than others. Our finding of outperformance of non-mission-related investments compared to our total counterfactual sample indicates potential investor capabilities and deal-access opportunities: Lerner and colleagues (2007) showed that foundations and endowments exhibit traits of sophisticated investors with advantages in processing information in PE and VC fund investing, which could be attributed to superior processes, better access to academic talent, and cross-sector investing expertise (Lerner et al., 2008). Sensoy and colleagues (2014) argued that the observed outperformance is mainly attributable to endowments' selection and access to the best VC fund managers during the late 1990s and early 2000s. While selecting top-performing fund managers requires a different skill set than selecting and developing portfolio companies (Braun et al.,

2020), the knowledge acquired and relationships built in the VC ecosystem and fund management communities could be an advantage. In particular, we consider the preferred access to information and co-investment opportunities that foundations and endowments are likely to enjoy as limited partners in VC funds as a potential source of explanation. Co-investments are often attractive investment opportunities (Braun et al., 2020), and there is evidence that funds' top LPs enjoy preferential access to high-performing alternative vehicles such as co-investments (Lerner et al., 2022). These findings could help explain continued access to high-performing direct investments and persistent outperformance by some foundations and endowments. The effect is likely strengthened because fund manager performance persistence is still significant in the VC industry, and founders value top-performing managers' approaches, reputation, and networks (Braun et al., 2017; Theinert, Braun, & Gerl, 2017). This pattern could also help rationalize the observed positive treatment effect, as the charitable organizations can benefit from top VC funds' expertise in value-adding activities. Furthermore, our time trend analysis reveals that a significant portion of Non-MRI direct investments occurred during the late 1990s and early 2000s, which is in line with the argument made by Sensoy and colleagues (2014). This interpretation is also supported by our finding that foundations and endowments tend to invest alongside more co-investors and act more passively when investing in Non-MRIs.

In summary, there is a strong narrative that charitable foundations and university endowments do not underperform as direct investors. In contrast, their commercially oriented (Non-MRI) investments even outperform the representative sample of US and UK VC financing rounds. We can also show that if portfolio companies' industry and business model align with their organizational mission, commercial prospects of the investment are lower. This positive externality presents a non-pecuniary utility for investors, influencing their portfolio selection choices.

# Chapter 4

## 4. University Venture Capital – The Promise and Pitfalls of University Direct Investments

### Abstract

Over the past three decades, universities in industrialized countries have become increasingly active as venture capital financiers. Here, we analyze if investments in university-affiliated portfolio companies, in the form of an institutional-personal relation between the university and the founders, are a commercially successful investment proposition. We use a hand-collected data set of 706 university portfolio companies in the United States and the United Kingdom to extend previous case-based evidence that investments in faculty and student-led start-ups are an elusive promise that rarely pays off commercially. Furthermore, we provide evidence that geographic proximity to a top venture capital ecosystem is a highly performance-relevant characteristic for university investors.

*Keywords:* Venture Capital, University Investors, University Spin-offs, University Technology Transfer

*JEL Codes:* G11, G24, M13, L26

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## 4.1. Introduction

Should universities invest directly in start-ups founded by their faculty and students? At least, this is what an entrepreneurial group of MBA students at Stanford University suggested recently (Bergman, 2021). This proposition seems promising at first sight since start-ups such as Doordash, Nubank, Clubhouse, and others founded by Stanford alumni have generated over USD 200 billion in market value as of 2021. For many universities in the United States (US) and the United Kingdom (UK), shifting towards increased direct venture investments would offer the opportunity to extend their established operating model beyond allocating significant shares of their financial endowment to private equity (PE) and venture capital (VC) fund managers. Due to their considerable success (cf. Lerner, Schoar, & Wang, 2008; Lerner, Schoar, & Wongsunwai, 2007; Sensoy, Wang, & Weisbach, 2014), the latter attracted broad scholarly research. In contrast, direct university investments into portfolio companies have received less attention (Rothaermel et al., 2007).

University VC direct investments are not an entirely novel idea. They have been recognized and employed, albeit at a small scale, as a tool to foster technology transfer, further the university's reputation, and generate institutional wealth, at least since the mid-1980s (Atkinson, 1994; Lerner, 2005, 2009). Among the early adopters of this strategy were several reputable US institutions such as the University of Chicago with the ARCH initiative, Boston University, and Stanford University, which began investing in start-ups at a larger scale in the 1990s. In the UK, university VC became increasingly popular throughout the 2000s, fueled by the increasing prevalence of technology transfer offices in UK universities and public-academic partnerships. Schemes such as the University Challenge Fund eventually spanned over 50 institutions (Cowling, Baden-Fuller, Mason, Hopkins, & Murray, 2011; Hockaday, 2020). This case evidence aligns with the growing relevance of direct investments in institutional investor

portfolios, which has been labeled the "disintermediation of private markets" (Fang et al., 2015) and has been investigated and discussed in the literature (Braun et al., 2020; Fang et al., 2015).

Our paper contributes to the debate on university VC by analyzing by which approach and under which conditions universities can be financially successful investors. We focus on two main questions: First, we empirically investigate whether investing in ventures founded by a university's faculty or students proves to be a financially profitable strategy. Secondly, we characterize universities through a set of theoretically derived factors and contribute to the discussion around what makes some universities more successful investors than others, a debate started by Munari, Pasquini, & Toschi (2015). To this end, our study focuses on the level of university-backed portfolio companies and measures the development and success in terms of funding and exit performance (i.e., the likelihood of achieving an IPO or a successful trade sale). This approach has been proven to provide a valid approximation of fund returns experienced by investors (Hochberg et al., 2007).

Previous research on university VC, so far, remains geographically and thematically fragmentary. Croce, Grilli, and Murtinu (2014) performed a first, primarily descriptive study of the phenomenon. They describe the landscape of university-managed funds in the US and Europe using a sample of 26 university-managed funds (i.e., funds directly managed by a university), 11 of which are based in the US and the rest across Europe. A subset (56%) of their entire sample includes data on founder affiliations to the investing university. Moreover, their investment performance analysis is based on fund averages and does not permit a detailed portfolio company-level assertion. Munari and colleagues (2015) go further and base their analysis of university-oriented seed funds on the portfolio company level. However, their sample is entirely focused on continental Europe and also includes funds that are university-oriented but not actively managed by a university. Neither does their study include detailed information on founder affiliations to the financing university, which our study is particularly



interested in. Considering specifically US-oriented research, the phenomenon, so far, has been explored mainly in the form of case studies. Lerner (2005) speaks of the "elusive promise of university venture capital funds" and illustrates some of the problems that may arise with universities getting involved in VC financing. In particular, he describes risks of political interference, conflicts of interest, and regulatory hurdles complicating the principle-agent relationship between the investing university and the start-ups. Other authors have also noted that academic spin-offs have a greater need for monitoring and strengthening the management team than non-academic start-ups (Mathisen & Rasmussen, 2019), complementing these arguments. To the best of our knowledge, there has been no systematic effort to map and analyze university VC investors, focusing on institutional and personal affiliations of start-ups to the university on the portfolio company level.

Our study intends to close this gap by building on one of the leading VC databases to investigate the portfolio company level and shed light on this phenomenon. We use the VentureSource (VS) database, which is now part of CB Insights, and one of the two most prominent and comprehensive sources for researchers to study the performance of VC investments (Retterath & Braun, 2020). Our sample includes 706 university-backed portfolio companies, including their founders' detailed educational and professional background information. 434 (61%) of the investigated portfolio companies have at least one direct founder affiliation to the university that invested. Our control group consists of 272 university-backed portfolio companies where the founders have no affiliation to the investing university. We examine the development and performance of university-backed portfolio companies in two ways: firstly, we look at the total (disclosed) VC funding raised by the portfolio company. Secondly, we consider exits, either via an IPO or, in a broader definition, exits via an IPO or acquisition with a reported exit multiple of  $>1.0$  times capital raised (i.e., the investment returned at least a marginal gain for investors). We employ these measures of success to

investigate two specific research questions. Firstly, do university-backed portfolio companies where the founders have a direct affiliation to the investing university exhibit lower prospects of commercial success than portfolio companies with no such affiliation? In line with Lerner's argumentation (2005, 2009), we hypothesize that a founder-university affiliation negatively impacts intermediate and final portfolio company outcomes, both for faculty- and student-founded companies.

*Hypothesis 1: founder-university affiliation has a negative relationship to intermediate and final portfolio company outcomes*

Secondly, we use multiple theoretically derived, university-specific quality measures to determine whether these characteristics affect the success of the portfolio companies backed by the university. These include (a) the prior deal-by-deal investment performance of the university, which has been shown to positively impact future performance (Gompers et al., 2016); (b) the location within or nearby a top VC ecosystem (and thereby access to deal-flow for the university and a favorable environment for portfolio companies); (c) the international reputation of the university (potentially providing a signal to the market and access to talents); (d) the university's academic excellence in terms of its international ranking performance; (e) its financial wealth, whereby we distinguish between public and private research universities, the latter generally having larger endowments (Rosen & Sappington, 2019). We hypothesize that these characteristics are quality indicators conducive to a comparatively more successful VC direct investment performance.

*Hypothesis 2: university quality has a positive relationship to intermediate and final portfolio company outcomes*

Our investigation provides the first empirical analysis to compare university investments in their staff and students (often so-called *university spin-off companies*) with

university investments in unaffiliated venture-backed companies. The contrast with a homogeneous control group permits an accurate likes-for-likes comparison of portfolio company outcomes concerning the background and characteristics of the investors. It also enables the first comprehensive statistical analysis of how a faculty or student affiliation with portfolio companies correlates with the venture outcomes beyond prior case study evidence.

Our work does face several limitations: we focus on portfolio company outcomes as an indicator of financial returns. Universities' motivations for participating in a financing round may not be purely financial. Other factors, such as furthering the entrepreneurial culture, prestige, or societal impact, may also play a role, yet we cannot adequately quantify these motivations through observational data. Our discussion offers suggestions for future research to address these questions. Our research design does not allow conclusions about academic entrepreneurs' performance or university spin-offs in general, which has been the focus of previous research (Shane, 2004; Wright, Lockett, Clarysse, & Binks, 2006; Zhang, 2009). We study only a sub-set, namely VC-backed companies that received financing from a university. It is also possible that some of these investments could be passive co-investments where deal access was provided through an existing GP-LP relationship of the university with a fund manager, which is not easily replicable by a randomly drawn university. Lastly, our measures of portfolio company success only allow conclusions on a limited number of hypotheses: by observing total VC raised and successful exits, we are analyzing the phenomenon from an investor's perspective. Drawing conclusions on long-term company development necessitates to include such criteria as revenue, profitability, and employee growth (ideally over time), which we do not consistently observe within our sample.

Our paper is organized as follows: Chapter 4.2 describes the data sourcing process and variables used in this study. Chapter 4.3 presents the results of our analysis, beginning with a descriptive study of trends and continuing with the multivariate analysis of portfolio company

outcomes. We differentiate between university-affiliated and non-affiliated ventures and examine university characteristics to explain the observed heterogeneity. Chapter 4.4 discusses our findings and provides concluding remarks.

## **4.2. Data construction**

### **4.2.1. Data sources**

We draw our initial sample of VC-backed portfolio companies from the DowJones VentureSource (VS) database, which is by now part of the platform CB Insights. VS is one of two databases widely recognized for providing representative samples of VC-backed start-ups and is therefore commonly used in empirical venture capital research (Da Rin, Hellmann, & Puri, 2013; Ewens & Rhodes-Kropf, 2015; Gompers et al., 2016; Retterath & Braun, 2020).

Next, we identify all VC-backed portfolio companies that received equity financing from university investors (excl. debt financing and grants). Therefore, we consider the investing firm profiles collected by VS. In a first draw, we include all investors that are identifiable as a university (or its endowment) by their investor name (e.g., "Stanford University" or "The Regents of the University of California") or by the VS investing firm type classification "university." After an additional manual check to avoid any misclassifications, we obtain a list of 163 university investors. We end up with a total initial draw of 748 portfolio companies that received a VC equity investment from one or multiple of these universities.

We can amend our independent variables of interest for 706 portfolio companies in our descriptive sample. Our sample for analysis consists of 602 portfolio companies. The difference arises because we limit our sample to companies started before 2015 to assure a minimum of

six years to observe eventual exits, which we have followed until the end of Q1 2021. This approach aligns with prior empirical research on venture-backed portfolio company outcomes.<sup>23</sup>

#### 4.2.2. University affiliations

Commercial data providers such as VS report the identities of the founding/executive team and, in most cases, provide (incomplete or fragmentary) information on their professional background, yet educational backgrounds are not included. Therefore, we hand-collect through the web, LinkedIn, and news searches and verify additional information on the founders' educational background and professional experience at a university, e.g., as a professor or other faculty member. For companies that do not have any founders listed in VentureSource (174 or 25% of our sample), we manually source the founders' names where possible. Overall, we can identify founder backgrounds for 94% of portfolio companies (706 out of the initial draw of 748), significantly more than previous studies (cf. Croce et al., 2014). We adhere to a strict definition of university affiliation: The respective founder must have been a student or has held a faculty position at the investing university at the time or before the investment in the company, indicated by the round closing date. Applying this definition, we identify a relevant university affiliation for at least one founder (faculty or student) for 61% of portfolio companies. We acknowledge the risk of designating some ventures as university-unaffiliated (i.e., false negatives) due to our narrow focus on founders only (e.g., leaving out other board members). Nevertheless, the approach yields a reliable sample of university affiliations where false positives are unlikely.<sup>24</sup> Table 12 provides an overview of the most active university investors in affiliated and non-affiliated ventures, as measured in deal count.

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<sup>23</sup> E.g. Hochberg et al. (2007), Nahata (2008), Gompers et al. (2016), Braun et al. (2019) and Nanda et al. (2020) leave 4, 4, 6, 6 and 8 years of time between investment and observed exit, respectively.

<sup>24</sup> We do not consider the possibility of false negatives to be a significant impairment within our research design. False negatives would only be an issue if our objective was to demonstrate the absence of an effect within our

**Table 12: Universities involved in venture financing**

This table reports the universities most frequently involved in VC-financing of university-affiliated ventures. The sample consists of 706 university-backed portfolio companies from the United States (US) and the United Kingdom (UK) that were founded between 1992 and 2019. A university-affiliated venture is a company where at least one founder is a faculty member or student at the investing university at or before the closing date of the financing round. The table lists all universities investing in more than five affiliated ventures, including the number of affiliated ventures backed and the number of total ventures backed during the sample period.

University investor	Country	Affiliated ventures backed	Total ventures backed	Affiliated ventures as % of total
Stanford University	US	71	200	36%
University of Cambridge (UCF)	UK	29	30	97%
Queen's University Belfast (QUBIS Ltd.)	UK	15	17	88%
University of Cambridge	UK	15	15	100%
Wisconsin Alumni Research Foundation	US	14	14	100%
University of Manchester (Manchester Tech Fund)	UK	13	13	100%
Oxford University (Innovation Ltd.)	UK	12	14	86%
Wolverine Venture Fund	US	10	17	59%
University of Strathclyde	UK	10	10	100%
University of Pennsylvania	US	7	8	88%
Boston University	US	7	13	54%
Imperial College	UK	7	7	100%
University of Chicago	US	7	10	70%
Yale University	US	7	8	88%
Massachusetts Institute of Technology	US	6	12	50%
Northwestern University	US	6	10	60%
New York University	US	6	7	86%
Columbia University	US	6	6	100%
Carnegie Mellon University	US	6	8	75%
University of Michigan	US	6	8	75%
University of Nottingham	UK	6	6	100%
University College London (UCL Business PLC)	UK	6	8	75%
Vanderbilt University	US	6	8	75%
University of Oxford	UK	6	6	100%

group of interest, as false negatives will diminish statistical power. Therefore, if at all, our analyses would be biased against finding significant results.

### 4.2.3. Variables

#### 4.2.3.1. Dependent variables.

We apply two measures to track the portfolio company development, the intermediate outcome and the eventual exit. We define all variables in Table 13 and provide summary statistics and a correlation matrix in Table 14.

*Total VC funding raised:* we use this variable to track the portfolio company's intermediate outcome before an exit occurs. Total VC funding sums up the total capital raised by the venture across all rounds, in 2015 US dollars. It is commonly argued that universities could help bridge early funding gaps and therefore act as a catalyst for follow-on funding rounds by private investors (Mathisen & Rasmussen, 2019; Munari et al., 2015). We measure the portfolio company trajectory before an exit occurs by considering the total venture capital raised. In our regression analyses, we use logarithms of total funding to minimize the effect of outliers.

**Table 13: Definitions of main variables**

Variable	Description
1 IPO	A dichotomous variable, indicating whether the portfolio company exited via an IPO
2 Successful exit	A dichotomous variable, indicating whether the portfolio company exited via an IPO or trade-sale with a valuation higher than 1.0 times total capital raised
3 Total VC Funding (LN)	A continuous variable, summing up the total capital raised by the venture across all rounds, in 2015 US dollars
4 University Affiliation: any	A dichotomous variable, indicating whether at least one of the founders was affiliated - either as a student or a staff member - to the investing university at the time of investment or before
5 University Affiliation: student	A dichotomous variable, indicating whether at least one of the founders was a student (undergraduate, graduate, or PhD) at the investing university at the time of investment or before
6 University Affiliation: faculty	A dichotomous variable, indicating whether at least one of the founders was a faculty or staff member at the investing university at the time of investment or before
7 Prior Performance	This variable measures the investor's success ratio up to the current deal, irrespective of whether the deal has been realized yet or not
8 Top Ecosystem Location	Dichotomous variable equal to one, if the university is situated within a top 5 venture capital ecosystem in the United States or the United Kingdom. This selection includes the San Francisco Bay Area and Los Angeles in California, the Boston area in Massachusetts, New York City, and London, England
9 Reputable University	This dichotomous variable equals one if the investing university is part of the so-called Ivy League, Stanford University, MIT, or Cambridge and Oxford in the United Kingdom
10 Top 100 Research University	A dichotomous variable which indicates if the investing university is included in the top 100 CWTS Leiden Ranking of worldwide research universities
11 Private University	A dichotomous variable which indicates if the investing university is a private research university
12 Serial Entrepreneur	Dichotomous variable equal to one if at least one of the founders of the portfolio company was previously a founder in another venture-backed company
13 Financing Round at University Entry	A count variable that indicates the portfolio financing round at the university's entry
14 VC Environment at Start (LN)	A continuous variable which indicates the value of venture capital investment in the United States in the year of the portfolio company's founding, in 2015 US dollars
15 Industry Cluster Fixed Effects	Fixed Effects for the primary industry clusters: information technology, healthcare, and other industries
16 Country Fixed Effects	Fixed Effects for the United States and the United Kingdom, respectively



*IPO & Successful exits*: for each portfolio company, we determine investment outcome by observing whether it achieved a successful exit, a proven proxy for investor returns (Hochberg et al., 2007). In a narrow definition, we treat outcomes as successful if the portfolio company achieved an IPO, typically the most transparent measure of success (Gompers et al., 2010, 2016). In a broader definition, we also consider a trade-sale with a valuation >1.0 times total capital raised (in 2015 US dollars) as successful exits, in line with Gompers and colleagues (2016). We avoid characterizing trade sales at nominal sums as successful exits with this approach since these are often disguised failures.<sup>25</sup> We confirm the validity of our results by also analyzing the sensitivity to a variation in the valuation threshold (e.g., 1.5x or 2.0x total capital raised) and by taking into account the available last round valuations of still privately held portfolio companies. Neither of these alternative approaches change the nature or significance of our findings.

#### **4.2.3.2. Independent variables**

We measure our principal dimensions of interest through several independent variables:

*University affiliation (any/faculty/student)*: we assign dichotomous variables on the portfolio company level to indicate university affiliation. It takes the value one if at least one of the founders held a faculty position or was a student at the institution at the time or before the university invested. The option "any" considers both options (i.e., faculty or student).

*Prior performance*: this variable measures the university's direct investing success ratio up to the current deal. We define this measure as the total number of successful exits divided by the total number of investments before the current investment. We consider all successful investments achieved, not just realized exits, in line with the approach established by Gompers

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<sup>25</sup> Various authors have argued that acquisition exits, especially if they happen without a reported valuation or at a nominal sum only, may be disguised failures, (cf. Korteweg (2019), Puri & Zarutskie (2012) and Gompers, Gornall, Kaplan & Strebulaev (2020)).

and colleagues (2016), who found significant performance persistence for individual VC partners.

**Top Ecosystem Access:** this dichotomous variable indicates whether the university is situated within a top 5 VC ecosystem in the US or the UK as of 2021. We choose the top 5 as these have been consistent over time, based on the global start-up ecosystem map and research center StartupBlink (2021). This selection includes the San Francisco Bay Area and Los Angeles in California, the Boston/Cambridge area in Massachusetts, New York City, and London, England. Universities situated within these ecosystems likely have better access to a broader and more consistent deal flow. The importance of spatial proximity for the likelihood of a VC investment has been documented in the United States and other geographies (Lutz, Bender, Achleitner, & Kaserer, 2013; Sorenson & Stuart, 2001).

**Top 100 Research University:** this variable measures the university's research excellence. It has also been included by Munari and colleagues (2015) in their studies of European university seed funds. A dummy variable indicates if the investing university is included in the top 100 CWTS Leiden Ranking of worldwide research universities. We considered the most up-to-date 2016-2019 version of the Leiden Ranking at writing. Our results remain quantitatively and qualitatively similar if we restrict the measure to the top 50 research universities as a robustness check.

**Reputable University:** this variable measures the international reputation of the university by assigning a dummy variable equal to one, if the investing university is part of the so-called Ivy League,<sup>26</sup> Stanford University, the MIT, or the Universities of Cambridge and Oxford in the United Kingdom. These universities are typically considered the most reputable

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<sup>26</sup> Including Brown University, Columbia University, Cornell University, Dartmouth College, Harvard University, the University of Pennsylvania, Princeton University, and Yale University.

private research universities in the United States and the United Kingdom. Therefore, outsiders could interpret them as a quality indicator for the portfolio company.

Private University: is a dummy variable that indicates if the investing university is a private research university. Private research institutions typically have larger financial endowments that contribute relatively more to the university's operating budget. Therefore, they are likely more professionalized yet also more dependent on the returns of their investments. (Rosen & Sappington, 2019)

#### **4.2.3.3. Control variables**

We control for several factors at the portfolio company, financing round, and environmental levels:

*Serial Entrepreneur*: this is a dummy variable equal to one if at least one of the venture founders was a founder in a previous venture in the VS database. Entrepreneurs with an established track record are more likely to succeed than first-time founders (Gompers et al., 2010).

Financing Round at University Entry: this is a count variable that indicates the portfolio financing round at the university's entry. Later rounds naturally involve financing to more mature companies with less risk and are more likely to result in a successful outcome (Gompers et al., 2016).

VC Environment at Start: this variable measures the VC market environment with the aggregate sum of VC invested (in 2015 US dollars) in the year the portfolio company was founded. Funding conditions and incentives for starting a company are more conducive in "boom" years. However, these ventures are historically more likely to enter a deteriorating market in the following years (Kaplan & Lerner, 2010).

Industry cluster and country fixed effects: we include fixed effects for the industry clusters (1) information technology and (2) healthcare which have historically shown diverging economic trajectories and exit rates from other sectors. We also include country fixed effects.

**Table 14: Descriptive statistics and correlations**

Variable	N	Mean	Median	SD	Min	Max	1	2	3	4	5	6	7
1 IPO	606	0.10	0	0.29	0	1.00	1.00						
2 Successful exit	606	0.21	0	0.41	0	1.00	0.63	1.00					
3 Total VC Funding (LN)	592	2.81	3.09	1.90	-4.66	9.41	0.38	0.37	1.00				
4 University Affiliation: any	606	0.60	1.00	0.49	0	1.00	-0.12	-0.15	-0.24	1.00			
5 University Affiliation: student	606	0.42	0	0.49	0	1.00	-0.05	-0.18	-0.27	0.68	1.00		
6 University Affiliation: faculty	606	0.36	0	0.48	0	1.00	-0.12	-0.06	-0.07	0.64	0.14	1.00	
7 Prior Performance	464	0.30	0	0.25	0	1.00	0.21	0.27	0.40	-0.28	-0.28	-0.12	1.00
8 Top Ecosystem Location	604	0.43	0	0.50	0	1.00	0.13	0.20	0.37	-0.33	-0.40	-0.10	0.39
9 Prestigious University	604	0.42	0	0.49	0	1.00	0.11	0.16	0.38	-0.28	-0.41	-0.04	0.37
10 Top 100 Research University	604	0.63	1.00	0.48	0	1.00	0.08	0.14	0.33	-0.20	-0.23	-0.06	0.27
11 Private University	604	0.54	1.00	0.50	0	1.00	0.09	0.16	0.38	-0.30	-0.38	-0.07	0.40
12 Serial Entrepreneur	606	0.07	0	0.26	0	1.00	-0.02	-0.05	0.15	-0.03	0.01	0.01	-0.02
13 Financing Round at University Entry	606	2.09	2.00	1.48	1.00	11.00	0.07	0.01	0.21	-0.09	-0.04	-0.08	-0.03
14 VC Environment at Start (LN)	606	10.46	10.75	0.82	8.22	11.77	-0.31	-0.38	-0.27	0.21	0.22	0.14	-0.33
Variable	N	Mean	Median	SD	Min	Max	8	9	10	11	12	13	14
1 IPO	606	0.10	0	0.29	0	1.00							
2 Successful exit	606	0.21	0	0.41	0	1.00							
3 Total VC Funding (LN)	592	2.81	3.09	1.90	-4.66	9.41							
4 University Affiliation: any	606	0.60	1.00	0.49	0	1.00							
5 University Affiliation: student	606	0.42	0	0.49	0	1.00							
6 University Affiliation: faculty	606	0.36	0	0.48	0	1.00							
7 Prior Performance	464	0.30	0	0.25	0	1.00							
8 Top Ecosystem Location	604	0.43	0	0.50	0	1.00	1.00						
9 Prestigious University	604	0.42	0	0.49	0	1.00	0.70	1.00					
10 Top 100 Research University	604	0.63	1.00	0.48	0	1.00	0.49	0.64	1.00				
11 Private University	604	0.54	1.00	0.50	0	1.00	0.72	0.63	0.53	1.00			
12 Serial Entrepreneur	606	0.07	0	0.26	0	1.00	0.07	0.06	0.08	0.07	1.00		
13 Financing Round at University Entry	606	2.09	2.00	1.48	1.00	11.00	0.05	-0.03	0.07	-0.02	-0.01	1.00	
14 VC Environment at Start (LN)	606	10.46	10.75	0.82	8.22	11.77	-0.37	-0.33	-0.20	-0.34	0.11	-0.05	1.00

### **4.3. Results**

We split our findings into two main sections. At first, we focus on the differentiation of university-affiliated and unaffiliated ventures and analyze the phenomenon over time and with descriptive statistics. We then use regression analyses to estimate the effect of university affiliation on intermediate and final portfolio company outcomes. In the second part of our findings, we test our hypotheses on which quality indicators make some universities more successful than others in direct venture financing.

#### **4.3.1. Descriptive statistics**

Figure 5 provides a time series of university VC direct investments into affiliated and unaffiliated ventures from 1994 to 2019. It reveals that while university investments fluctuate cyclically over time, a substantial amount of university-backed ventures do have a university-affiliated founder. This trend has been increasing since the 1990s and is particularly prevalent in the UK, where 91% of university portfolio companies are university-affiliated. Between 1992 and 2014, one observes a university affiliation for 364 ventures, equivalent to 60% of our sample.

**Figure 5: Time trend of university VC direct investments**

The graph plots university VC direct investments in the United States and the United Kingdom between 1994 and 2019. We show the total count of portfolio companies that first received university financing per year and country (Total No). We also show the percentage of portfolio companies where at least one founder had an affiliation to the financing university as a faculty member or student (Faculty/Student). Linear trend lines illustrate development over time.

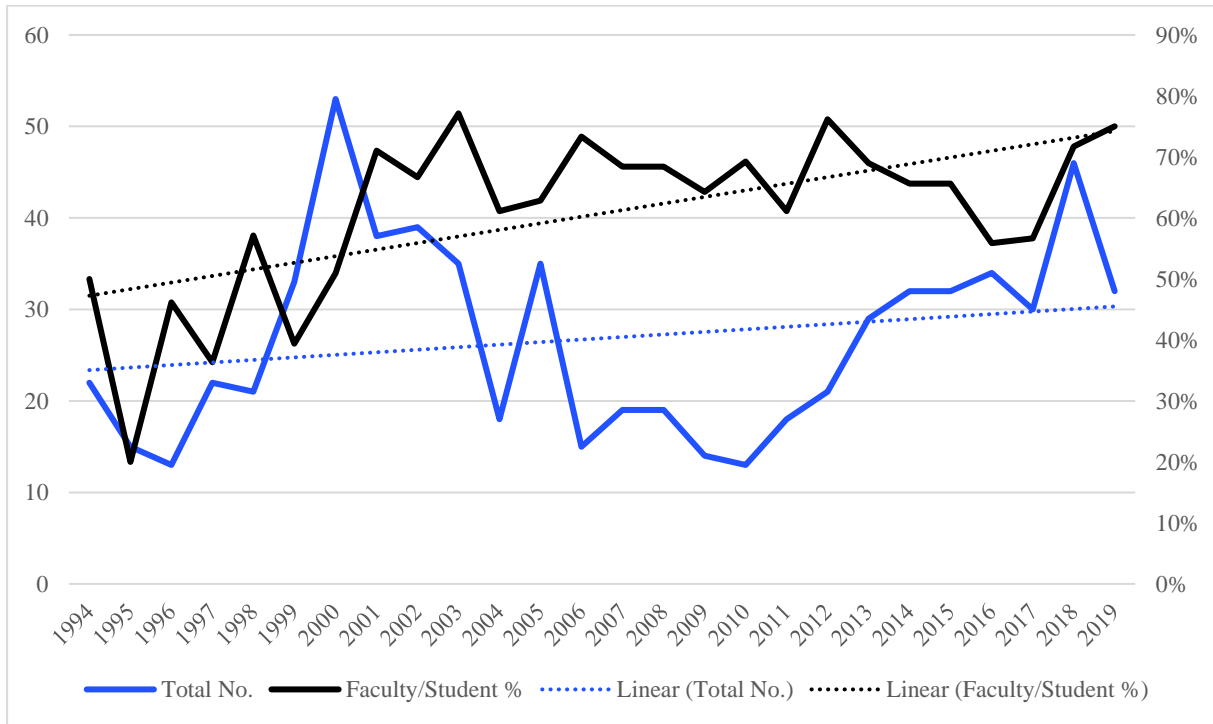


Figure 6 breaks down industry investment patterns: it becomes apparent that university VC is focused on the healthcare and information technology sectors, in keeping with prior evidence from Continental Europe (Munari et al., 2015). University-affiliated founders are especially frequently financed in the healthcare and information technology sectors (in absolute numbers) and industrial goods and materials (in relative numbers). Non-affiliated ventures represent the majority of investments in the business and financial services and consumer services sectors.

**Figure 6: University VC direct investments across sectors**

The graph plots university VC direct investments in the United States and the United Kingdom between 1994 and 2019. We show the total count of university-affiliated (i.e., at least one founder was a faculty member or student at or before the time of financing) and non-affiliated portfolio companies distributed across core industry groups, as classified by VentureSource.

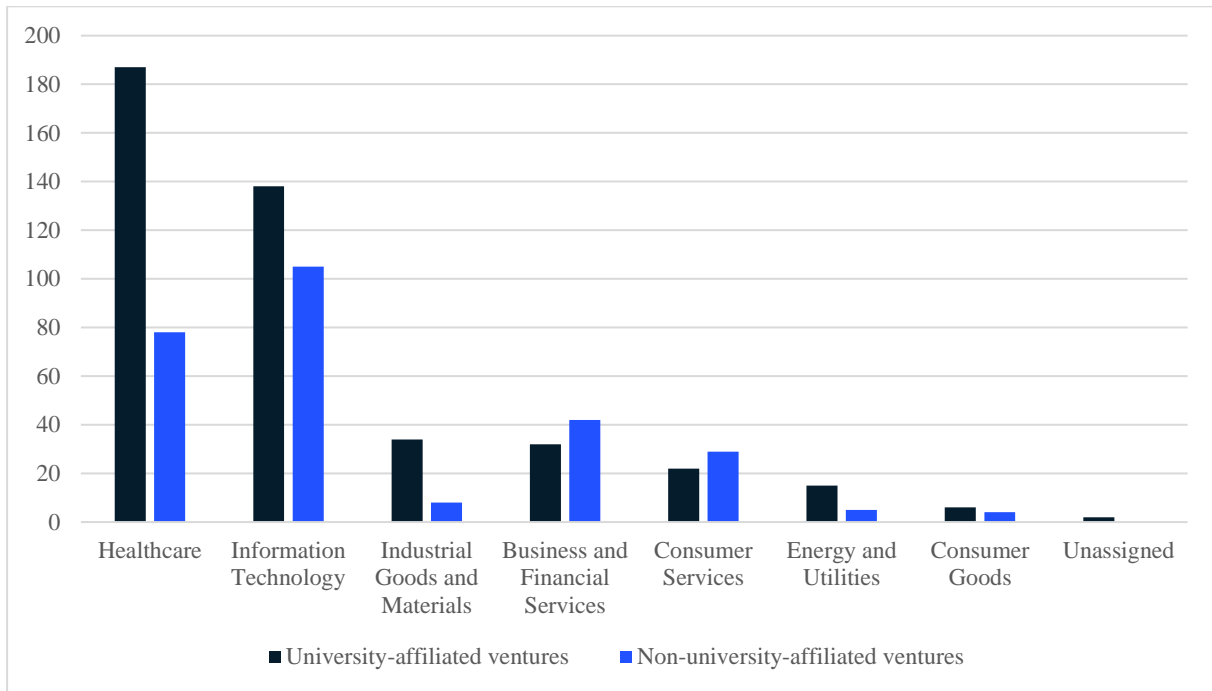


Table 15 focuses on the years 1992 to 2014 and drills into the types of university affiliations: it reveals that professors and PhD students are the most frequent recipients of university VC, which is again in line with prior work showing that university financing is often directed towards research-based spin-off companies (Croce et al., 2014; Mathisen & Rasmussen, 2019). MBA students follow in 7% of our sample, although there is a marked difference between the US (9%) and the UK (1%).



**Table 15: Descriptive statistics on university affiliations**

This table summarizes the distribution of university affiliations of portfolio company founders within our sample (1992-2014). A portfolio company is counted in the respective categories if at least one founder is or was a faculty member (incl. Professor or other staff) or student (PhD, MBA, or other (under-)graduate student) at the investing university at or before the closing date of the financing round. There are portfolio companies with more than one founder affiliation (e.g., a professor and a PhD student). That is why faculty and student do not add up to any.

University Affiliations	Total		US		UK	
	No. of companies	%	No. of companies	%	No. of companies	%
Affiliation: any	364	60%	221	49%	143	91%
Affiliation: faculty	254	42%	136	30%	118	75%
<i>Professor</i>	180	30%	101	23%	79	50%
<i>Others</i>	74	12%	35	8%	39	25%
Affiliation: student	220	36%	156	35%	64	41%
<i>PhD</i>	122	20%	61	14%	61	39%
<i>MBA</i>	42	7%	40	9%	2	1%
<i>Others</i>	56	9%	55	12%	1	1%
No affiliation	242	40%	227	51%	15	9%
Full sample	606		448		158	

Table 16 describes the distribution of portfolio company outcomes. It reports the percentages of IPOs, successful exits, and acquisitions for university-affiliated and unaffiliated portfolio companies. The results show that university-affiliated portfolio companies are less likely to achieve all types of exits. Only 6% of university-affiliated portfolio companies achieved an IPO, and 15% achieved a successful exit, compared to 15% and 30% of unaffiliated portfolio companies. The pattern holds if we alternatively consider all acquisitions.

**Table 16: Descriptive statistics on portfolio company outcomes**

This table summarizes our sample’s distribution of portfolio company outcomes and university affiliations (1992-2014). We differentiate between IPOs, successful exits (an IPO or acquisition with a valuation >1.0 times total capital raised), and acquisitions (irrespective of the exit valuation). We categorize portfolio companies if at least one founder is or was a faculty member (incl. Professor or other staff) or student (PhD, MBA, or other (under-)graduate student) at the investing university at or before the closing date of the financing round. There are portfolio companies with more than one founder affiliation (e.g., a professor and a PhD student). That is why *faculty* and *student* do not add up to *any*.

University Affiliations	IPOs		Successful Exits		Acquisitions		All obs.
	No. of companies	%	No. of companies	%	No. of companies	%	
Affiliation: any	22	6%	56	15%	109	30%	364
Affiliation: faculty	17	7%	31	12%	61	24%	254
<i>Professor</i>	14	8%	26	14%	47	26%	180
<i>Others</i>	3	4%	5	7%	14	19%	74
Affiliation: student	10	5%	40	18%	79	36%	220
<i>PhD</i>	4	3%	18	15%	36	30%	122
<i>MBA</i>	3	7%	8	19%	14	33%	42
<i>Others</i>	3	5%	14	25%	29	52%	56
No affiliation	36	15%	72	30%	101	42%	242
Full sample	58	10%	128	21%	210	35%	606

### 4.3.2. Econometric estimations

#### 4.3.2.1. University affiliations

We formulate two separate econometric models: we use a linear regression model for total VC funding, our primary continuous variable of interest. We use logarithms of total VC funding to minimize the effect of outliers. Secondly, we employ a logit model for binary-coded variables, namely IPO and successful exit. This approach is in keeping with prior research in the VC field (Braun et al., 2019; Gompers et al., 2010).<sup>27</sup>

<sup>27</sup> We obtain qualitatively and quantitatively similar results when we estimate bivariate probit models instead of the logit models presented.

Table 17 reports our regression results where the primary independent variable is university affiliation (i.e., we compare ventures where the founders do have an affiliation to the investing university with those that do not). Our first specifications (1 and 2) estimate the effect of founder university affiliation on total VC funding obtained, whereby (1) accepts any affiliation, and (2) additionally differentiates between faculty and students. In all cases, the omitted group consists of unaffiliated portfolio companies. We find a negative effect on total funding obtained, which is statistically significant at the 5% level. These findings indicate that university-affiliated portfolio companies obtain less funding than unaffiliated ventures. However, specification (2) shows that only the coefficient for faculty member-founded portfolio companies is negative and significant at the 5% level, while there is no such evidence for student-founded ventures.

Table 17 specifications (3) to (6) test our hypothesis concerning final venture outcomes, measured as binary variables in terms of an IPO or successful exit (i.e., IPO or acquisition at >1.0x total capital raised). The evidence is unequivocal: the coefficients are negative and significant if we consider only IPOs or all successful exits (both with 1% significance). The negative IPO effect remains significant for the sub-group *Affiliation: student* yet loses its significance for *Affiliation: faculty* – and vice versa when considering successful exits. This finding seems surprising at first. In part, the negative yet non-significant coefficients could be considered a matter of statistical power within our limited sample size.

In terms of control variables, we find that being a global top 100 research university, backing a serial entrepreneur, and the respective round number (i.e., timing) of the university entry significantly impact the total funding amount. However, they are not significant concerning final outcomes. Only the VC environment when the portfolio company was started negatively influences intermediate and final outcomes. This finding seems intuitive as in a

"booming" market environment, funding is easier to raise, and more economically unsustainable ventures are started and funded (Kaplan & Lerner, 2010).

To check the robustness of our findings on a country-level, we also run our model on the US sub-sample only: all prior observed effects remain significant. Our findings all remain directionally and statistically valid. Only the negative coefficient on *Affiliation: faculty* on successful exits loses some significance (5% level).<sup>28</sup> We also checked on various definitions of a successful exit, where we increased the constraints from the lower bound of 1.0x capital raised to 1.5x and 2.0x capital raised.<sup>29</sup> The coefficients on *Affiliation: any* and *Affiliation: faculty* remain highly statistically significant (at the 1% or 5% level) and do not change much regarding their economic significance. The coefficient on *Affiliation: student* on successful exit remains insignificant in all specifications. Lastly, we confirm the robustness of our findings by looking at available last-round valuations of still privately held portfolio companies. We obtain directionally and qualitatively identical results compared to *Total VC funding raised*.

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<sup>28</sup> Our sub-sample of the UK alone is too small (185 observations) to produce reliable econometric estimates.

<sup>29</sup> This reduces the overall percentage of successful exits in our sample from 22.1% (at 1.0x) to 20.8% (1.5x) and 19.5% (2.0x), respectively.

**Table 17: Performance implications of university-affiliated vs. non-university-affiliated portfolio companies**

This table reports the marginal effects of linear and logit regressions for the outcomes of portfolio companies backed by universities. Linear OLS regressions are used in the case of total funding obtained and logit regressions in the case of IPO and successful exits. Affiliation: any, faculty, and student are dummy variables taking the value one if a founder in the company has any affiliation to the investing university, or is/was a student or faculty member, respectively. We followed exits until the end of Q1 2021. Total funding is missing for 13 portfolio companies in our sample. Robust standard errors, cluster-adjusted on the university, are used in the regressions. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels.

	Intermediate venture outcome		Final venture outcome			
	Total Funding (LN)		IPO		Successful Exit	
	(1)	(2)	(3)	(4)	(5)	(6)
Affiliation: any	-0.263** (0.132)		-0.997*** (0.264)		-0.530*** (0.176)	
Affiliation: faculty		-0.319** (0.141)		-0.467 (0.371)		-0.702*** (0.252)
Affiliation: student		-0.0311 (0.121)		-0.884*** (0.266)		-0.0123 (0.199)
Top 100 Research University	0.535** (0.229)	0.526** (0.227)	0.563 (0.356)	0.565 (0.360)	0.280 (0.247)	0.254 (0.258)
Serial Entrepreneur	0.897*** (0.180)	0.914*** (0.178)	-0.0152 (0.550)	0.0436 (0.539)	-0.138 (0.413)	-0.102 (0.425)
Financing Round at University Entry	0.261*** (0.0588)	0.265*** (0.0603)	0.138 (0.0876)	0.135 (0.0901)	-0.0108 (0.0977)	-0.00480 (0.102)
VC Environment at Start	-0.299*** (0.0766)	-0.292*** (0.0774)	-0.967*** (0.150)	-0.944*** (0.139)	-0.790*** (0.111)	-0.784*** (0.116)
Industry Cluster FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Observations	589	589	602	602	602	602
R-squared	0.295	0.296	0.173	0.170	0.122	0.126

#### 4.3.2.2. University institutional characteristics

The second main question we investigated is which characteristics differentiate successful university funds from less successful ones. We follow the same logic regarding dependent variables and regression design as in the prior section. Our independent variables of interest are shown in Table 18 (1/6) prior investor performance, (2/7) top ecosystem location, (3/8) top 100 research university, (4/9) reputable university, and (5/10) private university (specifications in parentheses).

Table 18 presents the results of our estimations. The specifications on intermediate venture outcomes (1–5) show that prior performance, location, research excellence, reputation, and university wealth have a highly significant positive correlation with total funding obtained by portfolio companies. All effects are significant at the 1% or 5% level. We interpret this finding as early development and VC fundraising advantage associated with these universities' direct investments, which is in keeping with our hypotheses. However, these intermediate outcomes do not equally translate into outcomes, as represented by specifications (6–10). Only prior performance and top ecosystem location produce significant coefficients on IPO, at the 1% and 5% levels, respectively. We do not find significance when we consider all successful exits, yet there is a highly significant correlation with valuations in the case of a successful exit (1% significance). Although the regression coefficients are positive, the other university characteristics do not translate into significantly superior exit probabilities. Therefore, we must reject our hypotheses that universities' research excellence, reputation, or wealth influence superior direct investment outcomes and therefore fund returns to the university.

**Table 18: Implications of university quality indicators on portfolio company performance**

This table reports the marginal effects of linear and logit regressions for the outcomes of portfolio companies backed by universities. Linear OLS regressions are used in the case of total funding and logit regressions in the case of IPOs. Variables are defined in Table 2. Prior performance is missing for all first-time investments of universities, a total of 138. Total funding is missing for 13 portfolio companies in our sample. Robust standard errors, cluster-adjusted on the university, are in brackets. Asterisks denote significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels.

	Intermediate start-up outcome					Final start-up outcome				
	Total Funding (LN)					IPO				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Prior Performance	1.762*** (0.428)					1.788*** (0.561)				
Top Ecosystem Location		0.756*** (0.230)				0.730** (0.288)				
Top 100 Research Univ.			0.535** (0.234)				0.504 (0.346)			
Reputable Univ.				0.927*** (0.175)				0.400 (0.288)		
Private Univ.					0.621*** (0.237)					0.248 (0.292)
Serial Entrepreneur	1.039*** (0.129)	0.880*** (0.168)	0.906*** (0.179)	0.856*** (0.168)	0.917*** (0.171)	0.376 (0.594)	0.00731 (0.551)	0.0240 (0.541)	0.0673 (0.532)	0.0836 (0.531)
Financing Round at Univ. Entry	0.201*** (0.0457)	0.259*** (0.0603)	0.266*** (0.0620)	0.281*** (0.0634)	0.283*** (0.0630)	0.130 (0.0981)	0.145 (0.0906)	0.152 (0.0966)	0.158 (0.0968)	0.156 (0.0980)
VC Environment at Start	-0.253*** (0.0790)	-0.242*** (0.0781)	-0.316*** (0.0763)	-0.200** (0.0804)	-0.274*** (0.0684)	-0.979*** (0.177)	-0.919*** (0.121)	-0.990*** (0.144)	-0.953*** (0.137)	-0.984*** (0.123)
Industry Cluster FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	454	589	589	589	589	464	602	602	602	602
R-squared	0.354	0.304	0.291	0.322	0.292	0.183	0.154	0.149	0.147	0.144

#### **4.4. Discussion and conclusion**

Our analyses provide empirical evidence on university VC investments, a phenomenon of increasing academic and practical relevance. We examine two relevant questions: (1) the development implications and exit probabilities of university investments in affiliated portfolio companies and (2) which characteristics can help explain the success of university VC funds.

We employ a unique dataset of university investments into 706 portfolio companies drawn from VentureSource and amended by the manual collection of professional and educational background data on a total of 1,325 founders within our sample. This approach allowed us to go beyond prior work by Croce and colleagues (2014) and analyze the implications of investing in university-affiliated ventures on investment outcomes. We also extend the work by Munari and colleagues (2015) by identifying additional characteristics differentiating the success likelihoods of university investors within a sample from the United States, which to date has only been available in the form of selected case studies (Lerner, 2005, 2009).

Our empirical analyses reveal that university investments in portfolio companies founded by their own faculty members or students exhibit a lower ultimate probability of a successful exit. However, they do not necessarily receive less funding than other university-backed ventures. Our descriptive statistics indicate that most affiliated founders either held a faculty position, particularly professorships, or were PhDs at the financing university. This finding indicates that most university-affiliated portfolio companies could be research-based academic spin-offs. This fact is further underlined by observing the sector distribution of portfolio companies. Regarding venture outcomes, the finding of lower exit rates is in line with existing research on university spin-offs (Mathisen & Rasmussen, 2019). However, empirical evidence was limited to Europe and comparing university and independent seed funds (Munari



et al., 2015). Our work, therefore, extends the validity of the findings to an intra-group analysis and the largest VC market, the United States.

A possible explanation within the context of university investors is the apparent conflicts of interest within the principle-agent relationship that can arise from investments into venture companies where institutional and personal relations or homophily may motivate actors to collaborate. Such collaborations based on a shared background or personal characteristics have been shown to cloud the judgment and decision-making in the economic development of venture-backed companies (Gompers et al., 2016). They can also be a gateway for back-channeling and detrimental influences motivated by individual career concerns and the reputational motivations of stakeholders. Atkinson (1994) and Lerner (2005) elaborate on these problems in university VC by using several descriptive case examples. They point towards political, regulatory, monitoring and incentive-alignment problems within the university fund as possible mechanisms for explanations. Therefore, frequent university investors such as Stanford university have adopted a policy governing university investments in venture companies involving Stanford faculty (Stanford Board of Trustees, 1994). Our work points towards the potential detrimental impact of these conflicts and supports the argument that attention and careful management are indispensable to avert negative consequences. One promising avenue for future research is the analysis of policies that have been adopted by university funds to mitigate such conflicts of interest, including if and how they affect the selection, development and ultimate success of portfolio companies.

A second possible explanation relates to the motivations of universities who engage in direct investments, particularly in faculty members and students. Anecdotal evidence from Stanford or Yale university suggests that financial returns play a role in the considerations of universities (Lerner, 2005; Stanford Board of Trustees, 1994), yet this might not be the case for all investments and investors alike. Furthering the entrepreneurial culture, reputation, or

societal impact of a university may equally play a role in their consideration and has been discussed as a potential motivational factor both for academic entrepreneurs and their financiers (Croce et al., 2014; Hayter, 2011; Munari et al., 2015). These motivations could result in a less focused approach to company growth, profitability, and eventual exit outcomes. Our evidence supports this explanation, at least when considering faculty members, as these portfolio companies exhibit lower total funding and successful exit rates. Nevertheless, the evidence for students is more mixed and does not support this explanation, as their ventures are not less likely to achieve a successful exit but are less likely to achieve an IPO. The empirical evidence on the ultimate motivations of universities to engage in VC direct investments, especially in the US market, still needs to be expanded. This gap presents an appealing opportunity to explore through qualitative or survey-based research designs which elaborate on the universities' financial and non-financial utility functions in direct investing.

Our analysis of the impact of university characteristics on venture outcomes offers further theoretical and practical insights. The results from our sample indicate that research excellence, reputation, and university wealth do present a fundraising advantage for the portfolio companies. However, the only factors available to us that also explain superior exit performance are prior performance (i.e., successful university investors are persistently successful) and top ecosystem access. Persistent investor performance is in keeping with prior empirical evidence from other groups of venture capital investors (Gompers et al., 2016). However, it does not reveal the underlying investor attributes that enable persistent outperformance. In contrast, top ecosystem access is an identifiable characteristic with explanatory power regarding university portfolio company outcomes. Empirical research underlines the importance of spatial proximity in providing deal access opportunities and facilitating the consistent monitoring required by investors (Lutz et al., 2013; Sorenson & Stuart, 2001). At the same time, university spin-offs backed by the respective university do

enjoy immediate access to the favorable funding environment, talent pool, and knowledge partnership opportunities provided by a flourishing entrepreneurial ecosystem (Stam & Spigel, 2016).

Therefore, universities that employ VC investing as a tool for participating in the economic wealth created through start-ups should consider their deal flow exposure and access opportunities. These are typically best for investors situated within spatial proximity of a top venture ecosystem, suggesting that a direct investments program could be more suitable for such universities. At the same time, our work disqualifies the sole reliance on research excellence, reputation, or financial wealth as a prerequisite of setting up a successful direct investments program. These characteristics give portfolio companies a fundraising advantage, comparable to the positive signaling effect of prominent VCs (Ko & McKelvie, 2018). However, there is no evidence that they are conducive to superior exit rates and financial returns.

One highly relevant question revolves around the factors that motivate venture companies to accept financing from a university investor. In the case of university spin-offs, a common rationale is a funding gap in "traditional" VC markets for high-risk companies based on academic intellectual property with high technology risk and longer timelines towards commercialization (Munari, Sobrero, & Toschi, 2018; Wright et al., 2006). There is an apparent lack of research on the motivational factors of non-academic ventures to take on funding from a university investor. Potential decision factors could be conditional access to intellectual property, the reputation and positive signal associated with a renowned academic institution, professional and academic networks, or abundant financial resources and follow-up funding opportunities through the university's endowment. Validation of these initial hypotheses requires further research, potentially in qualitative case studies or interviews with founders and management teams of such companies. Such research could help further the academic debate

and provide additional insights for university practitioners on how to successfully navigate and seize on the opportunities of venture capital investing.

In summary, we provide empirical evidence that universities' direct investments in portfolio companies with a founder affiliation have lower exit rates and are likely to generate lower financial returns for the investing universities compared to unaffiliated investments. We also find that only prior performance and spatial proximity to a top ecosystem significantly correlate to investment success among the outside-in observable institutional characteristics. In contrast, other empirically observable factors such as academic excellence, reputation, or financial wealth only provide a fundraising advantage which does not translate into superior exit probabilities.

# Chapter 5

## 5. Conclusion

### 5.1. Summary of results

The core hypothesis investigated in this thesis is that charitable organizations do not exclusively focus on return-maximization in their investment decisions. The three essays presented consider this hypothesis through various geographical and organizational lenses, with different methods, focusing on different theoretical propositions.

Essay 1 aims to test and conceptualize the investment motives of charitable organizations with a qualitative research design with a sample of nonprofit foundations in Germany. I find that besides commercial goals, mission objectives are an essential influencer of the investment decisions of charitable foundations. I cast this duality of objectives in a novel conceptual framework. I also find that organizations within the sample are heterogeneous in their entrepreneurial level in pursuing their mission and commercial objectives. My analysis of how entrepreneurial orientation materializes in portfolio choices indicates that the level of commercial entrepreneurialism influences the types of asset classes included in the portfolio. On the other hand, the organization's mission orientation influences the subset of assets considered, depending on whether they align with mission and sustainability objectives. I also empirically derive an antecedent model that shows that *the founder's will*, *management team's professional background*, and *legacy capital* are critical influencers of the investment orientation within a charitable foundation. However, the research design and methods employed do not allow us to make statements about the performance implications of different materializations of commercial and mission orientation in charitable foundations.

The second essay builds on the conceptual findings of the first one and analyzes MRIs' performance implications. My analysis of VC direct investments in the US and the UK shows that VC direct investments of charitable foundations and university endowments tend to be clustered in industries adjacent to their philanthropic fields of activity, such as human health, education, environment/sustainability, and scientific technology transfer. This empirical application supports the conceptual propositions brought forward in essay 1. I further test the proposition that mission-related investments have a lower likelihood of success and take longer to achieve a successful exit, which I can confirm compared to foundations' and endowments' non-mission-related (i.e., purely commercial) investments. However, there is no such evidence regarding other investors' VC investments, which I ascertain by comparing my sample of interest with a counterfactual sample of over 50,000 VC financing rounds. I find that the effects persist in a sample matched via coarsened exact matching, indicating the effects are not merely attributable to observable financing round characteristics.

Essay 3 follows the same fundamental idea but focuses on a particular application area: university VC investments in ventures founded by faculty members or students of the same university. I analyze the performance implications of such investments, measured in intermediate and final portfolio company outcomes, i.e., funding raised and likelihood to achieve an IPO or successful acquisition. I find a highly significant negative correlation between investments in university-affiliated portfolio companies and all identified measures of success. Furthermore, I analyze which other organizational characteristics influence VC investment success among universities. Among the characteristics I theoretically derive and measure, only prior university investing performance and university proximity to a top venture ecosystem exhibit a highly significant positive correlation with the likelihood of an IPO. The other identified characteristics, namely research ranking performance, reputation, and financial

resources, only deliver a fundraising advantage for the portfolio company but do not influence the exit outcome.

## **5.2. Theoretical implications**

The results from this thesis yield contributions to several academic research fields: Most prominently, I offer an extension of entrepreneurial orientation theory and empirically analyze the implications of direct (co-)investing strategies and of non-pecuniary preferences in charitable organizations' investment decisions.

My essay 1 offers a significant extension of the existing entrepreneurial orientation theory (Austin et al., 2006; Morris et al., 2007, 2011) in the context of nonprofit organizations. I conceptually demonstrate the parallels between nonprofit entrepreneurs and charitable organizations that invest endowment assets and empirically investigate several ideas of Morris and colleagues (2011) regarding the manifestation of entrepreneurial orientation in the nonprofit context. The framework I derive allows mapping nonprofit foundations' entrepreneurial vs. conservative orientations on two dimensions, a *mission* and *commercial orientation* in their investment decisions. I empirically describe these manifestations and link them to preferred asset classes and investment processes, thereby developing a new model to understand entrepreneurial behavior in nonprofit organizations' investment decisions. I also extend the understanding of antecedents of entrepreneurial orientation in nonprofit organizations: prior research links organizational structure, leadership style, and control systems to entrepreneurial orientation (Morris et al., 2007). My investigation of antecedents of differing commercial and mission orientations in charitable foundations helps build a new model specific to charitable foundations.

My essay 2 contributes to the scholarly understanding of foundations' and endowments' VC investments and those investors' non-pecuniary utility functions. University endowments

and foundations have been identified as top-performing LPs (Lerner et al., 2008, 2007), mainly through their access to top-performing VC partnerships (Sensoy et al., 2014). My research shows that this investor group's VC direct investments perform on par with those of other VC investors. If I only consider commercially oriented investments (i.e., Non-MRIs), they significantly outperform the average deal, which I attribute to the access to excellent co-investment opportunities. This proposition aligns with recent findings that top LPs receive access to better alternative vehicles, including co-investment opportunities (Lerner et al., 2022). My research helps to strengthen this hypothesis, showing that charitable organizations' commercially oriented VC direct investments are often passive co-investments and result in comparatively more successful exits.

Moreover, my work contributes to the increasing body of literature exploring impact-oriented strategies and their financial implications (Barber et al., 2021; Geczy et al., 2021; Kovner & Lerner, 2015). While recent research has already made seminal contributions regarding the willingness to pay of institutional investors for VC impact funds (Barber et al., 2021), evidence on impact-oriented VC direct investments is limited to community development VC funds (Kovner & Lerner, 2015). My investigation of foundations and university endowments significantly improves the understanding of how investors select mission-related portfolio companies, the industries and topics they invest in, and the financial implications of these mission-related investments. Thereby, my work supports previous evidence of a performance gap of impact-oriented investing strategies compared to deals where the same organizations acted out of purely commercial motives.

Essay 3 delivers valuable contributions to university VC and university-managed funds research. To date, research on university VC was either mainly of descriptive nature (Croce et al., 2014) or focused on comparing university-oriented funds with independent seed funds in Europe (Munari et al., 2015). My investigation is the first that focuses on a purely internal



comparison of university VC investments in university-affiliated vs. non-affiliated portfolio companies. My data supports Lerner's (2005, 2009) hypothesis that universities do not profit from competitive advantages when investing in faculty- and student-led startups through internal fund vehicles. Instead, these investments generally underperform significantly regarding their likelihood of a successful exit compared to investments in other unaffiliated portfolio companies.

### **5.3. Managerial implications**

My essays provide several practical implications that improve managerial decision-making, particularly for nonprofit foundations and universities.

I am the first to systematically analyze VC direct investments as a vehicle for charitable organizations. My studies based on US and UK data can serve as a guideline for charitable organizations in other countries, particularly for those looking to enter this sub-segment of private markets and what to expect regarding financial returns. By showing that foundations and endowments can achieve investment returns comparable to other VC investors, my work amplifies calls for the German nonprofit foundation sector to consider employing their patient capital to provide growth capital to innovative new ventures (Achleitner et al., 2019). Of course, charitable organizations should act following their internal capabilities. Here, my analyses demonstrate that co-investments are a particularly sought-after constellation for foundations and endowments to build portfolio exposure, likely because they can benefit from the managerial skills and reputation of experienced fund managers (Croce et al., 2014). Therefore, a charitable organization willing to enter the VC asset class should consider building a VC fund and a direct investment portfolio jointly.

Regarding mission and impact investing, I also provide essential managerial insights for charitable organizations: My main finding is that MRIs have a lower likelihood of success and

take longer to exit than Non-MRIs, showing that mission-aligned investments likely come at a cost for the investor. However, when comparing MRI performance against a representative sample of 50,000 VC financing rounds, I find they can still achieve market-level returns, a result in line with practitioner reports (Pandit & Tamhane, 2018). Therefore, MRIs can be a tool to pursue mission goals and achieve a decent financial return for foundations and universities.

Lastly, my work offers lessons for universities considering VC investments in general and in ‘homegrown’ startups. There may be many good reasons to engage in such investments, such as enabling academic entrepreneurship, reputational benefits for the university, or strengthening the local entrepreneurial ecosystem (Croce et al., 2014). However, my results indicate that VC direct investments in faculty- and student-founded start-ups are typically not a suitable vehicle for financial gains for universities. This evidence results from a sample covering over 20 years of university VC investments, including many of the most prominent US and UK institutions. My findings support existing case-based evidence on the topic (Atkinson, 1994; Lerner, 2005, 2009). Furthermore, I find that universities located within a thriving venture ecosystem do significantly better regarding financial investment performance, whereas other factors such as financial wealth, academic excellence, and reputation do not correlate with exit outcomes. These findings help universities that consider a VC direct investment program to evaluate if their goals are achievable and what factors could help them to be successful.

#### **5.4. Future research and outlook**

The essays presented in this thesis suggest several opportunities for future research contributions. Three areas come to mind deserving particular attention from scholars:

Firstly, my essays and other studies on impact VC investing focus on their comparative financial performance. The non-financial impacts are still harder to measure in secondary data

yet are an equally important part of investors' decision-making rationale. Therefore, evaluating the societal impact of mission-related VC investments should be in the focus for future research. One way to potentially approach this is by measuring new venture-backed firms' innovation intensity and strength (e.g., via forward and backward patent citations). Economic and societal wealth creation should be evaluated beyond the venture phase (i.e., the early phase of a company's lifecycle), my studies' prime focus. Such measures could, for example, be derived from the UN Sustainable development goals, which often provide reference points for mission-driven entrepreneurs (Apostolopoulos, Al-Dajani, Holt, Jones, & Newbery, 2018). From a managerial point of view, developing approaches and methods to make non-financial impact more tangible could help strengthen the base for comprehensive financial and non-financial performance reviews of mission-related investments.

Secondly, there is still a lack of knowledge in the decision processes around mission-related investments. Quantitative studies of mission investments such as mine typically rely on secondary data and cannot account for the internal decision-making processes of charitable organizations and how investment decisions, particularly towards mission-related VC investments, are formed. There is extensive research about the investment decision processes in independent VC funds (Gompers et al., 2020; Hudson & Ewans, 2005; Silva, 2004), yet there is little to no evidence on mission-related investment decision processes within charitable organizations. Analyzing the criteria used to arrive at investment decisions would provide valuable context on how investors weigh the pecuniary and non-pecuniary criteria. Such research could yield precious contributions to the mission and impact investing theory and practice.

Thirdly, it would be desirable to extend and generalize my findings, particularly regarding investor orientations in charitable foundations. The scope of my empirical study of charitable foundations was limited to Germany for practical reasons and to ensure a similar

regulatory and cultural context. Extending the research design and comparing my findings internationally to other philanthropically active geographies in Europe, North America, or Japan could further test and specify my findings. Another open question is whether the study's findings extend beyond the foundation sector, for example, family offices, which are an additional source of philanthropically oriented capital (Hand et al., 2020), and will grow significantly in the future (Arizton, 2022). Such an extension would be an essential step towards generalizing a theory of mission and commercial orientations in charitable organizations' capital allocation decisions.

In conclusion, this thesis was motivated by the hypothesis that philanthropic organizations are not exclusively motivated by return maximization motives, an idea we evaluated in three essays with differing topical foci. We provide evidence that philanthropically oriented organizations such as charitable foundations and university endowments are often motivated by non-pecuniary motives such as impact towards their mission in various areas. We also analyze the performance implications of such non-pecuniary motives, thereby generating valuable insights for scholars and practitioners.

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## Appendix

### Appendix 1: Essay 1 interview guide (German original)

#### Einführung und Hintergrund

- Bitte geben Sie mir einen kurzen Überblick über Ihren aktuellen Verantwortungs- und Tätigkeitsbereich. Wie lange und in welchen Funktionen sind sie bereits in der Stiftung aktiv?
- Wie hoch ist das Anlagevermögen, welches Ihre Stiftung verwaltet? Welcher Anteil hiervon sind liquide Mittel gegenüber in Liegenschaften und Beteiligungen gebundene Mittel?
- Welche jährliche Renditeerwartung haben Sie bei der Kapitalanlage?
- Haben Sie ihre Renditeerwartung über die vergangenen 3 bis 5 Jahre erfüllen können?
- Welche Trends und Herausforderungen sehen Sie für Stiftungen in der Kapitalanlage? Inwiefern sehen Sie im Niedrigzinsumfeld eine Gefahr für die Handlungsfähigkeit deutscher Stiftungen?

#### Motivationsfaktoren in der Kapitalanlage

- In welche Anlageklassen investiert ihre Stiftung typischerweise? In welchem Umfang?
- Welche Kriterien sind für Sie bei der Anlageentscheidung relevant? Wie gewichten Sie diese?
- Welche Rolle spielt die philanthropische Mission der Stiftung in Anlageentscheidungen?
- Über welche Quellen beziehen Sie entscheidungsrelevante Informationen zu diesen Anlageklassen? Wie bewerten Sie diese Quellen?
- Welchen zeitlichen Anlagehorizont hat Ihre Stiftung? Wodurch wird dieser beeinflusst?
- Hat Ihre Institution Anlagerichtlinien verabschiedet, nach welchen investiert wird? Welche Vorgaben machen diese?

#### Erfahrungen mit Alternativen Anlageklassen

- Wie schätzen Sie das Potenzial von Alternativen Anlageklassen wie PE, VC oder Impact Investments für Stiftungen ein? Welche Chancen und Risiken sehen Sie in diesen Produkten für Stiftungen?
- Welche Anlageerfahrungen hat ihre Stiftung mit diesen Produkten?
- Weshalb haben Sie sich bisher für/gegen die Anlage in Private Equity/Venture Capital-nahe Produkte entschieden? (Zudem, falls ja: welches sind ihre gewonnenen Erkenntnisse aus der Anlage?)

## Appendix 2: Essay 2 variable definitions

Variables	Description
<i>Investor characteristics</i>	
Foundation	At least one charitable foundation is involved in the financing round
Endowment	At least one university endowment investor (endowment or investing on the endowment's assets) is involved in the round
Fields of activity	The one or multiple fields of philanthropic activity of the charitable organization (e.g., human health, scientific technology transfer, environment and sustainability, education and academia, or culture and arts)
Primary income model	The primary income model refers to the primary source of funds through which the foundation finances its operating activities
Location	The organization's headquarter location
Prior performance	The investor's success ratio up to the current deal - irrespective of whether the deal has been realized yet or not
<i>Investment</i>	
Mission-related investment	Foundation or endowment financing round is a mission-related investment (MRI), defined as an overlap of philanthropic fields of activity and portfolio company operating field of activity
Non-mission-related investment	Foundation or endowment financing round is not a mission-related investment (Non-MRI)
Education/academia	The venture is active in the (higher) education sector, i.e., educational/training media and services or educational/training software per industry segments/codes or educational purpose outlined in short company description
Human health	The venture is active in the healthcare, biotechnology, or life sciences sectors as per industry segments/codes or has a human health purpose outlined in short company description
Science/technology transfer	The venture has at least one founder with an academic degree, i.e., scientific background in the form of a doctoral degree or professor position
Environment/sustainability	The venture is active in the green tech, renewable energy, environmental engineering/services as per industry segments/codes or has a sustainability purpose outlined in short company description
Culture/human services	The venture has art or journalism-related or humanitarian/nonprofit purpose outlined in the short company description

**Appendix 2: Essay 2 variable definitions and sources (continued)**

<b>Variables</b>	<b>Description</b>
<i>Deal &amp; venture characteristics</i>	
Financing round no	The financing round indicates the equity round at which the investment was made into the portfolio company
Syndicate size	Syndicate size refers to the number of investors participating in the financing round
Amount raised (\$ m)	Amount raised refers to the sum of capital raised in that round in USD millions
Pre-money valuation (\$ m)	The pre-money valuation the venture received in the round in USD millions
Serial entrepreneur	Serial entrepreneur is a dummy equal to one if the founder of a portfolio company had previously founded another venture capital-backed company
Company Age	Age of the portfolio company (in years) at the time of round closing
Sales in year of round (\$ m)	Cumulative sales generated by the portfolio company in the year of the financing round in USD millions
Employees at transaction	Number of employees of the portfolio company at the time of closing of the financing round
<i>Exit events</i>	
Successful exit	Portfolio company went public via an IPO or was acquired at a multiple of larger 1.0 times the total reported venture capital raised
Age at successful exit (Years)	The portfolio company age at the point of the successful exit
<i>Fixed effects</i>	
Country FE	Country fixed effects indicating the headquarters of the portfolio company: the United States or the United Kingdom
Industry FE	Portfolio company industry fixed effects in line with VentureSource's industry groups: Business and Financial Services, Consumer Goods, Consumer Services, Energy and Utilities, Healthcare/Biotech, Industrial Goods, Information Technology, Other.
Year FE	Financing Year (determined by financing round closing date) fixed effects

**Appendix 3: Essay 2 key variables correlation matrix**

Panel A: Dependent variable is a successful exit										
Variable	N	1	2	3	4	5	6	7	8	9
1 Outcome: successful exit	52,840	1.000								
2 Mission-related investment	52,840	0.007	1.000							
3 Non-mission-related investment	52,840	0.013	(0.010)	1.000						
4 Foundation	52,840	0.014	0.505	0.469	1.000					
5 Endowment	52,840	0.009	0.590	0.438	0.053	1.000				
6 Amount raised (LN) <sup>30</sup>	52,840	0.213	(0.007)	0.005	0.020	(0.021)	1.000			
7 Serial entrepreneur	52,840	0.029	(0.001)	(0.007)	0.004	(0.012)	0.047	1.000		
8 Financing round	52,840	0.119	0.007	(0.007)	0.003	(0.001)	0.278	(0.004)	1.000	
9 Syndicate size (LN) <sup>30</sup>	52,840	0.129	0.073	0.076	0.075	0.078	0.476	0.038	0.250	1.000
Panel B: Dependent variable is the age at successful exit (LN)										
Variable	N	1	2	3	4	5	6	7	8	9
1 Age: successful exit (LN) <sup>30</sup>	10,042	1.000								
2 Mission-related investment	10,042	0.035	1.000							
3 Non-mission-related investment	10,042	(0.023)	(0.013)	1.000						
4 Foundation	10,042	(0.009)	0.498	0.504	1.000					
5 Endowment	10,042	0.028	0.613	0.413	0.101	1.000				
6 Amount raised (LN) <sup>30</sup>	10,042	0.017	0.016	(0.023)	0.009	(0.018)	1.000			
7 Serial entrepreneur	10,042	(0.049)	0.005	(0.021)	0.003	(0.022)	0.038	1.000		
8 Financing round	10,042	0.299	0.025	(0.016)	0.003	0.009	0.284	(0.020)	1.000	
9 Syndicate size (LN) <sup>30</sup>	10,042	(0.018)	0.100	0.071	0.090	0.088	0.449	0.028	0.267	1.000

<sup>30</sup> LN indicates that the natural logarithm of the variable was used to reduce the effect of outliers on the analysis.