



## THESIS / THÈSE

### DOCTOR OF ECONOMICS AND BUSINESS MANAGEMENT

#### On the Financial Performance of Impact Investments and the Behavior of Socially Minded Agents

Ledru, Francois-Xavier

*Award date:*  
2023

*Awarding institution:*  
University of Namur

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## **On the Financial Attributes of Impact Investments and the Behavior of Socially Minded Agents**

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**François-Xavier Ledru**

A thesis submitted in fulfillment of the requirements for the  
degree of Doctor in Economics and Business Management

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Defended on September the 5<sup>th</sup> of 2023

Cover design: © Presses universitaires de Namur

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Registration of copyright: D/2023/1881/17

ISBN: 978-2-39029-180-0

Printed in Belgium.

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## Acknowledgements

The submission of the present manuscript is the pinnacle of a nine-year journey at the university. That journey began in August 2014, when I first attended preparatory courses in mathematics at the Université de Namur. At that time, I could not have envisioned that I would later complete a Ph.D. dissertation. Yet, almost a decade later, here I am. When I look back and reflect on this adventure, I understand more than ever how important numerous people have been in accompanying me throughout this journey. For that reason, I would now like to take the time to sincerely thank all those people.

First things first, I would like to express my deepest gratitude to my supervisors, Prof. Oscar Bernal and Prof. Marek Hudon, to whom I will eternally be indebted for having given me the opportunity to complete my Ph.D. dissertation. Not only have they been excellent supervisors, but they are also great human beings. I feel fortunate to have had the opportunity to work at my own pace and with a considerable freedom to take initiatives. Thank you for trusting me and guiding me throughout the Ph.D. process as well as for benefitting from your advice in numerous aspects of my life.

Next, I would like to extend my thanks to the four other members of the jury, starting with Prof. Jean-Yves Gnabo, whom it has been a real pleasure to work with as a teaching assistant in evening classes for six years. Undoubtedly, your rigor, your extensive and detail-oriented knowledge, as well as the countless hours you devoted to help me greatly contributed to improve my work as a researcher. I also really appreciated our conversations on numerous other topics, some of which contributed to shape my current thinking. In particular, I remember great conversations about French wines, Bourdieu's work in sociology, the city of Paris, and even combat sports. I also show gratitude to Prof. Ariane Szafarz, who devoted a considerable amount of time to my questions and with whom it has always been a real pleasure to discuss, whether it be about our common research projects or about other topics such as career paths, strange and exotic cryptocurrencies, or the United-States. Clearly, your advice helped me to structure my thinking and my arguments. Noticeably, you showed me the importance of challenging the relevance of a research question, an argument, or a project. I am also grateful to Prof. Thi Hong Van Hoang, who kindly accepted to join the jury and provided me with insightful comments on my work. Finally, I would like to thank Prof. Wafa Hammedi for having been the President of the jury and for her useful comments formulated in the final months of my Ph.D. journey.

It goes without saying that I express my deepest gratitude to the teaching staffs of the Université de Namur and the Université Libre de Bruxelles, first as a student, then as a Ph.D. candidate.



Going to the university has assuredly changed my life, and that I notably owe to all those Professors whom I have had the opportunity to meet and learn from. In particular, I would like to sincerely thank Professors Jean-Marie Baland, Sophie Béreau, Corentin Burnay, John Cultiaux, Marcus Dejardin, Patrick Foissac, Pierre Giot, Hugues Pirotte, Olivier Scaillet, Eric Toulemonde, Denise Van Dam, and Vincenzo Verardi. In one way or another, you all contributed to my education and to the successful completion of my research projects.

Numerous other Professors from other universities and countries also significantly contributed to my Ph.D. journey. Special thanks go to Prof. Marc Labie, who wisely advised me throughout the years, and to Prof. Mikael Petitjean, with whom I had insightful conversations and who kindly allowed me to search his Bloomberg terminal to access relevant data. I also express my thanks to Professors Anastasia Cozarenco, Gregor Dorfleitner, Marjorie Gassner, Roy Mersland, Jay Rosengard, and Paul Smeets.

Throughout my journey, I have also had the chance to meet with remarkable people who have close ties with the academic community. To start with, I would like to express my deepest gratitude to Jean-Luc Gustin, who has been of an incredible support year after year, and with whom I have had great and insightful conversations. I feel privileged to have been his colleague for six years and to have benefited from his extensive knowledge and work experience. Next, I would like to thank Antoine Leroy, who supervised my master's thesis, and has since become a colleague with whom it is always great to discuss and exchange ideas. I would also like to extend my thanks to Etienne de Callataÿ, who has consistently been of great help whenever I asked for his opinion and expertise. Finally, I would like to express my thanks to Michel Damar, Bernard Jehin, Philippe Ledent, Baudouin Meunier, Marc van der Vleugel, and Emmanuel van Rillaer.

Undoubtedly, completing this Ph.D. dissertation would not have been that great without the daily support of my colleagues. To start with, I would like to sincerely thank Olivier Hubert and Auguste Debroise with whom it has been a real pleasure to work as teaching assistants. Their professionalism made things simple and efficient, which greatly contributed to the excellent atmosphere we have had in evening classes throughout the years. I am also grateful to Komlan Agba, Yerali Gandica and Coline Serres, with whom I shared my office at both Namur and Brussels for almost five years. Today of course, they have become good friends, and I wish them the best for what is to come. I would also like to thank all my other colleagues at both Namur and Brussels, and particularly Victor Amaral de Sousa, Samuel Anokye Nyarko, Syrine Ayachi, Camille Baily, Coline Broka, Tristan Caballero-Montes, Antoine Clarinval, Christian Colot, Claire Deventer, Marie Dewitte, Alicia Dipierri, Arnaud Dufays, Nathalie Dumont, Cécile Godfroid, Floriane Goosse, Doux Baraka Kusinza, Jérôme Mallargé, Florence Nizette, Baptiste

Perez Riaza, Lhorie Pirnay, Patrick Reichert, Andrea Renk, Ariane Reyns, Quentin Richard, Louise Schraверus, Victor Sluyters, Joey Soudant, Henri Vanhomwegen and François Woitrin. Finally, I would like to thank all the students to whom I have had the opportunity to teach for six years.

I am also conscious that my journey would have clearly been more complicated without the precious help of all those people working in the administrative staffs at both the Université de Namur and the Université Libre de Bruxelles. For that reason, I am grateful to Florence Art, Katty Catinus, Bénédicte Coulon, Véronique Gilson, Laurie Goffette, Brune Goguillon, Nathan J'Espère, Véronique Lahaye, Pierrette Noël, Anne-Lise Remy and Valérie Warrand. I would also like to thank Fabrice Orbant for his assistance throughout this journey as well as for our great conversations.

From the beginning, I have also received great support from people outside of the academic world, and notably from my close friends. I would therefore like to thank Armend and Géraldine, Guillaume and Maud, Arnaud and Laurie, Gazmend and Sandra, Cédric and Marisa, Giancarlo and his parents, Skender, Mandy, Philippo, Bily, Eli and his family. In particular, I am grateful to Christophe Preti and Sophie Derbaix, who played a decisive role in my choice to go to the university nine years ago.

Naturally, I would like to deeply thank Anneline who has unconditionally encouraged and helped me day after day to complete this journey. Your love and support have been key in motivating me to achieve that milestone. I am also grateful to her family—particularly to my mother-in-law—and her friends for their warm-hearted support.

Last but certainly not least, I would like to thank my family. My mother and my father, my sister Florence and my brother Vincent, who have always believed in me and strongly encouraged me to do what I deem right for me. Their love and support have both been crucial in helping me to achieve this milestone. To conclude, I would like to dedicate my Ph.D. dissertation to my grandfather who taught me so well about the rewards of perseverance and passion.



# Contents

Acknowledgements .....	3
Contents .....	7
List of Figures .....	11
List of Tables.....	13
General Introduction .....	15
I.        History and Conceptualization of Sustainable Finance Practices .....	16
I.i.    A General Conceptualization of Sustainable Finance .....	16
I.ii.   Corporate Social Responsibility: Adopting a Stakeholder-Oriented Behavior.....	22
I.iii.  Socially Responsible Investing: A First Step to Integrating Non-Financial Concerns into Investment.....	23
I.iv.   Impact Investing: Going a Step Further? .....	25
I.v.    ESG Integration: Where Is the Difference? .....	26
I.vi.   Social Banks: Another Sustainable Banking Sector.....	28
II.       Positioning the Thesis in the Current Sustainable Finance Research Landscape .	29
II.i.   Is Sustainability Consistent with Profitability?.....	31
II.ii.  Are There Differences among Sustainable Investment Strategies? .....	34
II.iii.  Uncovering the Motives behind Agents’ Sustainable Asset Allocation Decisions	35
III.      Structure of the Thesis .....	37
III.i.  Chapter 1 – Are Impact and Financial Returns Mutually Exclusive? Evidence from Publicly Listed Impact Investments.....	37
III.ii.  Chapter 2 – More of the Same? Comparing Impact and Socially Responsible Investments .....	39
III.iii.  Chapter 3 – Who Buys Social Bank Shares? Exploring Financial and Non-Pecuniary Individual Motives .....	41
Chapter 1 Are Impact and Financial Returns Mutually Exclusive? Evidence from Publicly Listed Impact Investments.....	43
1.1.      Introduction.....	43
1.2.      A Literature Review of Impact Investing .....	45

---

1.2.1.	Financial Performance .....	45
1.2.2.	Diversification Potential .....	46
1.3.	Data and Methodology .....	47
1.3.1.	The Data Challenge .....	47
1.3.2.	The Financial Performance of Impact Investments.....	48
1.3.2.1.	A Multifactor Analysis of Impact Investing.....	48
1.3.2.2.	Impact Companies' Returns.....	49
1.3.2.3.	Traditional Companies' Returns .....	51
1.3.2.4.	Indices' Summary Statistics.....	52
1.3.3.	The Diversification Potential of Impact Investments.....	54
1.3.3.1.	Dynamic Conditional Correlation Multivariate GARCH .....	54
1.3.3.2.	Preliminary Analysis: Unconditional Correlations .....	55
1.4.	Results.....	56
1.4.1.	Financial Performance .....	56
1.4.2.	Diversification Potential .....	58
1.5.	Robustness Tests .....	60
1.6.	Discussion .....	63
1.7.	Conclusion .....	65
Chapter 2 More of the Same? Comparing Impact and Socially Responsible Investments.....		67
2.1.	Introduction.....	67
2.2.	Literature Review and Hypotheses.....	70
2.2.1.	Socially Responsible Investing.....	70
2.2.2.	Impact Investing.....	72
2.2.3.	Hypotheses .....	73
2.3.	Data and Matching Methodology .....	74
2.4.	Financial Performance of Impact and Socially Responsible Mutual Funds .....	78
2.5.	Diversification of Impact and Socially Responsible Mutual Funds .....	84
2.6.	Discussion .....	87

---

2.6.1.	Funds' Asset Selection Processes .....	87
2.6.2.	Explaining Homogeneity in Asset Selection Processes .....	89
2.7.	Conclusion .....	92
Chapter 3 Who Buys Social Bank Shares? Exploring Individual Financial and Non-Pecuniary Motives.....		95
3.1.	Introduction.....	95
3.2.	Social Banks and Study Context .....	98
3.3.	Data and Methodology .....	101
3.3.1.	Non-Financial Motives.....	104
3.3.1.1.	Social Preferences .....	104
3.3.1.2.	Signaling .....	106
3.3.1.3.	Trust in Banks .....	106
3.3.1.4.	Perceived Social Impact .....	106
3.3.1.5.	Social Bank Identification .....	107
3.3.2.	Financial Motives .....	107
3.3.2.1.	Return Expectations .....	107
3.3.2.2.	Risk Perceptions.....	108
3.3.3.	Individual Characteristics .....	108
3.3.3.1.	Risk Preferences.....	108
3.3.3.2.	Financial and Economics Knowledge.....	108
3.3.3.3.	Investors and Socially Responsible Investors .....	109
3.3.3.4.	Donations .....	109
3.3.3.5.	Miscellaneous Variables .....	109
3.3.4.	Summary Statistics of Members and Non-Members .....	110
3.4.	Empirical Results .....	112
3.4.1.	What Prompts Individuals to Buy Social Bank Shares? .....	112
3.4.2.	What Determines the Amount Spent on Social Bank Shares? .....	114
3.4.3.	Do Social Attributes Influence Trust in Banks?.....	116

3.5.	Conclusion.....	120
	General Conclusion.....	125
I.	Our Contribution to the Current Literature on Sustainable Finance .....	125
I.i.	Chapter 1 – Listed Impact Investments May Strongly Underperform Conventional Investments .....	125
I.ii.	Chapter 2 – Practical Ambiguity Remains Between Impact and Socially Responsible Investing.....	127
I.iii.	Chapter 3 – Non-Financial Motives Are the Main Driver of Capital Allocation to Social Banks.....	128
II.	Broader Implications and Future Research .....	129
II.i.	Long-Run Financial Attractiveness of Impact Investments .....	130
II.ii.	Commitment, Regulatory Initiatives, and Real Societal Impact.....	131
II.iii.	Sustainability: A Necessary Yet Insufficient Condition.....	133
	References.....	137
	Appendices.....	155
	Appendix A .....	155
	Appendix B .....	181
	Appendix C .....	187
C.1	Survey Structure .....	187
C.2	Additional Details about the Game .....	187
C.3	Robustness Tests .....	189
C.4	Tables.....	190

## List of Figures

Figure I.i.1 A general conceptualization of sustainable finance.....	18
Figure 1.1 Evolution of the Impact Investing Index, the two reduced impact investing indices and the four MSCI benchmark indices between 5 January 2009 and 31 May 2018 .....	54
Figure 1.2 Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the four MSCI benchmark indices.....	62
Figure 2.1 Monthly EUR cumulative total returns for impact and socially responsible mutual funds .....	79
Figure 2.2 Monthly sum of squared portfolio weights (SSPW) for impact (blue lines) and socially responsible mutual funds.....	87
Figure 3.1 Overview of the sampling process .....	103
Figure 3.2 Overview of the game .....	104
Figure A.1 Evolution of the Impact Investing Index and the four MSCI benchmark indices between 5 January 2009 and 31 December 2013.....	173
Figure A.2 Evolution of the Impact Investing Index and the four MSCI benchmark indices between 1 January 2014 and 31 May 2018.....	173
Figure A.3 Dynamic Conditional Correlation (DCC) between the Impact Investing Index (Ex-US) and the four MSCI benchmark indices .....	174
Figure A.4 Dynamic Conditional Correlation (DCC) between the Impact Investing Index (UK-only) and the two MSCI UK benchmark indices .....	174
Figure A.5 Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the four MSCI benchmark indices.....	175
Figure A.6 Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the four MSCI benchmark indices.....	175
Figure A.7 Dynamic Conditional Correlation (DCC) between the nine-firm Impact Investing Index and the four MSCI benchmark indices .....	176
Figure A.8 Evolution of the Impact Investing Index and the two benchmark indices constructed for robustness test purposes between 5 January 2009 and 31 May 2018 .....	176
Figure A.9 Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the two benchmark indices constructed for robustness test purposes .....	177
Figure A.10 Evolution of the Impact Investing Index, the two reduced impact investing indices and the four MSCI benchmark indices between 1 February 2009 and 31 May 2018 .....	177
Figure A.11 Evolution of the Impact Investing Index and the four MSCI benchmark indices between 1 February 2009 and 31 December 2013.....	178



Figure A.12 Evolution of the Impact Investing Index and the four MSCI benchmark indices between 1 January 2014 and 31 May 2018.....	178
Figure A.13 Three-step Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the four MSCI benchmark indices .....	179
Figure A.14 Three-step Dynamic Conditional Correlation (DCC) between the Impact Investing Index (Ex-US) and the four MSCI benchmark indices .....	179
Figure A.15 Three-step Dynamic Conditional Correlation (DCC) between the Impact Investing Index (UK-only) and the two MSCI UK benchmark indices.....	180

## List of Tables

Table 1.1 Market capitalization data for selected MSCI UK benchmark indices.....	52
Table 1.2 Market capitalization data for selected MSCI Europe benchmark indices .....	52
Table 1.3 Summary statistics of indices' weekly financial return series .....	53
Table 1.4 Unconditional correlations between the Impact Investing Index and MSCI benchmark indices .....	56
Table 1.5 Four-factor model estimation results .....	58
Table 1.6 DCC-MVGARCH estimation results.....	61
Table 1.7 Mean-variance portfolio analysis.....	62
Table 1.8 Robustness analysis: Market capitalization data .....	63
Table 2.1 Summary of matched impact and socially responsible mutual funds .....	77
Table 2.2 Summary statistics of funds' monthly total return series.....	80
Table 2.3 Assessment of abnormal performance with monthly alphas .....	82
Table 2.4 Statistical significance of difference between monthly alphas .....	83
Table 2.5 Diversification statistics of impact and socially responsible mutual funds .....	86
Table 3.1 Summary statistics of members and non-members .....	111
Table 3.2 What prompts individuals to buy social bank shares?.....	117
Table 3.3 What determines the amount spent on social bank shares? .....	118
Table 3.4 Social determinants of trust in banks .....	121
Table A.1 Summary of impact companies' business activities.....	155
Table A.2 Summary characteristics of impact companies.....	156
Table A.3 Summary statistics of impact companies' weekly financial return series .....	157
Table A.4 Performance statistics pre- and post-2014.....	158
Table A.5 Unconditional correlations between reduced impact investing indices and MSCI benchmark indices.....	158
Table A.6 Four-factor model estimation results with reduced impact investing indices .....	159
Table A.7 Four-factor model estimation results pre- and post-2014.....	160
Table A.8 DCC-MVGARCH estimation results with the Impact Investing Index (Ex-US) .....	161
Table A.9 DCC-MVGARCH estimation results with the Impact Investing Index (UK-only) ..	162
Table A.10 DCC-MVGARCH estimation results pre-2014.....	163
Table A.11 DCC-MVGARCH estimation results post-2014 .....	164
Table A.12 Robustness analysis: DCC-MVGARCH estimation results (1).....	165
Table A.13 Robustness analysis: Summary statistics of indices' weekly financial return series .....	166

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Table A.14 Robustness analysis: Unconditional correlations .....	166
Table A.15 Robustness analysis: Four-factor model estimation results .....	166
Table A.16 Robustness analysis: DCC-MVGARCH estimation results (2).....	167
Table A.17 Summary statistics of indices' monthly financial return series .....	168
Table A.18 Monthly performance statistics pre- and post-2014 .....	168
Table A.19 Four-factor model estimation results .....	169
Table A.20 Specification choice: DCC vs ADCC.....	170
Table A.21 Univariate specification choice: GARCH vs EGARCH.....	170
Table A.22 Three-step DCC-MV(E)GARCH estimation results .....	171
Table B.1 Examples of impact funds' impact metrics.....	181
Table B.2 Summary characteristics of funds .....	182
Table B.3 Summary of funds' sustainable investment policy .....	183
Table B.4 Proximity scores between impact and candidate socially responsible mutual funds	185
Table B.5 Terminology of funds' sustainable investment policies .....	186
Table C.1 Comparisons of sample means.....	190
Table C.2 Representativeness of the sample of non-members.....	191
Table C.3 Description of variables .....	192
Table C.4 Ordered Probit models – Frequency table .....	194
Table C.5 What determines the amount spent on social bank shares? – Marginal effects.....	195
Table C.6 What prompts individuals to buy social bank shares? (Robustness A).....	196
Table C.7 What prompts individuals to buy social bank shares? (Robustness B).....	197
Table C.8 What prompts individuals to buy social bank shares? (Robustness C).....	198
Table C.9 What determines the amount spent on social bank shares? (Robustness D) .....	199
Table C.10 What determines the amount spent on social bank shares? (Robustness E) .....	200
Table C.11 Social determinants of trust in banks (interaction effects).....	201

## General Introduction

Established on the foundations laid by Adam Smith in the 18<sup>th</sup> century, a central theorem of welfare economics contends that under several assumptions describing an ideally operating economy with perfect competition and self-interested agents, the resulting market equilibrium is Pareto efficient (Arrow, 1970). Violation of the theorem's assumptions may lead to inefficient outcomes, a phenomenon known as market failure (Bator, 1958). Yet, even in the absence of market failure, a Pareto efficient equilibrium may produce substantial inequality. The theorem therefore addresses that issue, contending that any Pareto efficient allocation can be reached when letting markets work freely after lump-sum redistribution of initial resources (Arrow, 1970). This way, the theorem asserts that there is no conflict between fairness and efficiency (Renneboog, Ter Horst and Zhang, 2008a). Correction of market failures, as well as redistribution of income and wealth is supposed to be governments' responsibility (Wolf, 1979; Bénabou and Tirole, 2010). In Western countries, governments are assumed to be ideally placed to perform these tasks, since they are democratically elected (Edmans, 2023) and therefore are supposed to be representative of society's aspirations and moral standards.

Traditional views in corporate finance and investment management have therefore long adopted a shareholder value approach. On the one hand, corporate executives are only accountable to profit-maximizing shareholders (Berle, 1931), as famously argued by Milton Friedman in his 1970 New York Times Magazine article. On the other hand, investors are supposed to make investment decisions solely based on financial risk and return considerations (Modigliani and Pogue, 1974), as developed by Harry Markowitz in his influential Modern Portfolio Theory (Markowitz, 1952). In this conception of business and society, corporations are not assumed to serve the interests of stakeholders other than shareholders (Liang and Renneboog, 2017), as doing so is considered a waste of corporate resources and, potentially, an agency problem (Ferrell, Liang and Renneboog, 2016). The protection of stakeholders other than shareholders—customers, employees, local communities, or the environment—is therefore ensured by contracts and by governments that establish regulation (Bénabou and Tirole, 2010).

This traditional paradigm also has limitations, three of which we lay out hereinafter. First, corporations do not internalize much of their externalities, in that these are not accounted for in firms' costs and revenues (Gollier and Pouget, 2022). Considering the growing public awareness of the impact of some companies' detrimental practices as well as the urgency to address

numerous social and environmental issues<sup>1</sup>, such market failures may increasingly be seen as unacceptable from a societal standpoint. Second, governments, that are first in line to address market failures, may occasionally fail, notably because of limited resources, capture by interest groups, territoriality of jurisdiction, ineffective bureaucracy, or corruption (Jain, 2008; Giagnocavo, Gerez and Sforzi, 2012; Besley et al., 2022). It is also possible that governments' redistribution of income and wealth does not fit the moral standards of all economic agents (Bénabou and Tirole, 2010). Third, the relentless pursuit of profit also sometimes led to inappropriate behavior in the financial markets<sup>2</sup>, as well as to disproportionate executive compensations, and ultimately to frauds in the banking industry (Guiso, 2010; Jansen, Mosch and van der Crujisen, 2015), all of which might have contributed to erode public trust in financial markets and institutions, particularly in the wake of the 2008 global financial crisis (Stevenson and Wolfers, 2011).

In response to the above-mentioned limitations, a growing call for increased social responsibility on the part of individuals, corporations, financial institutions, and even governments developed, as an alternative means of correcting for market and redistributive failures, addressing perceived malfunctions in the financial industry, and promoting societal preferences (Bénabou and Tirole, 2010). In the financial sphere, this progressive change of paradigm led to the birth and development of sustainable finance.

## **I. History and Conceptualization of Sustainable Finance Practices**

### **I.i. A General Conceptualization of Sustainable Finance**

Sustainable finance is inextricably linked to the concept of sustainability that started to become a real public concern with the release in 1972 of the Club of Rome's report titled "The Limits to Growth". The report raised concerns on the ability of the Earth's resources to keep pace with societies' economic and population growth rates. That same year, the first conference to place environmental concerns at the top of the international agenda—the Stockholm United Nations (UN) Conference on the Human Environment—took place. Two years later, in 1974, chemist

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<sup>1</sup> The United Nations provides a non-exhaustive list of such issues in its Sustainable Development Goals. See <https://sdgs.un.org/goals> (page accessed 13 August 2023).

<sup>2</sup> See, for instance, the case against Goldman Sachs involving the synthetic collateralized debt obligation called Abacus 2007-AC1, in which the Securities and Exchange Commission alleged that the bank knowingly misled investors about the true nature of the financial product. See <https://www.ft.com/content/5f346632-38b6-3d4e-9e40-7d2c0098ca18> (page accessed 13 August 2023).

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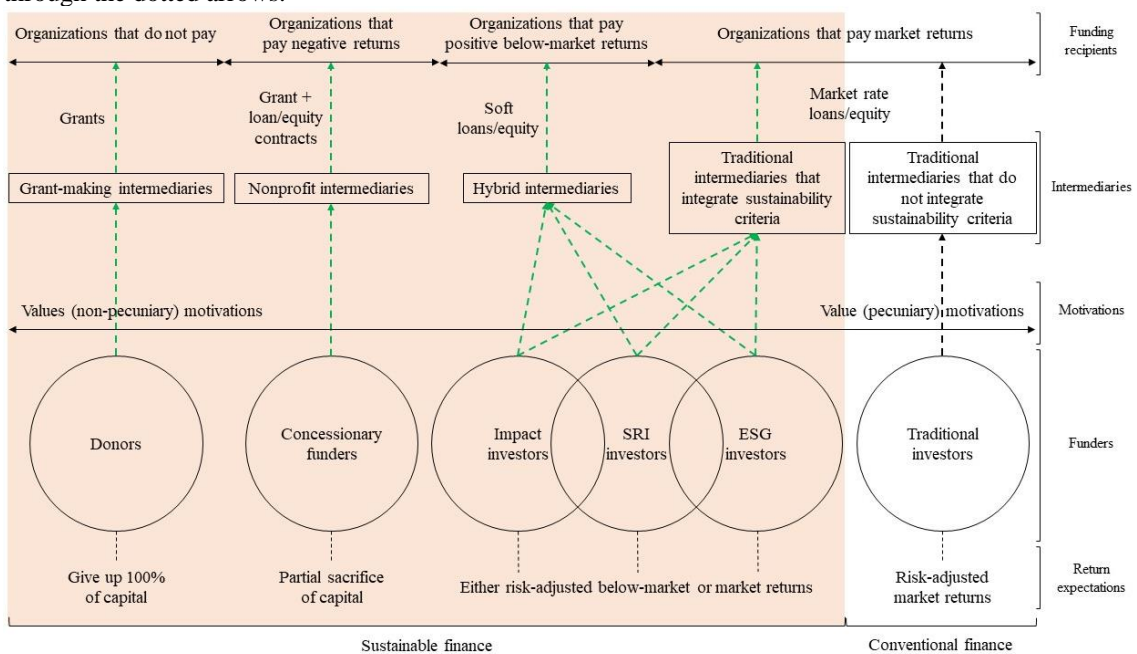
James Lovelock and biologist Lynn Margulis introduced the Gaia Hypothesis, which posits that the Earth is habitable thanks to self-regulatory mechanisms that rely on the interaction between living organisms and their environment (Reichle, 2020). A few years later, in 1980, the International Union for the Conservation of Nature argued for the first time in its World Conservation Strategy that sustainable development commands living resources conservation. Finally, in 1987, the Brundtland Commission on Environment and Development proposed its now widely accepted definition of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

In 1992, at the Earth Summit in Rio de Janeiro, the UN established its Framework Convention on Climate Change to address the issue of greenhouse gases. The treaty was later operationalized in 1997 by the Kyoto Protocol, which committed 37 industrialized countries alongside the countries of the European Union to reduce greenhouse gas emissions. In 2015, 195 countries signed the Paris Agreement, which replaced the Kyoto Protocol and intends to keep “the global average temperature to well below 2°C above pre-industrial levels” and pursue “efforts to limit the temperature increase to 1,5°C above pre-industrial levels”. During the same year, the UN launched its 2030 Agenda for Sustainable Development, which notably contains 17 Sustainable Development Goals (SDGs) aimed to tackle poverty and protect the environment. The agenda also highlights that society’s challenges go beyond that posed by climate change.

As sustainability concerns grew, so did sustainable finance. Yet, to this day, there is still no clear consensus on what sustainable finance means (Coqueret, 2022; Starks, 2023). It is similarly difficult for scholars to agree on common definitions of and to differentiate between the numerous sustainable finance practices. Conceptualizations of the latter are often context-dependent and tend to evolve over time (Liang and Renneboog, 2020). According to Sandberg et al. (2009), heterogeneity at different levels—terminological, definitional, strategic, and practical—may be attributable to at least three factors: (i) cultural and ideological differences between regions, (ii) differences in values, norms, and ideology among protagonists, and (iii) incentives for the latter to define and implement practices differently from other market actors (see also Höchstädter and Scheck, 2015). Although it seems feasible to reach some degree of standardization, Sandberg et al. (2009) argue that it may not always be desirable (see also Edmans, 2023). Nevertheless, the proper reading of this thesis requires the adoption of a coherent framework for sustainable finance. In this section, we therefore attempt to propose *a* general conceptualization of sustainable finance that introduces important concepts and serves as a basis for the subsequent description of the practices that we deem relevant for the understanding of this thesis.

Sustainable finance may be defined as financial decision-making that takes non-financial (social, environmental, ethical, and governance) considerations into account (Edmans and Kacperczyk, 2022).<sup>3</sup> Relying on the works of Cornée, Jegers and Szafarz (2022) and Starks (2023), Figure I.i.1 presents a theoretical conceptualization of sustainable finance where the latter is an umbrella term that encompasses a broad range of practices. The shaded area in Figure I.i.1 establishes the boundaries of sustainable finance vis-à-vis conventional finance.<sup>4</sup> In that conceptualization, economic agents—individuals and organizations—may care about non-financial considerations for “values” or “value” purposes (Starks, 2023). The former means that agents care about non-financial considerations because they have non-pecuniary preferences. The latter means that agents care about non-financial considerations because they consider that taking sustainability risks and opportunities into account enhances financial value.<sup>5</sup>

**Figure I.i.1 A general conceptualization of sustainable finance.** This figure presents a conceptualization of sustainable finance based on the frameworks of Cornée, Jegers and Szafarz (2022) and Starks (2023). The shaded area establishes the boundaries between sustainable finance and conventional finance. It is best to look at the figure from bottom to top, thereby following capital flows from funders to funding recipients through the dotted arrows.



<sup>3</sup> See also the definition of the European Commission ([https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance\\_en](https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en); page accessed 13 August 2023) and of the Swiss Finance Institute (<https://industry.sfi.ch/en/publications?publication=79886>; page accessed 13 August 2023).

<sup>4</sup> In our conceptualization of sustainable finance, conventional finance protagonists do not integrate sustainability criteria, do not have non-pecuniary preferences, and therefore solely maximize profits (see below). We acknowledge that the boundaries between sustainable and conventional finance may sometimes be more ambiguous in practice.

<sup>5</sup> Only in this Section I.i do the plural term “values” and the singular term “value” systematically refer to non-pecuniary values and financial value, respectively.

Similar to the framework of Cornée, Jegers and Szafarz (2022), the conceptualization of sustainable finance presented in Figure I.i.1 sees sustainable financial intermediaries channel capital from sustainable funders to sustainable funding recipients through the green dotted arrows. Sustainable funding recipients are organizations that somehow have non-pecuniary preferences. Examples of such organizations include nonprofits, social enterprises, or any firm that has sustainability objectives alongside the pursuit of profit, for instance through corporate social responsibility (CSR) initiatives. Depending on their features (e.g., mission, market, or organizational structure), that notably determine whether they require preferential funding conditions, different such organizations may search for funding at a different cost, namely market rate, positive but below-market rate, negative rate, or donation-based funding. In our framework, traditional organizations solely maximize profits, do not have non-pecuniary preferences, and obtain funding at market rates. These traditional organizations, despite not exhibiting non-pecuniary preferences, may manage sustainability risks and opportunities with the aim of maximizing profits.

Sustainable funding recipients receive funding through sustainable financial intermediaries, which are financial intermediaries that have non-pecuniary preferences and/or integrate sustainability risks and opportunities in their processes. There are four different types of sustainable financial intermediaries. First, “grant-making intermediaries”, such as private foundations, provide funding by means of grants. Second, “nonprofit intermediaries” provide grant-plus-loan or grant-plus-equity contracts, meaning that the recipient pays a negative financial return. Third, “hybrid intermediaries” provide soft loans and equity, meaning that the recipient pays positive, yet below-market returns. Examples of hybrid intermediaries are social banks (Barigozzi and Tedeschi, 2015) and the private impact funds studied in Barber, Morse and Yasuda (2021). The above-mentioned three intermediaries care about non-financial considerations because they have non-pecuniary preferences. Fourth, “traditional intermediaries that integrate sustainability criteria” provide market rate loans and equity and may be split into three categories. The first category is made of intermediaries that exhibit non-pecuniary preferences. The second category is made of intermediaries that do not have non-pecuniary preferences, only aim to maximize profits, and therefore integrate sustainability risks and opportunities in their processes in that respect (Pedersen, Fitzgibbons and Pomorski, 2021). The third category is made of intermediaries that combine both values and value motivations.

Except for traditional intermediaries that integrate sustainability criteria with the sole aim of maximizing profits, the goal of sustainable financial intermediaries is to maximize their non-financial contribution under the return constraint imposed by sustainable funders. To do so, they screen organizations based on financial and non-pecuniary criteria to identify appropriate



sustainable funding recipients. Therefore, according to Cornée, Jegers and Szafarz (2022), sustainable financial intermediaries increase global welfare for at least three reasons: (i) they meet sustainable funders' unmet demand for sustainable funding, (ii) they allow numerous sustainable funding recipients to receive funding at preferential terms—an essential requirement for many societal projects that are often less profitable than regular ones, and (iii) they are often highly involved in the governance of funding recipients. Besides sustainable financial intermediaries are “traditional intermediaries that do not integrate sustainability criteria”. The latter aim solely to maximize profits, do not have non-pecuniary preferences, and do not take sustainability risks and opportunities into account.

Sustainable financial intermediaries collect funds from sustainable funders who, contrary to traditional investors, have non-pecuniary preferences and/or take sustainability risks and opportunities into account. As Figure I.i.1 shows, two features may help to differentiate among sustainable funders, and consequently influence each funder's strategy, i.e., the intermediary through which funding is allocated, as well as the targeted funding recipients. The first feature is funders' expectations for financial returns. The second feature is funders' mixture of motivations, i.e., the weights that funders assign to values and value motivations. Based on these two features, we first identify the two extremes of the spectrum. At one end, one finds traditional investors, who seek risk-adjusted market returns, are exclusively value-motivated, and therefore turn to traditional intermediaries that do not integrate sustainability criteria. At the other end of the spectrum are donors, who give up 100% of their capital, are exclusively values-motivated, and rely on grant-making intermediaries to allocate their capital. Next to donors are concessionary funders, whose only value motivation is to recover part of their capital. They are therefore mostly values-motivated and allocate their capital through nonprofit intermediaries.

Between traditional investors and concessionary funders are three types of sustainable investors: impact investors, socially responsible (SRI) investors, and ESG investors. Based on financial return expectations, the financial literature does not provide a clear-cut differentiation between those sustainable investors. Indeed, although some of these investors—particularly impact investors—expect risk-adjusted below-market financial returns (Riedl and Smeets, 2017; Rossi et al., 2019; Barber, Morse and Yasuda, 2021), others expect to earn risk-adjusted market returns (Krueger, Sautner and Starks, 2020; Giglio et al., 2023), thereby targeting ethical free-lunch (Coqueret, 2022). We therefore aim to differentiate among sustainable investors based on their weighting of values motivations. Indeed, many sustainable investment strategies are grounded in substantive moral and ethical standards, though the use of the terms “moral” and “ethical” in this context is sometimes debatable (see, e.g., Schawrtz, 2003; Sandberg, 2008). Yet, although values motivations may differ widely from one type of sustainable investor to the other, the academic

literature does not currently allow for the identification of precise mutually exclusive values motivations among the different types of sustainable investors (Starks, 2023). For that reason, the three circles overlap in Figure I.i.1.

It is nevertheless possible to discern broad theoretical differences. Indeed, impact investors generally intentionally seek to invest in businesses that generate net positive externalities (Hockerts et al., 2022). As such, they are particularly interested in the specific non-pecuniary outcomes created by their investments, a principle known as “additionality”. For their part, SRI investors mainly aim to invest in businesses that they view as morally praiseworthy or exemplary (Sandberg, 2008; Renneboog, Ter Horst and Zhang, 2008a). To do so, they promote strong social, environmental, ethical, and governance practices among their portfolio companies, and refrain from investing in businesses that they view as morally unacceptable (Sandberg, 2008; Gollier and Pouget, 2022). Finally, ESG investors may invest for values and/or value purposes. When their investments are values-motivated, ESG investors build portfolios that are in line with their non-pecuniary preferences, and in that sense resemble SRI investors. On the other hand, when they invest with a value purpose, the goal of ESG investors is to identify and manage investments’ sustainability risks and opportunities to enhance financial value (Pedersen, Fitzgibbons and Pomorski, 2021). A good example of an important issue that may be the focus of ESG investors for both values and value purposes is climate risk (Giglio, Kelly and Stroebel, 2021; Faccini, Matin and Skiadopoulos, 2023). Obviously, ESG investors may invest in companies that aim to address climate issues such as abnormal heat, rainfalls, or rising sea levels because they genuinely care about the long-term societal consequences of these issues. At the same time, ESG investors may prefer to invest in companies that have low climate risk to reduce, among others, regulatory and reputational risks, thereby preserving financial value (Coqueret, 2022). Like ESG investors, it is possible that some SRI and impact investors decide to invest for value purposes. For instance, some investors expect SRI portfolios to be better positioned to deliver risk-adjusted abnormal returns (Dimson, Karakaş and Li, 2021). Yet, value motivations remain secondary for most SRI and impact investors, who are principally values-motivated (Riedl and Smeets, 2017; Bauer, Ruof and Smeets, 2021). Overall, depending on their financial return expectations and weighting of values motivations, Figure I.i.1 shows that all three types of sustainable investors may allocate their capital through either hybrid intermediaries or traditional intermediaries that integrate sustainability criteria.

The conceptualization of sustainable finance presented in Figure I.i.1 is a theoretical framework that attempts to provide a general overview of the field. In the five sections below, we provide a more detailed description of five sustainable finance practices which we deem relevant for the proper reading of this thesis. In providing these descriptions, we aim to differentiate between

those five practices sometimes more rigorously than what may have been done in Figure I.i.1, in order to help structure the empirical work of this thesis and provide intelligible conclusions. In doing so, we acknowledge that the definitions and criteria that we use to differentiate between practices likely have limitations. We also admit that we may sometimes adopt a rather binary view of certain practices, and that our findings and conclusions may depend upon our conceptual choices, which is a recurrent issue in the sustainable financial literature (Revelli and Viviani, 2015; Atz et al., 2023; Starks, 2023).

## **I.ii. Corporate Social Responsibility: Adopting a Stakeholder-Oriented Behavior**

In 1953, Howard Bowen published his seminal book titled “Social Responsibilities of the Businessman”, which is one of the first discussions about businesses’ social responsibility and ethical behavior (Zhao et al., 2023). In this book, Bowen advances that businesses should make decisions and take actions that are beneficial to society (Carroll, 2015). A similar pioneering initiative is the code of conduct written in 1977 by Leon Sullivan—The Sullivan Principles—which was a set of proposals for US firms with operations in South Africa in an effort to undermine the policy of apartheid (Patten, 1990; McMillan, 1996). More recently, the UN initiated in 2000 a call for firms worldwide to voluntarily align their operations, policies, and strategies with a set of ten principles—the Global Compact—related to human rights, labor, anti-corruption, and the environment. A decade later, in 2011, the Organization for Economic Cooperation and Development (OECD) released the last version of its Guidelines for Multinational Enterprises, which develops recommendations for responsible business conduct.

The stakeholder-oriented behavior prescribed to firms by initiatives such as those mentioned above forms the basis of corporate social responsibility, which has become a mainstream activity for many corporations. Although its definition has greatly evolved over time to reflect society’s expectations of appropriate corporate behavior (Latapí Agudelo, Jóhannsdóttir and Davídsdóttir, 2019), and despite a lack of consensus among scholars (Liang and Renneboog, 2020), CSR is nowadays frequently understood as a firm voluntarily sacrificing profits to address societal issues beyond its legal and contractual obligations (Bénabou and Tirole, 2010).<sup>6</sup> Indeed, the basic idea of CSR is that corporations are part of networks of stakeholders whose demands may potentially

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<sup>6</sup> Yet, the legal regime of a firm’s country may still influence the firm’s practice of CSR. Indeed, Liang and Renneboog (2017) find that firms from common law countries—discretion-oriented systems with few restrictions on managers and high protection of shareholders—have significantly lower CSR performance than firms from civil law countries, that are characterized by greater government intervention and regulation and favor a stakeholder-oriented approach.

conflict (Lindgreen and Swaen, 2010). In practicing CSR, the firm goes beyond the maximization of profits for the sole benefit of shareholders, internalizes various externalities that it produces, and enhances other stakeholders' welfare (Liang and Renneboog, 2017). To do so, firm managers must engage with stakeholders to build long-lasting mutually beneficial relationships (Lindgreen and Swaen, 2010). Examples of CSR behaviors include the use of environment-friendly materials, the setting of ethical labor policies, or the donation of money, products, or services to good causes and nonprofits (Bénabou and Tirole, 2010).

Although the above-mentioned definition of CSR emphasizes the sacrifice of profits in the interest of stakeholders, firms' adoption of CSR has at least partly been driven by a so-called business case for the latter (Bansal and Roth, 2000; Kotler and Lee, 2005). Indeed, the belief that the implementation of CSR practices can lead to mutually beneficial outcomes for both firms and their stakeholders became popular in the 1990s (Carroll, 2015). Since then, proponents of the business case for CSR have advanced several arguments to rationalize the adoption of CSR and present it as a set of practices that enhance firms' financial performance. According to Carroll (2015), those arguments belong to four categories: (i) enhancing the firm's legitimacy and reputation, (ii) cutting costs and lowering risks, (iii) boosting the firm's competitive advantages, and (iv) encouraging collective value creation that benefits all stakeholders including the firm. In the end, although the business case for CSR remains a controversial idea for some, it is almost indisputable that CSR practices are nowadays regularly used as corporate strategic tools (Vogel, 2005).

### **I.iii. Socially Responsible Investing: A First Step to Integrating Non-Financial Concerns into Investment**

Sustainability is nowadays widely valued by investors (Hartzmark and Sussman, 2019). As reported by the Global Sustainable Investment Alliance, sustainable investments made up 35.9% of global assets under management and amounted to USD 35.3 trillion at the start of 2020, a 55% growth since 2016.<sup>7</sup> According to Edmans and Kacperczyk (2022), at least three forces rationalize the widespread interest of the investor community for sustainability. Firstly, firms that are more sustainable may be better positioned for attracting and retaining employees and customers, increasing their market share, and minimizing costs linked to social and environmental corporate scandals. If such benefits are not fully incorporated in share prices, those firms may deliver high risk-adjusted returns to investors. Secondly, investors may prefer more sustainable firms because,

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<sup>7</sup> See the Global Sustainable Investment Review 2020 available at <https://www.gsi-alliance.org/trends-report-2020/> (page accessed 13 August 2023).

beyond profit, they want their investments to generate non-financial returns. In other words, they care about societal issues, even if it is sometimes at the expense of profit. Thirdly, investors may have a taste for firms that are more sustainable that is, they suffer disutility when holding so-called “brown” stocks and therefore prefer including “green” stocks in their portfolios.

Socially responsible investing is an investment process that takes social, environmental, ethical, and governance factors into account when making investment decisions (Sandberg et al., 2009). It therefore departs from conventional investing in that it does not assess investment opportunities based exclusively on financial considerations and it aims to cause firms to internalize (part of) their externalities (Gollier and Pouget, 2022). Historically, the integration of non-financial concerns into investment decisions is linked to religious traditions. In the 17<sup>th</sup> and 18<sup>th</sup> century, the Quakers prohibited profits derived from the trade of both slaves and weapons. Similarly, in the 1920s, the UK Methodist Church decided not to invest in so-called sinful corporations, such as those producing alcohol, tobacco, and weapons. Eventually, in 1928, Philip Carret founded the Pioneer Fund for Evangelical Protestants, one of the first US mutual funds to use screens derived from religious traditions.

Contrary to religiously motivated investment decisions, modern-day SRI expresses individuals’ social, environmental, and ethical preferences. In the 1970s, socially responsible investors in the US avoided investments in the military industry to oppose the Vietnam War, whereas in the 1980s, they divested from companies doing business in South-Africa to protest against the racist policy of apartheid. In the past forty years, environmental disasters such as the Exxon Valdez and the Deepwater Horizon oil spills in 1989 and 2010, respectively, increased investors’ awareness of the environmental damage of massive industrialization. In parallel, corporate scandals such as the 2001 Enron scandal, as well as the rise of ethical consumerism, contributed to the strong growth of SRI since the early 1990s (Renneboog, Ter Horst and Zhang, 2008a).

Nowadays, a socially responsible investor constructs her portfolio by means of a two-step process. In the first step, the investor constructs a subset of her initial investment universe (e.g., the S&P 500) by selecting some firms while discarding others using several techniques that rely on non-financial criteria. In the second step, the investor decides on which firms in the subset to include in her portfolio based on pure financial considerations such as risk, return, and covariances. According to Renneboog, Ter Horst and Zhang (2008a), three techniques may be used in the first step of the investment process to construct the subset. The first and oldest technique—negative screening—consists in excluding specific firms or industries from the initial investment universe based on non-financial criteria. Typically, an investor would exclude firms that are involved in the production of alcohol, tobacco, weapons, or shale oil. In the second technique—positive

screening—the investor selects firms that meet minimum social, environmental, ethical, or governance standards. Sometimes, the selected firms are those that perform better than their peers with regard to such standards, in which case the positive screening technique is said to adopt a best-in-class approach. Finally, the third technique—engagement—consists in adopting an active ownership approach, and hold shares in companies to influence their actions, either through dialogue with the management or by making use of voting rights (Dimson, Karakaş and Li, 2015).

In our view, SRI is different from CSR, in that the latter relates to corporate practices (i.e., it concerns funding recipients in Figure I.i.1) whereas the former is an investment strategy (i.e., it concerns funders in Figure I.i.1; Kim, 2019; Nath, 2021). Yet, there is a link between the two, as socially responsible investors aim to encourage and improve sound social and environmental corporate practices.

#### **I.iv. Impact Investing: Going a Step Further?**

It is in 2007, at a meeting organized by the Rockefeller Foundation in Italy, that one first heard of the term impact investing to denote investments that the Global Impact Investing Network (GIIN) would later define as intended to “generate positive, measurable social and environmental impact alongside a financial return”.<sup>8</sup> According to Höchstädter and Scheck (2015), impact investing combines philanthropic objectives with mainstream financial practices. Although it is an investment strategy used by funders in Figure I.i.1, which makes it different from CSR, impact investing may also be distinguished from SRI. Indeed, the main objective of socially responsible investors is often to promote strong social, environmental, ethical, and governance practices among traditional and usually large listed firms. In contrast, impact investors aim to provide financial and non-financial resources to businesses with aggregate positive externalities (Hockerts et al., 2022) which they often select by means of proprietary processes and criteria. These are often growth- and venture-stage scalable businesses in which impact investors make direct investments in the form of private equity and debt (Höchstädter and Scheck, 2015), although investments in listed firms have become increasingly popular among impact investors over the past few years.<sup>9</sup> Another distinctive feature of impact investors is that they resolutely care about, measure, and report on the societal outcomes of their investments (Hehenberger, Mair and Metz, 2019).

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<sup>8</sup> See <https://thegiin.org/impact-investing/need-to-know/#what-is-impact-investing> (page accessed 13 August 2023).

<sup>9</sup> See <https://thegiin.org/research/publication/impact-investing-in-listed-equities-strategies-for-pursuing-impact/> (page accessed 13 August 2023).

The origins of impact investing date back two decades ago, when several protagonists with varying interests and motivations decided to engage in a new investment strategy. On the one hand, philanthropic foundations were willing to investigate innovative financing tools as well as new methods for assessing the positive externalities of their funding. On the other hand, some investors, notably high-net-worth individuals, started to consider investment in social-purpose organizations, while some bankers began to view the latter as potential clients (Hehenberger, Mair and Metz, 2019). In particular, venture capitalists argued that their methods—a combination of investment and managerial support—rather than traditional philanthropy’s grant-making activities, were necessary to make social-purpose organizations more efficient (Mair and Hehenberger, 2014). They laid the foundations of the venture philanthropy movement, the precursor of impact investing, that initiated in Europe in the early 2000s (Hockerts et al., 2022). Since its inception, impact investing has been driven by the premise that new sources of (private) capital are needed to address pressing societal issues, due to a lack of funding from both governments and charities (Bugg-Levine and Goldstein, 2009).

The global financial crisis of 2008 triggered a moral crisis and brought considerations of business ethics into the spotlight (Lewis et al., 2010; Claassen, 2015). Impact investing, which had thus far been the domain of only a few investors, expanded rapidly. New actors, such as pension funds and public investment vehicles, got involved in the field, substantially increasing the volume of capital flows. According to the GIIN, the size of the impact investing market amounted to USD 1.164 trillion in 2022.<sup>10</sup> For financial-first impact investors—those who place financial returns ahead of societal impact—impact investments have been an opportunity to generate new profits in a post-crisis era (Watts and Scales, 2020). The late 2000s also witnessed the structuring of the impact investing industry, notably with the creation of the GIIN in 2009. Overall, in an effort to address funding challenges and in response to the growing public demand for sustainability, impact investing has transformed the availability of private financial capital for social-purpose organizations (Phillips and Johnson, 2021).

#### **I.v. ESG Integration: Where Is the Difference?**

Whereas some ESG investors in Figure I.i.1 may invest because they are motivated by non-pecuniary preferences—in which case they resemble SRI investors—other ESG investors may practice “ESG integration”, which is a sustainable investment strategy that aims to enhance financial value (Starks, 2023). More precisely, ESG integration is a methodology that seeks to

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<sup>10</sup> See <https://thegiin.org/research/publication/impact-investing-market-size-2022/> (page accessed 13 August 2023).

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identify and manage environmental, social, and governance risks and opportunities to preserve and enhance the long-term financial value of a company.<sup>11</sup> It is used in corporate finance to improve the long-term resilience and profitability of a firm. It is also used by investors to de-risk portfolios and invest in companies that are likely to be best positioned to seize the opportunities created by current societal challenges. In our view, ESG integration differs from CSR, as the former is an investment strategy, whereas the latter is a set of corporate practices. It also differs from socially responsible and impact investing, as the latter two practices are at least partly driven by some moral and ethical preferences, even if it is sometimes at the expense of profits. In contrast, ESG integration is meant to create future-proofed companies by assessing the impact that ESG factors have on the firm (outside-in perspective) as well as the firm's impact on both the Earth and society (inside-out perspective; Hockerts et al., 2022), a practice known as “double materiality” (Lambillon and Chesney, 2023).<sup>12</sup>

The term “ESG” was originally coined in a UN-sponsored 2004 report titled “Who Cares Wins – Connecting Financial Markets to a Changing World”. The main goal of the report, which was endorsed by major public and private financial institutions, was to provide guidelines on how to integrate environmental, social, and governance concerns in financial analysis and investment management. In 2006, the UN supported the launch of today's largest network of institutional investors that have committed to invest responsibly—the Principles for Responsible Investment (PRI; Ceccarelli et al., 2021). Since then, ESG integration has become a key sustainable finance practice, with PRI signatories managing more than USD 120 trillion of assets in 2022<sup>13</sup>, up from USD 6.5 trillion back in 2006 (Edmans, Levit and Schneemeier, 2022). Over time, ESG integration has become an activity and a business of its own, with specialized service providers collecting and processing an enormous quantity of firm data along the three ESG dimensions (van Duuren, Plantinga and Scholtens, 2016). For instance, some organizations have specialized in the provision of so-called “ESG ratings”, which are meant to provide investors and consumers with a score that sums up the assessment of a company's ESG performance (Berg, Heeb and Kölbel, 2002), i.e., its ability to identify and manage ESG risks and opportunities (Lambillon and Chesney, 2023).

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<sup>11</sup> See, for instance, the definition by Eurosif (<https://www.eurosif.org/responsible-investment-strategies/>; page accessed 13 August 2023) or by the UN PRI (<https://www.unpri.org/investment-tools/what-is-esg-integration/3052.article>; page accessed 13 August 2023).

<sup>12</sup> The inside-out perspective of ESG integration may sometimes be viewed as the practice of SRI. Yet, the purpose is different. Indeed, SRI is mainly concerned with aligning investment decisions with investors' moral and ethical preferences, whereas ESG integration is essentially about identifying long-term sustainability risks and opportunities to preserve and enhance firms' long-term financial value.

<sup>13</sup> See <https://www.unpri.org/annual-report-2022> (page accessed 13 August 2023).



That being said, ESG integration has also been the subject of heated debates, notably about it potentially conflicting with fiduciary duty, and hence about its legal use by pension funds, insurance companies, and asset managers. In this regard, the UN Environment Programme asked in 2005 the London-based law firm Freshfields Bruckhaus Deringer to produce a report on the issue. The report concluded that ESG integration is allowed if it is not conducted at the expense of financial performance, or if the investment firm is given a mandate to implement ESG integration by its beneficiaries.<sup>14</sup> ESG integration has also come under criticism for being a compliance burden and a box-ticking exercise that captures company resources that could otherwise have been used to create real value (Edmans, 2023).

### **I.vi. Social Banks: Another Sustainable Banking Sector**

The rise of sustainable finance has led conventional banks and other mainstream financial institutions to propose a panel of sustainable financial products and services that has considerably expanded over the years. Yet, public trust towards the conventional banking industry deteriorated in the aftermath of the 2008 global financial crisis (Knell and Stix, 2015), which helped stimulate the growth of another sustainable banking sector. Social banks, which are hybrid intermediaries in Figure I.i.1, promote value-based financial intermediation. Practically, this means providing loans to social enterprises, which are small- and medium-sized enterprises undertaking societal projects such as the provision of goods and services to impoverished people, the creation of job opportunities, or the promotion of environmentally friendly solutions. In doing so, social banks correct for a market failure, since conventional banks severely restrict access to credit for social enterprises because the latter are less profitable than traditional for-profit businesses (Defourny, 2001; Barigozzi and Tedeschi, 2015).

Social banks are primarily European banks, with institutions such as Triodos Bank in the Netherlands, La Nef in France, and Banca Etica in Italy. According to the Global Alliance for Banking on Values, social banks serve over 60 million customers in more than 40 countries and manage over USD 200 billion of assets in 2023. Over the period 2011-2020, their assets increased by 10.1%, compared with 3.1% for conventional banks.<sup>15</sup>

As it is essentially a credit activity, social banking differs from the other four sustainable finance practices introduced above. Social banks also differ from conventional banks on several

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<sup>14</sup> See <https://www.unepfi.org/industries/investment/a-legal-framework-for-the-integration-of-environmental-social-and-governance-issues-into-institutional-investment/> (page accessed 13 August 2023).

<sup>15</sup> See <https://www.gabv.org/> (page accessed 13 August 2023).

characteristics. Firstly, they pursue social profitability—they only fund socially relevant economic activities—and refrain from speculative projects (San-Jose, Retolaza and Gutierrez-Goiria, 2011). Secondly, instead of pursuing profit maximization and distribution, they target economic sustainability, which means nonnegative profits (Cornée and Szafarz, 2014). Thirdly, they follow simple, transparent, and prudent intermediation principles, which facilitates accountability to both investors and depositors (Cornée, Jegers and Szafarz, 2022). Lastly, social banks adopt corporate governance structures that allow for the active involvement of stakeholders in decision-making processes (Becchetti, Garcia and Trovato, 2011).

Over the course of the past 50 years, sustainable finance has gradually evolved to become a major pillar of today's financial sphere, as testified by the emergence and development of the practices introduced above. In line with the expansion of the field, academic research on sustainable finance practices has also developed a great deal, with researchers from all around the world investigating a large variety of topics throughout the years. Yet, as the field continues to expand and transform, several fundamental questions remain at least partially unanswered. In the next section, we discuss three such questions, explain their relevance for the field of sustainable finance, and introduce the research topics that we focus on in this thesis.

## **II. Positioning the Thesis in the Current Sustainable Finance Research Landscape**

A first fundamental question for sustainable finance relates to the potential consequences for corporations and investments' profitability of the integration of sustainability concerns in financial decision-making. In other words, is sustainability consistent with profit maximization? That question notably arises because of the perceived difficulty to align the diverging interests of numerous stakeholders—e.g., shareholders, employees, local communities, or the environment—which might lead to a trade-off between financial and non-pecuniary objectives (Liang and Renneboog, 2020; Pedersen, Fitzgibbons and Pomorski, 2021). Indeed, the pursuit of two objectives by firm and portfolio managers may weaken the latter's incentive and ability to maximize profits (Renneboog, Ter Horst and Zhang, 2008a; Meng, Newth and Woods, 2022). Although that question is likely relevant for all agents in Figure I.i.1, the research topics of this thesis make it particularly relevant for sustainable investors—impact, SRI, and ESG investors—as it may either confirm or challenge the relevance of sustainable investors (and hybrid intermediaries) who accept risk-adjusted below-market financial returns. Indeed, if sustainability concerns are found to be hurting firms' profitability, making it impossible for sustainable firms to achieve market-rate returns, then sustainable firms may not receive funding from investors who

expect market returns.<sup>16</sup> In that case, firms can only care about sustainability if there exist sustainable investors who accept below-market returns (Morduch and Ogden, 2018), possibly in exchange for non-financial utility (Barber, Morse and Yasuda, 2021; Pastor, Stambaugh and Taylor, 2021). On the other hand, if pursuing sustainability objectives is found to be consistent with profit maximization (Edmans, 2023), then sustainable firms have access to market-rate funding, which may enhance their societal contribution. In that case, the existence of sustainable investors who exhibit some willingness-to-pay (WTP) must be justified differently. For instance, acceptance of below-market returns may aim to lower borrowers' probability of default (Cornée and Szafarz, 2014), or to lower the cost of capital of firms perceived as more sustainable by investors (De Angelis, Tankov and Zerbib, 2022).

A second fundamental question is whether there are major differences between sustainable investment strategies, i.e., between impact, SRI, and ESG investment strategies in Figure I.i.1. As explained in Section I.i, scholars have not yet agreed on whether impact, SRI, and ESG investors strongly differ in terms of return expectations and motivations, as illustrated by the overlapping circles in Figure I.i.1. It is similarly difficult to differentiate between sustainable investment strategies with quantitative metrics. Indeed, the important heterogeneity among sustainability rating providers—exemplified by the low correlation among ratings (Berg, Koelbel and Rigobon, 2022)—considerably affects the investment universe when switching from one provider to another (Billio et al., 2021). Moreover, ratings often fluctuate through time and are backward-looking metrics that do not guarantee future sustainability performance (Chatterji, Levine and Toffel, 2009; Coqueret, 2022). Consequently, there is still much room for improvement in assessing whether sustainable investment strategies coherently and consistently differ, which is a question that ought to be clarified. Indeed, the current confusion may prevent investors from intelligibly understanding what they might expect from the existing sustainable investment strategies, both in terms of financial and non-pecuniary objectives. This, in turn, may prevent investors from expressing their sustainability preferences through their investment decisions (Barreda-Tarrazona, Matallín-Sáez and Balaguer-Franch, 2011). In that case, part of society's financial resources may not be allocated according to investors' sustainability preferences, and that may presumably prevent investors from correcting for market and redistributive failures.

A third fundamental question concerns the motivations behind funders' asset allocation decisions. Importantly, we need a more accurate and complete picture of funders' weighting of value and values motivations. Here again, the question is particularly relevant for sustainable investors—

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<sup>16</sup> Some investors seeking market returns may still include sustainable firms in their portfolios, notably if such firms have low market betas, and therefore contribute to portfolio diversification.

impact, SRI, and ESG investors in Figure I.i.1—for three reasons at least. First, it might help to better assess sustainable investors’ financial and non-pecuniary expectations, notably to determine whether some sustainable investors would accept below-market returns, as well as to provide a more coherent assessment of sustainable investments’ financial performance (Starks, 2023). Second, it might help to better map the networks between sustainable investors and intermediaries, i.e., to understand why different types of sustainable investors may choose to allocate their assets through different types of intermediaries. Indeed, several studies show that investors’ choice of intermediary is influenced, among others, by investors’ non-pecuniary preferences (Bauer and Smeets, 2015). Third, the consistent growth in sustainable investments means that sustainable investors’ preferences may affect asset allocations and have asset pricing implications (Pastor, Stambaugh and Taylor, 2021; Avramov et al., 2022a). Indeed, Fama and French (2007) show that tastes for assets can have long-term effects on asset prices, notably when the invested wealth of investors with tastes is substantial, and when they allocate assets quite differently from the market portfolio.

In the three sections below, we first provide an overview of the literature on each of the three fundamental questions discussed above and we subsequently introduce the contributions that this thesis makes to that literature.

## **II.i. Is Sustainability Consistent with Profitability?**

The debate on whether sustainability is consistent with profit maximization is one that has been around for decades. In the academic literature, two opposite views prevail (Ferrell, Liang and Renneboog, 2016). On the one hand, some scholars argue that integrating sustainability concerns into firm and portfolio management can be considered as an investment that enhances financial value in the long run, thereby promoting the “doing well by doing good” motto (Renneboog, Ter Horst and Zhang, 2008a; Bénabou and Tirole, 2010; Liang and Renneboog, 2020). This view is principally based on the conjecture that sustainable firms would be highly profitable and less risky, due to high consumer demand and prices, more motivated employees, favorable tax dispositions, a lower cost of capital, better governance, or lower climate and tail risks (Fernando, Sharfman and Uysal, 2017; Giese et al., 2019; Coqueret, 2022).<sup>17</sup> Moreover, if sustainability enhances future profitability, and if the value of sustainability is not fully incorporated in share prices, then investing in sustainable firms might generate abnormal risk-adjusted financial returns, which would be at odds with the efficient market hypothesis (Pedersen, Fitzgibbons and

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<sup>17</sup> In fact, it is also possible that only well-performing firms can afford to care about sustainability issues, which would transform the motto into “doing good by doing well” (Hong, Kubik and Scheinkman, 2012).

Pomorski, 2021).<sup>18</sup> On the other hand, some scholars contend that sustainability is not consistent with profit maximization. At the firm level, defining sustainability objectives may for example be viewed as a manifestation of agency problems, whereby firm managers would invest in sustainability to improve their own societal image rather than maximize profit for shareholders (Bénabou and Tirole, 2010; Ferrell, Liang and Renneboog, 2016). At the portfolio level, it is often argued that integrating sustainability concerns restricts the investment universe, which in turn might deteriorate the profitability of sustainable portfolios (Geczy, Stambaugh and Levin, 2021; Pedersen, Fitzgibbons and Pomorski, 2021). In keeping with the underperformance hypothesis, several studies report that some socially responsible investors expect to earn lower returns compared to conventional investors (Riedl and Smeets, 2017; Rossi et al., 2019; Laudi, Smeets and Weitzel, 2022).

Several theoretical models attempt to reconcile both views. For instance, Pástor, Stambaugh and Taylor (2021) contend that, in equilibrium, green assets are supposed to have lower expected financial returns than brown assets in the long run, because of investors' tastes for green assets and the latter's climate risk hedging properties. At the portfolio level, their model predicts that investors whose portfolios overweight green assets have lower expected returns. Yet, Pástor, Stambaugh and Taylor (2021) also emphasize that green assets may temporarily outperform brown assets due to unexpected positive shocks to investors and customers' preferences for green assets and green products, respectively (see also Avramov et al., 2022b). For instance, Pástor, Stambaugh and Taylor (2022) find that green assets outperformed brown between November 2012 and December 2020. They attribute that outperformance to the unexpected surge in environmental concerns rather than higher expected returns.

Empirically, scholars first investigated the link between corporate financial performance (CFP) and corporate social performance (CSP). CSP is the result of CSR, in the sense that CSR translates into company investments which, over time, aggregate into the firm's CSP (Barnett, 2007). Overall, there is evidence of the positive association between CSP and CFP, although the meta-analyses do not necessarily conclude on the causality of the relationship (Orlitzky, 2011; Friede, Busch and Bassen, 2015; Atz et al., 2023). A nuance is introduced by Orlitzky, Schmidt and Rynes (2003) who argue that the contribution of social responsibility to the CSP-CFP relationship is greater than that of environmental responsibility.

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<sup>18</sup> If sustainable portfolios generate abnormal risk-adjusted returns, it may also mean that there is some missing risk factor in asset pricing models.

Progressively, interest shifted from the financial performance of sustainable firms to that of sustainable investments. To start with, the meta-analyses conducted by Revelli and Viviani (2015), Kim (2019), and Atz et al. (2023), as well as the studies by Bauer, Koedijk and Otten (2005), Renneboog, Ter Horst and Zhang (2008a and 2008b), and Bialkowski and Starks (2016) conclude that the performance of SRI has generally not been significantly different from that of conventional investments. Yet, other studies argue that there are financial costs associated with the practice of SRI (Lee et al., 2010; Belghitar, Clark and Deshmukh, 2014; El Ghouli and Karoui, 2017; Geczy, Stambaugh and Levin, 2021). Hong and Kacperczyk (2009) notably demonstrate that so-called “sin stocks” deliver higher expected returns, whereas Bolton and Kacperczyk (2021) show that firms with higher carbon dioxide emissions command higher returns. On the other hand, a handful of studies contend that SRI delivers superior financial performance (Kim, 2019; Dimson, Karakas and Li, 2021). Finally, some studies conclude that SRI underperforms in non-crisis times and outperforms in crisis times, thereby providing protection against downside risk (Nofsinger and Varma, 2014; Atz et al., 2023).

Throughout the years, scholars have provided several explanations to the heterogeneity among the studies that investigate the financial performance of SRI, as well as the apparent disconnect between the CSP-CFP relationship and the performance of SRI. For instance, Atz et al. (2023) explain that studies may use different samples that include investment funds with different SRI strategies. On the contrary, some studies may use a pooled sample that does not distinguish between the different SRI strategies. Orlitzky (2011) points to differences in institutional logics (e.g., research in economics and finance versus research in management and business ethics) as a driver of the heterogeneity of findings. Finally, other factors such as differences in the investment horizon and/or the statistical method used by researchers are also emphasized (Revelli and Viviani, 2015).

As a matter of fact, SRI captures the lion share of the literature on the financial performance of sustainable investments. Yet, a smaller, growing strand of that literature recently started to study the financial performance of impact investments. According to the seminal empirical paper by Barber, Morse and Yasuda (2021), impact funds produce lower financial returns (IRRs) than conventional funds, leading to a trade-off for investors between financial and non-pecuniary utility. Several arguments rationalize these findings, and notably the fact that impact investing involves interactions among stakeholders with antagonistic objectives (Chowdhry, Davies and Waters, 2019). That being said, the findings of Barber, Morse and Yasuda (2021) are based on data from private funds. Yet, as mentioned in Section I.iv, investment in listed firms has become increasingly popular among impact investors. This offers the opportunity to analyze the financial performance of impact firms in a different setting, characterized by higher transparency, liquidity,

and regulatory compliance. In the first chapter of this thesis, we therefore contribute to the existing literature by investigating the investment performance of a sample of (mostly) European listed impact companies.

## **II.ii. Are There Differences among Sustainable Investment Strategies?**

Sustainable investment strategies have long been plagued by issues related to informational and conceptual clarity, the difficulty to rely on commonly accepted metrics (Chiu, 2022), and uncertainty about whether there exist clear differences between the different strategies. Firstly, investors often have difficulties to determine the accurate sustainability profile of a company (Zetzsche and Anker-Sørensen, 2022), notably due to a lack of informational transparency and clarity as well as the absence of standards regarding companies' non-financial reporting (Avramov et al., 2022a). An excellent example is the substantial disagreement among sustainability rating providers, which makes it difficult for investors to compare firms based on their alleged sustainability profile (Chatterji et al., 2016). Moreover, black-and-white classifications of firms and investments into sustainable and non-sustainable categories may be fallacious. For instance, polluting corporations, particularly in the oil and gas industries, often massively invest in both sustainable technologies and R&D. Therefore, excluding such firms from sustainable portfolios on the basis of an incomplete assessment of their sustainability profile may be counterproductive (Cohen, Gurun and Nguyen, 2020; Coqueret, 2022). It may notably slow down a transition towards sustainability, i.e., "a fundamental transformation towards more sustainable modes of production and consumption" (Markard, Raven and Truffer, 2012). Secondly, investors' low sustainable finance literacy adds to their initial difficulty to collect accurate, clear, and transparent information, as they then lack the necessary knowledge to understand and interpret it (Filippini, Leippold and Wekhof, 2022). Indeed, making sustainable investment decisions involves processing additional information on top of the usual financial knowledge, which may quickly become too complex a task for low-literacy individuals (Anderson and Robinson, 2022). Thirdly, new regulation on sustainable finance, such as the European Sustainable Finance Disclosure Regulation (SFDR), whose initial objective was to clarify and structure the field, may in fact add layers of complexity to investors' already convoluted decision-making process (Lambillon and Chesney, 2023).

The issues outlined in the previous paragraph have important implications at two levels at least. Firstly, at the firm level, the absence of a clear framework for non-financial reporting as well as the divergence among sustainability ratings might lower firms' sustainability performance. Indeed, uncertainty surrounding the initiatives that are expected and valued by the market might lead firms to decrease their involvement in sustainability-enhancing activities (Berg, Koelbel and

Rigobon, 2022). It is also possible that firms engage in activities that are praised by the market, irrespective of the real sustainable impact of these activities. Secondly, at the investor level, difficulties to reliably establish the sustainability profile of companies might lead to a decrease in sustainable investments and, consequently, to a reduction of their real societal impact (Avramov et al., 2022a). As investors struggle to overcome informational hurdles, they may use simple investment rules and allocate their assets to funds with a sustainability-sounding name and/or description (Anderson and Robinson, 2022; Lambillon and Chesney, 2023). Overall, as already mentioned, the lack of clarity and transparency may prevent investors from expressing their sustainability preferences through their investment decisions (Barreda-Tarrazona, Matallín-Sáez and Balaguer-Franch, 2011).

Among sustainable investment strategies, impact and socially responsible investing have long been at the heart of a debate to determine whether those two investment strategies are fundamentally different (Sandberg et al., 2009; Höchstädter and Scheck, 2015; Nath, 2021). As outlined in Section I.iv, it is possible to establish theoretical differences, particularly regarding the asset selection process—the type of firms supposedly included in investment portfolios—which is supposed to be more restrictive for impact portfolios, notably because of the aggregate positive externalities that should stem from impact firms. However, the debate in the literature has largely been theoretical so far and, to the best of our knowledge, no study has ever analyzed whether those theoretical differences flow through to practical investment management, particularly when it comes to large equity mutual funds. That is the reason why, in the second chapter of this thesis, we contribute to the existing literature by empirically comparing the financial performance and diversification of impact and SRI fund portfolios and by deriving several implications for their asset selection processes.

### **II.iii. Uncovering the Motives behind Agents' Sustainable Asset Allocation Decisions**

Over the years, the steady growth of sustainable finance practices has led academic researchers to investigate the set of motives behind agents' sustainable asset allocation decisions. A few decades ago, several scholars introduced some key concepts that went on shaping research on the topic. For instance, Andreoni (1989 and 1990) introduced the concept of “warm glow”—experiencing positive feelings following one's prosocial behavior—and demonstrated the relevance of an “impure altruism” modeling of giving. In the 2000s, Akerlof and Kranton (2000 and 2005) described how identity—an individual's sense of self—influences economic decisions and outcomes, and notably prosocial behavior (Chen and Li, 2009). A few years later, Bénabou and Tirole (2010) divided the motives behind prosocial behavior into three categories, namely



intrinsic altruistic motivation, material self-interest, and social or self-image concerns. That mixture of drivers, they argued, varies across individuals and contexts (Bénabou and Tirole, 2006).

To date, most of the empirical research on the topic has focused on the motives behind the holding of sustainable investment portfolios. In particular, there has been an intense debate about the relative roles of financial and non-financial motives in driving allocation to sustainable investments. Several studies conclude that financial motives—expectations about risk and return—chiefly affect sustainable investment decisions (Døskeland and Pedersen, 2016; Kollenda, 2021). Yet, other studies emphasize the critical role of non-financial motives, such as social preferences and signaling (Riedl and Smeets, 2017; Colonnello, Curatola and Gioffré, 2019; Bauer, Ruof and Smeets, 2021). Finally, researchers such as Hartzmark and Sussman (2019) shed light on the links between the two types of motives, notably providing evidence consistent with the influence of positive affect on individuals' expectations of sustainable investments' performance.

The advent of social banks in the wake of the 2008 financial crisis provided a new opportunity to study the determinants of agents' sustainable asset allocation decisions, in a setting that is quite different from that of sustainable—mostly socially responsible—investments, as explained in Section I.vi. Accordingly, several studies investigate the motives behind the behavior of agents in the social banking industry. For example, analyzing the interaction between lenders and borrowers in a theoretical setting, Barigozzi and Tedeschi (2015) argue that entrepreneurs who borrow from social banks and undertake an ethical project obtain a non-financial premium for social responsibility. In parallel, in another theoretical modeling, Cornée, Jegers and Szafarz (2022) emphasize the role of funders' social preferences in the social banking value chain. Empirical studies have, to the best of our knowledge, focused on social bankers as well as on the clientele of social banks. For instance, Cornée, Masclet and Thenet (2012) conjecture that social bankers often grant fairer credit conditions to borrowers due to their pronounced social preferences. Focusing on social banks' customers, Bauer and Smeets (2015) find a positive relationship between an individual's social identification and the share of its wealth allocated to social banks. Finally, Krause and Battenfeld (2019) show that social banking customers have higher social and weaker financial preferences than clients at conventional banks.

An important observation from the studies presented above is that no empirical research has been conducted so far on the motives of social banks' owners—the individuals and/or organizations that buy the shares of social banks and thereby capitalize them. Yet, as they are designed to fund projects that address social and environmental issues, it is important to ensure that social banks

are properly and sufficiently capitalized to fund such projects. Uncovering the motives of social banks' owners is a step in that direction, as it may help to accelerate the provision of additional capital to social banks, thereby contributing to their development. This, in turn, will enable the scaling of solutions to address current societal challenges. That is the reason why, in the third chapter of this thesis, we contribute to the existing literature by establishing the motivational profile of social banks' owners. To do so, we partner with a newly created Belgian social bank, and assemble a unique dataset that combines survey questions and individual behavior in an incentivized experiment.

### **III. Structure of the Thesis**

This thesis is made of three chapters that are derived from three papers whose common aim is to contribute to the literature that addresses fundamental questions linked to sustainable finance practices. The three chapters have been written under the joint supervision of Oscar Bernal (Université de Namur) and Marek Hudon (Université Libre de Bruxelles), who are also co-authors of the first and third chapters. The first chapter has notably been published as a paper in 2021 in the *Quarterly Review of Economics and Finance*. In the subsections below, we provide an executive summary of each chapter.

#### **III.i. Chapter 1 – Are Impact and Financial Returns Mutually Exclusive? Evidence from Publicly Listed Impact Investments**

This first chapter has been written at a time when the academic literature on impact investments was still in its infancy. Noticeably, there was a relative scarcity of academic studies investigating the financial performance and diversification potential of impact investments. A notable exception was the paper by Barber, Morse and Yasuda (2021). Yet, as explained in Section II.i, that paper focuses on venture capital (VC) and growth equity funds and, hence, uses privately-owned data, which poses issues of transparency and replicability. In particular, it is possible that private impact funds do not report on underperforming investments (Watts and Scales, 2020), which may bias financial performance assessments. Practitioner studies, which at the time formed the bulk of research on the financial performance of impact investments, also relied on data from private funds. Moreover, those studies exhibited a series of inconsistencies. For instance, several studies compared private equity and VC impact funds to conventional public market benchmarks, while other studies did not fully account for fund fees in their performance assessments. Our goal in this first chapter was to overcome the above-mentioned issues by taking advantage of the growth of the impact investing market segment dedicated to listed firms. This also allowed us to study the

financial features of impact investments in a setting characterized by higher liquidity, harsher competition, and greater regulatory compliance.

To investigate the financial performance and diversification potential of impact investments, we construct a market capitalization-weighted Impact Investing Index made of 16 listed impact firms spread across 7 different sectors. Most of the impact firms are developed market microcap companies located in the United-Kingdom. An essential common feature of those firms is that they have all been part of the Impact Group (IG), a UK-based organization whose conception of impact investing derives from that of the GIIN—one of the most influential institutions in the field of impact investing (Höchstädter and Scheck, 2015). To be recognized as an impact firm by the IG, a company must go through its stringent admission process and commit to relevant UN SDGs in the long-term. This rigorous identification process of impact firms is essential for at least two reasons. First, it makes sure that our sample is exclusively made of firms with aggregate positive externalities (Hockerts et al., 2022) and is free of greenwashing concerns (Brandon et al., 2022; Kim and Yoon, 2022). Second, it avoids bundling together assets belonging to different investment strategies (Atz et al., 2023), a methodology that might ultimately lead to unreliable and/or mixed findings.

In our empirical analysis, we compare the Impact Investing Index to a series of conventional MSCI small and microcap indices over a period of almost 10 years, from 2009 to 2018. To assess impact and conventional indices' alphas, we use the four-factor model of Carhart (1997) as the most adopted risk-adjusted performance measurement tool in the related literature (see, for instance, Hong and Kacperczyk, 2009 or Nofsinger and Varma, 2014). In doing so, we contemplate the possibility that impact investors might accept risk-adjusted returns that underperform relative to conventional investors. In parallel, we study the financial return correlations between impact and conventional indices using Dynamic Conditional Correlation Multivariate GARCH modeling (Engle and Sheppard, 2001; Engle, 2002) to assess the diversification potential of impact investments regarding conventional markets. Considering the substantial growth and transformation of the impact investing industry over the years (Hehenberger, Mair and Metz, 2019), we conjecture that its correlation with conventional markets might have evolved over the period under study.

Overall, our findings point to a strong underperformance of listed impact investments. Indeed, not only does the Impact Investing Index have a significantly negative alpha, but it also delivers negative annualized returns to impact investors, highlighting that the latter may derive non-financial utility from their investments. The results also indicate that the diversification potential of listed impact investments regarding conventional markets slowly decreases over time,

suggesting that impact investors attach only limited weight to this aspect. As a matter of fact, our decisions to only focus on listed firms and to rely on the GIIN's rigorous definition of impact investments led us to assemble a small sample of impact firms. We therefore consider that our results provide an insightful contribution that still ought to be interpreted with the utmost caution. Accordingly, it is important that future research assesses whether our results generalize to larger samples of impact firms that may notably be assembled based on alternative definitions and criteria.

### **III.ii. Chapter 2 – More of the Same? Comparing Impact and Socially Responsible Investments**

As explained in Section II.ii, the goal of this second chapter is to analyze whether the theoretical differences between impact and socially responsible investments translate into significant financial performance and diversification differences at the fund level. Our rationale is that the differences between the two investment strategies are supposed to affect funds' financial outcomes via the asset selection processes. In particular, we initially hypothesize that impact funds use asset selection processes that are more restrictive than that of SRI funds, which should lead to less diversified and underperforming impact portfolios, in line with the rationale of Pástor, Stambaugh and Taylor (2021) and Modern Portfolio Theory. This research is relevant for at least two reasons. Firstly, it is important for investors to know whether funds walk the walk, and indeed select portfolio companies by means of a process that is in line with the criteria of the investment strategy that the funds pretend to commit to. Failure to do so might mislead investors and raise concerns about greenwashing (Brandon et al., 2022; Kim and Yoon, 2022). Secondly, the underperformance of impact investments compared to SRI could potentially impede the future growth of the impact investing industry and prevent it from massively scaling high-impact solutions to address societal challenges. Indeed, as demonstrated by Heeb et al. (2022), investors' willingness-to-pay for sustainable investments may not increase proportionally with impact, as positive emotions rather than real impact drive investors' allocations to sustainable assets (see also Bonnefon et al., 2022). Hence, if impact portfolios underperform SRI portfolios, the average sustainable investor may not have the necessary WTP to support impact firms.

In order to reliably compare impact and socially responsible investments, two conditions are necessary. First, we must make use of comparable investment vehicles. Hence, this study focuses on large equity mutual funds, which are the standard investment vehicle in the SRI industry and have started to be used by impact investors. Second, we must use a rigorous identification process to unambiguously classify funds, for the reasons detailed in Section III.i above. We therefore start with the rigorous selection of three impact funds recognized by the GIIN and listed on its online

database ImpactBase. Those funds are European mutual funds managed by major financial institutions and with a global investment focus on public equities. The GIIN initially listed six of those funds, three of which we could not select, essentially for data availability reasons. We next associate each of the three impact funds to three comparable SRI funds by means of a proven matching methodology.

In our empirical analysis, we assess funds' risk-adjusted financial performance using the one-, three-, and four-factor models (Sharpe, 1964; Lintner, 1965; Fama and French, 1993; Carhart, 1997). To assess funds' level of diversification, we mainly rely on two proven metrics from the financial literature, namely the normalized variance ratio (Goetzmann and Kumar, 2008) and the sum of squared portfolio weights (Nofsinger and Varma, 2013). Overall, we find that the risk-adjusted returns of impact and SRI funds are statistically indistinguishable, at least during the period under study. In the same vein, our findings reveal that reducing aggregate portfolio volatility via diversification is as possible with impact funds as it is with SRI funds. In a bid to understand why the results contradict our initial hypotheses, we inquire into funds' asset selection processes and find out that these are rather homogeneous and akin to socially responsible rather than impact investment processes. We subsequently formulate four proposals to explain that propinquity in asset selection processes: (i) profitability, diversification, and liquidity constraints, (ii) information asymmetry between fund managers and retail investors, (iii) fund managers' herd behavior, and (iv) regulation incompleteness. We conclude that our analysis of funds' investment policies casts doubts on the nature of impact funds in our sample and therefore on their real non-financial impact on society, in line with the recent findings of Berg, Heeb and Kölbel (2022), Duchin, Gao and Xu (2022), and Gosling and MacNeil (2023).

Given the small number of mutual funds in our sample, our results and conclusions in this chapter undoubtedly ought to be challenged by the findings obtained from larger datasets. Moreover, our results and conclusions may also depend on our conceptual differentiation of impact and socially responsible investing, which helps to structure the empirical work and to provide intelligible conclusions, but likely has limitations. In that respect, our decision to impose that impact funds in our sample be recognized by the GIIN has important implications. Indeed, while it ensures coherence and consistency in our selection of impact mutual funds, it also strongly restricts our sample size. In the end, while we acknowledge the limited scope and implications of our results, we nevertheless view them as insightful findings paving the way for future research on the conceptualization, distinctiveness, and practical implementation of sustainable investment strategies.

### **III.iii. Chapter 3 – Who Buys Social Bank Shares? Exploring Financial and Non-Pecuniary Individual Motives**

In this third chapter, we aim to analyze why private individuals buy social bank shares. As the scaling of solutions to address societal concerns has become increasingly challenging, uncovering the mixture of motives behind the acquisition of shares of social banks may accelerate the provision of capital to these double bottom line financial intermediaries (Weber, 2014). To the best of our knowledge, theories developed to describe the motivational profile of social banks' owners still lack empirical support, and numerous motives may actually drive their decision to buy social bank shares. Indeed, besides traditional considerations of financial risk and return, the decision of social owners may be driven by their intrinsic social preferences, the latter being known for influencing the behavior of economic agents (Bénabou and Tirole, 2010) and notably their holding of sustainable investment funds (Riedl and Smeets, 2017). Another possibility is that social owners act to signal prosocial behavior, thereby attempting to enhance their social reputation (Ariely, Bracha and Meier, 2009). It may also be that social owners' decision be influenced by previous investment decisions in sustainable financial products or by habits to donating to charitable organizations. Finally, buying social bank shares may also be prompted by a lack of trust in the traditional banking sector (Fungáčová, Hasan and Weill, 2019).

To uncover the drivers of capital flows to social banks, we assemble a unique dataset by combining survey questions and behavior in an incentivized experiment. Specifically, we first obtain data on members of a Belgian social bank, who are private individuals who decided to buy shares in the latter during its initial fundraising campaign in 2019. We then merge these data with data on non-members—private individuals who decided not to buy shares in the social bank during the same fundraising campaign. Using a sample of 1068 individuals, we can thus relate the latter's survey and experiment data to their field decision of bringing or not capital to the social bank. Experiment data allow us to reliably analyze the role of social preferences by using a behaviorally meaningful measure. To obtain that measure, we invite members and non-members to participate in a variant of the controlled and anonymous one-shot trust game experiment introduced by Berg, Dickhaut and McCabe (1995). In our empirical analysis, we rely on Probit and Ordered Probit regressions to investigate the role of non-financial motives, financial motives, as well as a battery of individual characteristics.

Overall, our findings reveal that individuals who buy social bank shares are characterized by a pronounced deficit of trust towards conventional banks. Moreover, their decision to fund social banks is primarily driven by non-financial motives. In particular, we show that, contrary to social signaling, social preferences play a meaningful role in the acquisition of social bank shares. These

results indicate that social owners likely have genuine non-pecuniary motives and do not seem to fund social banks to improve their social image and reputation. Holding sustainable financial products and donating more to charities are also found to be positively influencing the likelihood of becoming a social owner. Lastly, we find that financial considerations also make a difference, notably influencing the amount spent on social bank shares. However, their role remains secondary relative to that of non-financial motives, in line with similar results for social bank customers (Krause and Battenfeld, 2019) and sustainable investors (Riedl and Smeets, 2017). Assuredly, our analysis has several limitations. Indeed, our reliance on data from a single social bank, our focus on Belgian private individuals, and the important time lag that separates the fundraising campaign and our survey all ask for caution in the interpretation and generalization of our conclusions. We therefore encourage the production of future research to challenge and assess the external validity of our findings.

The rest of this manuscript provides the full text of the three chapters summarized above, as well as a few pages dedicated to general concluding thoughts.

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# Chapter 1 Are Impact and Financial Returns Mutually Exclusive? Evidence from Publicly Listed Impact Investments<sup>1</sup>

## 1.1. Introduction

The inclusion of the social and environmental dimensions of investment in finance is of increasing interest to both researchers and practitioners. In this chapter, we focus on impact investments, which combine philanthropy with mainstream finance (Höchstädter and Scheck, 2015) and are defined by the Global Impact Investing Network (GIIN)<sup>2</sup> as “investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return”.<sup>3</sup>

Impact investing is part of a broader movement of sustainable finance practices that aim to transform the investment paradigm (Hehenberger, Mair and Metz, 2019) and promote the development of “ethical capitalism” (Watts and Scales, 2020). Examples of such sustainable finance practices include socially responsible investing (Nofsinger and Varma, 2014; Lapanan, 2018), microfinance (Morduch, 1999; Dorfleitner, Röhe and Renier, 2017), social entrepreneurship (Dacin and Dacin, 2011) and corporate social responsibility (Liang and Renneboog, 2017).

In our view, impact investing differs from these practices, starting with socially responsible investing. Indeed, impact investors actively seek to fund projects with a positive and measurable social or environmental objective (Lee, Adbi and Singh, 2020), whereas socially responsible investors rather aim to promote sound environmental, social, ethical, and governance corporate practices (Morduch and Ogden, 2018). Impact investing also differs from microfinance, as it involves investment into innovative organizations that tackle societal issues (Viviani and Maurel, 2019), whereas microfinance does not necessarily impose restrictions on the nature of the projects

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<sup>1</sup> This chapter has been published in 2021 in the Quarterly Review of Economics and Finance (copyright Elsevier). The MSCI data contained herein is the property of MSCI Inc. (MSCI). MSCI, its affiliates and its information providers make no warranties with respect to any such data. The MSCI data contained herein is used under license and may not be further used, distributed, or disseminated without the express written consent of MSCI.

<sup>2</sup> Although the GIIN is currently the most influential institution in the field of impact investing, other conceptions of impact investing exist as well (although they are less influential). This situation is not characteristic of impact investing, since there is also a heterogeneity of conceptions for related practices, such as socially responsible investing (Sandberg et al., 2009).

<sup>3</sup> See <https://thegiin.org/impact-investing/> (page accessed 13 August 2023).



developed by micro-entrepreneurs (Watts and Scales, 2020). Impact investors carefully and exclusively select firms that are demonstrably able to deliver significant social value, and they hold larger equity stakes in those firms that are the most socially valuable (Chowdhry, Davies and Waters, 2019).

Interest in impact investing has increased over recent years (Chowdhry, Davies and Waters, 2019). As a matter of fact, the European Sustainable Investment Forum documented an annual growth rate of 52% between 2011 and 2017 in European impact investments (Eurosif, 2018), while in the United States, the Forum for Sustainable and Responsible Investment reported a 38% growth in sustainable, responsible and impact investments between 2016 and 2018 (US SIF, 2018). Overall, the GIIN estimates the current market size to be of USD 1.164 trillion.<sup>4</sup>

Yet, the field of impact investing is still young (Höchstädter and Scheck, 2015) and questions remain about both the financial performance and diversification potential of impact investments. While these issues have already been discussed in the literature, practitioner studies (e.g., Mudaliar and Bass, 2017) and the very few academic papers on the topic (e.g., Barber, Morse and Yasuda, 2021) relied almost exclusively on privately-owned data. Our goal in this chapter is therefore to take advantage of both the emergence of social stock exchanges and the increasing number of publicly-listed impact firms to improve our knowledge of those issues using public data. In particular, we investigate the critical question of whether listed impact firms provide investors with non-negative financial returns (Rangan, Appleby and Moon, 2011).

Our empirical analysis relies on an impact investing index constructed from an original dataset essentially composed of European impact firms within the Impact Group (IG), a UK-based organization that identifies impact firms through a stringent admission process. We compare the Impact Investing Index to a series of MSCI benchmark indices over a period ranging from 2009 to 2018. We use the traditional four-factor model (Fama and French, 1993; Carhart, 1997) to analyze financial performance, and we rely on DCC-MVGARCH modeling (Engle and Sheppard, 2001; Engle, 2002) to assess diversification potential.

Overall, not only do our results hint at a risk-adjusted underperformance of impact compared to traditional investments, they also reveal impact firms' failure to deliver non-negative returns to investors, though some improvement is observed starting from 2014. This contradicts the win-win situation presented in the practitioner literature (e.g., Mudaliar and Bass, 2017). Our results also highlight a decreasing diversification potential of impact investments with regard to

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<sup>4</sup> See <https://thegiin.org/research/publication/impact-investing-market-size-2022/> (page accessed 13 August 2023).

mainstream markets. Taken together, and in line with the results of Barber, Morse and Yasuda (2021) and Riedl and Smeets (2017), these insights suggest that investors in listed impact firms must accept to pay a high price for investing according to their values.

The rest of the chapter is organized as follows. Section 1.2 provides a review of the impact investing literature. Section 1.3 discusses the challenge related to data accessibility, the empirical methodology and the features of the dataset. The results are presented in Section 1.4, and Section 1.5 contains robustness tests. Section 1.6 provides a discussion of the findings. Finally, we present our conclusions in Section 1.7.

## **1.2. A Literature Review of Impact Investing**

Impact investing is a recent research field (Höchstädter and Scheck, 2015; Chowdhry, Davies and Waters, 2019) and, among numerous research gaps, two issues are of particular interest to investors, fund managers, and researchers. Firstly, is impact investing a financially sustainable investment practice (Hehenberger, Mair and Metz, 2019) that delivers non-negative financial returns alongside a positive societal impact? Secondly, do impact firms contribute to portfolio diversification?<sup>5</sup>

### **1.2.1. Financial Performance**

Numerous studies assess the financial performance of investments with a sustainability dimension. To start with, a number of studies compare the financial performance of socially responsible and traditional investments. That literature stream delivers several results. For instance, Bialkowski and Starks (2016) conclude that there is no statistical difference in risk-adjusted returns between socially responsible and conventional equity mutual funds, whereas other studies highlight financial costs linked to socially responsible investing (e.g., Hong and Kacperczyk, 2009). Taking a wider perspective, Orlitzky (2011) explains that study results on the relationship between corporate social and financial performance differ at times. Some studies find a positive relationship whereas other studies find a nonsignificant or even a negative relationship. More recently, in an attempt to provide empirical evidence for the rationale behind the holding of socially responsible mutual funds by investors, Riedl and Smeets (2017) showed that financial motives play less of a role compared to social preferences and signaling in explaining investment decisions.

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<sup>5</sup> These two issues are of particular relevance to asset managers who are bound to a fiduciary duty and whose clients request impact investments. These managers must know whether it is possible to do well while doing good at the same time.

As for the field of impact investing more specifically, so far, contributions have mostly taken the form of non-academic, practitioner studies relying mainly on privately-owned data (e.g., Gray et al., 2015; Matthews et al., 2015). Recently, Mudaliar and Bass (2017) reviewed practitioner studies dedicated to the financial performance of impact investments and concluded that market-rate financial returns were within reach in private equity impact investing. However, these works suffer from a series of drawbacks. For instance, some studies compare private equity and venture capital impact investments to mainstream public market benchmarks, whose functioning and risk-return profile might be significantly different. The fact that fees are not always properly taken into account constitutes another important issue.

In one of the very few academic studies on the financial performance of impact investments, Barber, Morse and Yasuda (2021) find that venture and growth equity impact funds earn an internal rate of return that is 4.7 percentage points lower than traditional venture capital funds. They conclude that impact investors are willing to sacrifice part of the financial return for investing in dual-objective funds. A few attempts to study impact investments' financial performance relying on public data have also emerged in the past few years (La Torre, Chiappini and Mango, 2017; Biasin et al., 2019).

### **1.2.2. Diversification Potential**

Whether impact investments contribute to portfolio diversification is another important issue. Results in the related SRI literature show that socially responsible investors attach only limited importance to diversification in their investment decisions. For instance, Barreda-Tarrazona, Matallín-Sáez and Balaguer-Franch (2011) found that investors who cared about social responsibility would invest significantly more in the socially responsible alternative even if the return differential was highly unfavorable compared to other projects. Similarly, Riedl and Smeets (2017) found that only a marginal share of investors would hold socially responsible investment funds for diversification purposes.

As with socially responsible investing, impact investing reduces the size of the initial possible universe, thereby shifting the mean-variance frontier towards unfavorable risk-return trade-offs compared to mainstream portfolios (Renneboog, Horst and Zhang, 2008a). Consequently, according to traditional financial theory, there is no rationale for building a portfolio exclusively made of impact investments. However, it may prove coherent for investors to add impact assets to a portfolio initially made of traditional assets if this improves diversification. For the rest of this chapter, the terms “diversification” and “diversification potential” will always refer to impact investments' diversification potential with regard to traditional assets.

## 1.3. Data and Methodology

### 1.3.1. The Data Challenge

Access to relevant data and metrics for impact investments constitutes a key issue. While several advances have been made in improving data accessibility, with projects such as IRIS Metrics<sup>6</sup>, studies on impact investments still largely rely on privately-owned data, which leads to issues of transparency and replicability. Indeed, in a competitive marketplace, private impact funds generally do not share their investment data and, if they do, they are unlikely to report on underperforming investments (Watts and Scales, 2020), which might lead to performance overstatement. Added to that, the link between financial performance and societal impact may be hard to establish. It is therefore the objective of this chapter to circumvent those issues and extend current knowledge on impact investing by relying on data from publicly-listed firms.

Several stock market indices have already been created for socially responsible firms.<sup>7</sup> Yet, at the time of writing this chapter, to the best of our knowledge, there is no index which focuses exclusively on impact firms. Indeed, although the recent MSCI ACWI Sustainable Impact Index<sup>8</sup> seemed to go in the right direction, its constituent firms are in fact only required to generate “at least 50% of their sales from one of MSCI’s Sustainable Impact categories”<sup>9</sup>, which leaves room for companies and activities that are inconsistent with the goals of impact investing. In this respect, the numerous projects that globally aim to set up stock exchanges for social firms constitute an unprecedented opportunity to study what investors can expect from listed impact companies.<sup>10</sup>

Among these so-called social stock exchanges, the case of the Impact Group (IG)<sup>11</sup> is particularly interesting. The IG is a licensee of the Social Stock Exchange (SSX)<sup>12</sup>, whose conception of

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<sup>6</sup> See <https://iris.thegiin.org/metrics> (page accessed 13 August 2023).

<sup>7</sup> See, for instance, MSCI KLD 400, MSCI SRI or MSCI ESG Leaders (<https://www.msci.com/esg-indexes>; page accessed 13 August 2023).

<sup>8</sup> See <https://www.msci.com/msci-acwi-sustainable-impact-index> (page accessed 13 August 2023).

<sup>9</sup> See <https://www.msci.com/documents/10199/6d2b3e68-90e0-448e-bd52-eaf0397539d1> (page accessed 13 August 2023).

<sup>10</sup> Past and current initiatives of this kind include: Germany’s NEXT SSE; the UK’s Impact Group; Singapore’s Impact Investment Exchange; South Africa’s Nexii, SASIX and Johannesburg Stock Exchange; Canada’s Social Venture Connexion; the United States’ Mission Markets; Brazil’s Bolsa de Valores Socioambientais and BrieX; Kenya’s Social Investment eXchange.

<sup>11</sup> See <https://impactgroup.info/> (page accessed 19 April 2023).

<sup>12</sup> The SSX was launched in June 2013 with the aim to develop and democratize the market for impact investments, as well as increase funds flow to businesses with a social and/or environmental dimension.

impact investing is based on the United Nations', which itself relies on the GIIN definition.<sup>13</sup> IG member companies undergo a strict admission process<sup>14</sup> and must commit to “measuring and monitoring progress against relevant United Nations Sustainable Development Goals”.<sup>15</sup> That being said, IG member firms are not directly traded on the IG platform. Rather, they are listed on mainstream exchanges such as the London Stock Exchange, the Frankfurt Stock Exchange or the NASDAQ. Hence, the IG's role is to provide investors with the “impact investment” seal. This chapter relies on the IG's original and unique dataset to assess the financial performance and diversification potential of listed impact firms.

### 1.3.2. The Financial Performance of Impact Investments

#### 1.3.2.1. A Multifactor Analysis of Impact Investing

Our analysis of impact firms' financial performance relies on Carhart's (1997) four-factor model, which adds the so-called momentum factor to the Fama and French (1993) three-factor model. The momentum factor relates to Jegadeesh and Titman's (1993) one-year momentum effect and to momentum investing<sup>16</sup>, which makes the four-factor model an active management evaluation model. Recent work by Fama and French (2015) introduces a new five-factor model. However, that model does not consider the momentum factor and, as acknowledged by the authors themselves, it fails to “capture the low average returns on small stocks whose returns behave like those of firms that invest a lot despite low profitability”. Given these limitations, we decided to rely on the four-factor model, which is the most-frequently adopted specification in the related literature<sup>17</sup> and is presented in Equation (1.1):

$$R_{i,t} - rf_t = \alpha_i + \beta_{MRP,i}MRP_t + \beta_{SMB,i}SMB_t + \beta_{HML,i}HML_t + \beta_{WML,i}WML_t + \varepsilon_{i,t} \quad (1.1)$$

where  $R_{i,t}$  is the weekly return of index  $i$  at time  $t$ ,  $rf_t$  is the risk-free rate<sup>18</sup> at time  $t$ ,  $\alpha_i$  is the intercept of the model for index  $i$ , and  $\varepsilon_{i,t}$  is the disturbance term for index  $i$  at time  $t$ .  $\beta_{MRP,i}$ ,  $\beta_{SMB,i}$ ,  $\beta_{HML,i}$  and  $\beta_{WML,i}$  are the factor loadings on the market ( $MRP_t$ ), firm size ( $SMB_t$ ), book-

<sup>13</sup> See <http://www.undp.org/content/sdfinance/en/home/solutions/impact-investment.html> (page accessed 13 August 2023).

<sup>14</sup> For further details, see <https://impactgroup.info/network-accreditation/> (page accessed 19 April 2023).

<sup>15</sup> See <https://impactgroup.info/network-accreditation/> (page accessed 19 April 2023).

<sup>16</sup> Momentum investing consists in recommending buying or selling a security based on its past performance.

<sup>17</sup> See, for instance, Renneboog, Horst and Zhang (2008b), Nofsinger and Varma (2014) or Brière and Szafarz (2015).

<sup>18</sup> Depending on the model specification (see below), we use the US, UK or German one-month government bond yield as risk-free rate. US data were retrieved from Professor Kenneth French's website, while UK and German data come from Datastream.

to-market ( $HML_t$ ) and momentum ( $WML_t$ ) factors, respectively. Depending on the model specification (see below), we considered the perspective of either a developed market or a European investor as regards the four factors. All weekly returns are in United States dollars (USD), and data for the four factors were retrieved from Professor Kenneth French's website.<sup>19</sup>

The main objective of this analysis is to compare the risk-adjusted performances (alphas) of impact and traditional companies, a question that goes beyond that of the financial sustainability of impact investing. Indeed, if impact firms are expected to be financially sustainable (Hehenberger, Mair and Metz, 2019), they are also considered riskier, notably because they are often pioneers in high-risk environments (Watts and Scales, 2020). Consequently, impact investors might accept non-negative returns that underperform with regard to the risks they take on (Morduch and Ogden, 2018), a practice which is opposite to that of traditional investors. The analysis will also allow us to identify the factors that matter for understanding variations in the excess returns of impact companies, and to compare the results to those obtained for traditional firms. The analysis requires us to estimate Equation (1.1) using excess returns for impact and traditional companies, the latter serving as benchmarks.

### 1.3.2.2. Impact Companies' Returns

We used a dataset assembled from the IG's database of listed impact firms. Our dataset included firms that were IG members in May 2018 (seven firms) and firms that had been members of the IG at some point before May 2018, but were no longer members at the time of data collection (ten firms). For the sake of consistency, we carefully checked whether these companies' activities were still in line with the IG's conception of impact investing. This process led to the exclusion of one firm from our dataset. As a matter of fact, the IG confirmed that leaving the network was not necessarily associated with impact deficiencies. The final dataset comprised 16 listed impact companies.<sup>20</sup> Tables A.1 and A.2 in Appendix A list the characteristics of these companies. Table A.1 is particularly relevant, as it lists IG member firms and provides an overview of their business activities. Although IG membership is granted according to proprietary criteria that turn the admission process into a black box, the information in Table A.1 provides the outcome of that

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<sup>19</sup> See [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html) (page accessed 13 August 2023).

<sup>20</sup> Small sample sizes are a common feature of studies that attempt to work with publicly-listed impact firms. Indeed, La Torre, Chiappini and Mango (2017) work with a sample of 8 firms, while Biasin et al. (2019) have a sample of 52 firms. However, the sample from Biasin et al. (2019) actually comprises two subsamples whose selection criteria differ, a practice that may lead to unreliable conclusions (Atz et al., 2023).

process and therefore makes it possible to transparently link the financial performance of member firms to their societal impact, a crucial point for investors, asset managers and researchers.

Table A.2 shows that the sample contains only developed market companies, 69% of which are located in the UK. Interestingly, all the companies were established after 1990. The majority of the firms (75%) list on an exchange that is based in London, and have their stocks traded in GBP (penny stocks). The London Stock Exchange (LSE) is home to 56% of the firms in the sample, with 37% of the companies listed on the Alternative Investment Market (AIM), a sub-segment of the LSE dedicated to smaller, growing firms. Overall, firms in the sample belong to seven different sectors, ranging from energy and technology to real estate and financial services. Average market capitalizations range from USD 0.55 million to USD 809.73 million, with an average of USD 156.89 million. However, the median average market capitalization is USD 43.52 million, and 12 firms have an average market capitalization that is below USD 80 million. This indicates that four firms have a large average market size compared to the rest of the sample.

Using weekly logarithmic returns for the 16 impact firms, we constructed a market capitalization-weighted Impact Investing Index (see Table A.3 in Appendix A for some descriptive statistics of its constituents).<sup>21</sup> At the time of writing this chapter, the Impact Group's dataset of listed impact firms is, to the best of our knowledge, the only coherent and structured census of such firms in the market. We therefore consider our sample as the only representation of the complete universe of listed impact firms available at that moment, and consequently decide to aggregate all firms into an index. Impact companies entered the index progressively, as they went public, between January 2009 and December 2016. The Impact Investing Index started with nine impact companies on 5 January 2009. The start date was chosen for two main reasons. Firstly, the GIIN was created in 2009, so choosing this start date ensured that the conception of impact investing used in the empirical work was consistent. Secondly, by starting in 2009, we also sought to remove the extreme first months of the 2008 financial crisis from the sample.

Despite the limited number of companies in the Impact Investing Index, we consider our dataset to be particularly relevant for the purpose of assessing listed impact companies. Indeed, it has the

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<sup>21</sup> More precisely, we used daily, weekly and monthly logarithmic total returns, depending on the frequency that was most appropriate for a given methodology or for robustness tests. Indices' daily and weekly return series start on 5 January 2009, while indices' monthly return series start on 1 February 2009. All indices' return series end on 31 May 2018. Logarithmic total returns were computed using USD total return indices (reinvestment of dividends). As to weights, they were computed every period (i.e., every day, week, or month, depending on the series' frequency) by dividing an impact firm's market capitalization by the total market capitalization of the Impact Investing Index.

twofold advantage of proposing a transparent set of impact firms selected according to a rigorous process that remains, as far as we know, the only coherent initiative of this kind in the market.

### 1.3.2.3. Traditional Companies' Returns

The selection of benchmark indices consisting of non-impact, traditional companies was performed as follows. Table A.2 shows that 81% of the impact firms are located in Europe and 69% in the UK. Hence, we began the selection of benchmark indices by restricting our scope to European and UK indices. For the UK, we started with MSCI UK's small and micro capitalization indices. Market capitalization figures for these indices and the Impact Investing Index are presented in Table 1.1. We concluded that the MSCI UK Micro Cap was the index that was closest to the figures of the Impact Investing Index and, therefore, we selected it as the first UK benchmark index. We also selected the MSCI UK Small + Micro Cap, for extending the scope of the analysis.

For European indices, we proceeded in a similar way, using MSCI Europe's small and micro capitalization indices as a starting point. These indices are presented in Table 1.2. We concluded that the MSCI Europe Micro Cap was the index that was closest to the figures of the Impact Investing Index. Therefore, we selected it as the first European benchmark index. The MSCI Europe Small + Micro Cap was also selected, for extending the scope of the analysis.

All total return data (reinvestment of dividends) for impact firms and benchmark indices, as well as market capitalization data for impact firms and exchange rates, are from Datastream.<sup>22</sup> It must be noted that a few impact companies were also included in the MSCI benchmark indices that we considered. However, it is reasonable to assume that the vast majority of these indices' constituents are non-impact firms.<sup>23</sup>

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<sup>22</sup> See <https://www.refinitiv.com/en> (page accessed 13 August 2023).

<sup>23</sup> The MSCI UK Micro Cap contains 4 firms from the impact dataset out of a total of 435 at the time of the study. The MSCI UK Small + Micro Cap contains 6 firms from the impact dataset out of a total of 692 at the time of the study. The MSCI Europe Micro Cap contains 4 firms from the impact dataset out of a total of 1386 at the time of the study. Finally, the MSCI Europe Small + Micro Cap contains 6 firms from the impact dataset out of a total of 2377 at the time of the study.



**Table 1.1 Market capitalization data for selected MSCI UK benchmark indices**

Constituent Sizes (M. Cap. in USDm)	Impact Investing Index	MSCI UK Small Cap Index	MSCI UK Micro Cap Index	MSCI UK Small + Micro Cap Index
Average	259	1 852	122	764
Largest	1 797	8 601	679	8 601
Smallest	0.47	73	0.52	0.52

Note: M. Cap. (market capitalization) data for the three MSCI UK indices and the Impact Investing Index. For each index, the average, largest and smallest market capitalization is presented. Data for all three MSCI indices are from MSCI as of 31 May 2018. The same holds for impact firms' market capitalization data from Datastream. All data are in USDm.

**Table 1.2 Market capitalization data for selected MSCI Europe benchmark indices**

Constituent Sizes (M. Cap. in USDm)	Impact Investing Index	MSCI Europe Small Cap Index	MSCI Europe Micro Cap Index	MSCI Europe Small + Micro Cap Index
Average	259	1 450	103	665
Largest	1 797	9 787	863	9 787
Smallest	0.47	73	0.52	0.52

Note: M. Cap. (market capitalization) data for the three MSCI European indices and the Impact Investing Index. For each index, the average, largest and smallest market capitalization is presented. Data for all three MSCI indices are from MSCI as of 31 May 2018. The same holds for impact firms' market capitalization data from Datastream. All data are in USDm.

#### 1.3.2.4. Indices' Summary Statistics

Table 1.3 displays summary statistics of the Impact Investing Index, the four benchmark indices and two reduced impact investing indices built for robustness test purposes. The Impact Investing Index (Ex-US) excludes the three US firms from the impact sample, while the Impact Investing Index (UK-only) further excludes non-UK firms from the impact sample. All four benchmark indices have a positive annualized return ranging from 12.46% to 15.18%, while all three impact investing indices deliver a negative annualized return ranging from -7.07% to -7.30%. This is in line with the fact that only four impact firms exhibit a positive annualized return (see Table A.3 in Appendix A). Impact investing indices also produce the highest volatility (unconditional standard errors ranging from 2.89% to 3.02%). All indices are left-skewed and five have fat tails, an unfavorable profile for the returns' distributions. Finally, Dickey-Fuller tests confirmed the stationarity of all series.

Figure 1.1 shows the evolution of the seven indices, using weekly cumulative returns. It can clearly be seen that all impact investing indices constantly underperform the four benchmark indices. Starting at 100, impact investing indices' values progressively decline until January 2012, and then stagnate around a value of 50 for the remaining years. By contrast, all four benchmark indices steadily increase in value and reach thresholds that lie between 290 and 350 at the end of the period under examination. Figure 1.1 is in line with the descriptive analysis, particularly

annualized returns, which also points to the strong relative underperformance of impact investing indices, as well as to their unfavorable risk-return profile when compared to the four benchmark indices.

**Table 1.3 Summary statistics of indices' weekly financial return series**

Index	Annualized Return (%)	Maximum (%)	Minimum (%)	Volatility (%)	Skewness	Kurtosis	Dickey-Fuller (P-value)
Impact Investing Index	-7.07	12.77	-12.49	2.89	-0.39	3.71	0.00
Impact Investing Index (Ex-US)	-7.30	12.54	-13.93	3.02	-0.39	3.60	0.00
Impact Investing Index (UK-only)	-7.17	12.54	-13.93	2.99	-0.42	3.79	0.00
MSCI UK Micro Cap	14.33	8.87	-14.24	2.06	-0.84	6.68	0.00
MSCI UK Small + Micro Cap	15.18	8.54	-15.85	2.47	-0.84	4.77	0.00
MSCI Europe Micro Cap	12.46	7.12	-8.53	1.93	-0.61	2.04	0.00
MSCI Europe Small + Micro Cap	14.06	7.92	-9.14	2.41	-0.60	1.95	0.00

Note: summary statistics of the USD weekly financial return series of the Impact Investing Index, the two reduced impact investing indices and the four MSCI benchmark indices. All series start on 5 January 2009 and end on 31 May 2018. The Impact Investing Index (Ex-US) consists only of European impact companies (UK firms included), whereas the Impact Investing Index (UK-only) consists exclusively of UK impact companies. The Impact Investing Index comprises all impact firms. Volatility is proxied by the unconditional standard error of weekly returns. Skewness measures the degree of asymmetry of the returns' distribution. Kurtosis is evidence of fat tails in the returns' distribution. Dickey-Fuller tests for the null hypothesis of a unit root.

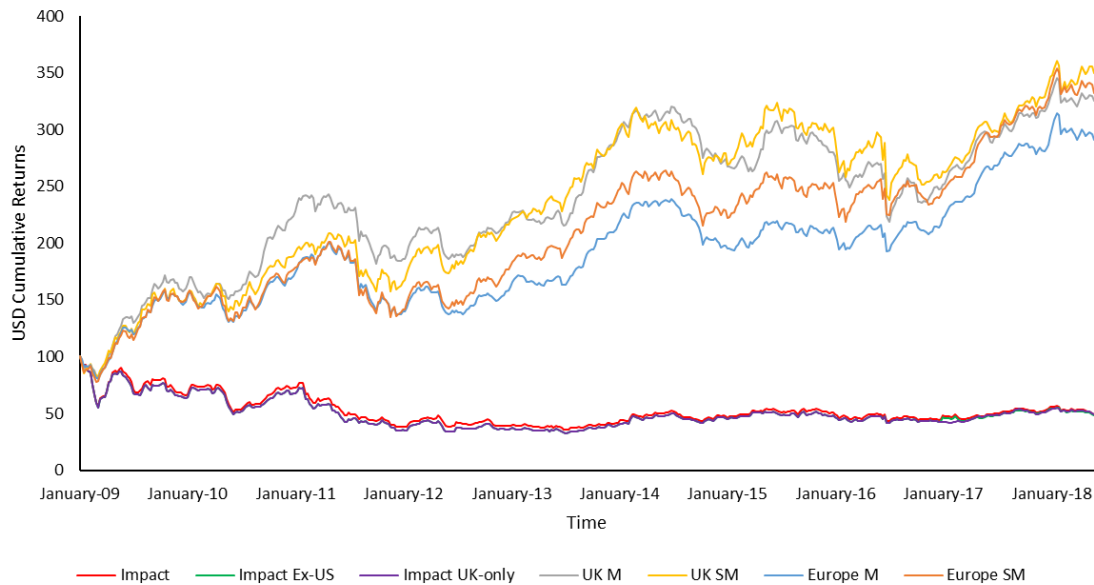
From Figure 1.1, we see that benchmark indices stop rising at the beginning of 2014, and subsequently decline for a couple of years. The decrease seems less pronounced for impact investing indices. To investigate the effects of that potential trend shift, we divided the sample in two periods: pre- and post-2014.<sup>24</sup> Table A.4 in Appendix A displays performance statistics for the Impact Investing Index and the four benchmark indices over those time periods. While the pre-2014 statistics are in line with previous results, the Impact Investing Index has a positive annualized return of 3.89% that outperforms UK benchmark indices post-2014.<sup>25</sup> Hence, although impact investors lost close to half of their initial investment over the entire period under study,

<sup>24</sup> We thank two anonymous referees for this suggestion.

<sup>25</sup> Robustness tests using monthly data confirm the results of the weekly descriptive analysis. See Tables A.17 and A.18, as well as Figures A.10 to A.12 in Appendix A.

impact firms' financial performance improved in later years.<sup>26</sup> This may be due to impact companies taking more time to recover from the 2008 financial crisis, as well as to the progressive maturation process of the impact investing industry.

**Figure 1.1 Evolution of the Impact Investing Index, the two reduced impact investing indices and the four MSCI benchmark indices between 5 January 2009 and 31 May 2018, USD weekly cumulative returns (starting value of 100 on 5 January 2009).**



### 1.3.3. The Diversification Potential of Impact Investments

#### 1.3.3.1. Dynamic Conditional Correlation Multivariate GARCH

To assess whether adding impact assets to a portfolio of traditional investments improves diversification, we analyzed the financial return correlations between impact and traditional companies. Since the impact investing industry had grown, structured and transformed markedly since its inception in 2007, when the term was coined (Hehenberger, Mair and Metz, 2019), we suspected that impact firms' correlation with traditional companies might have changed over time. This is why we applied Dynamic Conditional Correlation Multivariate GARCH modeling (DCC-MVGARCH; Engle and Sheppard, 2001; Engle, 2002) to study the joint movements of listed impact and traditional firms. Brière and Szafarz (2015) applied the same methodology to microfinance and financial institutions.

As in Engle and Sheppard (2001), we assumed that the  $n$  indices' daily logarithmic returns, represented by the vector  $r_t = (r_{1t}, r_{2t}, \dots, r_{nt})'$ , are conditionally multivariate normal with  $\mu$ , the expected value, and  $H_t$ , the covariance matrix, i.e.,  $r_t | I_t \sim N(\mu, H_t)$ .  $I_t$  is the information set

<sup>26</sup> See also Figures A.1 and A.2 in Appendix A.

available at time  $t$ . The mean and variance equations of the standard  $GARCH(P, Q)$  model are as specified in Equations (1.2) and (1.3).

$$r_t = \mu + u_t \quad (1.2)$$

with  $u_t = H_t^{1/2} z_t$  and  $z_t \sim N(0,1)$ , an *i. i. d.* process.

$$h_{i,t} = \alpha_{i0} + \sum_{p=1}^P \alpha_{ip} u_{i,t-p}^2 + \sum_{q=1}^Q \beta_{iq} h_{i,t-q} \quad (1.3)$$

with  $\alpha_{i0} > 0$ ,  $\alpha_{ip} \geq 0$  ( $p = 1, \dots, P$ ),  $\beta_{iq} \geq 0$  ( $q = 1, \dots, Q$ ),  $\sum_{p=1}^P \alpha_{ip} + \sum_{q=1}^Q \beta_{iq} < 1$ .

The covariance matrix  $H_t$  was calculated as follows:

$$H_t = D_t R_t D_t \quad (1.4)$$

with  $D_t = \text{diag}(h_{1t}^{1/2}, \dots, h_{nt}^{1/2})$  for  $n$  indices, and  $R_t$  is the time-varying correlation matrix of  $\varepsilon_t$ , the standardized residuals calculated as shown in Equation (1.5).

$$\varepsilon_t = D_t^{-1} u_t \sim N(0, R_t) \quad (1.5)$$

$R_t$  is calculated as follows:

$$R_t = Q_t^{*-1} Q_t Q_t^{*-1} \quad (1.6)$$

$$Q_t = (1 - A - B) \bar{Q} + A \varepsilon_{t-1} \varepsilon'_{t-1} + B Q_{t-1} \quad (1.7)$$

with  $\bar{Q}$ , the standardized residuals' unconditional covariance, and  $Q_t^{*-1} = (\text{diag}(Q_t))^{-1/2}$ . As we used a DCC(1,1)-MVGARCH model, we must have  $A \geq 0$ ,  $B \geq 0$  and  $A + B < 1$ . The model was estimated by applying Engle's (2002) two-step log-likelihood estimation technique.

### 1.3.3.2. Preliminary Analysis: Unconditional Correlations

Vector  $r_t$  in Equation (1.2) consists of daily returns for the Impact Investing Index and the benchmark indices. Following Brière and Szafarz (2015), Table 1.4 presents unconditional correlations between the Impact Investing Index and the benchmark indices. For each pair, we computed two separate unconditional correlation coefficients, over the first half (January 2009 to September 2013) and the second half of the sampling period (October 2013 to May 2018), respectively. All unconditional correlations are statistically significant at the 1% level and range from 39.80% to 61.16%. For each pair, there seems to be an increase in correlation from one half of the sampling period to the next. This is confirmed by Fisher's *r*-to-*z* tests, which test for the statistical significance of the difference between two correlation coefficients.

However, the increase varies from one pair to another. The smallest increase, 11.45 percentage points, is found in the MSCI Europe Small + Micro Cap. The largest increase, 18.50 percentage points, is found in the MSCI UK Micro Cap. The pairs associated with the MSCI Europe Micro Cap and the MSCI UK Small + Micro Cap present increases of 13.28 and 17.80 percentage points, respectively. These preliminary results point to an increasing degree of co-movement, meaning that the diversification potential of impact investments may be decreasing over time, particularly with regard to MSCI UK benchmark indices.<sup>27</sup>

**Table 1.4 Unconditional correlations between the Impact Investing Index and MSCI benchmark indices**

Benchmark Index	MSCI UK Micro Cap	MSCI UK Small + Micro Cap	MSCI Europe Micro Cap	MSCI Europe Small + Micro Cap
First Half Correlation (%)	42.66***	40.57***	41.08***	39.80***
Second Half Correlation (%)	61.16***	58.37***	54.36***	51.25***
Fisher's r-to-z Test (P-value)	0.00	0.00	0.00	0.00

Note: unconditional correlations (%) between the Impact Investing Index and each of the four MSCI benchmark indices. Two correlations, one for the first half and one for the second half of the sampling period, are presented for each pair. Fisher's r-to-z tests test for the null hypothesis of equality between the two correlation coefficients. \*\*\* indicates statistical significance at the 1% level.

## 1.4. Results

### 1.4.1. Financial Performance

The results of the multifactor analysis are presented in Table 1.5.<sup>28</sup> We can observe that the Impact Investing Index's weekly alpha is negative, significant and has an annualized value of -10.30%, while all four benchmark indices present negative yet non-significant alphas. Hence, unlike benchmark indices, the Impact Investing Index delivers returns that underperform relative to the risks taken on by impact investors. Moreover, the underperformance is such that returns are negative over the entire study period (see Table 1.3).

<sup>27</sup> Table A.5 in Appendix A presents unconditional correlations for reduced impact investing indices. Results are qualitatively unchanged.

<sup>28</sup> We ran four-factor multiple linear regressions in line with the asymptotic Gauss-Markov assumptions for time series regression. Dickey-Fuller tests and autocorrelation functions confirmed the stationarity and weak dependence of the series, respectively. The regressions did not suffer from multicollinearity issues, with Variance Inflation Factors (VIF) below 2.5. White's tests revealed the presence of heteroskedasticity in the residuals of all regressions. Hence, we used White's heteroskedasticity-consistent standard errors. Durbin-Watson tests confirmed the presence of autocorrelation in the residuals of one regression, for which we used Newey-West standard errors that deal with both heteroskedasticity and autocorrelation issues.

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Looking at the other factors, we find that with a  $\beta_{MRP} < 1$ , the Impact Investing Index and the four benchmark indices are defensive assets, and therefore underreact to market volatility. All five indices have a positive and statistically significant  $\beta_{SMB}$ , meaning that part of the excess return is a reward for firm-size risk, which is in line with all five indices being small and micro cap-oriented. The value premium and the persistence of past returns also seem to explain variations in indices' excess returns.<sup>29</sup>

The Impact Investing Index's regression has the lowest R-squared value. This suggests that factors other than those found in the four-factor model may play some role in the specific context of impact investing. A multifactor model for impact investments might need to include a factor linked to the social and environmental mission of impact companies. Such a factor may negatively weigh on impact companies' excess returns. However, this will likely not prevent impact investors from investing in impact companies, given their high interest in the societal mission of these firms.

That being said, the results in Table A.7 in Appendix A show that the Impact Investing Index's underperformance disappears in the post-2014 period (positive and non-significant alpha). These results are in line with the descriptive findings documented in Section 1.3.2.4 and indicate that impact firms' risk-adjusted performance improved in later years. Yet, given our findings over the entire study period, the fact that some impact firms in our sample have been listed for more than a decade suggests that negative returns may not necessarily be perceived as a drawback by impact investors, as discussed in Section 1.6.

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<sup>29</sup> Table A.6 in Appendix A presents the results of the four-factor model estimation for reduced impact investing indices. The results confirm the underperformance of impact investing indices. We also ran four-factor model regressions using monthly data (see Table A.19 in Appendix A), and the results are in line with our main findings.

Table 1.5 Four-factor model estimation results

Index	$\alpha$	$\beta_{MRP}$	$\beta_{SMB}$	$\beta_{HML}$	$\beta_{WML}$	$R^2$
Impact Investing Index	-0.0021* (0.0012)	0.4516*** (0.0740)	1.1001*** (0.2061)	0.4156** (0.1716)	-0.2711** (0.1168)	0.21
MSCI UK Micro Cap	-0.0009 (0.0006)	0.1640*** (0.0584)	0.7601*** (0.1064)	0.2777*** (0.0901)	-0.2379*** (0.0598)	0.25
MSCI UK Small + Micro Cap	-0.0003 (0.0007)	0.3706*** (0.0798)	0.8057*** (0.1228)	0.3793*** (0.1193)	-0.2839*** (0.0637)	0.32
MSCI Europe Micro Cap	-0.0008 (0.0006)	0.5478*** (0.0336)	0.9572*** (0.1145)	0.2235** (0.1029)	-0.1159* (0.0612)	0.49
MSCI Europe Small + Micro Cap	-0.0001 (0.0007)	0.6886*** (0.0411)	1.0063*** (0.1282)	0.3392*** (0.1117)	-0.2000*** (0.0671)	0.54

Note: coefficient estimates for the four-factor model linear regressions using factors from developed countries. The indices considered are the Impact Investing Index and the four MSCI benchmark indices. The one-month US, UK and German government bond yields are used as risk-free rates for specifications with the Impact Investing Index, MSCI UK indices and MSCI European indices, respectively.  $\alpha$  is the intercept of the model, while  $\beta_{MRP}$ ,  $\beta_{SMB}$ ,  $\beta_{HML}$  and  $\beta_{WML}$  are the four factor loadings. Robust standard errors are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

## 1.4.2. Diversification Potential

With regard to the DCC-MVGARCH estimation results, Box-Pierce testing on squared standardized residuals led us to consider the univariate GARCH(1,1) specification as the most appropriate for the data. The only exception is the pair of indices associated with the MSCI UK Micro Cap, for which we used the univariate GARCH(1,2) specification.<sup>30</sup> Table 1.6 presents the results of the two-step estimation procedure. In the first step, univariate GARCH models were estimated (parameters are  $\mu$ ,  $\alpha_0$ ,  $\alpha_1$ ,  $\beta_1$  and  $\beta_2$ ). In the second step, the parameters  $A$  and  $B$  of the dynamic correlation were estimated. The majority of the coefficients have a strong statistical significance, often at the 1% level. This is particularly true for two of the three lagged values in the variance equation ( $\alpha_1$  and  $\beta_1$ ), which reflects time-varying volatility.

Figure 1.2 shows the evolution of the four dynamic conditional correlations. The two dynamic correlations with MSCI UK indices follow a similar pattern, while there are differences in the two dynamic correlations with MSCI European indices. Thus, the graphs indicate that the Impact Investing Index is similarly correlated to the two MSCI UK indices, but differently correlated to the two MSCI European indices. Moreover, looking at the red trend lines, the four graphs suggest

<sup>30</sup> The GARCH(1,2) specification is  $h_{i,t} = \alpha_{i0} + \alpha_{i1}u_{i,t-1}^2 + \beta_{i1}h_{i,t-1} + \beta_{i2}h_{i,t-2}$ .

an average conditional correlation that lies between 35% and 50%<sup>31</sup>, and slightly increases over time (between five and ten percentage points) for three pairs out of four.<sup>32</sup> These results are in line with (though to a less pronounced extent) the preliminary findings on unconditional correlations: on average, the degree of co-movement increases over time, implying a decrease in the Impact Investing Index's diversification potential with regard to traditional indices.<sup>33</sup> Figures A.5 and A.6 in Appendix A suggest that the post-2014 period is when the correlations increased.<sup>34</sup>

Assuming that MSCI benchmark indices are well-diversified, the increase in correlation can be explained in two ways that need not be mutually exclusive. Firstly, the growing number of firms within the Impact Investing Index may contribute to a higher level of diversification in the index. Secondly, the transformative nature of the impact investing industry over the past decade may have changed the return dynamics among firms within the Impact Investing Index. The latter explanation is supported by the construction and use of an alternative Impact Investing Index consisting of only the nine impact firms that were listed as of January 2009. Figure A.7 in Appendix A shows the evolution of the four dynamic correlations, using this alternative Impact Investing Index. It clearly shows that the increase in correlation remains present even with no further firms being added to the Impact Investing Index (see also Table A.12 in Appendix A, for coefficient estimates).

As impact companies survive in public markets, these results suggest that impact investors do not attach much weight to the decreasing diversification potential of impact investments with regard to mainstream markets. This may be due to investors' intrinsic social preferences (Riedl and Smeets, 2017), or to the growing level of diversification within listed impact investing. It is nevertheless worth observing that investors may improve their portfolio performance by short

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<sup>31</sup> It is difficult to decide how to determine whether those figures are indicative of a "high" or "low" degree of diversification as, to the best of our knowledge, there exists no formal demarcation threshold between the two. In fact, the lower the correlation, the better for diversification purposes. As a point of comparison, De Santis and Gerard (1997) find an average correlation of 43% between stock indices of G7 countries (and Switzerland) over a 25-year period, while Goetzmann and Kumar (2008) find average correlations between 13% and 34% for equity portfolios of US households over a six-year period.

<sup>32</sup> The average conditional correlation stagnates for the pair of indices associated with the MSCI Europe Small + Micro Cap.

<sup>33</sup> Tables A.8 and A.9, as well as Figures A.3 and A.4 in Appendix A present the results of the DCC analysis with reduced impact investing indices. These results are in line with and support our main findings. We also tested the robustness of our main results via the three-step estimation of both DCC and ADCC models using either GARCH or EGARCH univariate specifications. Table A.20 in Appendix A presents the results of log-likelihood ratio tests that confirmed the relevance of the DCC model over the ADCC model. Table A.22 presents the estimation results of three-step DCC-MV(E)GARCH models with all three impact investing indices. The univariate specification for each pair of indices is determined based on the AIC, as reported in Table A.21. Finally, the evolution of dynamic conditional correlations shown in Figures A.13 to A.15 confirms the robustness of our main findings.

<sup>34</sup> See Tables A.10 and A.11 for coefficient estimates.



selling impact firms. Taking the perspective of an international investor in equity, bonds and commodities, results of the mean-variance analysis presented in Table 1.7 show that the portfolio's Sharpe ratio and Value-at-Risk may be improved when short selling the Impact Investing Index (weight of  $-6.4\%$ ), independent of the time period under consideration.<sup>35</sup>

## 1.5. Robustness Tests

The empirical analysis performed in this chapter is based on comparing an Impact Investing Index consisting of 16 firms with MSCI indices composed of several hundreds of companies. While this approach has the advantage of being straightforward, one may argue that the results are driven by the small number of constituents of the Impact Investing Index compared to benchmark indices. In order to address this issue, we constructed two new benchmark indices, each of which also consists of 16 companies. We then reassessed the financial performance and diversification potential of the Impact Investing Index with regard to those two new indices, using the same empirical methodology as presented in Sections 1.3.2.1. and 1.3.3.1.

The MSCI UK and Europe Small + Micro Cap indices, composed of 692 and 2377 companies, respectively, on 31 May 2018, served as initial possible universes for the construction of the two new benchmark indices. We applied a selection process based on two criteria<sup>36</sup>—sector representation and market capitalization proximity—to select the 16 firms that composed each of the two new indices. More precisely, we first singled out the seven sectors within the MSCI UK and Europe Small + Micro Cap indices that matched the seven sectors of the impact sample. We then selected firms within each sector, based on market capitalization data as of 31 May 2018. For instance, three firms in the impact sample belong to the real estate sector (see Table A.2 in Appendix A). Hence, we selected the three companies within the MSCI real estate sector that were closest to those three impact firms in terms of market capitalization as of 31 May 2018. The selection process led to the construction of the two new traditional benchmark indices: the UK Index and the European Index.<sup>37</sup> Market capitalization figures for the UK Index, the European Index and the Impact Investing Index are presented in Table 1.8, which shows that the two new benchmark indices are closer in terms of market capitalization to the Impact Investing Index than the four MSCI benchmark indices used in the main analysis (see Tables 1.1 and 1.2).

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<sup>35</sup> We thank an anonymous referee for suggesting this analysis.

<sup>36</sup> Belghitar, Clark and Deshmukh (2014) also apply a selection process based on industrial classification and market capitalization proximity to match conventional and socially responsible companies.

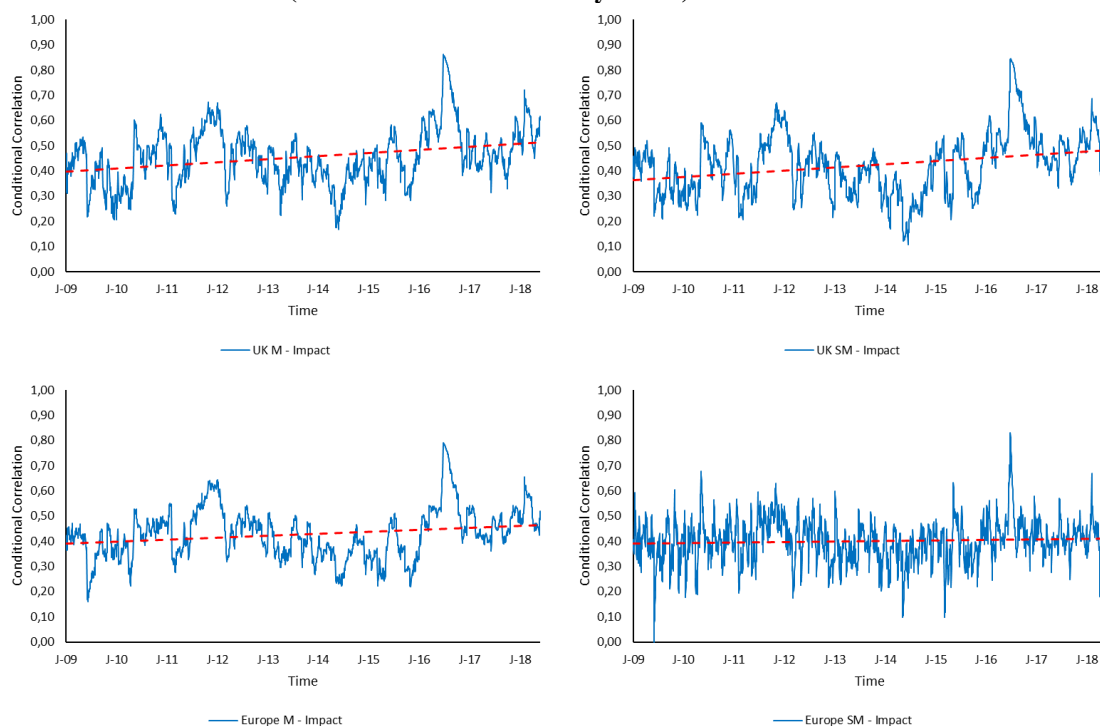
<sup>37</sup> It must be noted that the UK Index and the European Index do not contain any of the 16 impact firms that constitute the Impact Investing Index.

Table 1.6 DCC-MVGARCH estimation results

Index	$\mu$	$\alpha_0$	$\alpha_1$	$\beta_1$	$\beta_2$	A	B
Impact Investing Index	0.0005* (0.0002)	0.1268e-4** (0.0622e-4)	0.2273*** (0.0620)	0.3314*** (0.0924)	0.4070*** (0.1001)		
MSCI UK Micro Cap	0.0006*** (0.0001)	2.3283e-6*** (0.8462e-6)	0.1560*** (0.0360)	0.4295** (0.1851)	0.3906** (0.1738)		
I.I. Index/MSCI UK Micro Cap						0.0266*** (0.0071)	0.9641*** (0.0108)
Impact Investing Index	0.0004* (0.0002)	0.0961e-4* (0.0527e-4)	0.1744*** (0.0561)	0.8024*** (0.0646)			
MSCI UK Small + Micro Cap	0.0008*** (0.0002)	0.0335e-4*** (0.0106e-4)	0.1139*** (0.0225)	0.8665*** (0.0224)			
I.I. Index/MSCI UK Small + Micro Cap						0.0256*** (0.0098)	0.9654*** (0.0169)
MSCI Europe Micro Cap	0.0006*** (0.0001)	1.3516e-6*** (0.5112e-6)	0.0954*** (0.0212)	0.8877*** (0.0235)			
I.I. Index/MSCI Europe Micro Cap						0.0188** (0.0085)	0.9722*** (0.0119)
MSCI Europe Small + Micro Cap	0.0007*** (0.0002)	0.0216e-4*** (0.0075e-4)	0.0984*** (0.0188)	0.8881*** (0.0205)			
I.I. Index/MSCI Eu. Small + Micro Cap						0.0485*** (0.0161)	0.8461*** (0.0949)

Note: coefficient estimates from univariate GARCH processes and Dynamic Conditional Correlations (DCC). Univariate GARCH processes are estimated for each index in each of the four pairs (the parameters are  $\mu$ ,  $\alpha_0$ ,  $\alpha_1$ ,  $\beta_1$  and  $\beta_2$ ), before the parameters A and B of the DCC are estimated. The indices considered are the Impact Investing Index (present in each of the four pairs) and the four MSCI benchmark indices (one per pair). Robust standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

**Figure 1.2 Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the four MSCI benchmark indices (“J-09” stands for “January 2009”).**



**Table 1.7 Mean-variance portfolio analysis**

Portfolio Type	MSCI World	MSCI Emerging Markets	IBOXX Overall	Crude Oil WTI	Gold Bullion	Impact Investing Index	Sharpe Ratio	Value-at-Risk
<i>Panel A: overall sample</i>								
Mainstream	-0.186	0.218	0.986	-0.002	-0.016	0.000	0.630	-0.009
Impact	0.424	-0.206	0.892	-0.032	-0.014	-0.064	1.722	-0.007
<i>Panel B: pre-2014</i>								
Mainstream	0.192	-0.164	0.938	0.146	-0.112	0.000	1.263	-0.010
Impact	0.424	-0.206	0.892	-0.032	-0.014	-0.064	1.821	-0.007
<i>Panel C: post-2014</i>								
Mainstream	0.288	0.042	0.872	-0.084	-0.118	0.000	1.530	-0.007
Impact	0.424	-0.206	0.892	-0.032	-0.014	-0.064	1.630	-0.005

Note: this table presents the results of a mean-variance portfolio analysis with no short-selling restrictions. Weekly data in Panels A and B both start on 5 January 2009, and end on 31 May 2018 and 31 December 2013, respectively. Weekly data in Panel C start on 1 January 2014 and end on 31 May 2018. Each of the three panels presents two portfolios. The “Impact” portfolio extends the initial possible universe of the “Mainstream” portfolio by adding the Impact Investing Index to the list of assets. Mainstream assets are equity (MSCI World and MSCI Emerging Markets), investment grade bonds (IBOXX Overall Index) and commodities (Crude Oil WTI and Gold Bullion). Columns 2 to 7 report the weights attached to each asset to maximize the portfolio’s Sharpe ratio, presented in column 8. Finally, the historical Value-at-Risk of the portfolio is presented in column 9.

**Table 1.8 Robustness analysis: Market capitalization data**

Constituent Sizes (M. Cap. in USDm)	Impact Investing Index	UK Index	European Index
Average	259	246	262
Largest	1 797	1 783	1 806
Smallest	0.47	0.52	0.52

Note: M. Cap. (market capitalization) data for the Impact Investing Index and the two indices constructed for robustness test purposes. For each index, the average, largest and smallest market capitalization is presented. Data for both the UK and European Index are from MSCI as of 31 May 2018. The same holds for impact firms' market capitalization data from Datastream. All data are in USDm.

Tables A.13 and A.15, as well as Figure A.8 in Appendix A show that the results of the assessment of the Impact Investing Index's financial performance are largely unchanged with respect to the main analysis. The only two qualitative changes are that (i) the European Index's alpha is slightly below the Impact Investing Index's, and (ii) the UK Index has a slightly higher volatility than the Impact Investing Index. Robustness tests for the assessment of the Impact Investing Index's diversification potential are more nuanced. Even though the results presented in Table A.14 in Appendix A show a significant increase in correlation between the first and second half of the sampling period for the pair associated with the UK Index, there seems to be no increase in Figure A.9 in Appendix A.<sup>38</sup> As for the pair associated with the European Index, both Table A.14 and Figure A.9 point to a stable correlation over time. These results are not necessarily surprising, since the two new benchmark indices have the same number of constituents as the Impact Investing Index, and are also quite close to it in terms of sectors represented and market capitalization figures.

## 1.6. Discussion

Overall, our results show that, over the entire period under study, investors who committed to listed impact firms had to accept returns that underperformed relative to risks and that often turned negative, even though impact firms' performance improved in later years. Our findings also suggest that the diversification potential of impact investments with regard to mainstream markets decreased over time. Hence, from a financial perspective, listed impact investments are not particularly appealing to investors. Yet, the fact that some impact firms have been listed for more than a decade suggests that some investors do not perceive the underperformance of their impact investments as a drawback. There are several possible reasons for such a behavior on the part of these investors.

<sup>38</sup> See Table A.16 in Appendix A for the coefficient estimates of the dynamic conditional correlation modeling.

For example, investors may be funding impact firms in spite of capital losses because those firms pay dividends that offset the losses (although the fact that our results rely on dividend-adjusted series would tend to invalidate this hypothesis). Moreover, our findings do not imply that impact firms' business models are not viable. Indeed, even though some of the impact firms from our sample have lost money in the past few years, others have generated constant profit. Most importantly, three of the four firms with the largest average market size have been constantly profitable in the past few years.

Investors may also be investing a more or less substantial share of their wealth into impact companies for signaling purposes. Riedl and Smeets (2017) have clearly demonstrated this in the context of socially responsible investing: investors who are prone to talking extensively about their investments are also more likely to invest in socially responsible mutual funds. In the same vein, Bénabou and Tirole (2006) explain that noticeable prosocial deeds can encourage prosocial behavior for self-image reasons.

Another explanation is the presence in the market of investors who derive non-financial utility from their investments. Such profit-sacrificing investors may knowingly accept a below-market rate of return if this allows them to generate some positive non-financial impact through their investments. This is in line with Bollen's (2007) suggestion that socially responsible investors have a multi-attribute utility function. Similarly, Barigozzi and Tedeschi (2015) talk about social entrepreneurs receiving a nonmonetary premium for the launching of ethical and socially responsible projects. According to Morduch and Ogden (2018), what makes impact investments different is precisely "the willingness to accept a financial trade-off". They argue that, in the absence of such a trade-off, traditional investors would be likely to fund impact companies and thus, there would be no need for impact investors. The cut in financial utility one may be ready to accept in order to invest according to one's values must not be underestimated. Indeed, Riedl and Smeets (2017) have demonstrated that intrinsic social preferences supplant financial motives in socially responsible investors' decisions. They have also confirmed the statement made by Barigozzi and Tedeschi (2015) that some socially responsible investors may expect a lower financial return on their investments compared to conventional investors.

As to the level of diversification with regard to mainstream markets, the fact that this may not be of primary importance to impact investors is not necessarily surprising. Barreda-Tarrazona, Matallín-Sáez and Balaguer-Franch (2011) found that socially responsible investors gave only limited weight to diversification in their investment decisions and, more recently, Riedl and Smeets (2017) reported that "only 5.4% of all socially responsible investors indicate that they hold SRI funds to pursue diversification benefits". Hence, even though impact investors may

place some importance on diversification within impact investing, diversification with regard to mainstream markets seems not to be their primary objective.

## 1.7. Conclusion

Interest in impact investments has increased over recent years (Chowdhry, Davies and Waters, 2019; Barber, Morse and Yasuda, 2021). However, both the industry and research field are still in their infancy (Höchstädter and Scheck, 2015), and various aspects of impact investments' financial performance and diversification potential, notably with regard to mainstream markets, remain unclear.

Our objective in this chapter was to contribute to the literature by providing a formal assessment of impact investing, relying exclusively on public data. To this end, we constructed an Impact Investing Index essentially made of European listed impact firms within the UK's Impact Group. We assessed the index's financial performance and diversification potential using several MSCI indices as benchmarks.

Our results contradict non-academic performance studies on private impact funds (Mudaliar and Bass, 2017), which argue that market-rate financial returns are within reach in impact investing, and go beyond the results of Barber, Morse and Yasuda (2021) who concluded that the returns were below market, yet positive. Indeed, not only do our results point to a risk-adjusted underperformance, they also reveal impact firms' failure to deliver non-negative returns to investors, even though performance improved post-2014. These results are in line with the argument set out by Morduch and Ogden (2018) and Chowdhry, Davies and Waters (2019) that impact investments are financially costly. As for impact investments' diversification potential, the results suggest an increase in the degree of co-movement with traditional indices, implying that the diversification potential of listed impact firms with regard to mainstream markets slowly decreases over time. These findings are consistent with those of Brière and Szafarz (2015) in the context of listed microfinance.

Admittedly, our work has several limitations. Indeed, we decided to rely on the GIIN's rigorous definition of impact investments to assemble our sample of listed impact firms. In doing so, we aimed to select firms that one could acceptably and unambiguously regard as impact firms. We considered the GIIN to be the most reliable institution to rely on, given its leading institutional and conceptual role in the impact investing industry at the time of writing this chapter. As a matter of fact, that rigorous selection process led us to only select a handful of impact firms within the Impact Group, and the small size of that sample commands that our results and conclusions be interpreted with the utmost caution. In addition, our sample is exclusively made of impact firms

that are publicly listed. It is therefore crucial for future research to assess whether our findings generalize to larger samples of impact firms, and notably to samples that may be assembled based on alternative definitions and criteria. If that were to be the case, it would be insightful to investigate the drivers of the financial underperformance of impact investments, particularly with regard to impact firms' business model and organizational structure. Moreover, a generalization of our findings to a larger population of impact firms would likely threaten the financial appeal of impact investments, which may in turn impede the development of the industry. Accordingly, despite recent improvements in financial performance, the rapid growth of the industry, and more particularly the survival of listed impact firms, hints at the presence in the market of investors who derive non-financial utility from their investments (Chowdhry, Davies and Waters, 2019).

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# Chapter 2 More of the Same? Comparing Impact and Socially Responsible Investments

## 2.1. Introduction

In 1970, Milton Friedman claimed in *The New York Times Magazine* that increasing profits is the only social responsibility of firms (Friedman, 1970). That is to say, that the sole objective of business is shareholder value maximization, in line with corporate finance tradition (Berle, 1931; Katz, 1960; Ferrell, Liang and Renneboog, 2016), and that the protection of other stakeholders is ensured by contracts and by regulation (Bénabou and Tirole, 2010). Fifty years later, that paradigm is increasingly being challenged, and a growing share of the investor community<sup>1</sup> now values non-financial attributes—social, environmental, governance and ethical attributes—when pondering asset allocation (Renneboog, Ter Horst and Zhang, 2011; Bialkowski and Starks, 2016; Colonnello, Curatola and Gioffré, 2019; Hartzmark and Sussman, 2019). Those investors make portfolio decisions according to a multi-attribute utility function (Bollen, 2007) that combines financial utility with the non-pecuniary utility derived from the responsible nature of investments<sup>2</sup> (Benson and Humphrey, 2008; Belghitar, Clark and Deshmukh, 2014; Barber, Morse and Yasuda, 2021). For instance, Bauer and Smeets (2015) show that strong social identification leads to increased asset allocation to social banks, while Bauer, Ruof and Smeets (2021) find that a majority (67.9%) of pension fund investors would be keen to increase pension savings allocation to sustainable investments. More generally, Hartzmark and Sussman (2019) demonstrate that US investors collectively view sustainability as a positive aspect in a fund.<sup>3</sup> They conclude that investors who aim purely to profit-maximize are a minority in the US mutual fund industry.<sup>4</sup> In their works, Bénabou and Tirole (2006) and Ariely, Bracha and Meier (2009) present three main

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<sup>1</sup> According to the US SIF (2020), sustainable investing in the United States represented 33% of the total assets under professional management at the start of 2020, a 42% increase compared to the start of 2018.

<sup>2</sup> Investors are not the only agents to derive non-financial utility from social responsibility. Entrepreneurs too may gain non-pecuniary utility from undertaking a socially responsible project (Barigozzi and Tedeschi, 2015), while employees may derive non-financial utility from working for a socially responsible firm (Gong and Grundy, 2019).

<sup>3</sup> In the research by Hartzmark and Sussman (2019), sustainability is proxied by the Morningstar Sustainability Rating that evaluates “how investments are meeting environmental, social, and governance challenges”. See <https://www.morningstar.com/articles/745467/morningstar-sustainability-rating> (page accessed 13 August 2023).

<sup>4</sup> The weight that investors place on financial and non-monetary attributes when investing responsibly can vary a great deal. For some investors, financial considerations are a primary factor in asset allocation decisions (Døskeland and Pedersen, 2016), while other investors mainly make portfolio decisions based on non-monetary considerations (Rossi et al., 2019).



reasons why individuals would be willing to blend investment and philanthropic activities (Chowdhry, Davies and Waters, 2019): (i) altruistic, intrinsic motivation, (ii) extrinsic, (material) self-interest, and (iii) social and self-image concerns. From a broader perspective, as society's pressure towards individual and corporate social responsibility grows (Bénabou and Tirole, 2010), prosocial behavior becomes a cornerstone of social norms.

In the financial sphere, several types of investments presenting non-monetary attributes coexist, noticeably socially responsible and impact investing. The former is defined by Renneboog, Ter Horst and Zhang (2008a, p. 1) as “an investment process that integrates social, environmental, and ethical considerations into investment decision making”.<sup>5</sup> The Global Impact Investing Network (GIIN) defines the latter as “investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return”.<sup>6</sup> With a formal existence of ten to fifteen years, impact investing is a younger investment field than socially responsible investing (SRI), a practice that dates back to the 1970s (Renneboog, Ter Horst and Zhang, 2008a). Indeed, impact investing came to prominence after the global financial crisis of 2008 (Bugg-Levine and Emerson, 2011). Combining traditional financial analysis with societal objectives (Höchstädter and Scheck, 2015) to create “blended value” (Bugg-Levine and Emerson, 2011), impact investing is often presented as a new type of investment, different from SRI. Indeed, it is assumed that socially responsible investors aim to improve the societal behavior of traditional corporations through their investment process (Watts and Scales, 2020), while impact investors intend instead to support commercial organizations with high potential social value (Chowdhry, Davies and Waters, 2019) and whose very purpose is to tackle social and environmental challenges (Agrawal and Hockerts, 2019; Barber, Morse and Yasuda, 2021).

In recent years, impact and socially responsible investing have grown in importance, along with their respective structures and proponents. According to J.P. Morgan, investments considered as socially responsible grew by over 200% in the United States over the past decade and are now worth at least USD 23 trillion of assets worldwide.<sup>7</sup> As for impact investments, the GIIN estimates a current global market size of USD 1.164 trillion in assets.<sup>8</sup> Overall, according to the US SIF

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<sup>5</sup> Sandberg et al. (2009, p. 1) similarly define socially responsible investing as “the integration of certain non-financial concerns—ethical, social, environmental, or corporate governance concerns—in the investment process”.

<sup>6</sup> See <https://thegiin.org/impact-investing/need-to-know/#what-is-impact-investing> (page accessed 13 August 2023).

<sup>7</sup> See <https://www.jpmorgan.com/insights/research/esg> (page accessed 13 August 2023).

<sup>8</sup> See <https://thegiin.org/research/publication/impact-investing-market-size-2022/> (page accessed 13 August 2023).

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(2020), sustainable investments<sup>9</sup> currently account for one in three dollars of total assets under management in the United States.

Given the growing shares of impact and socially responsible assets in investment portfolios, it is highly relevant to know whether the theoretical differences between those two investment strategies lead to contrasting financial features between impact portfolios and socially responsible portfolios. Indeed, as demonstrated by Heeb et al. (2022), although the average investor has a significant willingness-to-pay (WTP) for sustainable investments in general (see also Riedl and Smeets, 2017), that WTP may not increase proportionally with impact. Hence, if impact investments do underperform socially responsible investments, as conjectured by the current literature, the average sustainable investor may not have the necessary WTP to support impact firms, which may severely impede the future growth of the impact investing industry and prevent it from massively scaling high-impact solutions to address societal challenges. We therefore ask: Do the theoretical differences between impact and SRI strategies, and particularly their supposedly different asset selection processes, translate into material financial performance and diversification differences?

While many aspects (notably the financial aspects) of both impact and socially responsible investments have already been researched separately, to the best of our knowledge, no study has ever compared them directly.<sup>10</sup> It is therefore the ambition of this chapter to make a first formal financial comparison of these two investment strategies. To do so, we delve into the financial (performance) characteristics of a series of carefully matched European impact and socially responsible mutual funds with a global investment focus in public equities. Contrary to our initial hypotheses, our findings reveal that impact funds produce similar risk-adjusted returns and are not less diversified than their comparable socially responsible counterparts. In a bid to explain why we cannot reconcile those empirical results with the current content of the financial literature, we discuss the asset selection processes of impact funds which we suspect may fall short of what is expected from impact investors.

The rest of this chapter proceeds as follows. Section 2.2 reviews the financial literature on impact and socially responsible investments and posits hypotheses. Section 2.3 provides information on the dataset and details our matching methodology. In Sections 2.4 and 2.5, we present a financial

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<sup>9</sup> The US SIF uses the term “sustainable investing” to encompass both impact and socially responsible investing (see <https://www.ussif.org/sribasics>; page accessed 13 August 2023).

<sup>10</sup> While several studies have already briefly discussed differences between impact and socially responsible investments (e.g., Höchstädter and Scheck, 2015; Agrawal and Hockerts, 2019), those discussions remain theoretical and are not the main purpose of the respective papers.

analysis of both investment strategies. Section 2.6 provides an extensive discussion of the results. Section 2.7 concludes.

## **2.2. Literature Review and Hypotheses**

According to traditional portfolio theory, investors should only care about the risk-return trade-off for making asset allocation decisions, thereby leaving aside non-monetary criteria (Bauer and Smeets, 2015; Nath, 2021). Indeed, the theory predicts that screening assets based on non-financial attributes leads to investment portfolios with less favorable risk-return trade-offs (Lee et al., 2010). The reason for this is that it reduces the investment opportunity set which, according to the theory, limits the level of diversification of the portfolio and causes investors to turn down lucrative investments (Lee et al., 2010; Ceccarelli, Ramelli and Wagner, 2023).<sup>11</sup> For instance, Hong and Kacperczyk (2009) and Colonnello, Curatola and Gioffré (2019) report on the return premium associated with investment in sin stocks, i.e., firms involved in activities such as gambling or the production of alcohol and tobacco. According to Hong and Kacperczyk (2009), rejection of sin companies by ethical investors leads to limited risk sharing of their stocks and this, coupled with heightened litigation risks, increases their financial returns (Merton, 1987). In the same vein, Bolton and Kacperczyk (2021) document on the carbon premium, a return compensation associated with investment in firms with high carbon dioxide emissions. Portfolios built solely on the basis of risk and return considerations likely include both sin stocks and stocks exposed to increased carbon risk, and therefore benefit from their superior returns.

### **2.2.1. Socially Responsible Investing**

It is common knowledge that socially responsible investors seek to improve traditional corporations' practices in terms of environmental, social, ethical and governance criteria, so that investments are made in securities that are not unethical (Renneboog, Ter Horst and Zhang, 2008b; Morduch and Ogden, 2018; Lapanan, 2018; Nath, 2021). For that purpose, they filter portfolios based on negative and/or positive screens (Renneboog, Ter Horst and Zhang, 2008a; Nofsinger and Varma, 2014), or turn to active-ownership engagement (Dimson, Karakaş and Li, 2015). Therefore, according to traditional portfolio theory, SRI portfolios should have less

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<sup>11</sup> Contrary to the underperformance hypothesis, Renneboog, Ter Horst and Zhang (2008b) explain that restrictions based on non-financial attributes might in fact reveal value-relevant information to investors. This is because firms included in ethical portfolios might be better managed and considerably reduce the costs that arise from social and environmental scandals, thereby producing superior risk-adjusted financial returns. The findings of Renneboog, Ter Horst and Zhang (2011) partly support that reasoning.

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favorable risk-return trade-offs than traditional portfolios that are built solely on the basis of risk and return considerations.

This is in line with a series of recent theoretical and empirical studies that support that green (socially responsible) assets have lower returns than brown (socially irresponsible) assets. According to Pástor, Stambaugh and Taylor (2021), in equilibrium, green portfolios earn lower expected returns due to investors' tastes for sustainability and the role of green assets in hedging against climate risk. The results of Avramov et al. (2022a) support the predictions of Pástor, Stambaugh and Taylor (2021) in the context of stocks with low ESG uncertainty. In the same vein, Bolton and Kacperczyk (2021) and De Angelis, Tankov and Zerbib (2022) show that carbon-intensive companies earn higher returns, consistent with the results of Heinkel, Kraus and Zechner (2001) on polluting firms.<sup>12</sup> Yet, Pástor, Stambaugh and Taylor (2022) find that green assets outperformed brown assets in recent years, due to an unexpectedly strong increase in environmental concerns, in line with observations from Pástor, Stambaugh and Taylor (2021) and Avramov et al. (2022b). That being said, Pástor, Stambaugh and Taylor (2022) still predict lower expected returns for green assets in the long run.

However, there is no consensus in the literature on the systematic underperformance of SRI portfolios. To start with, several recent studies focused on the financial expectations of socially responsible investors and concluded that some investors were willing to forgo expected financial returns in order to invest according to their values (Barigozzi and Tedeschi, 2015; Riedl and Smeets, 2017; Rossi et al., 2019; Bauer, Ruof and Smeets, 2021; Heeb et al., 2022). The empirical results from Riedl and Smeets (2017) support that assertion, while Geczy, Stambaugh and Levin (2021) argue that the cost of being socially responsible is higher for investors who commit their entire portfolio to SRI. Results from other studies are more balanced. For instance, Nofsinger and Varma (2014) analyze a sample of 240 US socially responsible equity mutual funds for the period 2000-2011. They conclude that socially responsible mutual funds underperform conventional mutual funds during non-crisis periods but outperform conventional funds in times of crisis, thereby providing protection against downside risk. Belghitar, Clark and Deshmukh (2014) also find mixed results, showing that there is no utility cost from being socially responsible unless one considers higher distribution moments than the mean and variance.

A third and predominant strand in the literature includes studies which conclude that the performance of socially responsible and conventional mutual funds is similar, with Bauer and

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<sup>12</sup> De Angelis, Tankov and Zerbib (2022) note that, although green investors' divestment process leads to an increase in the cost of capital of carbon-intensive companies, the impact is limited, consistent with the findings of Berk and van Binsbergen (2021).

Smeets (2015) even finding that the bulk of the investor community expects higher returns from socially responsible funds. Indeed, based on a sample of 103 US, UK and German ethical mutual funds, Bauer, Koedijk and Otten (2005) find that the difference in returns between those funds and conventional funds is statistically insignificant for the period 1990-2001. Summarizing the findings of numerous performance studies, Renneboog, Ter Horst and Zhang (2008a, p. 18) conclude that “the existing studies do not univocally demonstrate that SRI investment funds perform worse than conventional funds”. Finally, using samples of 440 and 117 socially responsible mutual funds for the periods 1991-2003 and 1999-2011, respectively, Renneboog, Ter Horst and Zhang (2008b) and Bialkowski and Starks (2016) demonstrate that the risk-adjusted performance of socially responsible funds is not statistically different from that of conventional funds, with the findings of Renneboog, Ter Horst and Zhang (2008b) supporting the idea that socially responsible funds attain adequate levels of diversification despite restricting the investment opportunity set in the first place. Bialkowski and Starks (2016) conclude that, over the period of the study, socially responsible investors did not forgo financial returns when they invested in line with their social preferences.

### **2.2.2. Impact Investing**

According to Höchstädter and Scheck (2015), impact investing is regularly considered as being distinct or going beyond SRI, and the two investment strategies are often wrongly conflated (Morduch and Ogden, 2018; Alijani and Karyotis, 2019). Indeed, the objective of impact investors is to actively pursue good, which they do by purposely investing in companies that have high potential social value (Chowdhry, Davies and Waters, 2019; Viviani and Maurel, 2019; Block, Hirschmann and Fisch, 2021). These companies are self-sufficient commercial organizations with clearly defined social missions (Hehenberger, Mair and Metz, 2019; Block, Hirschmann and Fisch, 2021; Kollenda, 2021) that are often embedded in the form of specific social, environmental and ethical goals in the contracts they have with impact investors (Geczy et al., 2021).<sup>13</sup> This contractual operationalization of impact demonstrates a higher degree of engagement on the part of impact investors with investees on societal issues (Agrawal and Hockerts, 2019), as well as impact investors’ intention to generate a measurable aggregate positive social impact (Barber, Morse and Yasuda, 2021), as implied by the GIIN’s definition.

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<sup>13</sup> Geczy et al. (2021) note that impact funds do not always contract on impact with their portfolio companies, notably when impact is embedded into the operations of the portfolio company (e.g., businesses that produce clean energy or sustainable consumer products), or when impact is inherent to the portfolio company’s industry (e.g., a healthcare company).

Impact investors' capital allocation to organizations with considerable potential social value means they rely on a very restrictive asset selection process and therefore make portfolio decisions from a scaled-down investment opportunity set. From this, it follows that impact investors are ready to accept below-market returns (Watts and Scales, 2020; Phillips and Johnson, 2021) for reasons such as the inability of the investee's business model to yield market returns, the priority of non-financial impact, or the overpayment of financial claims to subsidize for-profit investors in a co-investment framework (Chowdhry, Davies and Waters, 2019). At the same time, impact investments are considered riskier investments (Höchstädter and Scheck, 2015) for at least two reasons. Firstly, impact investors are often pioneers in high-risk environments (Watts and Scales, 2020), targeting smaller organizations than socially responsible investors (Höchstädter and Scheck, 2015). Such organizations often serve remote low-income market segments, which increases costs and lowers profit margins. Secondly, the restricted investment opportunity set reduces the level of diversification of impact investors' portfolios, thereby limiting the reduction of risk. In summary, Morduch and Ogden (2018) explain that impact investors are willing to accept higher risks in exchange for a lower financial risk premium compared to other investors. They point to "the willingness to accept a financial trade-off" as a differentiating feature of impact investors. In the absence of such a trade-off, they argue, all investors would likely fund impact firms and there would be no need for impact investors.

As impact investing is a nascent research field, there is a relative scarcity of data, and only a handful of academic contributions have studied the financial performance of impact investments. Yet, there is general agreement among those scholars that impact investors are willing to make significant financial concessions in exchange for the expected social output of their investments. Indeed, based on a sample of 159 venture capital and growth equity impact funds over the period 1995-2014, Barber, Morse and Yasuda (2021) demonstrate that those funds underperform traditional funds by as much as 4.7 percentage points in annualized IRR. Similarly, Bernal, Hudon and Ledru (2021) show that listed impact firms' risk-adjusted returns significantly underperform traditional benchmarks over the long run. Finally, Islam and Habib (2022) find that impact investors forgo additional financial returns for impact investments made during the COVID-19 pandemic.

### **2.2.3. Hypotheses**

It emerges from the literature that impact investors' asset selection process is supposedly more restrictive than that of socially responsible investors. This implies that impact investors' investment opportunity set ought to be smaller, which in theory leads them to reject many more lucrative opportunities than socially responsible investors, and considerably limits their ability to

adequately diversify their portfolios. Last but not least, it is assumed that impact investors invest in riskier-than-average securities with lower return prospects, which is consistent with the theory that, in the long run, *greener* investments have lower expected returns (Heinkel, Kraus and Zechner, 2001; Pástor, Stambaugh and Taylor, 2021). Therefore, all things considered, impact portfolios can be expected to be less diversified and underperform socially responsible portfolios. This conjecture is in line with the current empirical literature that demonstrates that impact investments underperform conventional investments whereas the performance of socially responsible and conventional mutual funds is most of the time statistically indistinguishable. Consequently, we posit the following two hypotheses:

**Hypothesis 1.** Impact portfolios underperform socially responsible portfolios.

**Hypothesis 2.** Impact portfolios are less diversified than socially responsible portfolios.

While it is tempting to turn to the results of the above-mentioned empirical studies (e.g., Renneboog, Ter Horst and Zhang, 2008a; Bialkowski and Starks, 2016; Barber, Morse and Yasuda, 2021; Bernal, Hudon and Ledru, 2021) to confirm those two hypotheses, it is not reasonable to take such a shortcut. Indeed, current empirical studies separately compare impact and socially responsible investments to mainstream investing, using different benchmarks, time periods, asset classes<sup>14</sup> and methodologies. Our objective in this chapter is therefore to draw a direct and formal financial comparison of both investment strategies relying on data from a series of comparable and rigorously identified impact and socially responsible mutual funds.

### **2.3. Data and Matching Methodology**

In order to draw a reliable comparison between impact and socially responsible investments, one important criterion is to make use of comparable investment vehicles. As explained by Agrawal and Hockerts (2019), SRI is essentially about screening and funding listed firms, which is why SRI performance studies rely on data from mutual funds (e.g., Renneboog, Ter Horst and Zhang, 2008b; Hong and Kacperczyk, 2009; Nofsinger and Varma, 2014; Riedl and Smeets, 2017). Impact investing, on the other hand, has a history of channeling capital to impact firms through private equity and debt (Viviani and Maurel, 2019; Barber, Morse and Yasuda, 2021). However, at the same time, public equity impact investing has been growing by 25% every year since 2014 and in 2018 represented more than 10% of the impact capital invested globally (Mudaliar et al.,

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<sup>14</sup> To assess the financial performance of socially responsible investments, authors mainly use mutual fund data. On the other hand, the performance of impact investments has so far been analyzed using data from private equity and venture capital funds, as well as listed impact firms.

2019). Taking advantage of that trend, we selected several impact mutual funds, all identified by the GIIN, which we associate with a series of socially responsible mutual funds by means of a rigorous matching methodology.<sup>15</sup>

Although relying on the GIIN as our unique source for identifying impact funds means we did not include all impact funds worldwide in our sample, it ensures that the impact funds we consider are selected by the most influential institution in the field of impact investing (Höchstädter and Scheck, 2015) according to its recognized definition of the investment strategy. When we selected our sample of impact funds in January 2020, six funds investing in public equities were referenced by the GIIN in its online database ImpactBase.<sup>16</sup> Important issues related to missing data meant that we were left with no other option than to exclude two funds from that initial sample. A third fund was also excluded, due to an insufficient number of eligible matching candidates among socially responsible funds. The remaining three impact mutual funds are managed by major financial institutions and are presented as investment vehicles whose objective is to generate positive social and environmental value through exposure to impact assets that deliver long-term capital growth. The funds address numerous issues, from waste management and climate change to education and health. Consistent with impact investors' expectations, the funds state that they measure the impact contribution of securities to those societal challenges. In that respect, Table B.1 in Appendix B provides several examples of impact metrics used by the three impact mutual funds to assess their impact contribution. Following Bauer, Koedijk and Otten (2005), Bollen (2007) and Nofsinger and Varma (2014), we next match each impact mutual fund to three socially responsible mutual funds.

Our three impact funds are European<sup>17</sup> SICAV with a global investment focus in public equities.<sup>18</sup> Therefore, to find suitable socially responsible funds to match our impact funds to, we searched Bloomberg for mutual funds with exactly the same features and ended up with an initial pool of 3627 mutual funds. We then applied a series of filters so as to retain only those funds that shared as many features as possible with our three impact funds. First, we only retained accumulation

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<sup>15</sup> Matching mutual funds is common practice in the financial literature. See, for instance, Bauer, Koedijk and Otten (2005), Bollen (2007), Renneboog, Ter Horst and Zhang (2008b) and Nofsinger and Varma (2014).

<sup>16</sup> The GIIN has recently brought that initiative to an end as part of a restructuring of its tasks and priorities.

<sup>17</sup> Both fund and fund manager are located in Europe, including Luxembourg, Switzerland, the United-Kingdom and Ireland. Funds are quoted in EUR.

<sup>18</sup> The funds invest at least 90% of their assets in public equities, similar to the criterion in Bollen (2007) and Renneboog, Ter Horst and Zhang (2008b).



funds, i.e., mutual funds that pay no profit out to investors.<sup>19</sup> Second, we applied fund age and load fees filters, similar to Bollen (2007) and Renneboog, Ter Horst and Zhang (2008b). More precisely, to make sure that funds had as close a life cycle as possible, we retained only those funds with an inception date within three years of that of an impact fund. Then, to control for the effect of fund fees, we retained only those funds with the same load fees structure as impact funds (front- and back-end fees). To select socially responsible funds out of the remaining funds, similar to Nofsinger and Varma (2014), we searched for a series of common SRI keywords among fund names.<sup>20</sup> This whole process reduced our initial pool of funds to 12 socially responsible mutual funds. We subsequently went through their prospectuses to verify SRI commitment. Following Renneboog, Ter Horst and Zhang (2008b), we considered a fund to be socially responsible if it employed at least one social, environmental, corporate governance or ethical screen.<sup>21</sup>

To find the three socially responsible funds among the 12 eligible candidates that best match each impact fund, we gave each of those SRI funds a score based on proximity to impact funds in terms of both size and risk exposures. Following Bollen (2007) and Renneboog, Ter Horst and Zhang (2008b), we estimate risk exposures of both impact and socially responsible funds using Carhart's (1997) four-factor model. The score for a given impact fund ( $i$ ) and one of the eligible SRI funds ( $j$ ) is computed by means of the following algorithm:

$$Score_{i,j} = \frac{(TA_i - TA_j)^2}{\sigma_{TA}^2} + \frac{(\beta_{MKT,i} - \beta_{MKT,j})^2}{\sigma_{MKT}^2} + \frac{(\beta_{SMB,i} - \beta_{SMB,j})^2}{\sigma_{SMB}^2} + \frac{(\beta_{HML,i} - \beta_{HML,j})^2}{\sigma_{HML}^2} + \frac{(\beta_{WML,i} - \beta_{WML,j})^2}{\sigma_{WML}^2} \quad (2.1)$$

where  $TA$  is the maximum size (total assets, in USD) of the fund over the time period that we study,  $\sigma_{TA}^2$  is the cross-sectional variance of  $TA$ ,  $\beta_{MKT}$ ,  $\beta_{SMB}$ ,  $\beta_{HML}$  and  $\beta_{WML}$  are the risk exposures to the four factors, and  $\sigma_{MKT}^2$ ,  $\sigma_{SMB}^2$ ,  $\sigma_{HML}^2$  and  $\sigma_{WML}^2$  are the cross-sectional variances of the risk exposures. To normalize the weights attached to the different matching criteria, the squared deviations are scaled by the variances. Eventually, since a lower score between two funds

<sup>19</sup> We decide to compare impact accumulation mutual funds to socially responsible accumulation mutual funds, to enhance comparability (Cogneau and Hübner, 2020). We therefore disregarded socially responsible income funds that regularly distribute profits to investors.

<sup>20</sup> The keywords are: social, socially, responsible, environment, green, sustainability, sustainable, ethics, ethical, faith, religion, religious, Christian, Islam, Baptist, Lutheran, impact, climate, ESG, governance, theme, thematic, SDG, transition, exclusion, clean, planet, charities, and charity.

<sup>21</sup> Screening usually takes two forms: negative and positive screening. Negative screening refers to the practice of removing from the investment universe (e.g., the S&P 500) firms that belong to industries that are deemed undesirable by investors. Positive screening consists in selecting only those firms that achieve certain social, environmental, corporate governance or ethical performance objectives. Positive screening is often achieved by means of a best-in-class approach. Beyond screening, a third means of fulfilling SRI objectives is engagement, which involves portfolio managers directly engaging on societal issues with the management of portfolio companies or making use of voting rights at Annual General Meetings. See Renneboog, Ter Horst and Zhang (2008a), Nofsinger and Varma (2014) and Dawkins (2018) for additional details.

implies greater similarity, each impact fund is matched to the three socially responsible funds with the lowest scores.<sup>22</sup> Thus, we work with a sample of three impact mutual funds and a control group of nine socially responsible mutual funds (see Table 2.1).

**Table 2.1 Summary of matched impact and socially responsible mutual funds**

<b>Impact fund</b>	<b>Matched SRI funds</b>
BNP Paribas Funds Climate Impact	Swisscanto Equity Fund Sustainable Global Climate Nordea 1 Global Climate and Environment Fund KBC Eco Fund Climate Change
NN Global Equity Impact Opportunities	BNP Paribas Funds Global Environment Robeco Sustainable Global Stars Equities ERSTE Responsible Stock Global
Triodos Pioneer Impact Fund	Swisscanto Equity Fund Sustainable Global Water BNP Paribas Funds Global Environment Robeco Sustainable Global Stars Equities

Note: this table presents the sample of three impact mutual funds and the control group of nine socially responsible mutual funds. Each impact mutual fund is matched to three socially responsible mutual funds. Impact mutual funds have been selected from the GIIN's online database, ImpactBase, whereas socially responsible mutual funds have been selected from Bloomberg.

Table B.2 in Appendix B summarizes the main features of both impact and SRI funds listed in Table 2.1. As the table shows, all funds were launched between 2003 and 2010, are quoted in EUR, have front-end but not back-end fees. Funds are either open-end funds or SICAV, and both fund and fund manager are most often located in Luxembourg. All funds are accumulation funds and predominantly invest in international public equity markets. According to the Morningstar investment style classification, all funds are growth-oriented investment vehicles that invest in either large- or mid-capitalization firms. Finally, Table B.2 also shows that there are sometimes important differences in funds' average total assets under management, particularly for SRI funds. Next, Table B.3 in Appendix B provides information on funds' sustainable investment policy. As the table shows, all impact funds are classified under the Article 9 of the Sustainable Finance Disclosure Regulation, whereas some SRI funds are classified under the Article 8.<sup>23</sup> All funds receive at least four globes (out of five possible) from Morningstar's assessment of funds' ESG risk management practices, implying that all funds belong to the top 32.5% of funds (top 10% for those funds that receive five globes). Finally, Table B.3 provides a summary of funds' sustainable investment policies. Although each fund has its own peculiarities, most funds integrate ESG

<sup>22</sup> Table B.4 in Appendix B provides scores for all eligible candidate SRI funds.

<sup>23</sup> Article 9 funds have sustainable investing as an objective, whereas Article 8 funds do not, though they promote social and/or environmental characteristics. See Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector.

criteria in their investment process, and seek to comply with international standards such as the United Nations Global Compact principles or the 2015 Paris Agreement.

For each fund, we obtained the monthly Net Asset Value<sup>24</sup> (NAV, net of annual management fees) as well as the fund's monthly Total Assets (TA). For all of the funds' securities<sup>25</sup>, we obtained monthly total return series (with net dividends) as well as monthly market capitalization series. All data, including exchange rates, come from Bloomberg. Time series for impact funds BNP Climate and NN, as well as their matched SRI funds, start in October 2011, while series for the Triodos impact fund and its matched SRI funds start in June 2013, for data availability reasons. All series end in June 2021.

## **2.4. Financial Performance of Impact and Socially Responsible Mutual Funds**

While we hypothesized, based on the financial literature, that impact funds would underperform socially responsible funds, Figure 2.1 tells a different tale. The three graphs on the left-hand side plot impact funds and each of the matched SRI funds, while the graphs on the right-hand side plot impact funds with the average return for matched SRI funds. Overall, the dynamics of impact funds' cumulative total returns are very similar to those of socially responsible funds. Moreover, the returns offered by impact funds at the end of the period under study are also very similar to those offered by socially responsible funds. Impact funds underperform relative to some SRI funds but outperform others, while their cumulative returns are particularly close to those of SRI averages.

Annualized returns reported in the fourth column of Table 2.2 confirm the absence of any systematic return difference between impact and SRI funds. Here too, impact funds underperform relative to some SRI funds and outperform relative to others. It is similarly difficult to find systematic differences in terms of risk between the two investment strategies. Looking at three different risk measures—portfolio volatility, Value-at-Risk (VaR) and Expected Shortfall (ES)—we see that results vary a great deal and prevent us from concluding that one type of funds is riskier than the other. Indeed, while the BNP Climate impact fund does better than its SRI counterparts on all three risk measures, the Triodos impact fund does worse, and it is hard to conclude whether the NN impact fund under- or over-performs its matched SRI funds. Finally,

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<sup>24</sup> The NAV of a mutual fund represents the fund's total assets minus the fund's total liabilities. The NAV is often expressed as a per share value and fluctuates daily.

<sup>25</sup> We use the latest fund constituent list available, either on Bloomberg or from the fund's most recent annual report.

risk-adjusted performance measures—Sharpe and Treynor ratios (Sharpe, 1966; Treynor and Mazuy, 1966)—presented in the last two columns of Table 2.2, confirm previous results, and prevent us from concluding that impact funds generally underperform SRI funds.

**Figure 2.1 Monthly EUR cumulative total returns for impact and socially responsible mutual funds.** For each impact fund (blue lines), we separately plot the cumulative total return with both its three matched SRI funds (on the left-hand side) and their average return (on the right-hand side). Series for impact funds NN and BNP Climate, as well as their matched SRI funds, start in October 2011, while series for the Triodos impact fund and its matched SRI funds start in June 2013. All series end in June 2021. All funds start with an initial value of 100.

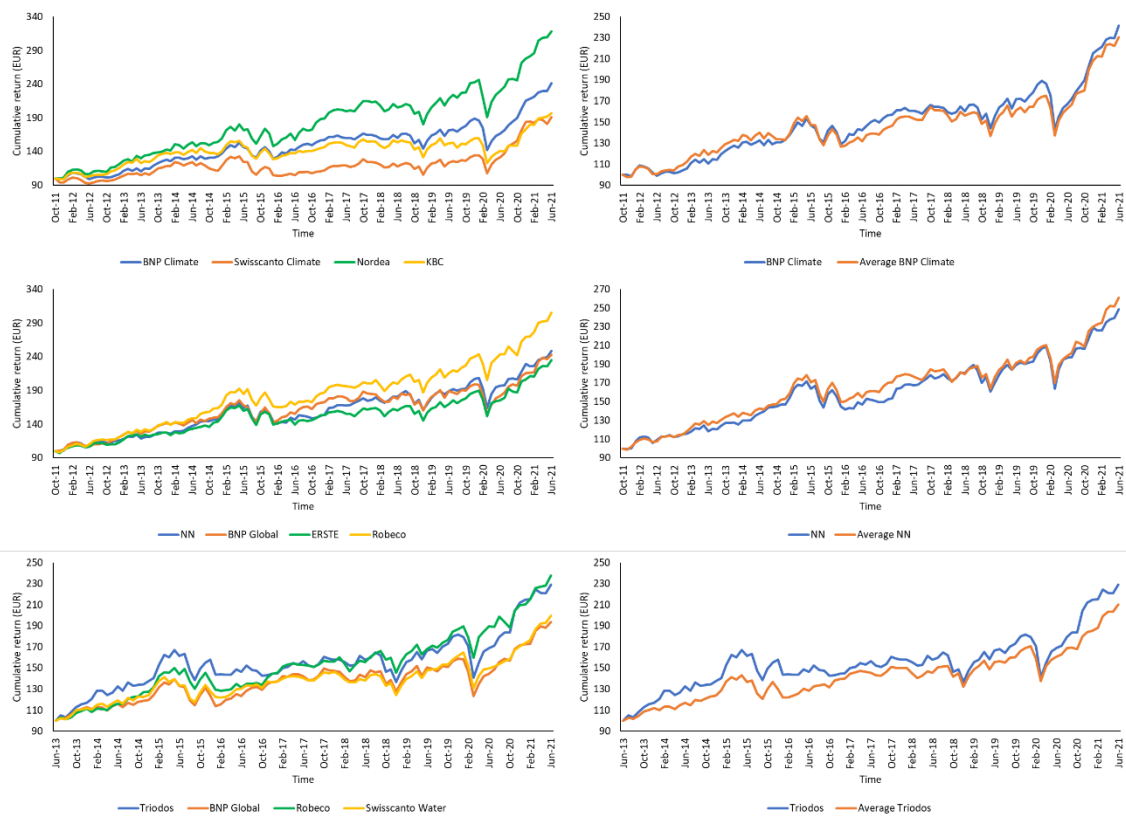


Table 2.2 Summary statistics of funds' monthly total return series

Fund	Maximum (%)	Minimum (%)	Annualized Return (%)	Volatility (%)	VaR <sub>0.05</sub> (%)	ES <sub>0.05</sub> (%)	Sharpe Ratio	Treynor Ratio(×100)
<b>BNP Climate</b>	8.94	-18.76	9.55	3.80	-6.03	-8.85	0.22	0.87
<i>SRI funds matched with the BNP Climate impact fund</i>								
Swisscanto Climate	11.75	-16.59	6.92	4.16	-6.12	-11.10	0.16	0.62
Nordea	11.70	-13.74	12.71	4.20	-8.05	-8.07	0.26	1.14
KBC	11.99	-17.83	7.27	3.93	-6.25	-9.29	0.17	0.68
Average SRI return	10.87	-16.05	9.02	3.94	-6.60	-9.16	0.20	0.81
<b>NN</b>	12.46	-15.06	9.87	3.68	-7.17	-7.64	0.23	0.87
<i>SRI funds matched with the NN impact fund</i>								
BNP Global	9.26	-15.72	9.63	3.83	-6.33	-10.16	0.22	0.88
Robeco	12.28	-10.65	12.25	3.48	-5.50	-7.79	0.30	1.18
ERSTE	12.56	-14.17	9.25	3.82	-6.69	-8.87	0.21	0.87
Average SRI return	11.37	-13.51	10.44	3.57	-6.56	-7.93	0.25	0.97
<b>Triodos</b>	11.04	-17.49	10.93	4.35	-8.04	-9.45	0.22	0.97
<i>SRI funds matched with the Triodos impact fund</i>								
Swisscanto Water	9.12	-13.90	9.02	3.61	-6.51	-8.67	0.22	0.91
BNP Global	9.26	-15.72	8.61	4.04	-7.50	-9.85	0.19	0.79
Robeco	12.28	-10.65	11.44	3.68	-6.01	-8.26	0.26	1.13
Average SRI return	10.22	-13.42	9.74	3.66	-6.59	-8.71	0.23	0.94

Note: summary statistics of the EUR monthly total return series of impact and socially responsible mutual funds. For each impact fund, we separately report statistics for both its three matched SRI funds and their average return. Series for impact funds NN and BNP Climate, as well as their matched SRI funds, start in November 2011, while series for the Triodos impact fund and its matched SRI funds start in July 2013. All series end in June 2021. Volatility is proxied by the unconditional standard error of monthly returns. VaR<sub>0.05</sub> and ES<sub>0.05</sub> are the non-parametric (kernel density estimation) Value-at-Risk and Expected Shortfall at the 5% level. The Sharpe Ratio divides the fund portfolio's mean return by the fund portfolio's standard error. The Treynor Ratio (multiplied by 100) divides the fund portfolio's mean return by the fund portfolio's beta derived from Carhart's (1997) four-factor model. All return series have negative skewness, excess kurtosis and therefore are not normally distributed, as confirmed by the results of Jarque-Bera tests (available upon request). Dickey-Fuller tests confirmed the stationarity of all return series (available upon request).

A complementary means of assessing fund portfolio performance is to analyze whether it produces risk-adjusted abnormal returns. Below, we measure alpha by means of three proven

factor models<sup>26</sup>: the CAPM (Sharpe, 1964; Lintner, 1965), the three-factor model developed by Fama and French (1993) and Carhart's (1997) four-factor model. We use the following specifications:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{1,i}(R_{m,t} - R_{f,t}) + \varepsilon_{i,t} \quad (2.2)$$

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{1,i}(R_{m,t} - R_{f,t}) + \beta_{2,i}SMB_t + \beta_{3,i}HML_t + \varepsilon_{i,t} \quad (2.3)$$

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{1,i}(R_{m,t} - R_{f,t}) + \beta_{2,i}SMB_t + \beta_{3,i}HML_t + \beta_{4,i}WML_t + \varepsilon_{i,t} \quad (2.4)$$

In all three specifications,  $R_{i,t}$  is the USD monthly total logarithmic return on fund portfolio  $i$  at time  $t$ ,  $R_{m,t}$  is the monthly market return at time  $t$ ,  $R_{f,t}$  is the risk-free rate at time  $t$ ,  $\alpha_i$  is the measure for risk-adjusted abnormal returns on fund portfolio  $i$ ,  $\beta_{1,i}$  measures fund portfolio  $i$ 's systematic risk, and  $\varepsilon_{i,t}$  is the disturbance term for fund portfolio  $i$  at time  $t$ . Fama and French (1993) and Carhart (1997) complete the CAPM with three additional factors, namely the size ( $SMB_t$ ), the value ( $HML_t$ ), and the momentum ( $WML_t$ ) factors, of which  $\beta_{2,i}$ ,  $\beta_{3,i}$  and  $\beta_{4,i}$  are the loadings for fund portfolio  $i$ .<sup>27</sup>

Table 2.3 presents alpha estimates for all fund portfolios and specifications. All impact and socially responsible alphas are not statistically different from zero. Moreover, results in Table 2.4, which presents coefficient estimates for SRI dummy variables<sup>28</sup>, confirm the non-significance of the difference between impact and socially responsible alphas. As a result, in line with our previous findings, it is not possible to conclude that there is any significant (abnormal) performance difference between impact and socially responsible funds. Overall, results so far do not validate our first hypothesis that impact funds would underperform SRI funds, which is at odds with the conception of impact investors accepting less favorable risk-return trade-offs than

<sup>26</sup> Assessing fund portfolio performance using those factor models is common practice in the related empirical literature (e.g., Renneboog, Ter Horst and Zhang, 2008b; Hong and Kacperczyk, 2009; Nofsinger and Varma, 2014; Belghitar, Clark and Deshmukh, 2014).

<sup>27</sup> As all impact and socially responsible mutual funds invest globally, we used global factors that span 49 countries, as well as the US one-month T-bill yield as risk-free rate. We retrieved data from Professor Kenneth French's data library at [https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html) (page accessed 13 August 2023).

<sup>28</sup> We re-estimate Equations (2.2), (2.3) and (2.4) for pairs of impact and socially responsible funds, adding a dummy variable that captures the difference in monthly alpha between the impact fund and the socially responsible fund. For instance, using the notation of Equation (2.2), we have  $R_{i,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \delta D + \varepsilon_{i,t}$ , where  $D$  is a dummy variable that takes the value of "1" for the returns of the socially responsible fund and "0" for the returns of the impact fund. A statistically non-significant coefficient estimate for the dummy variable indicates that there is no statistically significant difference between impact and socially responsible alphas. We pair each impact fund with each of its three matched SRI funds as well as their average return.

socially responsible investors. An extensive discussion of the implications of those findings follows in Section 2.6.

**Table 2.3 Assessment of abnormal performance with monthly alphas**

Fund	CAPM		Three-factor model		Four-factor model	
	$\alpha$	R <sup>2</sup>	$\alpha$	R <sup>2</sup>	$\alpha$	R <sup>2</sup>
<b>BNP Climate</b>	-0.0005 (0.0017)	0.83	-0.0008 (0.0015)	0.86	-0.0001 (0.0016)	0.87
<i>SRI funds matched with the BNP Climate impact fund</i>						
Swisscanto Climate	-0.0027 (0.0020)	0.80	-0.0035* (0.0018)	0.84	-0.0026 (0.0019)	0.85
Nordea	0.0021 (0.0021)	0.76	0.0018 (0.0021)	0.77	0.0030 (0.0022)	0.78
KBC	-0.0024 (0.0016)	0.85	-0.0025 (0.0015)	0.87	-0.0015 (0.0016)	0.87
Average SRI return	-0.0011 (0.0016)	0.86	-0.0014 (0.0015)	0.88	-0.0004 (0.0016)	0.88
<b>NN</b>	-0.0001 (0.0014)	0.87	-0.0008 (0.0013)	0.89	-0.0003 (0.0013)	0.89
<i>SRI funds matched with the NN impact fund</i>						
BNP Global	-0.0003 (0.0016)	0.84	-0.0007 (0.0015)	0.86	-0.0001 (0.0016)	0.86
Robeco	0.0023 (0.0016)	0.82	0.0019 (0.0015)	0.83	0.0026 (0.0016)	0.83
ERSTE	-0.0003 (0.0014)	0.81	-0.0007 (0.0013)	0.82	-0.0003 (0.0015)	0.82
Average SRI return	0.0006 (0.0013)	0.88	0.0002 (0.0013)	0.89	0.0007 (0.0014)	0.89
<b>Triodos</b>	0.0007 (0.0025)	0.74	-0.0001 (0.0022)	0.81	0.0008 (0.0023)	0.81
<i>SRI funds matched with the Triodos impact fund</i>						
Swisscanto Water	0.0001 (0.0017)	0.82	-0.0005 (0.0016)	0.84	-0.0005 (0.0016)	0.84
BNP Global	-0.0011 (0.0018)	0.85	-0.0016 (0.0017)	0.86	-0.0008 (0.0017)	0.87
Robeco	0.0018 (0.0018)	0.82	0.0012 (0.0017)	0.83	0.0021 (0.0018)	0.84
Average SRI return	0.0003 (0.0014)	0.87	-0.0003 (0.0014)	0.89	0.0003 (0.0014)	0.89

Note: this table reports monthly alpha estimates and R<sup>2</sup> for several factor models: the CAPM, the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model. For each impact fund, we separately report statistics for both its three matched SRI funds and their average return. Dependent variables are excess returns of impact and socially responsible funds. (Robust) standard errors are reported in parentheses. \* indicates statistical significance of the coefficient at the 10% level.

Table 2.4 Statistical significance of difference between monthly alphas

Fund	CAPM	Three-factor model	Four-factor model
<b>BNP Climate</b>			
<i>SRI funds matched with the BNP Climate impact fund</i>			
Swisscanto Climate	-0.0019 (0.0025)	-0.0019 (0.0023)	-0.0019 (0.0023)
Nordea	0.0025 (0.0027)	0.0025 (0.0025)	0.0025 (0.0025)
KBC	-0.0017 (0.0023)	-0.0017 (0.0021)	-0.0017 (0.0021)
Average SRI return	-0.0004 (0.0023)	-0.0004 (0.0021)	-0.0004 (0.0020)
<b>NN</b>			
<i>SRI funds matched with the NN impact fund</i>			
BNP Global	-0.0001 (0.0021)	-0.0001 (0.0020)	-0.0001 (0.0020)
Robeco	0.0017 (0.0021)	0.0017 (0.0020)	0.0017 (0.0020)
ERSTE	-0.0004 (0.0019)	-0.0004 (0.0018)	-0.0004 (0.0018)
Average SRI return	0.0004 (0.0019)	0.0004 (0.0018)	0.0004 (0.0018)
<b>Triodos</b>			
<i>SRI funds matched with the Triodos impact fund</i>			
Swisscanto Water	-0.0018 (0.0030)	-0.0018 (0.0027)	-0.0018 (0.0027)
BNP Global	-0.0019 (0.0030)	-0.0019 (0.0027)	-0.0019 (0.0027)
Robeco	0.0001 (0.0030)	0.0001 (0.0028)	0.0001 (0.0028)
Average SRI return	-0.0012 (0.0028)	-0.0012 (0.0026)	-0.0012 (0.0026)

Note: this table reports monthly coefficient estimates of dummy variables for socially responsible funds to capture the statistical significance of the difference between impact and socially responsible monthly alphas. The table reports estimates for the CAPM, the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model. For each impact fund, we separately report statistics for both its three matched SRI funds and their average return. (Robust) standard errors are reported in parentheses.



## 2.5. Diversification of Impact and Socially Responsible Mutual Funds

Based on a given investment opportunity set that may be reduced by non-financial constraints, an investor's objective is most often to maximize her portfolio's risk-return trade-off. As demonstrated in Section 2.4, impact and socially responsible funds have similar risk-adjusted returns, an unexpected result for impact funds given the characteristics of the firms they are expected to invest in. In this section, we aim to separately analyze both types of funds' level of diversification. To do so, we aim to use proven measures that are suitable to capture whether the level of diversification of impact investors' portfolios is affected by their supposedly scaled-down investment opportunity set.

The first measure is the number of portfolio securities (Blume, Crockett and Friend, 1974). That crude measure of diversification is reminiscent of an important result in finance, namely that portfolio risk decreases with the consecutive addition of securities (Goetzmann, Li and Rouwenhorst, 2005). Yet, when the number of securities in the portfolio becomes large, diversification benefits derived from the simple addition of securities quickly dry up, and portfolio variance is principally influenced by correlations among securities (Statman, 2004; Goetzmann, Li and Rouwenhorst, 2005). Hence, our second measure of portfolio diversification is the average correlation among portfolio securities (Goetzmann and Kumar, 2008; Nofsinger and Varma, 2013). In fact, simply adding securities to a portfolio without looking at correlations is referred to as "naïve" diversification, while carefully selecting securities with the aim of reducing average portfolio correlation is viewed as "skillful" diversification. With our second measure, we therefore aim to gauge the diversification benefits that result from skillful diversification. The lower the average correlation among securities, the smaller the portfolio variance relative to the variance of the portfolio securities.

To obtain a more conclusive and comparable assessment of impact and SRI funds' level of diversification, we use the normalized variance ratio (NV ratio) as a third measure (Goetzmann, Li and Rouwenhorst, 2005; Goetzmann and Kumar, 2008; Nofsinger and Varma, 2013). The NV ratio, presented in Equation (2.5), divides a portfolio's variance by the average variance of the securities within it. It is therefore an appropriate measure to evaluate the extent to which an investor reduces the volatility of her portfolio as compared to that of its individual constituents. Moreover, the NV ratio enables the comparison of portfolios with different sizes.

$$NV = \frac{\sigma_p^2}{\bar{\sigma}^2} = \frac{1}{N} + \left(\frac{N-1}{N}\right) \left(\frac{\overline{COV}}{\bar{\sigma}^2}\right) \quad (2.5)$$

In Equation (2.5) above,  $\sigma_p^2$  is the portfolio variance,  $\bar{\sigma}^2$  is the average constituent variance,  $N$  is the number of securities in the portfolio, and  $\overline{COV}$  is the average covariance among securities in the portfolio. The NV ratio shows that portfolio volatility can be reduced by either increasing the number of portfolio constituents or decreasing the average covariance (or correlation) among constituents, as separately implied by our first two measures of diversification.

Finally, a portfolio's level of diversification may be assessed by measuring how closely that portfolio comes to the supposedly well-diversified market portfolio. Our fourth measure of diversification, the sum of squared portfolio weights (SSPW; Blume and Friend, 1975; Goetzmann and Kumar, 2008; Faccio, Marchica and Mura, 2011; Nofsinger and Varma, 2013), therefore gauges the distribution of weights among portfolio securities to measure deviations from the market portfolio:

$$SSPW = \sum_{i=1}^N w_i^2 \quad (2.6)$$

In Equation (2.6),  $N$  is the number of securities in the portfolio, and  $w_i$  is the weight assigned to security  $i$ . The idea is that a portfolio is likely better diversified when weights of individual securities are smaller. Hence, the lower the value of the SSPW, the higher the level of diversification.

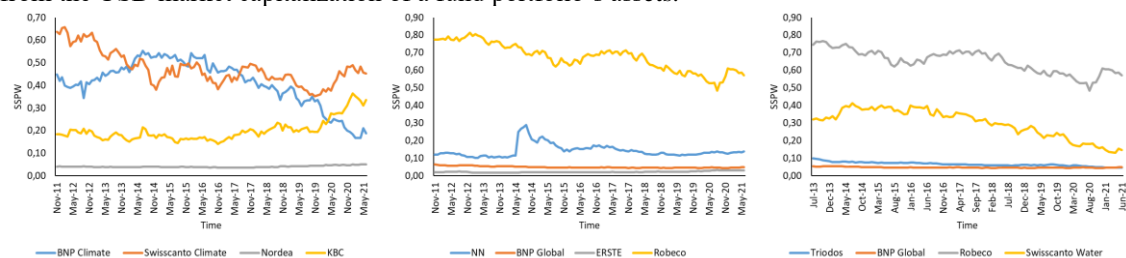
The third column of Table 2.5 shows that impact funds have a statistically equal or higher average constituent variance than SRI funds, in line with the generally riskier nature of impact investments, as explained in Section 2.2. In column 5, we see that impact funds often have a statistically lower average correlation among portfolio securities than socially responsible funds. This is a rather surprising result. Indeed, as impact investors' selection process for securities is supposedly more restrictive than socially responsible investors', the impact investment opportunity set is assumed to be smaller (see Section 2.2). Hence, it is supposed to be easier for SRI fund managers to achieve a lower level of average correlation among portfolio securities. Yet, in spite of lower average correlations, column 7 shows that impact funds do not systematically have a lower normalized variance ratio. In fact, those SRI funds that have a lower NV ratio also generally have a higher number of portfolio securities (see column 2) as well as a lower SSPW measure through time, implying a better distribution of portfolio weights, as shown in Figure 2.2. Thus, overall, the findings do not validate our second hypothesis that impact funds are less diversified than socially responsible funds. Indeed, results show that it is as possible for investors to better reduce aggregate portfolio volatility with impact funds as it is with SRI funds.

**Table 2.5 Diversification statistics of impact and socially responsible mutual funds**

<b>Fund</b>	<b>Number of constituents</b>	<b>Average Constituent Variance</b>	<b>P-value</b>	<b>Average Correlation</b>	<b>P-value</b>	<b>Normalized Variance</b>
<b>BNP Climate</b>	55	0.0081*** (0.0007)		0.2703*** (0.0040)		0.4364*** (0.0836)
<i>SRI funds matched with the BNP Climate impact fund</i>						
Swisscanto Climate	46	0.0116*** (0.0019)	0.22	0.3132*** (0.0062)	0.00	0.5268*** (0.1157)
Nordea	59	0.0075*** (0.0007)	0.36	0.2857*** (0.0043)	0.00	0.1917*** (0.0347)
KBC	90	0.0118*** (0.0016)	0.75	0.2591*** (0.0024)	0.00	0.2688*** (0.0605)
<b>NN</b>	56	0.0105*** (0.0014)		0.2350*** (0.0039)		0.4641 (0.2959)
<i>SRI funds matched with the NN impact fund</i>						
BNP Global	49	0.0051*** (0.0004)	0.03	0.3697*** (0.0050)	0.00	0.3536*** (0.0574)
Robeco	40	0.0068*** (0.0010)	0.23	0.2987*** (0.0056)	0.00	0.6817*** (0.1360)
ERSTE	170	0.0076*** (0.0007)	0.13	0.3100*** (0.0014)	0.00	0.1862*** (0.0331)
<b>Triodos</b>	50	0.0105*** (0.0010)		0.2414*** (0.0053)		0.1568*** (0.0352)
<i>SRI funds matched with the Triodos impact fund</i>						
Swisscanto Water	44	0.0063*** (0.0008)	0.00	0.3454*** (0.0060)	0.00	0.4226*** (0.0945)
BNP Global	49	0.0050*** (0.0003)	0.00	0.3811*** (0.0052)	0.00	0.3689*** (0.0612)
Robeco	40	0.0066*** (0.0010)	0.00	0.3156*** (0.0060)	0.00	0.6797*** (0.1448)

Note: this table reports monthly diversification statistics of impact and socially responsible mutual funds. Column 2 shows the number of constituents per fund, using the latest data available. Column 3 presents the average variance among a fund portfolio's constituents. Column 5 presents the average correlation between securities in a fund portfolio. Column 7 reports the Normalized Variance (NV), which is the ratio between a fund portfolio's variance and average constituent variance. Bootstrap standard errors are reported in parentheses. P-values are from two-sided Mann-Whitney U tests with the null hypothesis that the two samples derive from the same population. Series for impact funds NN and BNP Climate, as well as their matched SRI funds, start in November 2011, while series for the Triodos impact fund and its matched SRI funds start in July 2013. All series end in June 2021. \*\*\* indicates statistical significance of the statistic at the 1% level (bootstrap confidence interval).

**Figure 2.2 Monthly sum of squared portfolio weights (SSPW) for impact (blue lines) and socially responsible mutual funds.** Series for impact funds NN and BNP Climate, as well as their matched SRI funds, start in November 2011, while series for the Triodos impact fund and its matched SRI funds start in July 2013. All series end in June 2021. We compute the measure every month, based on the weights derived from the USD market capitalization of a fund portfolio's assets.



## 2.6. Discussion

Underpinning our initial hypotheses of less diversified and underperforming impact funds is the assumption derived from both theory and the literature that impact and socially responsible funds select assets differently. Therefore, in our bid to understand why our empirical findings do not support our hypotheses, we contemplate the possibility that impact and socially responsible funds in fact have similar asset selection processes. In order to inquire into funds' asset selection processes, we carefully examined each fund's investment policy<sup>29</sup> that notably explains how the fund uses non-financial criteria to construct its portfolio. Overall, it appears to us that, in practice, asset selection processes are rather homogeneous and akin to socially responsible rather than impact investment processes. We outline below how we arrive at this conclusion and provide several possible explanations as to why this may be so.

### 2.6.1. Funds' Asset Selection Processes

To start with, we notice that all funds, whether presented as impact or SRI funds, explain that they rely on the two main screening practices of socially responsible funds: negative and positive screening (Renneboog, Ter Horst and Zhang, 2008a; Nofsinger and Varma, 2014). Of course, the terminology varies from one fund to another. Funds often use terms like "exclusion filters", "exclusion list" or simply "exclusions" to denote negative screening. Sometimes, firms are excluded from the portfolio only if they exceed a certain threshold, in terms of coal or tobacco production for instance. To denote positive screening, funds use terms such as "integration of ESG criteria", "ESG analysis" or "best-in-class". Finally, all funds also directly engage on sustainability issues with the management of portfolio companies, a practice better known in the field of SRI as "engagement" or "shareholder activism" (e.g., Dawkins, 2018). According to the

<sup>29</sup> We examined funds' investment policies based on their investment prospectuses.

funds' investment policies, engagement is meant to change companies' behavior and involvement in undesirable business activities and thus to improve their sustainability performance. Engagement is also expected to reorient portfolio companies that may no longer align with the funds' non-financial investment principles.<sup>30</sup>

Beyond homogeneity in engagement and screening practices, we find that impact funds in our sample in fact apply asset selection processes that may fall short of what is theoretically expected from impact investors, which brings them closer to the practices of SRI funds. The impact funds are presented as investment vehicles aimed at generating positive societal impact alongside financial returns through involvement in a variety of global issues. Consistent with the theory on impact investments, impact funds also state that they measure and report on their contribution to those global challenges. Yet, these arguments are insufficient to conclude that the funds actually apply asset selection processes that are in line with impact investors' expectations, and also, delving deeper into the funds' investment policies reveals a number of practices that may not fully align with the theory and literature on impact investments.

As mentioned in Section 2.2, impact investors' objective is to fund commercial organizations with high potential social value and that generate an aggregate positive societal impact (Chowdhry, Davies and Waters, 2019; Barber, Morse and Yasuda, 2021). In other words, the firms that make up an impact portfolio must have a clearly defined social mission (Hehenberger, Mair and Metz, 2019; Block, Hirschmann and Fisch, 2021). However, as it happens, the asset selection processes used by impact funds in our sample may not be mainly targeting such firms, for several reasons.

Firstly, impact funds in our sample may invest in securities that do not comply with the rules of their sustainable investment policies, i.e., there is heterogeneity in the impact breadth of the different funds. For instance, we find that one fund may invest no more than 75% of its assets according to its policy of climate change mitigation<sup>31</sup>, which leaves ample room for assets that are not involved in the fight against climate change. Secondly, impact funds may mainly invest in large publicly traded firms. Indeed, as an example, we find that one fund's selection process leads to a reduction of 20% or more of the investment universe, which is made of traditional developed market firms with large- and mid-market capitalizations.<sup>32</sup> Clearly, that outcome would appear to

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<sup>30</sup> Table B.5 in Appendix B summarizes the many terms used by funds to denote negative and positive screening as well as engagement.

<sup>31</sup> See the BNP Paribas Funds Prospectus by BNP Paribas Asset Management (January 2022): <https://docfinder.bnpparibas-am.com/api/files/edb1fb6b-ed1b-441d-bc70-22c092a27772/512> (page accessed 13 August 2023).

<sup>32</sup> See the BNP Paribas Funds Prospectus by BNP Paribas Asset Management (January 2022): <https://docfinder.bnpparibas-am.com/api/files/edb1fb6b-ed1b-441d-bc70-22c092a27772/512> (page accessed 13 August 2023).

diverge from impact investors' theoretically restrictive selection process that leads them to mostly target smaller, high-risk organizations (Höchstädter and Scheck, 2015; Watts and Scales, 2020). Thirdly, while impact firms are meant to be addressing societal challenges, we find that one impact fund in our sample may invest in firms within industries with "increased sustainability risks", as long as those firms demonstrate an awareness of such risks and manage their involvement in controversies.<sup>33</sup> Finally, our search of funds' investment prospectuses did not reveal quantifiable social, environmental or ethical objectives in impact funds' investment policies. The absence of such objectives would raise questions as to how impact funds intend to track progress towards the solving of global issues, particularly when one impact fund declares that measured performance is simply a result and not an objective.<sup>34</sup>

### **2.6.2. Explaining Homogeneity in Asset Selection Processes**

We now propose several explanations for the high degree of homogeneity in the asset selection processes of impact and socially responsible mutual funds. Firstly, this chapter studies impact and SRI mutual funds managed by major financial institutions that invest in listed equity on behalf of retail investors. Although investors may have some WTP for being able to invest according to their values (Riedl and Smeets, 2017; Rossi et al., 2019), that WTP may not substantially increase with impact (Heeb et al., 2022), and profitability remains an important objective of investment funds. In the same vein, delivering competitive risk-adjusted returns while investing huge amounts of money requires the funds to diversify their holdings (Statman, 2004; Goetzmann and Kumar, 2008). Finally, the funds must guarantee acceptable levels of liquidity to investors (Pástor and Stambaugh, 2003; Brunnermeier and Pedersen, 2008). Overall, allocating investors' capital to small-size and high-risk organizations aiming for an aggregate and significant positive societal impact would seem to be hardly feasible for mutual funds in our sample, as profitability, diversification and liquidity requirements likely prevent funds from adopting highly restrictive asset selection processes.

Secondly, investors' lack of appropriate information and knowledge may strengthen the homogeneity in asset selection processes. Indeed, when assessing the sustainability of a financial product, investors must deal with a complex and often confusing information set (Filippini, Leippold and Wekhof, 2022; Anderson and Robinson, 2022). Yet, most individuals possess limited financial and sustainable finance literacy (Van Rooij, Lusardi and Alessie, 2011; Filippini, Leippold and Wekhof, 2022). Therefore, gathering information and building investment

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<sup>33</sup> See the Triodos SICAV I Prospectus by Triodos Investment Management (March 2022).

<sup>34</sup> Ibid.

knowledge, especially on the differences between impact and socially responsible investments, may be demanding and time-consuming, particularly for retail, non-professional investors. As a result, an asymmetry of information develops between fund managers and most retail investors (Rothschild and Stiglitz, 1976), who are unlikely to be able to evaluate the investment policy of an investment fund presented as an impact fund and may therefore be misled by financial providers (Filippini, Leippold and Wekhof, 2022; Anderson and Robinson, 2022).

Thirdly, homogeneity in asset selection processes may also stem from herd behavior on the part of fund managers (e.g., Deng, Hung and Qiao, 2018). In their seminal paper, Scharfstein and Stein (1990) demonstrate that fund managers who are concerned about their reputation may rationally mimic the investment decisions of other managers. Chang, Cheng and Khorana (2000) explain that herd behavior is particularly important when large institutional investors dominate the market, since they are assessed against their peers. It is therefore possible that part of the homogeneity observed in the selection processes of impact and SRI funds could be attributable to herd behavior, though genuine impact funds should rather seek to differentiate themselves from the rest of the market. If some non-financial selection criteria prove to be loose or inefficient, at least many managers in the market will share the blame, and each individual manager will salvage her reputation.

Finally, we find that recent European regulation on sustainable finance may in fact fuel homogeneity in asset selection processes, in line with the findings of Ahlström and Monciardini (2022). Here, we take the example of the 2019 Sustainable Finance Disclosure Regulation (SFDR) that requires financial market participants and financial advisers to increase “transparency with regard to the integration of sustainability risks and the consideration of adverse sustainability impacts in their processes” and to provide “sustainability-related information with respect to financial products.” Although the SFDR increases transparency on sustainability practices, it leaves financial institutions free to decide on the non-financial categorization of their funds.<sup>35</sup> Jumping from one category to another changes information disclosure requirements, but the

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<sup>35</sup> The SFDR proposes three categories of funds. Article 6 gathers funds that do not promote sustainability criteria. Article 8 gathers funds that promote social and/or environmental characteristics, though they do not consider sustainable investing as a core objective. Article 9 gathers funds that have a sustainable investment objective, i.e., funds that contribute to social and/or environmental objectives and measure their progress towards environmental objectives (see Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector).

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SFDR is silent on the non-financial selection criteria or standards that a fund must apply if it is to belong to a more sustainable category of funds<sup>36</sup>, as demonstrated by the excerpts below:

“Financial market participants shall include descriptions of the following in pre-contractual disclosures: (a) the manner in which sustainability risks are integrated into their investment decisions; and (b) the results of the assessment of the likely impacts of sustainability risks on the returns of the financial products they make available.” (Article 6)

“When a financial product promotes, among other characteristics, environmental or social characteristics, or a combination of those characteristics, provided that the companies in which the investments are made follow good governance practices, the information to be disclosed [...] shall include the following: (a) information on how those characteristics are met [...]” (Article 8)

“Where a financial product has sustainable investment as its objective and no index has been designated as a reference benchmark, the information to be disclosed [...] shall include an explanation on how that objective is to be attained.” (Article 9)

Consequently, it is possible for a financial institution to present its funds as belonging to the most sustainable category of funds without raising the funds’ non-financial standards in practice. This way, it becomes possible to decouple a fund’s presentation (e.g., as an impact fund) from its actual asset selection process.

As pointed out by Avramov et al. (2022a), investors often face much uncertainty when assessing the sustainability profile of a firm, a situation meaningfully illustrated by the significant heterogeneity across sustainable rating agencies (Chatterji et al., 2016; Berg, Koelbel and Rigobon, 2022). Accordingly, there is a need for policy makers to set more rigorous and uniformed standards to better determine the sustainability profile of a firm (De Angelis, Tankov and Zerbib, 2022; Filippini, Leippold and Wekhof, 2022; Avramov et al., 2022a) and help investors to classify between socially responsible and impact investments.

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<sup>36</sup> The same is true for the EU Taxonomy for Sustainable Activities. While it “establishes the criteria for determining whether an economic activity qualifies as environmentally sustainable”, it does not provide non-financial criteria or standards for rigorously classifying sustainable investments into different categories such as socially responsible or impact investments (see Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088).



## 2.7. Conclusion

In this chapter, we investigate whether the theoretical differences between impact and socially responsible investments translate into differences in financial performance and diversification. Overall, empirical results do not support our two initial hypotheses of less diversified and underperforming impact funds. Indeed, we find that impact funds in our sample produce risk-adjusted returns that are similar to those of comparable SRI funds, and that reducing aggregate portfolio volatility via diversification is as possible with impact funds as it is with SRI funds. As it happens, our results go against the bulk of the financial literature on impact and socially responsible investments, which portrays two contrasting investment strategies, notably due to their supposedly different asset selection processes (Höchstädter and Scheck, 2015; Alijani and Karyotis, 2019). We note that our results are likely not driven by an important overlap of portfolio companies, as comparable impact and SRI funds have a maximum of 24% of common constituents (median of 9.6%).

As investors' WTP may not increase proportionally with impact (Heeb et al., 2022), our findings that impact funds—whose societal impact is assumed to be more sizeable—display competitive financial features compared with SRI funds would appear to send a positive signal for the future growth of the impact investing industry. Yet, our examination of funds' investment policies casts doubt on the nature of impact funds in our sample and therefore on their ability to massively scale up high impact solutions to address societal challenges. Indeed, we found that those funds in fact apply asset selection processes that are similar to those of SRI funds and therefore may not align with the standards of impact investors who look for portfolio firms with top-tier non-financial attributes.

We propose several explanations to that propinquity in the asset selection processes of impact and socially responsible funds, namely (i) profitability, diversification and liquidity requirements, (ii) information asymmetry between fund managers and retail investors, (iii) herd behavior on the part of fund managers, and (iv) incompleteness of regulation. Future research should concentrate on completing and confirming the above-mentioned list of proposals to gain a better understanding of the factors that may be preventing investment funds from developing practices that align with impact investors' expectations. That being said, other reasons might also explain why impact funds would be able to achieve similar levels of financial performance and diversification as SRI funds. For instance, it is possible that, despite a less restrictive asset selection process, SRI portfolios may not be constructed from a broader initial investment universe, notably if SRI fund managers operate a restricted list of eligible assets to adopt specific

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investment styles (e.g., the SRI manager exclusively invests in mid-cap stocks; Gnabo and Vanhomwegen, 2021).

Our results and conclusions in this chapter are naturally bound to the small dataset that we assembled. That small sample size is largely attributable to our decision to impose that impact funds in our sample be recognized by the GIIN for coherence and consistency purposes. Our decision to rely on the GIIN's conceptualization of impact investing is based on the institution's conceptual leadership in the impact investing industry at the time of writing this chapter. Yet, exclusive reliance on the GIIN clearly leads to an incomplete picture of the European impact and socially responsible mutual fund industries. As such, our empirical results undoubtedly ought to be challenged by the findings obtained from larger datasets—notably datasets based on alternative conceptualizations of impact investing—that we encourage future research to assemble.

Our assessment of the potential difference between impact and socially responsible alphas also has limitations. Indeed, in our analysis presented in Table 2.4, we chose not to control for fund and country characteristics, given our use of a rigorous matching methodology to associate funds and the similarities of the different countries where both funds and fund managers are located (for instance, all countries have a civil law system). Yet, we acknowledge that some fund and country characteristics may still influence fund performance to some extent (Amihud and Goyenko, 2013; Ferreira et al., 2013; El Ghouli and Karoui, 2017). Examples of such fund characteristics identified in the literature are size, age, turnover, fees and expenses, past returns, flows and the volatility of flows, management structure, and fund's  $R^2$ . Examples of country characteristics include economic and financial development, the quality of legal institutions, the degree of law enforcement, and the structure of the mutual fund industry. Ferreira et al. (2013) also demonstrate that the determinants of mutual fund performance may also vary from country to country. Future research may therefore extend our analysis of impact and SRI funds' financial performance based on the above-mentioned methodological aspects.

In the end, despite several limitations, this study produces early findings on an under-researched topic with the goal of laying the groundwork for future research on the debate about the conceptualization, distinctiveness, and practical implementation of impact investing in the sustainable finance universe.



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# Chapter 3 Who Buys Social Bank Shares? Exploring Individual Financial and Non- Pecuniary Motives

## 3.1. Introduction

The global financial crisis of 2008 led to a pronounced deterioration in public trust in traditional financial markets and institutions (Stevenson and Wolfers, 2011; Knell and Stix, 2015; Fungáčová, Hasan and Weill, 2019). Reasons for this are legion, and include disintermediation and lucrative trading activities (Becchetti, Ciciretti and Paolantonio, 2016), large executive salaries and bonuses (Jansen, Mosch and van der Cruijssen, 2015), governments' perceived permissiveness towards bankers (Sapienza and Zingales, 2012) and frauds (Guiso, 2010). Against this backdrop, society's growing demand for sustainability in banking and finance (Bénabou and Tirole, 2010; Hartzmark and Sussman, 2019) led to the rapid development of sustainable investment practices as a means to integrate environmental, social, and ethical concerns into the financial sphere (Pástor, Stambaugh and Taylor, 2021; De Angelis, Tankov and Zerbib, 2022). Such practices include, for instance, socially responsible investing (Nofsinger and Varma, 2014) and impact investing (Barber, Morse and Yasuda, 2021; Bernal, Hudon and Ledru, 2021), and according to the Global Sustainable Investment Alliance, made up 35.9% of global assets under management in 2020.<sup>1</sup>

While the industry for sustainable investments is no longer a niche industry (Edmans and Kacperczyk, 2022), alternative solutions to integrate societal concerns into finance are still expanding. Of these, the case of social banks deserves particular attention. Social banks are double bottom line financial intermediaries whose mission is to fund social-purpose organizations (Weber, 2014; Barigozzi and Tedeschi, 2015; Cornée, Kalmi and Szafarz, 2020). Hence, by nature, social banks fund projects that contribute to addressing current social and environmental issues such as those highlighted by the 2015 Paris Agreement and the United Nations' Sustainable Development Goals (SDGs). Although they share the same fiscal and regulatory framework as conventional banks, social banks exhibit particular characteristics. For instance, they forbid purely speculative transactions, limit the distribution of profits, increase information

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<sup>1</sup> See the Global Sustainable Investment Review 2020 available at <https://www.gsi-alliance.org/trends-report-2020/> (page accessed 13 August 2023).

transparency, and follow specific corporate governance rules (San-Jose, Retolaza and Gutierrez-Goiria, 2011; Cornée and Szafarz, 2014; Barigozzi and Tedeschi, 2015). While the social banking industry remains modest in comparison to the traditional banking sector, it nevertheless serves over 60 million customers worldwide, manages over USD 200 billion in assets, and had assets increase by 10.1% between 2011 and 2020, compared with 3.1% for conventional banks.<sup>2</sup>

The above-mentioned figures make of social banks an interesting field of research, notably when it comes to uncovering the determinants which lead private individuals—frequently called “social owners”—to acquire social bank shares. Numerous motives may indeed drive such a decision, starting with individuals’ social preferences. As a matter of fact, social preferences partly drive the prosocial behavior of economic agents (Bénabou and Tirole, 2010) and are among the reasons for their holding sustainable investment funds (Bauer and Smeets, 2015; Riedl and Smeets, 2017; Bauer, Ruof and Smeets, 2021). In the specific context of social banking, social preferences may also play a role besides traditional risk and return considerations. Indeed, the literature shows that socially-minded individuals deposit their money at social banks because they share the banks’ social values (San-Jose, Retolaza and Gutierrez-Goiria, 2011; Barigozzi and Tedeschi, 2015), and social owners are willing to forgo a significant part of their financial returns to allow social banks to grant loans at preferential terms (Borzaga and Defourny, 2001; Becchetti, Garcia and Trovato, 2011; Krause and Battenfeld, 2019).

Social owners’ decision may also be driven by previous investment decisions in sustainable financial products, or by their lack of trust in the traditional banking sector (Stevenson and Wolfers, 2011; Sapienza and Zingales, 2012; Knell and Stix, 2015). Reputational motives may also play a role (Bénabou and Tirole, 2006; Ellingsen and Johannesson, 2008; Ariely, Bracha and Meier, 2009; DellaVigna, List and Malmendier, 2012), in which case social owners would buy social bank shares with the purpose of creating a positive social image via social signaling (Fehrler and Przepiorka, 2013; Cappelen et al., 2017), as demonstrated by Riedl and Smeets (2017) in the context of sustainable investment funds.

While the literature on social preferences is abundant (see, e.g., Charness and Rabin, 2002; Sobel, 2005; Fehr and Charness, 2023), there is no empirical evidence as to their actual relevance to explain the dynamics of capital flows to social banks. Similarly, there is also a lack of empirical evidence regarding the other above-mentioned motives. In a context in which accelerating the provision of additional capital to social banks can contribute to the scaling of solutions to address

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<sup>2</sup> Based on the figures of the Global Alliance for Banking on Values, available at <https://www.gabv.org/> (page accessed 13 August 2023).

current societal challenges, the aim of this chapter is precisely to fill that gap. Therefore, to uncover the determinants driving the decision to acquire social bank shares, we take advantage of the 2019 initial fundraising campaign of a Belgian social bank<sup>3</sup> to assemble a unique dataset that combines survey data and behavior in an incentivized experiment that is a variant of the controlled and anonymous one-shot trust game experiment introduced by Berg, Dickhaut and McCabe (1995).

Our analysis delivers three main findings. First, private individuals who fund social banks exhibit a significant lack of trust towards conventional banks. Second, their decision to buy social bank shares is primarily driven by non-financial considerations, among which social preferences play a meaningful role. Financial motives play a secondary role, notably influencing the amount spent on social bank shares. Third, we find that the non-financial concerns of members—private individuals who bought shares in the social bank<sup>4</sup>—are likely authentic, as they do not seem to fund social banks to boost their social image and reputation. In a separate section of this chapter, we further exploit our unique dataset to investigate the effect of specific social determinants on trust in banks. Our findings show that several individual social attributes, such as higher conviction of the societal benefits of sustainable finance, have a positive influence on the level of trust individuals have in banks.

Our empirical results are related to several strands in the literature, starting with that on social banks.<sup>5</sup> Scholars have notably studied the business model of social banks (Barigozzi and Tedeschi, 2015; Cornée, Kalmi and Szafarz, 2020), their peculiarities (San-Jose, Retolaza and Gutierrez-Goiria, 2011), their positioning on the social finance continuum (Cornée, Jegers and Szafarz, 2022), the relevance of soft information (Cornée, 2014 and 2019), and reciprocity in the credit market of social banks (Cornée and Szafarz, 2014). More closely related to our study, Krause and Battenfeld (2019) analyzed a series of defining characteristics of German social banking customers. However, the profile of customers may be significantly different from that of social

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<sup>3</sup> The creation of a brand-new social bank in Europe is an infrequent phenomenon. Indeed, among the European social banks that are members of the Global Alliance for Banking on Values, close to 70% were launched before 2000, and the most recent social bank was created in 2002 (Fiare Banca Etica, in Spain). See <https://www.gabv.org/members/> (page accessed 13 August 2023).

<sup>4</sup> The private individuals who bought shares in the Belgian social bank are called “members” because the social bank is a cooperative bank. Those members are social owners.

<sup>5</sup> This chapter also contributes to the literature on cooperative banks. See, e.g., Giagnocavo, Gerez and Sforzi (2012), Becchetti, Ciciretti and Paolantonio (2016) and Périlleux and Nyssens (2017).

owners.<sup>6</sup> This chapter therefore contributes to the literature by uncovering the motives that prompt private individuals to buy social bank shares.

Our work also relates to the literature on the determinants of prosocial behavior (Bénabou and Tirole, 2006 and 2010; Ellingsen and Johannesson, 2008; Ariely, Bracha and Meier, 2009; Lacetera, Macis and Slonim, 2012; Cappelen et al., 2017). Prosocial behavior may notably be explained by identity (Akerlof and Kranton, 2000 and 2005; Chen and Li, 2009), and its determinants have been researched in contexts such as that of charitable donations (Glazer and Konrad, 1996; DellaVigna, List and Malmendier, 2012) and sustainable investment funds (Bauer and Smeets, 2015; Bauer, Ruof and Smeets, 2021). This chapter adds to this literature by studying the determinants of prosocial behavior in a novel and unique setting: the initial fundraising of a social bank.

Finally, we contribute to the literature on trust in financial institutions, in which scholars uncovered numerous determinants of trust in banks (Stevenson and Wolfers, 2011; Knell and Stix, 2015; Jansen, Mosch and van der Crujisen, 2015; Fungáčová, Hasan and Weill, 2019), and studied trust in relation to public institutions and the stock market (Guiso, Sapienza and Zingales, 2008; Guiso, 2010; Clausen, Kraay and Nyiri, 2011).<sup>7</sup> We contribute to this literature by providing evidence that individual social attributes influence trust in banks.

The rest of the chapter proceeds as follows. Section 3.2 describes social banks in greater detail and presents the specific context of our study. In Section 3.3, we introduce our data and methodology. Section 3.4 discusses our main empirical results, while Section 3.5 provides evidence on the influence of social determinants on trust in banks. Section 3.6 concludes.

## **3.2. Social Banks and Study Context**

Public awareness with regard to social and environmental challenges has risen significantly in recent years. In 2022, more than 90% of the European population considered climate change as a serious problem.<sup>8</sup> At the same time, results from opinion polls suggest that confidence in public institutions has also been fragile, with sizeable shares of citizens around the globe considering

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<sup>6</sup> For instance, referring to the Belgian social bank under consideration in this study, only 13.70% of the individuals who bought shares in the bank ultimately became customers of the bank.

<sup>7</sup> See also La Porta et al. (1996), Sapienza and Zingales (2012) and Guiso, Sapienza and Zingales (2013) who study trust in related contexts.

<sup>8</sup> See “Public opinion in the European Union”, Standard Eurobarometer 97, Summer 2022.

governments to be opaque, environmentally unsustainable, and to not always behave responsibly.<sup>9</sup> Overall, half of the world's population would even see governments as untrustworthy.<sup>10</sup> The same holds true for the traditional banking industry, as less than three in ten citizens globally would see the sector as trustworthy.<sup>11</sup> This growing public demand for sustainability, reliability and responsibility in the banking sector has fueled the expansion of alternative forms of financial intermediation, including social banks.

Social banks are value-based financial intermediaries (Cornée, 2019) that have a social mission and attempt to correct for market failures, as conventional banks tend to restrict access to credit for social enterprises<sup>12</sup> because the latter are seen as less profitable than for-profit businesses (Barigozzi and Tedeschi, 2015; Cornée, Kalmi and Szafarz, 2020). Although they share a series of features with conventional banks, such as being recognized and regulated as banks by national authorities (San-Jose, Retolaza and Gutierrez-Goiria, 2011), social banks are different in several ways. First, they pursue social profitability, i.e., they only fund socially-relevant economic activities and refrain from speculative projects (Green, 1989; San-Jose, Retolaza and Gutierrez-Goiria, 2011). Therefore, social banks fund societal projects such as the provision of goods and services to impoverished people, the creation of job opportunities, or the promotion of environmentally-friendly solutions (Defourny, 2001; Barigozzi and Tedeschi, 2015; Cornée, Kalmi and Szafarz, 2020). Second, social banks do not pursue profit maximization. Rather, they target economic sustainability, i.e., making nonnegative profits (Lynch, 1991; Becchetti, Garcia and Trovato, 2011), and they considerably limit the distribution of such profits (Cornée and Szafarz, 2014; Barigozzi and Tedeschi, 2015). Third, social banks fulfil their mission through simple, transparent, and prudent intermediation, which facilitates accountability to social owners and depositors, i.e., to social funders<sup>13</sup> (Cornée, Kalmi and Szafarz, 2020; Cornée, Jegers and Szafarz, 2022). Lastly, social banks adopt corporate governance structures that allow for the active involvement of stakeholders in decision-making (Becchetti, Garcia and Trovato, 2011).<sup>14</sup>

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<sup>9</sup> More than half of EU Member States' citizens apparently consider that national governments do not do what it takes to tackle climate change. See "Public opinion in the European Union", Standard Eurobarometer 97, Summer 2022.

<sup>10</sup> See the Ipsos 2021 Global Trustworthiness Monitor.

<sup>11</sup> See the Ipsos 2021 Global Trustworthiness Monitor.

<sup>12</sup> Social enterprises are small- and medium-sized enterprises undertaking societal projects (Defourny, 2001).

<sup>13</sup> To carry out their credit activities, social banks rely on two main funding sources: they receive capital from social owners who acquire social bank shares, and they collect deposits.

<sup>14</sup> For a comprehensive description of social banks, see Becchetti, Garcia and Trovato (2011), San-Jose, Retolaza and Gutierrez-Goiria (2011), Cornée and Szafarz (2014) and Cornée, Kalmi and Szafarz (2020).



Social banks are primarily located in Europe (Cornée, Kalmi and Szafarz, 2020), including institutions such as Triodos Bank in the Netherlands, La Nef in France, and Banca Etica in Italy. Many are legally structured as financial cooperatives, i.e., organizations that focus on retail banking, take low risks and support projects that deliver substantial positive externalities to society (Giagnocavo, Gérez and Sforzi, 2012; Becchetti, Ciciretti and Paolantonio, 2016; Périlleux and Nyssens, 2017). Another major feature of financial cooperatives is their democratic governance structure that follows the “one member, one vote” principle (Périlleux and Nyssens, 2017), which rules out dominant shareholders and helps to strengthen the moral contract (Cornée and Szafarz, 2014; Cornée, Jegers and Szafarz, 2022).

In this chapter, we obtain data on members of a recently-constituted Belgian cooperative social bank. From October to December 2019, the bank carried out a fundraising campaign aimed at collecting at least EUR 30 million of financial capital, a regulatory prerequisite to obtaining its banking license in January 2020 by the National Bank of Belgium as part of the Eurosystem.<sup>15</sup> To collect the necessary funding and so to be able to launch its activities, the bank presented itself as a brand-new player in the Belgian banking industry, one whose aim was to redefine the banking business in Belgium through the inclusion of ethical and sustainable considerations in financial solutions. To reach that objective, the bank announced that depositors’ money would be used for funding projects that, *inter alia*, would support local and cultural initiatives, contribute to the development of a circular economy, respect human rights, favor renewable energy and aim to tackle climate change. To ensure compliance with those principles, the bank designed its own code of ethics and decided to conduct all its activities in keeping with 13 distinct values listed in its articles of association.

More than 75 000 private individuals became members of the social bank during its fundraising campaign in 2019, by acquiring one or more shares. From a financial point of view, those shares bear two main features. First, the shares have low liquidity, as they are not listed on an exchange and cannot easily be transferred to another individual. Indeed, to dispose of her shares, a member must either resign—in which case the social bank buys the shares back—or transfer her shares to either another member or a private individual who fulfils the conditions to become a member. In the end, the social bank’s board of directors must approve the resignation or the transfer. Second, potential financial returns are very limited. Indeed, the bank explains that, in the case of a resignation, it will buy the member’s shares at a price that cannot exceed the nominal value,

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<sup>15</sup> By the end of its fundraising campaign, the bank had collected EUR 35 million.

thereby ruling out capital gains.<sup>16</sup> Moreover, although owning shares theoretically confers the right to receive dividends, the social bank indicates that, as of its inception, it does not know when it will be able to pay a dividend to its members. The payment of dividends is linked to nonnegative profits, a situation which, according to the social bank, may take years to achieve.

### 3.3. Data and Methodology

The objective of this chapter is to uncover the motives that prompt private individuals to buy social bank shares. To do so, we rely on Probit and Ordered Probit regression analysis, as well as on three sets of variables: (i) non-financial motives, (ii) financial motives, and (iii) individual characteristics. To construct our variables, we conducted a survey in March 2022 that contained both questions and an incentivized experiment.<sup>17</sup> We collected data on 1068 individuals split into two samples: (i) a sample of 507 members of the Belgian social bank—private individuals who bought shares in the bank during its 2019 fundraising campaign, and (ii) a sample of 561 non-members—private individuals who decided not to buy shares during the 2019 fundraising campaign.<sup>18</sup>

To collect the data for the sample of 507 members, we initially started from a pool of 52 113 members of the Belgian social bank.<sup>19</sup> Budget constraint reasons meant that we knew from the start that we could fund the participation of approximately 500 members in the incentivized experiment.<sup>20</sup> Therefore, to better assess the representativeness of our sample of members vis-à-vis its underlying unknown population (see below), the survey was sent to members in two parts. In the first part, which consisted mostly of simple socio-demographic questions, we collected data on 2508 members (response rate of 4.81%) to whom we then sent the second part of the survey, consisting of the remaining questions and the experiment. In that second part, we collected data on 507 members, which form our final member sample. To assess the representativeness of that sample, we started by evaluating whether respondents differed from nonrespondents. To this end, we followed the rationale of Wallace and Mellor (1988) and, using the subset of questions we

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<sup>16</sup> As for a shares transfer to either another member or a private individual, it is unlikely that the buyer would pay a higher share price than that proposed by the social bank, i.e., a price that cannot exceed the nominal value.

<sup>17</sup> The survey, survey instructions and the emails we sent are available upon request.

<sup>18</sup> Non-members never bought shares in the Belgian social bank, neither before the 2019 fundraising campaign (i.e., before the social bank received its banking license, when it was a financial cooperative but not a bank), nor during or after the campaign.

<sup>19</sup> The members in that pool are those who had agreed to be contacted by the social bank, notably for marketing purposes.

<sup>20</sup> The incentivized experiment is, by definition, incentivized with actual money (see Section C.2 in Appendix C for further details) which, for budgetary reasons, limits the number of individuals who can participate in it.

asked our larger sample of 2508 members, we compared the mean responses of the first 10% of respondents with those of the last 10% of respondents, using the Mann-Whitney U Test. We conducted the test for seven questions. The mean responses for early and late respondents were statistically different at the 10% level for only two questions (see Panel 1 in Table C.1 in Appendix C), indicating that nonresponse bias is not a major issue. We next compared the responses to the same seven questions by our larger sample of 2508 members and our final sample of 507 members. Although they differed slightly for three questions (see Panel 2 in Table C.1 in Appendix C), global proportions remained stable from one sample to the other, suggesting that our final sample of 507 members is reasonably representative of the underlying unknown population of members.

To collect the data for the sample of 561 non-members, we hired an external company specialized in conducting surveys. The company started by filtering its database of potential respondents to remove individuals who had not been informed of the opportunity to buy shares in the social bank. Next, the company sent the complete survey to remaining potential respondents<sup>21</sup>, assembling the sample of non-members to make it as representative as possible of the population of Belgian private individuals aged 21 or over.<sup>22</sup> Initially, the sample of non-members contained 1024 respondents, from which we removed 463 respondents who declared in the survey that they had bought shares in the Belgian social bank and were therefore ineligible to serve as non-members.<sup>23</sup> Although removing that important number of individuals from the sample affected its initial representativeness, our final sample of 561 non-members remains reasonably representative of the underlying unknown population of non-members on the selected criteria (see Table C.2 in Appendix C). Figure 3.1 provides an overview of the sampling process described above. Additional details about the survey can be found in Section C.1 in Appendix C.

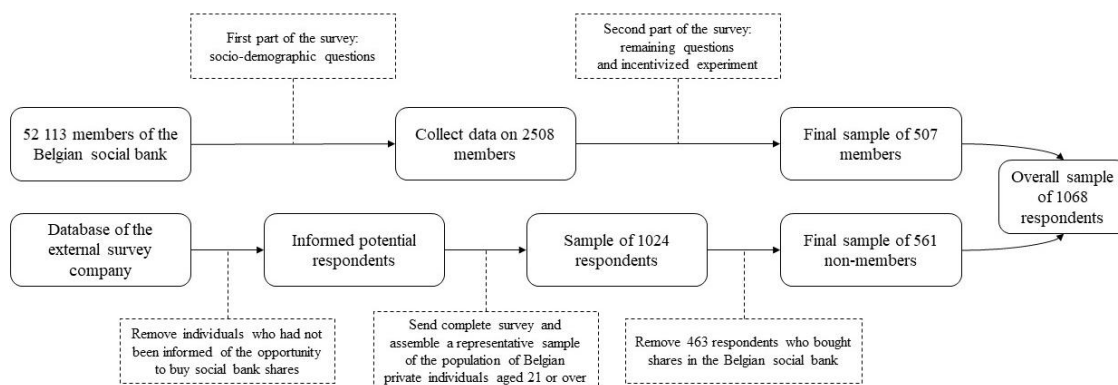
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<sup>21</sup> Because the external company directly assembled a sample of non-members as representative as possible of its underlying population, we did not need to send the survey in two parts.

<sup>22</sup> The sample of non-members was to be as representative as possible of the underlying unknown population of non-members whose features are likely similar to those of the population of Belgian private individuals, as non-members represent close to 99% of the Belgian population. The external company built the representative sample of non-members using the gender, age and province criteria based on StatBel figures (StatBel, the Belgian statistical office; see <https://statbel.fgov.be/en>; page accessed 13 August 2023).

<sup>23</sup> For budgetary reasons, we could not filter potential respondents on whether they had bought shares in the social bank before assembling the sample of non-members. Therefore, we had to ask respondents the question in the survey and remove those respondents who were ineligible to serve as non-members once the initial sample of 1024 respondents had been built. A potential reason why so many individuals in the initial sample of 1024 respondents had bought shares in the social bank is that the external company initially removed potential respondents who had not been informed of the opportunity to buy shares in the social bank.

**Figure 3.1 Overview of the sampling process.** This figure summarizes the different steps of the sampling process.



The samples of members and non-members share a series of characteristics that enhance comparability. First, they are composed only of private individuals of Belgian nationality and whose primary residence is in Belgium. Indeed, although several organizations participated in the 2019 fundraising campaign, most of the financial capital was provided by private individuals, who are the focus of this study. Second, both members and non-members were making their decisions for themselves, which is important, as they may have taken different decisions if they had been deciding on behalf of others (Andersson et al., 2020). To buy shares for themselves, members and non-members had to be at least 18 years old at the time of the fundraising campaign back in 2019. We therefore restricted the survey to individuals aged 21 or more in March 2022. Third, like members, non-members were also informed of the opportunity to buy shares in the social bank. This allows us to study the determinants of a conscious decision not to buy shares, as an individual who does not buy shares because she does not know about the opportunity simply does not make any decision. We control for a series of additional characteristics in our analyses.

There are several well-known limitations to survey questions besides the potential nonresponse bias already discussed above. For instance, the framing of questions may affect respondents' answers (Riedl and Smeets, 2017), particularly for complex questions (Van Rooij, Lusardi and Alessie, 2011). In our case, since members and non-members both received the same questions, framing effects should not have altered answers' cross-sectional variability (Guiso, Sapienza and Zingales, 2013). Also, respondents may distort their reported attitudes or provide untruthful answers (Dohmen et al., 2011). Yet, since our survey was anonymous, that issue was likely to have been minimal (Graham and Harvey, 2001). Surveys also have numerous benefits that are particularly relevant to our study. They allow the asking of specific and qualitative questions that capture otherwise unobserved information about, for instance, return expectations, risk attitudes, or trust in the traditional banking sector (Graham and Harvey, 2001; Riedl and Smeets, 2017). Surveys also capture unobservable psychological traits and moral positions via the collection of

stated perceptions and self-assessments (Dorn and Huberman, 2005). Finally, it has been shown that survey responses reflect real-life financial decisions relatively accurately (Bauer and Smeets, 2015). For a deeper discussion of the pros and cons of survey questions when studying financial decisions, see Guiso, Sapienza and Zingales (2013) and Riedl and Smeets (2017).

In the following sections, we provide details on all variables, which are also summarized in Table C.3 in Appendix C.

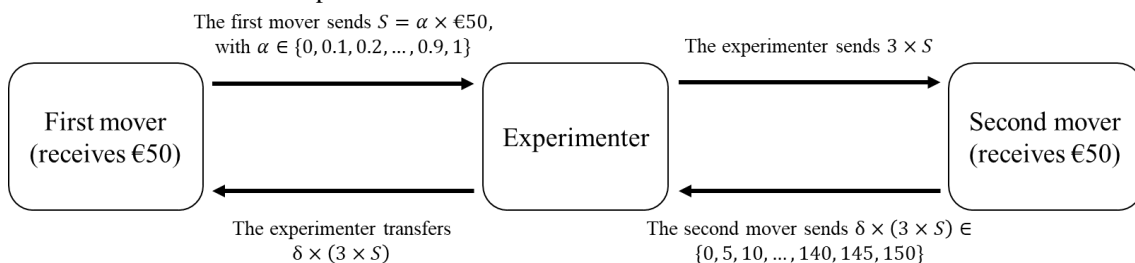
### 3.3.1. Non-Financial Motives

In this study, non-financial motives include the following variables: social preferences, social signaling, perceived social impact, trust in conventional banks, and social bank identification.

#### 3.3.1.1. Social Preferences

To capture members and non-members' social preferences, we refer to the clean and independent measure proposed by Riedl and Smeets (2017) and use a variant of the trust game experiment introduced by Berg, Dickhaut and McCabe (1995).<sup>24</sup> The game involves two players (first and second mover) and two sequences. It is illustrated in Figure 3.2. In the first sequence, each player is given a show-up fee of EUR 50.<sup>25</sup> The first mover decides how much of her EUR 50 she wants to send to the second mover (any multiple of EUR 5, from EUR 0 to EUR 50, which is then tripled by the experimenter). In the second sequence, the second mover decides how much of the amount received to return to the first mover.

**Figure 3.2 Overview of the game.** This figure summarizes the variant of the trust game experiment used to measure individual social preferences.



<sup>24</sup> That variant of the trust game has already been widely used in the literature. See, for instance, Baran, Sapienza and Zingales (2010) or Falk, Meier and Zehnder (2013). The original trust game was introduced by Kreps (1990).

<sup>25</sup> To make sure that both players start the game on an equal footing, it is standard practice to give them the same show-up fee (see, e.g., Berg, Dickhaut and McCabe, 1995; Fehr and List, 2004; Falk and Zehnder, 2013; Riedl and Smeets, 2017).

We use the behavior of the second mover to measure social preferences.<sup>26</sup> To allow both players to play the game at different points in time, and to measure social preferences comprehensively, we adopt the standard procedure in the literature using trust games and employ Selten's (1967) strategy method (see, for instance, Brandts and Charness, 2011).<sup>27</sup> This means that we asked the second mover to indicate the amount she would return for all 10 possible nonzero amounts she might receive without knowing the actual amount sent by the first mover. Using the strategy method allows us to assess the second mover's social preferences independently of the amount actually sent by the first mover, which is key to obtain a clean and comparable measure of social preferences (Falk, Meier and Zehnder, 2013; Falk and Zehnder, 2013). Overall, using an incentivized experiment allows us to derive a reliable measure of social preferences.<sup>28</sup> That measure is behaviorally meaningful and unaffected by strategic motives and reputation effects (Berg, Dickhaut and McCabe, 1995; Dohmen et al., 2011). Moreover, numerous studies have demonstrated that experimental measures (of social preferences) correlate well with field behavior (Benz and Meier, 2008; Baran, Sapienza and Zingales, 2010; Stoop, 2014), and that preferences remain relatively stable across contexts (Fehr and Leibbrandt, 2011).<sup>29</sup> Additional details about the game can be found in Section C.2 in Appendix C.

Following Baran, Sapienza and Zingales (2010) and Riedl and Smeets (2017), we compute the return ratio for each of the 10 decisions made by a second mover, by dividing the amount returned by the amount initially sent by the first mover.<sup>30</sup> We then average a second mover's 10 return ratios to get the mean return ratio, which we refer to as the *Social preferences (experiment)* variable in the rest of the chapter. That variable ranges from 0 to 3. A value of 1 means that the second mover returned exactly what the first mover had sent to her. A value of 1.5 means that the second mover returned 50% of the amount received from the first mover (after it had been tripled

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<sup>26</sup> Two remarks. First, the behavior of second movers is sometimes used to capture trustworthiness (Karlán, 2005; Baran, Sapienza and Zingales, 2010) or reciprocity (Berg, Dickhaut and McCabe, 1995), which are forms of social preferences (Fehr and List, 2004; Falk, Meier and Zehnder, 2013). Second, we do not use the data on the behavior of first movers, as they are meant to measure trust rather than social preferences (Cox, 2004; Baran, Sapienza and Zingales, 2010). Moreover, while the trust game is endorsed for reliably measuring social preferences, it is considered unreliable for capturing trust (Karlán, 2005).

<sup>27</sup> The strategy method is sometimes also called the contingent response method (Falk, Meier and Zehnder, 2013; Falk and Zehnder, 2013).

<sup>28</sup> As explained in greater detail in Section C.2 in Appendix C, since participants could potentially derive actual monetary gains from their participation in the experiment, this led them to view every decision as consequential, thereby creating an incentive-compatible environment, which improves the reliability of our measure.

<sup>29</sup> Other studies on the external relevance of laboratory experiments include List (2006), Levitt and List (2007), Dana, Weber and Kuang (2007), Falk and Heckman (2009), Stoop, Noussair and Van Soest (2012), Falk, Meier and Zehnder (2013), and Galizzi and Navarro-Martinez (2019).

<sup>30</sup> For instance, if the first mover sends EUR 20 (the second mover receives  $20 \times 3 =$  EUR 60) and the second mover decides to return EUR 40, the return ratio is  $40/20 = 2$ .

by the experimenter). Finally, any value greater than 1 means that the first mover received an amount greater than she had sent.

In addition to the experiment-based measure of social preferences, we also elicited social preferences with an experimentally-validated survey question inspired by Falk et al. (2016).<sup>31</sup> Specifically, we asked participants the following question: “On a scale from 1 to 10, how willing are you to give money to charities or humanitarian associations without expecting anything in return?” The variable *Social preferences (question)* is coded from 1 “Unwilling” to 10 “Willing”, and notably allows us to conduct robustness tests.

### **3.3.1.2. Signaling**

Prosocial behavior is often at least partly motivated by the desire for social prestige (Ellingsen and Johannesson, 2008; Ariely, Bracha and Meier, 2009; Bénabou and Tirole, 2010). In a financial setting, Riedl and Smeets (2017) demonstrated that talking more often about one’s investments increases the likelihood of holding sustainable investment funds. It is therefore possible that individuals buy shares in social banks to signal prosocial behavior. To investigate that assumption, we follow Riedl and Smeets (2017), and asked participants to rate their agreement with the following statement on a 7-point Likert scale: “I often talk about investment with others”.<sup>32</sup> The variable *Signaling* is coded from 1 “Fully disagree” to 7 “Fully Agree”.

### **3.3.1.3. Trust in Banks**

Social banks emerged in the wake of the 2008 global financial crisis as public trust towards traditional financial institutions collapsed (Becchetti, Garcia and Trovato, 2011; Knell and Stix, 2015). The buying of social bank shares may therefore be motivated by a lack of trust in the traditional banking sector. To capture individuals’ level of trust in conventional banks, we use a general measure of trust in banks inspired by the works of Guiso, Sapienza and Zingales (2013) and Fungáčová, Hasan and Weill (2019), and asked participants to rate their agreement with the following statement: “I do trust banks”. We again used a 7-point Likert scale, and we coded the variable *Trust banks* from 1 “Fully disagree” to 7 “Fully Agree”.

### **3.3.1.4. Perceived Social Impact**

Individuals may also channel capital to social banks because they view such banks as catalysts for the development of projects that tackle social and environmental issues. We therefore elicited

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<sup>31</sup> See also Bauer, Ruof and Smeets (2021).

<sup>32</sup> As for the buying of investment funds, the acquisition of social bank shares is known only to the buyer. Hence, to signal their acquisition of shares, individuals must talk about it with others.

individuals' perception of the social impact of sustainable finance by asking participants to rate their agreement with the following statement, again on a 7-point Likert scale: "Sustainable finance (responsible investments, ethical banks, etc.) has a positive influence on society". We asked for the social impact of sustainable finance rather than social banking, as it was felt like the latter may be too specific a topic for non-members who, consequently, might not be sufficiently knowledgeable about social banks to assess their social impact in a reliable way. The variable *Perceived social impact* is coded from 1 "Fully disagree" to 7 "Fully Agree".

### 3.3.1.5. Social Bank Identification

Behavior in economics is known to be shaped by identity (Akerlof and Kranton, 2000 and 2005). That is why we also wished to capture the extent to which members identified with the social bank they had bought shares in. To this end, we asked participants to rate their agreement with the following five statements (Homburg, Wieseke and Hoyer, 2009) on a 7-point Likert scale: "I feel attached to this social bank; It feels good to be a member of this social bank; I like people to know that I am a member of this social bank; This social bank's success is my success; When someone praises this social bank, it feels like a personal compliment". The variable *Social bank identification* is the average score from those five statements and is therefore coded from 1 "Fully disagree" to 7 "Fully Agree".<sup>33</sup>

### 3.3.2. Financial Motives

In our empirical setting, financial motives refer to the following variables: return expectations and risk perceptions.

#### 3.3.2.1. Return Expectations

Although buying shares in the social bank may in the medium term only lead to limited financial returns (see Section 3.2), the latter is an integral factor when making financial decisions (Markowitz, 1952; Modigliani and Pogue, 1974; Barreda-Tarrazona, Matallín-Sáez and Balaguer-Franch, 2011; Døskeland and Pedersen, 2016). Therefore, to investigate the role played by hypothetical financial gains in the decision to hold social bank shares, we elicited return expectations vis-à-vis such shares using the responses to the following statement: "In your opinion, what financial return might one expect from keeping a share in the social bank for ten years?" The five responses to this statement are used to create a variable for our regression

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<sup>33</sup> That variable *Social bank identification* was obviously only available for members.



models. That *Expected return* variable is coded from 1 (“Less than 0% per year (= money loss)”) to 5 (“More than 10% per year”).

### **3.3.2.2. Risk Perceptions**

Indissociable from potential financial returns is the level of financial risk perceived by those individuals who had the opportunity to buy social bank shares. To capture risk perceptions, we asked members and non-members to rate their agreement with the following statement on a 7-point Likert scale: “Buying one or more shares in the social bank is a riskier-than-average financial investment”.<sup>34</sup> Responses are used to create the variable *Perceived risk* that is coded from 1 “Fully disagree” to 7 “Fully Agree”.

### **3.3.3. Individual Characteristics**

In this study, individual characteristics include the following variables: risk preferences, financial and economics knowledge, the status as an investor or a socially responsible investor, average yearly donations, and a series of miscellaneous variables such as gender, income, age, etc.

#### **3.3.3.1. Risk Preferences**

Like many studies investigating financial decisions (see, e.g., Dorn and Huberman, 2005; Guiso, Sapienza and Zingales, 2013; Riedl and Smeets, 2017), we developed a measure of risk preferences that has been experimentally validated by Dohmen et al. (2011) as a behaviorally meaningful general measure of risk attitudes. More precisely, we asked participants the following question: “On a scale from 1 to 10, are you someone who is generally willing to take risks?” The variable *Risk preferences* is coded from 1 “Unwilling” to 10 “Willing”. The lower the score, the more risk-averse the individual. The question was purposely formulated in a simple way, as complex theory-based measures are known to be less reliable at eliciting risk preferences (Kapteyn and Teppa, 2011).

#### **3.3.3.2. Financial and Economics Knowledge**

Similar studies also emphasized the relevance of a measure of self-assessed financial and economics knowledge (see, e.g., Dorn and Huberman, 2005; Graham, Harvey and Huang, 2009). Van Rooij, Lusardi and Alessie (2011) notably clarify that such a measure cannot be proxied by a

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<sup>34</sup> It was made clear to participants that we were asking their return expectations and risk perceptions vis-à-vis the particular Belgian social bank we focus on in this study, and not vis-à-vis social banks in general. Being able to elicit return expectations and risk perceptions of non-members is another reason why it was crucial that they be informed of the opportunity to buy shares in the social bank. Indeed, an individual who had not heard of the social bank would hardly have had any financial expectation about its shares.

measure of the level of education. Given the context of our study, we aimed to assess participants' investment knowledge, and therefore asked them to rate their agreement with the following statement on a 7-point Likert scale: "My investment knowledge is good". The variable *Perceived knowledge* is coded from 1 "Fully disagree" to 7 "Fully Agree" (see Riedl and Smeets, 2017).

### 3.3.3.3. Investors and Socially Responsible Investors

Being an investor or a socially responsible investor, thereby already holding (sustainable) financial products, may play some role in the buying of social bank shares. For instance, Rossi et al. (2019) show that individuals who already hold responsible financial products are usually more inclined to invest more in such products. We therefore created two additional variables. The dummy variable *Investor* takes the value of one if the individual already invested money in at least one of the following financial products: stocks, bonds, investment funds (mutual funds, real estate investment trusts, etc.), or complex financial products (options, futures, ETF, etc.). The dummy variable *Socially responsible investor* equals one if the individual has been investing money in socially responsible, sustainable, or "green" investments and/or savings accounts for at least three years.<sup>35</sup>

### 3.3.3.4. Donations

Similarly, given the shares' rather limited financial return prospects (see Section 3.2), we thought that individuals who were used to donating to charity might be more inclined to channel capital to social banks. Based on that assumption, we asked participants the following question: "On average, how much do you donate each year to charities, non-governmental organizations, or foundations?" We subsequently construct the variable *Donations* that ranges from 1 "Between EUR 0 and EUR 100" to 11 "More than EUR 1000".

### 3.3.3.5. Miscellaneous Variables

We constructed seven additional variables to capture common individual characteristics. The variable *Female* is a dummy variable equal to one if the individual is a woman and zero otherwise. The variable *Age* reflects the individual's age in years. The dummy variable *University degree* takes the value of one if the individual reported having a university degree and zero otherwise. We also asked both members and non-members for their estimated wealth<sup>36</sup>, and constructed the

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<sup>35</sup> The fundraising campaign of the Belgian social bank took place between October and December 2019, and we conducted our survey in March 2022. Therefore, we asked participants whether they had been investing sustainably for at least three years to make sure that those we would call "socially responsible investors" had already been so back in October 2019.

<sup>36</sup> Wealth includes investments, life insurances, real estate, savings accounts, etc.

dummy variables *Low wealth* and *High wealth*, which take the value of one if the individual's self-reported wealth is at most EUR 150 000 or at least EUR 500 000, respectively. Finally, we constructed the variables *Low income* and *High income*, which are dummy variables equal to one if the individual's self-reported annual net family income is at most EUR 50 000 and at least EUR 100 000, respectively.

### 3.3.4. Summary Statistics of Members and Non-Members

Table 3.1 shows that, based on our sample, members have significantly higher social preferences than non-members, both for the experimental measure and the measure built from the survey question. However, members report talking less about their investments with others than non-members. These insights indicate that, while social preferences may play a non-negligible role in the decision to buy social bank shares, the decision does not seem to be aimed at improving the individual's social reputation. Regarding trust in banks, it is on average lower among members, indicating that lack of trust towards conventional banks may be a driver of capital flows to social banks. Unsurprisingly, members are on average more convinced of the benefits for society stemming from sustainable finance than non-members. Finally, Table 3.1 shows that members' average level of identification with the social bank is at 4.59/7.

With respect to financial motives, Table 3.1 shows that non-members are on average marginally more optimistic regarding the financial returns they might expect from holding social bank shares. However, the two groups do not perceive the risk linked to the buying of social bank shares significantly differently. We view these as preliminary indications that financial motives may not be the main determinants of capital flows to social banks.

Summary statistics of individual characteristics reveal that the average member is marginally more willing to take risks, considers herself less knowledgeable regarding investment, is marginally more likely to be an investor, is more likely to be a socially responsible investor, and clearly donates more to charities. Finally, members are less likely to be female, much more likely to hold a university degree, more likely to be in the high wealth category, and marginally less likely to be in the low income category. However, there is no statistically significant difference in terms of age between the two groups.

Table 3.1 Summary statistics of members and non-members

	Members (mean)	Non-members (mean)	Mann-Whitney U Test (p-value)
<i>Non-financial motives</i>			
Social preferences (experiment)	1.91 (0.52)	1.34 (0.78)	0.00
Social preferences (question)	7.71 (2.40)	5.21 (2.88)	0.00
Signaling	2.50 (1.56)	3.28 (1.94)	0.00
Trust banks	2.99 (1.56)	3.94 (1.74)	0.00
Perceived social impact	5.96 (1.19)	4.50 (1.70)	0.00
Social bank identification	4.59 (1.31)		
<i>Financial motives</i>			
Expected return	2.42 (0.71)	2.90 (0.81)	0.00
Perceived risk	3.55 (1.79)	3.70 (1.65)	0.11
<i>Individual characteristics</i>			
Risk preferences	5.32 (2.03)	4.77 (2.29)	0.00
Perceived knowledge	3.02 (1.67)	3.74 (1.66)	0.00
Investor	66.67%	60.78%	0.05
Socially responsible investor	57.00%	36.19%	0.00
Donations	3.88 (3.33)	1.84 (1.79)	0.00
Female	29.39%	48.31%	0.00
Age	51.18 (15.53)	52.63 (14.43)	0.15
University degree	61.34%	26.02%	0.00
Low wealth	24.46%	52.23%	0.00
High wealth	28.80%	12.48%	0.00
Low income	59.37%	65.24%	0.05
High income	3.94%	4.63%	0.58

Note: this table presents and compares summary statistics of members (N=507) and non-members (N=561). Standard errors are reported in parentheses. We only use data on second movers in the incentivized experiment to compute the mean of the *Social preferences (experiment)* variable (for that variable, the samples of members and non-members contain 253 and 275 individuals, respectively). The description of all variables can be found in Table C.3 in Appendix C. The Mann-Whitney U Test tests for the null hypothesis that the two samples derive from the same population.

## 3.4. Empirical Results

Using Probit and Ordered Probit regression analysis, we first investigate the motives that prompt private individuals to buy social bank shares in Section 3.4.1. We then shed light on the factors that influence the amount of money spent by members to acquire social bank shares in Section 3.4.2. Robustness tests were conducted. The results support our main conclusions and can be found in Section C.3 in Appendix C.

### 3.4.1. What Prompts Individuals to Buy Social Bank Shares?

In Table 3.2, we present marginal effects of Probit regressions in which the dependent dummy variable *Member* takes the value of one if the individual bought shares during the fundraising campaign, and zero otherwise.<sup>37</sup> In specifications (1) to (6), we separately investigate the different motives, which are subsequently grouped together in specification (7).

Starting with non-financial motives, we investigate the role of social preferences and signaling in specification (1). Consistent with summary statistics, the results show that social preferences have a positive and highly significant impact on the likelihood of buying social bank shares. As an example, we find that an individual who equally shares the amount received from the first mover in the trust game is  $1.5 \times 0.1640 = 24.6$  percentage points more likely to buy shares than an individual who returns zero to the first mover. This shows that social preferences play a meaningful role in the buying of social bank shares, which is in line with previous findings that relate strong social preferences to the holding of sustainable investment funds (Riedl and Smeets, 2017; Bauer, Ruof and Smeets, 2021) and to the social banking business (Cornée, Masclet and Thenet, 2012).

Contrary to social preferences, signaling is significantly negatively related to the likelihood of buying social bank shares. Specification (1) shows that an individual who scores one point higher on the signaling 7-point Likert scale is 2.94 percentage points less likely to become a member. This indicates that the decision to buy shares in a social bank is apparently not driven by the desire to improve one's social reputation, contrary to what has been found for the holding of sustainable investment funds (Riedl and Smeets, 2017; Bauer, Ruof and Smeets, 2021), but in line with the findings of Bauer and Smeets (2015) that clients' asset allocations to socially responsible banks are not driven by a signaling motive.

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<sup>37</sup> In Table 3.2, we use the measure of social preferences derived from the incentivized experiment and, consequently, from the behavior of second movers only. Our sample for the Probit regressions in Table 3.2 is therefore made up of 253 members (out of 507) and 275 non-members (out of 561). See Section 3.3.1.1.

In specification (2), we test the robustness of our result for social preferences with the dummy variable *Strong social preferences (experiment)* that takes the value of one for individuals who share the earnings in the trust game at least equally (mean return ratio of 2 or more) and zero otherwise. In line with our results in specification (1), we find that individuals with strong social preferences are 30.22 percentage points more likely to hold shares in the social bank than individuals who decide to keep more than half of the earnings from the game.

Results in specification (3) show that a lack of trust in the traditional banking sector is positively related with the decision to buy social bank shares. We find that an individual who scores one point higher on the *Trust banks* variable is 4.02 percentage points less likely to buy shares. This result is consistent with the idea that social banking is considered by those who mistrust conventional banking as an alternative form of financial intermediation (Cornée and Szafarz, 2014).

The results also show that individuals who see greater benefits for society in sustainable finance are more likely to become members. More precisely, we find in specification (4) that an individual who scores one point higher on the *Perceived social impact* variable is 10.62 percentage points more likely to hold social bank shares. This result supports the view that individuals who get involved in the funding of social banks are those who have greater trust in the social impact of sustainable finance.

Turning to financial motives, we first find in specification (5) that the perception of the risk linked to the buying of social bank shares does not have any significant effect on the likelihood of becoming a member. The results also show that individuals with greater return expectations are less likely to buy social bank shares. For instance, an individual who has annual return expectations ranging between 0% and 5% is 25.9 percentage points less likely to buy shares than an individual whose return expectations are a money loss. Taken together, these results show that the decision to become a social bank member is not mainly driven by financial considerations, in line with the results of Riedl and Smeets (2017), Rossi et al. (2019), and Bauer, Ruof and Smeets (2021) for sustainable investment funds, and Bauer and Smeets (2015) for clients' asset allocations to socially responsible banks.

In specification (6), we focus on two individual characteristics of particular interest. First, the results show that individuals who already hold sustainable financial products are 9.17 percentage points more likely to buy social bank shares than individuals who do not hold such products. This is consistent with the idea that individuals who are already familiar with sustainable investments and savings accounts are more likely to support a bank that views sustainability as a major objective. Second, the results show that those individuals who donate more to charities are also

more likely to become members. For instance, an individual who donates between EUR 400 and EUR 500 per year is 17.48 percentage points more likely to buy social bank shares than an individual who donates at most EUR 100. We see two plausible explanations for this result. First, individuals who are used to donating more to charities may view the buying of shares in a prosocial organization as an additional means of furthering their commitment, irrespective of the reasons that lie behind that commitment. Second, individuals who donate more may be more inclined to buy shares with limited financial return prospects than individuals who seek to make a profit when they conduct financial transactions.

The remaining individual characteristics, which are included in all specifications, also offer interesting insights. Indeed, the results show that being a woman and being older are features that decrease the likelihood of becoming a member. Conversely, having a university degree increases the likelihood of buying social bank shares, in line with the results of Rossi et al. (2019) for sustainable investments and Krause and Battenfeld (2019) for social banking customers. The more the individual considers herself knowledgeable about investment, the less likely she is to become a member, whereas individuals with a higher propensity to take risks are more likely to buy shares in the social bank. Being an investor and being in the low income category do not seem to have any significant effect on the likelihood of becoming a member. Interestingly, high income individuals are less likely to buy social bank shares, while high wealth individuals are more likely to do so. In turn, being in the low wealth category decreases the likelihood of becoming a member.

In specification (7), we include all the variables discussed above (except for the *Strong social preferences (experiment)* variable). The results remain qualitatively unchanged, despite a notable decrease in the size of the coefficients of the variables *Social preferences (experiment)*, *Donations*, *University degree*, *Perceived knowledge* and *Low wealth*. Overall, these results are in line with our preliminary insights from Section 3.3.4.

### **3.4.2. What Determines the Amount Spent on Social Bank Shares?**

This section focuses on the factors that influence the amount of money spent on acquiring social bank shares, conditional on being a member.<sup>38</sup> To this end, Table 3.3 presents coefficients of Ordered Probit regressions.<sup>39</sup> The dependent variable *Amount* is the member's response to the question "How much did you spend to buy one or more shares in the social bank during the

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<sup>38</sup> Actually, we only use data on members in this section. Therefore, in order to have a sufficiently large sample, we make use of the measure of social preferences derived from our experimentally-validated survey question. This allows us to use our complete sample of 507 members.

<sup>39</sup> Marginal effects are omitted here for the sake of brevity, but are presented in Table C.5 in Appendix C.

fundraising that took place between October and December 2019?” The variable is originally coded from 1 (“Less than EUR 50”) to 11 (“At least EUR 500”) (see Table C.3 in Appendix C). To obtain reliable results from our regressions, we reorganized the dependent variable into either four or three categories. We present results for both in Table 3.3 and provide a comparison of actual and predicted frequencies in Table C.4 in Appendix C.

As can be seen from Table 3.3, the results remain qualitatively unchanged from the four categories specification to the three categories specification. Starting with non-financial motives, we first notice that social preferences have no significant effect on the amount spent. This means that strong social preferences are important for becoming a social bank member in the first place, but they do not influence the amount of money that members decide to spend on social bank shares. This result echoes that of Riedl and Smeets (2017) in the context of sustainable investment funds. Similarly, we find that signaling and the perceived social impact of sustainable finance do not influence the amount spent, either. However, in line with our previous results, we see that a lack of trust in conventional banks increases the likelihood of spending more on social bank shares. Put differently, those members who trust conventional banks the most are those who spend the least on social bank shares. The results also show that members who identify more strongly with the social bank are more likely to spend larger amounts of money on social bank shares, in line with Akerlof and Kranton’s (2000 and 2005) theories of identity in economics.

Turning to financial motives, we notice that both return expectations and risk perceptions have a significant effect on the amount spent on social bank shares. Combining these findings with those of the previous section produces interesting insights. Indeed, although risk perceptions do not have any significant effect on the likelihood of buying social bank shares, they do affect the amount spent. Likewise, even though the decision to become a member is not mainly driven by financial considerations, higher return expectations increase the likelihood of spending more on social bank shares. Taken together, these findings demonstrate that financial considerations remain somehow as indissociable from the holding of social bank shares as they are from countless financial decisions (Markowitz, 1952; Modigliani and Pogue, 1974; Barreda-Tarrazona, Matallín-Sáez and Balaguer-Franch, 2011; Døskeland and Pedersen, 2016).

Among the individual characteristics, only four variables exhibit statistically significant coefficients. Unsurprisingly, members who are less risk averse and who fall into the high income category are more likely to spend big on social bank shares, as are members who already hold sustainable financial products and donate more to charities.

Overall, three main findings emerge from our results. First, private individuals who get involved in the funding of social banks exhibit a significant lack of trust in the traditional banking sector.



Second, their decision to fund social banks is primarily driven by non-financial considerations. Financial motives still play some role—notably, influencing the amount spent on social bank shares—but they are secondary, in line with the findings of Krause and Battenfeld (2019) for social banking customers. Third, members' non-financial concerns are likely authentic, as they do not seem to buy social bank shares to boost their social image and reputation.

### **3.4.3. Do Social Attributes Influence Trust in Banks?**

In this section, we extend our analysis to explore whether individual social attributes influence trust in banks; a question that has been mostly overlooked in the literature thus far, and one which our dataset allows us to address. Public trust in the banking industry stems from a mixture of drivers that broadly fall into two categories. On the one hand, trust in banks depends on the confidence individuals have in objective features of the financial system, such as deposit insurance schemes, investor protection mechanisms, and supervisory authorities. On the other hand, trust in banks also depends on the confidence individuals have in the integrity and ethics of bankers, as well as on their subjective perceptions of the role banks are meant to play in a market economy (Guiso, Sapienza and Zingales, 2008; Fungáčová, Hasan and Weill, 2019). Whereas many of those drivers have already been researched (see, e.g., Clausen, Kraay and Nyiri, 2011; Knell and Stix, 2015), little attention has been given to the role of individuals' social attributes, such as their intrinsic social preferences, vis-à-vis the trust they have in banks. Indeed, to the best of our knowledge, Fungáčová, Hasan and Weill (2019) are the only authors to have investigated the influence of a social attribute—ecological preferences—on individuals' trust in banks. They conclude that environmental views do not affect individuals' trust in banks. Yet, as the integration of environmental, social, and ethical considerations into investment and banking is now mainstream (Edmans and Kacperczyk, 2022; Edmans, 2022), it becomes necessary to shed more light on the influence social attributes may have on individuals' trust in banks.

Table 3.2 What prompts individuals to buy social bank shares?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Non-financial motives</i>							
Social preferences (experiment)	0.1640*** (0.0230)						0.0750*** (0.0194)
Signaling	-0.0294*** (0.0114)						-0.0325*** (0.0088)
Strong social preferences (experiment)		0.3022*** (0.0390)					
Trust banks			-0.0402*** (0.0100)				-0.0303*** (0.0079)
Perceived social impact				0.1062*** (0.0084)			0.0772*** (0.0080)
<i>Financial motives</i>							
Perceived risk					-0.0136 (0.0109)		-0.0036 (0.0085)
Expected return					-0.1295*** (0.0243)		-0.0983*** (0.0176)
<i>Individual characteristics</i>							
Socially responsible investor						0.0917** (0.0365)	0.0637** (0.0304)
Donations						0.0437*** (0.0074)	0.0227*** (0.0058)
Female	-0.1754*** (0.0354)	-0.1701*** (0.0352)	-0.1809*** (0.0374)	-0.1857*** (0.0333)	-0.1694*** (0.0375)	-0.1857*** (0.0353)	-0.1391*** (0.0288)
Age	-0.0031** (0.0012)	-0.0025** (0.0012)	-0.0033** (0.0013)	-0.0030** (0.0012)	-0.0030** (0.0013)	-0.0054*** (0.0013)	-0.0040*** (0.0011)
University degree	0.2482*** (0.0388)	0.2352*** (0.0392)	0.2828*** (0.0402)	0.2220*** (0.0365)	0.2753*** (0.0388)	0.2159*** (0.0389)	0.1012*** (0.0312)
Perceived knowledge	-0.0627*** (0.0134)	-0.0742*** (0.0112)	-0.0764*** (0.0122)	-0.0806*** (0.0109)	-0.0796*** (0.0123)	-0.0896*** (0.0119)	-0.0450*** (0.0105)
Risk preferences	0.0390*** (0.0092)	0.0340*** (0.0089)	0.0434*** (0.0093)	0.0325*** (0.0091)	0.0469*** (0.0093)	0.0356*** (0.0095)	0.0335*** (0.0076)
Investor	0.0669* (0.0385)	0.0617 (0.0387)	0.0669 (0.0426)	0.0434 (0.0358)	0.0899** (0.0434)	0.0646 (0.0394)	0.0402 (0.0330)
Low income	0.0447 (0.0368)	0.0250 (0.0366)	0.0466 (0.0384)	0.0313 (0.0346)	0.0391 (0.0376)	0.0511 (0.0376)	0.0319 (0.0295)
High income	-0.2214*** (0.0740)	-0.2445*** (0.0694)	-0.2282*** (0.0728)	-0.1938*** (0.0697)	-0.2534*** (0.0714)	-0.2624*** (0.0648)	-0.2115*** (0.0592)
Low wealth	-0.1687*** (0.0400)	-0.1582*** (0.0394)	-0.1958*** (0.0419)	-0.1250*** (0.0378)	-0.1836*** (0.0413)	-0.1656*** (0.0402)	-0.0832** (0.0326)
High wealth	0.1413*** (0.0514)	0.1510*** (0.0515)	0.1694*** (0.0540)	0.1514*** (0.0478)	0.1525*** (0.0538)	0.1423*** (0.0537)	0.0954** (0.0454)
McFadden's R <sup>2</sup>	0.3516	0.3608	0.2927	0.4207	0.3135	0.3538	0.5666
N	528	528	528	528	528	528	528

Note: this table presents marginal effects of Probit regressions. The dependent variable is *Member*, which takes the value of one if the individual is a member of the social bank and zero otherwise. The description of all explanatory variables can be found in Table C.3 in Appendix C. Specifications (1) to (6) have correct prediction rates that lie between 77.65% and 82.58%. Specification (7) has a correct prediction rate of 87.69%. Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.

Table 3.3 What determines the amount spent on social bank shares?

	Ordered Probit (4 categories)	Ordered Probit (3 categories)
<i>Non-financial motives</i>		
Social preferences (question)	-0.0102 (0.0240)	-0.0097 (0.0245)
Signaling	-0.0326 (0.0392)	-0.0324 (0.0397)
Trust banks	-0.0576* (0.0338)	-0.0568* (0.0344)
Perceived social impact	0.0012 (0.0457)	0.0087 (0.0467)
Social bank identification	0.1548*** (0.0441)	0.1497*** (0.0449)
<i>Financial motives</i>		
Perceived risk	0.0692** (0.0297)	0.0636** (0.0299)
Expected return	0.1414* (0.0754)	0.1326* (0.0762)
<i>Individual characteristics</i>		
Female	-0.0230 (0.1227)	-0.0083 (0.1238)
Age	0.0025 (0.0040)	0.0023 (0.0041)
University degree	-0.0206 (0.1123)	-0.0498 (0.1138)
Perceived knowledge	0.0357 (0.0426)	0.0421 (0.0426)
Risk preferences	0.0468* (0.0283)	0.0532* (0.0286)
Investor	0.0416 (0.1239)	0.0128 (0.1262)
Socially responsible investor	0.3810*** (0.1110)	0.3499*** (0.1122)
Donations	0.0907*** (0.0193)	0.0890*** (0.0197)
Low income	-0.1425 (0.1180)	-0.1728 (0.1205)
High income	0.7454** (0.3013)	0.7793*** (0.2782)
Low wealth	-0.1421 (0.1403)	-0.1644 (0.1430)
High wealth	0.0104 (0.1268)	-0.0188 (0.1292)
$\theta_1$	1.1325** (0.4502)	1.0828** (0.4578)
$\theta_2$	1.7548** (0.4517)	2.1940** (0.4616)
$\theta_3$	2.2543** (0.4551)	
McFadden's R <sup>2</sup>	0.0887	0.1028
N	507	507

Note: this table presents coefficients of Ordered Probit regressions. The ordered dependent variable *Amount*, initially divided into 11 categories, is reorganized into either four or three categories. The description of all explanatory variables can be found in Table C.3 in Appendix C. Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.

To address the question, Table 3.4 presents coefficients of ordinary least squares (OLS) regressions in which the dependent variable is our general measure of trust in banks detailed in Section 3.3.1.3. In specifications (1) to (4), we use our sample made of 253 members and 275 non-members (see Table 3.2). Then, in specifications (5) to (8), we use our final sample of 561 non-members to test the robustness of our results, as that second sample is fairly representative of the Belgian population (see Section 3.3).

Results in specifications (1) to (4) show that stronger social preferences significantly decrease the level of trust in banks, whereas being a socially responsible investor and perceiving greater societal benefits in sustainable finance are attributes that significantly increase the level of trust in banks. The results in specifications (6) to (8) clearly confirm the positive and significant effects of the variables *Perceived social impact* and *Socially responsible investor* on the level of trust in banks. However, the effect of stronger social preferences becomes positive in specification (5) and non-significant in specification (8).

That being a socially responsible investor on average significantly increases an individual's level of trust in banks is not very surprising, as most socially responsible investment funds are in fact managed by major financial institutions, notably banks. The same rationale may apply to those individuals who perceive greater societal benefits in sustainable finance, the practices of which have now permeated the entire financial and banking industry. At the end of the day, banks remain the dominant protagonists in financial markets, and privileged providers of financial solutions to proponents of sustainable finance. With regard to social preferences, differences in results may be driven by differences in samples. Indeed, the sample used in specifications (1) and (4) contains members, who have higher social preferences and lower trust in banks than non-members (see Section 3.3.4). Results may therefore be more reliable for specifications (5) and (8), given their reliance on a sample that is far more representative of the Belgian population as a whole. In view of specification (8), which includes all variables, it therefore appears that social preferences have no effect on the level of trust in banks.

A number of other individual characteristics exhibit statistically significant coefficients. Having a university degree significantly decreases the level of trust in banks, while regarding oneself as more knowledgeable about investment has the opposite effect. When using the sample made up of members and non-members, results show that donating more to charities negatively affects the level of trust in banks. Finally, when using the sample made up exclusively of non-members, we find that belonging to higher income categories increases an individual's level of trust in banks, in line with the results of Fungáčová, Hasan and Weill (2019).

Overall, our main finding is that individual social attributes, particularly being a socially responsible investor and seeing greater societal benefits in sustainable finance, do have a positive influence on the level of trust in banks. As sustainable financial practices are increasingly becoming mainstream (Edmans and Kacperczyk, 2022; Edmans, 2022), these findings are likely positive for the banking industry, whose public image has been severely deteriorating since the global financial crisis of 2008 (Stevenson and Wolfers, 2011; Knell and Stix, 2015).

### **3.5. Conclusion**

This chapter investigated the determinants of capital flows to social banks, an important topic in light of today's considerable societal challenges. Combining survey data and behavior in an incentivized experiment, we assessed private individuals' mixture of motives for funding social banks and highlighted three key results. First, individuals who bring new capital to social banks exhibit a significant deficit of trust towards the conventional banking industry. Second, their decision to fund social banks is primarily driven by non-financial motives, among which social preferences play a non-negligible role. We also found that although financial considerations matter as well, notably influencing the amount spent on social bank shares, they are secondary. Third, we find that members' non-financial motives are likely authentic, as they seemingly do not fund social banks to improve their social image and reputation. In a separate section of this chapter, we made further use of our dataset to investigate the impact of social attributes on trust in banks. Our findings revealed that individual social attributes, particularly being a socially responsible investor and perceiving greater societal benefits from sustainable finance, have a positive effect on individuals' level of trust in banks.

Table 3.4 Social determinants of trust in banks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Social determinants</i>								
Social preferences (experiment)	-0.2404** (0.1058)			-0.2996*** (0.1074)				
Social preferences (question)					0.0701** (0.0290)			0.0352 (0.0304)
Perceived social impact		0.0807* (0.0481)		0.0927* (0.0492)		0.1976*** (0.0481)		0.1771*** (0.0499)
Socially responsible investor			0.3654** (0.1519)	0.3577** (0.1506)			0.5070*** (0.1651)	0.4474*** (0.1638)
<i>Other individual characteristics</i>								
Signaling	0.0471 (0.0539)	0.0491 (0.0544)	0.0365 (0.0544)	0.0387 (0.0542)	0.0795 (0.0502)	0.0807 (0.0504)	0.0679 (0.0498)	0.0660 (0.0502)
Female	0.2163 (0.1529)	0.2090 (0.1534)	0.2069 (0.1531)	0.1989 (0.1517)	0.1475 (0.1472)	0.1204 (0.1467)	0.2175 (0.1483)	0.1206 (0.1462)
Age	-0.0015 (0.0054)	0.0008 (0.0054)	-0.0003 (0.0054)	-0.0011 (0.0054)	-0.0036 (0.0051)	-0.0032 (0.0050)	-0.0034 (0.0051)	-0.0034 (0.0050)
University degree	-0.3327** (0.1631)	-0.4099** (0.1618)	-0.3978** (0.1619)	-0.3821** (0.1624)	-0.4417** (0.1852)	-0.4821*** (0.1838)	-0.3652** (0.1845)	-0.4457** (0.1838)
Perceived knowledge	0.1901*** (0.0613)	0.1968*** (0.0619)	0.2009*** (0.0613)	0.1864*** (0.0614)	0.2098*** (0.0610)	0.1569** (0.0631)	0.1973*** (0.0604)	0.1617*** (0.0630)
Risk preferences	0.0474 (0.0392)	0.0344 (0.0400)	0.0309 (0.0393)	0.0339 (0.0389)	-0.0043 (0.0380)	0.0127 (0.0362)	-0.0033 (0.0371)	-0.0133 (0.0377)
Investor	-0.1123 (0.1721)	-0.1596 (0.1730)	-0.2086 (0.1778)	-0.1926 (0.1755)	0.0186 (0.1672)	-0.0270 (0.1649)	-0.0805 (0.1727)	-0.1288 (0.1705)
Donations	-0.0295 (0.0253)	-0.0504* (0.0263)	-0.0510** (0.0254)	-0.0483* (0.0261)	-0.0068 (0.0338)	0.0159 (0.0316)	0.0165 (0.0320)	-0.0151 (0.0334)
Income	-0.0085 (0.0828)	0.0118 (0.0821)	0.0061 (0.0824)	0.0146 (0.0812)	0.1336* (0.0778)	0.1360* (0.0743)	0.1053 (0.0755)	0.1491* (0.0764)
Wealth	0.0008 (0.0303)	-0.0165 (0.0305)	-0.0159 (0.0302)	-0.0185 (0.0308)	0.0026 (0.0275)	-0.0062 (0.0273)	-0.0003 (0.0271)	-0.0100 (0.0271)
Constant	3.0941*** (0.4482)	2.3985*** (0.4605)	2.7756*** (0.4105)	2.8274*** (0.4789)	2.4516*** (0.4177)	2.0758*** (0.4251)	2.7546*** (0.4115)	2.0873*** (0.4343)
R <sup>2</sup>	0.0903	0.0863	0.0907	0.1085	0.0914	0.1140	0.0965	0.1298
N	528	528	528	528	561	561	561	561

Note: this table presents coefficients of OLS regressions. The dependent variable is *Trust banks*, which is the individual's response to the statement "I do trust banks" (1 fully disagree, ..., 7 fully agree). In the above regressions, the variables *Income* and *Wealth* are not binary variables, and instead are scales made of 6 and 10 categories, respectively. The description of all remaining explanatory variables can be found in Table C.3 in Appendix C. Specifications (1) to (4) use the sample made of members and non-members (N=528, see Table 3.2). Specifications (5) to (8) use the sample only made of non-members (N=561). Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.

Our results have an important implication for social banks: to attract capital flows from private individuals, social banks must reach out to those individuals who strongly identify with their values and goals (Cornée and Szafarz, 2014). To do this, social banks must clearly communicate

their values and emphasize their social and environmental impact on society (Krause and Battenfeld, 2019), as these are the aspects primarily valued by potential social owners. Our results also show how sustainable finance in general relates in a somewhat complex manner to public trust in the conventional banking sector. Indeed, our findings highlight that an individual's level of trust in conventional banks is likely going to differ based on her sustainable finance-related attributes—whether she is a social bank member or a socially responsible investor, whether she sees great societal benefits in sustainable finance or not. For instance, as we showed, social bank members and socially responsible investors, on average, have lower and higher trust in conventional banks, respectively.<sup>40</sup>

While we analysed many drivers of capital flows to social banks, future research could investigate several other potential determinants which were beyond the scope of this chapter. To start with, the decision of an individual to become a member may be (partly) attributable to social pressure (Milgram, 1963; Mas and Moretti, 2009), which for instance has been proved to be an important determinant of charitable giving (DellaVigna, List and Malmendier, 2012). In our setting, the Belgian social bank had a defined number of days for collecting the necessary funding to be able to launch its activities. It is therefore possible that individuals whose relatives, friends or colleagues had become members felt some social pressure to buy social bank shares. Another possibility is that the holding of social bank shares is influenced by individuals' level of sustainable finance literacy, which differs from traditional investment knowledge, and has been shown to be a significant determinant of sustainable-product ownership (Filippini, Leippold and Wekhof, 2022).

Given the societal benefits social banks are meant to deliver, it may also be that individuals buy social bank shares to get a warm glow (Andreoni, 1990), as demonstrated for sustainable investors who prefer “investments that feel good” (Heeb et al., 2022). Conversely, individuals may become members because they are more altruistic than others (Fehr and Fischbacher, 2003). In fact, in this chapter, we used a broad measure of social preferences, and future research could develop and use measures of pure and impure altruism to investigate the above-mentioned determinants.

Admittedly, the generalization of our conclusions is limited, due to our reliance on data from a single social bank. Therefore, further research—ideally based on data from a larger sample of

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<sup>40</sup> This rationale is confirmed by the results of Table C.11 in Appendix C that introduces two interaction effects in a replication of specification (4) from Table 3.4. The first captures the effect on the level of trust in banks of being both a social bank member and a socially responsible investor. The second captures the effect on the level of trust in banks of the perceived social impact when the individual is a member. The results show that, in both cases, introducing an effect related to the member status negatively mitigates the initial positive effect on the level of trust in banks.

social banks—is needed to reliably assess the external validity of our results. Moreover, as we essentially studied the behavior of Belgian private individuals, our findings could be affected by cultural, economic, religious, or other variations. Hence, future research could empirically establish whether our results carry through to other settings. It is also possible that our findings be affected by the important time lag of roughly two years that separates the fundraising campaign and our survey. Beyond the influence of time per se, events such as the Covid-19 pandemic might have altered respondents' perception. Finally, even though this study focuses on private individuals, it is important to mention that organizations such as companies, public institutions and non-governmental organizations also fund social banks. Therefore, it could be an avenue for future research to investigate whether organizations' mixture of motives differs from that uncovered in this chapter.





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## General Conclusion

This thesis is made of three chapters that address specific questions lying in the realm of sustainable finance. The findings of each chapter provide both targeted and broader insights. Indeed, the first objective of each chapter is to contribute to the current literature by providing specific results for specific research questions. Yet, it is also crucial to step back and reflect on the broader implications of the findings, notably considering how they could inspire future research. We therefore summarize our main results below and contemplate them from the two above-mentioned perspectives.

### **I. Our Contribution to the Current Literature on Sustainable Finance**

In the sections below, we present the main results of each chapter through the lens of the latter's purpose.

#### **I.i. Chapter 1 – Listed Impact Investments May Strongly Underperform Conventional Investments**

In this first chapter, we investigate the financial performance and diversification potential of impact investments with regard to conventional investments. In doing so, we aim to provide insights on the financial features of a relatively new sustainable finance practice that expanded in the wake of the 2008 global financial crisis. At the time we wrote this chapter, SRI had captured the lion share of academic research on the financial performance of sustainable investments, and information on the financial characteristics of impact investments was very limited. Moreover, there were important issues of transparency and replicability, as the few academic and practitioner studies on the topic had relied on data from private funds, which are prone to selection bias as funds are unlikely to report on underperforming investments (Watts and Scales, 2020). Finally, practitioner studies exhibited a series of inconsistencies that cast doubt on the reliability of the findings, such as the comparison of private impact funds with mainstream public market benchmarks. As investment in listed impact firms was gathering momentum, we seized the opportunity to overcome the above-mentioned issues and investigate the financial performance and diversification potential of impact investments in a setting characterized by higher transparency and liquidity, harsher competition, and greater regulatory compliance.

In our empirical analysis, we build a market capitalization-weighted Impact Investing Index made of 16 listed firms whose recognition as impact organizations results from a rigorous identification

process using GIIN-related criteria. This way, we ensure that our sample includes assets that belong to a similar investment strategy (Atz et al., 2023) and is exclusively made of firms with aggregate positive externalities (Hockerts et al., 2022), thereby eliminating greenwashing concerns (Brandon et al., 2022). We compare the Impact Investing Index to a series of conventional MSCI indices over a period of almost 10 years, using the four-factor model of Carhart (1997) to capture risk-adjusted abnormal returns, as well as Dynamic Conditional Correlation Multivariate GARCH modeling (Engle and Sheppard, 2001; Engle, 2002) to study the joint movements of listed impact and traditional firms.

Our findings in this first chapter are twofold. First, we point to a strong underperformance of listed impact investments. Indeed, the Impact Investing Index has a significantly negative alpha, and delivers negative annualized returns to impact investors, although that underperformance disappears in the post-2014 period. These findings contradict the favorable situation presented in the practitioner studies on private impact funds and suggest that investors in listed impact firms accept to pay a price for investing according to their values. This, in turn, indicates that impact investors may derive non-financial utility from their investments. Second, our results show that co-movements between the Impact Investing Index and conventional indices increase over time, which leads to a decrease in the diversification potential of impact investments with regard to conventional investments. Yet, given that impact firms survive in public markets, this result suggests that concerns of diversification are not of primary importance to impact investors, in line with the literature on SRI (Barreda-Tarrazona, Matallín-Sáez and Balaguer-Franch, 2011; Riedl and Smeets, 2017). Overall, our findings lend support to the literature strand that contends that sustainability is not consistent with profit maximization (El Ghoul and Karoui, 2017; Geczy, Stambaugh and Levin, 2021; Pedersen, Fitzgibbons and Pomorski, 2021). They also support the presence in the market of sustainable investors (and hybrid intermediaries) who accept risk-adjusted below-market financial returns.

As already mentioned in the present manuscript, it is important to interpret our results with caution, given both the small size of our impact sample and the fact that it is only made of listed impact firms. That small sample size is notably attributable to our decision to rely on the GIIN's rigorous definition of impact investments. Indeed, at the time of writing this chapter, we considered the GIIN's conception as the most reliable to unambiguously select impact firms, given the institution's leading position in the impact investing industry. Accordingly, we consider that our results provide an insightful contribution that still ought to be further investigated in future research.

## **I.ii. Chapter 2 – Practical Ambiguity Remains Between Impact and Socially Responsible Investing**

It is possible to establish theoretical differences between impact and socially responsible investing, particularly when it comes to the asset selection process, which is supposedly more restrictive for impact portfolios, notably given impact firms' aggregate positive externalities. In this second chapter, we analyse whether these theoretical differences translate into significant financial performance and diversification differences between impact and SRI funds. Indeed, it is important that investors be able to express their sustainability preferences through their investment decisions (Barreda-Tarrazona, Matallín-Sáez and Balaguer-Franch, 2011). Yet, they often struggle to collect and correctly interpret information on sustainable investment funds (Filippini, Leippold and Wekhof, 2022), which regularly leads them to use simple decision rules and select funds based on their name and description (Anderson and Robinson, 2022; Lambillon and Chesney, 2023). Therefore, to avoid misleading investors, it is important to know whether those funds that describe themselves as either impact or SRI funds actually select portfolio companies according to criteria that reflect the investment strategies they pretend to commit to. Assessing whether there are differences in the financial performance of impact and SRI funds also has implications for the future growth of the impact investing industry. Indeed, if impact funds were to underperform their SRI counterparts, investors' limited WTP for investments delivering high impact (Heeb et al., 2022) means that their support to impact firms could be insufficient, thereby strongly restricting the latter's growth prospects.

To bring empirics to a debate that has so far remained largely theoretical, we rely on a sample of three rigorously selected European impact equity mutual funds which we carefully associate with nine SRI funds sharing similar characteristics. To assess funds' financial performance and level of diversification, we rely on factor models (Sharpe, 1964; Lintner, 1965; Fama and French, 1993; Carhart, 1997) as well as on several proven diversification metrics (Goetzmann and Kumar, 2008; Nofsinger and Varma, 2013).

Our findings in this second chapter show that impact and SRI funds deliver risk-adjusted financial returns that are statistically indistinguishable over the 10-year period under study. Moreover, our analysis reveals that impact and SRI funds reduce aggregate portfolio volatility to a comparable extent, implying similar levels of portfolio diversification. In an effort to explain why our findings contradict the current content of the financial literature, we inquire into funds' asset selection processes and conclude that impact funds in our sample rely on SRI-like processes. We explain that propinquity in asset selection processes with a non-exhaustive list of four proposals: (i) profitability, diversification, and liquidity constraints, (ii) information asymmetry between fund

managers and retail investors, (iii) fund managers' herd behavior, and (iv) regulation incompleteness. Overall, we consider that our findings bring the true nature of the impact funds in our sample into question and cast doubt on their real societal impact. This, in turn, may question the ability of investors to intelligibly allocate their financial resources based on their sustainability preferences which, on a greater scale, may prevent sustainable financial capital to satisfactorily correct for market and redistributive failures.

As a matter of fact, our findings in this chapter may depend on the rigorous definitions and criteria that we use to differentiate between impact and socially responsible investing. In particular, our decision to impose that impact funds in our sample be recognized by the GIIN for coherence and consistency purposes considerably limits our sample size, which prevents us from reliably drawing generalizable conclusions. Yet, while we acknowledge that our results ought to be challenged by those obtained from larger and different datasets, we still view our work in this chapter as providing insightful findings and laying the groundwork for further research on the debate about the conceptualization, distinctiveness, and practical implementation of sustainable investment strategies.

### **I.iii. Chapter 3 – Non-Financial Motives Are the Main Driver of Capital Allocation to Social Banks**

The goal of this third chapter is to investigate why private individuals buy social bank shares. Considering the non-negligible role of the financial industry in contributing to addressing current and future societal challenges, it is critical to gain a deeper understanding of individuals' mixture of motives behind their involvement in sustainable finance. To date, empirical research on that topic has mainly focused on the motivational profile of individuals who hold sustainable investment portfolios (e.g., Bauer, Ruof and Smeets, 2021). However, social banks play an increasingly important role in channeling financial capital to organizations that aim to solve social and environmental issues (Cornée, Cozarenco and Szafarz, 2023). It is therefore relevant to shed light on the motivational profile of those individuals who capitalize social banks. Yet, although several papers provide theoretical insights on the mix of motives of social owners (Weber, 2014; Cornée, Kalmi and Szafarz, 2020), no empirical research has been conducted on that topic. We attempt to fill that gap in this third chapter.

Our empirical analysis relies on two samples. The first sample is made of 507 members—individuals who bought shares in a Belgian social bank created in January 2020 during the bank's initial fundraising campaign. The second sample is made of 561 non-members—individuals who decided not to buy shares in the social bank. We collect data on both members and non-members

by means of a survey that combines questions with an incentivized experiment designed to reliably capture individuals' intrinsic social preferences (Berg, Dickhaut and McCabe, 1995; Riedl and Smeets, 2017). Using Probit and Ordered Probit regression analysis, we subsequently relate individuals' survey and experiment data to their field decision of bringing or not capital to the social bank.

Our findings are threefold. First, in line with the vision of social banking as an alternative form of financial intermediation (Cornée, Cozarenco and Szafarz, 2023), we find that members exhibit a significant lack of trust towards conventional banks. Second, our results show that financial motives are not the main driver behind the decision of members to buy social bank shares. Rather, that decision is primarily prompted by non-financial considerations, among which social preferences play a meaningful role. Third, we find that, contrary to results pertaining to the universe of sustainable investment funds, social signaling is not behind members' decision to acquire social bank shares. That last result leads us to conjecture that members likely have authentic non-financial motives. Taken together, our results highlight the necessity for social banks to primarily raise financial capital among those individuals who strongly identify with their objectives and values, and for whom financial considerations are secondary. Our results also have broader implications for asset prices. Indeed, as demonstrated by Fama and French (2007), tastes for assets can have long-term effects on asset prices, notably when the invested wealth of investors with tastes is substantial. Therefore, given both the primary importance of non-pecuniary motives among members and the strong growth of social banking over the past decade, our findings lend support to the view that sustainable investing might be having a significant effect on asset prices, one that may not decrease in the coming years, if the wealth invested in sustainable assets continues to grow (Riedl and Smeets, 2017; Pastor, Stambaugh and Taylor, 2021; Avramov et al., 2022a).

Finally, while it provides valuable insights, our study also has several limitations. Indeed, our reliance on data from a single institution, our exclusive focus on Belgian private individuals, and the important time lag between the fundraising campaign and the survey all ask for caution in the interpretation and generalization of our findings. For that reason, we encourage the production of additional work to challenge and assess the external validity of our conclusions.

## **II. Broader Implications and Future Research**

In the sections below, we provide a broader reflection on the implications of our findings, notably laying avenues for future research.

## II.i. Long-Run Financial Attractiveness of Impact Investments

As a matter of fact, our findings in the first chapter of this thesis that listed impact investments strongly underperform conventional investments echo those of Barber, Morse and Yasuda (2021) in the context of private funds. They are notably attributable to the fact that impact investments are often made in organizations that are not yet considered to be commercially attractive<sup>1</sup> (Höchstädter and Scheck, 2015; Watts and Scales, 2020) and that operate in high-risk environments where financial returns do not systematically and proportionally compensate for risk (Morduch and Ogden, 2018). Moreover, the price discrimination practices of financial advisors who charge higher fees to sustainable investors further lower potential financial returns for impact investors (Laudi, Smeets and Weitzel, 2022). Stepping back, and considering those elements together, one may therefore raise doubts about the long-run financial attractiveness of impact investments and, in turn, about the latter's ability to be a driving force behind the scaling of solutions to address societal issues at the global level.

So far, a share of the investment community has obviously agreed to trade off portions of financial returns for societal returns (Riedl and Smeets, 2017). Those investors appear to value positive social and environmental externalities, and consequently have a positive WTP (Barber, Morse and Yasuda, 2021) as well as a multi-attribute utility function (Bollen, 2007). For instance, Chowdhry, Davies and Waters (2019) demonstrate that some impact investors are ready to forgo financial returns to jointly hold financial claims with conventional investors, thereby compensating for the latter's tendency to exclusively focus on profits. Yet, one may ask whether impact investors' consent to receive below-market financial returns will last through time, particularly if the latter are a defining feature of impact investments (Morduch and Ogden, 2018). To a certain extent, accepting lower returns may indeed be a temporary phenomenon, caused by the recent surge in public awareness about societal challenges such as climate change. One may also raise doubts about the share of the investment community that is ready to accept below-market returns to invest with a societal impact. Finally, it is also possible that a significant part of the impact investing community be at least partly driven by social signaling motives, as demonstrated by Riedl and Smeets (2017) for SRI investors.

Above-mentioned doubts about the long-term financial attractiveness of impact investments are to be taken seriously. Indeed, Moran and Ward-Christie (2022) warn about the financial-first logic that still dominates the impact investing industry. In addition, Heeb et al. (2022) argue that sustainable investors are mostly driven by positive emotions rather than by a rigorous assessment

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<sup>1</sup> This argument is likely more adequate for private rather than listed impact firms.

of impact, and that impact investors are not ready to increase their WTP in proportion to the impact of their investments. Similarly, Bonnefon et al. (2022) find that sustainable investors make investment decisions based on their values rather than on the societal impact of their investments. Taken together, these findings imply that impact investments' financial underperformance may threaten the long-run viability of the industry, particularly if sustainable investors derive positive emotions from lower-sustainability, non-impact investments that would provide higher financial returns and align with investors' values.

To shed light on the above-mentioned issues, future research could investigate whether the acceptance of a trade-off by a share of the investment community is a phenomenon that is likely to last, or whether it may fade away in the future. It could also be interesting to research whether and to what extent impact investors may be acting with the purpose of enhancing their social reputation via social signaling. Next, future research should also try to estimate the share of the investment community that would accept below-market returns, as well as its elasticity with regard to the magnitude of the trade-off. Finally, future research might also investigate the potential implications for asset prices of the preceding research avenues.

## **II.ii. Commitment, Regulatory Initiatives, and Real Societal Impact**

In the second chapter of this thesis, we brought into question the true nature of the impact funds in our sample, given their reliance on SRI-like asset selection processes. Clearly, these findings echo those provided by other researchers on the issue of funds' commitment to sustainability. For instance, Kim and Yoon (2022) show that US mutual funds that sign the PRI on average fail to improve the sustainability of their investments, while Ceccarelli et al. (2021) demonstrate that only a handful of institutional investors walk the walk when it comes to sustainability commitment. In the second chapter, we provided several proposals to explain the propinquity in asset selection processes between impact and SRI funds. Future research should more thoroughly investigate these proposals, to better understand why self-declared impact funds struggle to align their practices with the theoretical principles of impact investing. Several papers already provide preliminary insights that ought to be more systematically researched. For example, Brandon et al. (2022) provide preliminary evidence that issues linked to fiduciary duty might impede US PRI signatories' commitment to sustainability. Other examples are the papers by Filippini, Leippold and Wekhof (2022) and Anderson and Robinson (2022) that highlight the need to improve both the quantity and quality of information available on sustainable financial products, as well as households' level of financial literacy. Obviously, it might also be fruitful to investigate alternative explanations to our finding of a similar financial performance for impact and SRI funds. In that



respect, the adoption of investment styles by fund managers is an aspect that ought to be further researched (see, e.g., Gnabo and Vanhomwegen, 2021).

The last proposal we discuss in the second chapter highlights the potential role of recent European regulatory loopholes in explaining homogeneity in asset selection processes, in line with the findings of Ahlström and Monciardini (2022). In particular, future research should carry on investigating the potential drawbacks of the current categorization of funds by the SFDR. Indeed, as pointed by Lambillon and Chesney (2023), the SFDR currently leaves much room for interpretation to fund managers who can therefore still invest in firms whose activities are not necessarily characterized by a reasonable degree of sustainability.<sup>2</sup> This may mislead investors and pose serious greenwashing risks, as investment funds may not act in line with the sustainability objectives they pretend to commit to (Cremasco and Boni, 2022). It therefore appears relevant for future research to analyze whether the European Commission should revise the SFDR to introduce sustainability criteria that funds would need to meet to be categorized as Article 8 or Article 9<sup>3</sup> (Och, 2021; Cremasco and Boni, 2022), as already suggested by France's Autorité des Marchés Financiers.<sup>4</sup> However, data shortages may impede the proper implementation of such criteria in the short term (Zetzsche and Anker-Sørensen, 2022). Dealing with the latter issue also constitutes an avenue for future research, that must also carefully weigh the pros and cons of introducing such criteria. Indeed, authors like Edmans (2023) warn about the risks of adopting a unique and exclusive approach to sustainable finance, highlighting the importance of opinion diversity in this debate.

Besides the SFDR, there are other supranational regulatory initiatives that future research could contribute to. For instance, it could investigate whether and how the current EU Taxonomy could enlarge its scope to define criteria that identify social activities, as it currently only focuses on

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<sup>2</sup> Admittedly, it may be complex to define what a “reasonable degree of sustainability” is. For instance, firms in the oil and gas industries may not be viewed as sustainable. Yet, they often massively invest in both sustainable technologies and R&D and may be ideally positioned to accelerate the transition towards sustainability.

<sup>3</sup> On 14 April 2023, the European Commission released additional information about the interpretation of the SFDR that seems to go in the opposite direction. Indeed, the Commission explains that SFDR “does not prescribe any specific approach to determine the contribution of an investment to environmental or social objectives” and “does not set out minimum requirements that qualify concepts such as *contribution*, *do no significant harm*, or *good governance*, i.e., the key parameters of a sustainable investment”. See <https://www.esma.europa.eu/joint-committee/joint-qas#list-of-published-joint-qas> (page accessed 13 August 2023).

<sup>4</sup> See <https://www.amf-france.org/fr/actualites-publications/positions-ue-de-lamf/proposition-de-criteres-minimaux-environnementaux-pour-les-produits-financiers-des-categories-art9> (page accessed 13 August 2023).

environmentally sustainable economic activities (Och, 2021).<sup>5</sup> It could also help assess the recently unveiled ECB climate change-related indicators that notably aim to evaluate the financial sector's exposure to climate-related risks.<sup>6</sup> Whether these indicators effectively contribute to providing investors with high-quality sustainability-related information could be an avenue for future research.

Lastly, if SRI-like investment strategies are to be predominant in practice, additional research is needed to assess their effectiveness as well as their real impact on societal issues. For instance, blanket divestment<sup>7</sup>, one of the most widely adopted SRI strategies, has recently come under strong criticism. In line with the rationale of Merton (1987), the strategy of blanket divestment postulates that, as the investor base of an unethical firm decreases, its stock price decreases, due to each individual investor having to bear more risk. This, in turn, raises the firm's cost of capital, which leads it to ultimately adopt more sustainable procedures (Heinkel, Kraus and Zechner, 2001). However, in practice, blanket divestment strategies are found not to meaningfully affect firms' real investment decisions (Berk and van Binsbergen, 2021; De Angelis, Tankov and Zerbib, 2022) for several reasons, such as the elastic demand for unethical firms' stocks (Broccardo, Hart and Zingales, 2022), the financing of real investments with internal cash flows (Edmans, Levit and Schneemeier, 2022), or the low fraction of funds controlled by sustainable investors (Heinkel, Kraus and Zechner, 2001). In fact, alternative SRI strategies, such as tilting<sup>8</sup> (Dawkins, 2018; Edmans, Levit and Schneemeier, 2022; Gantchev, Giannetti and Li, 2022) or engagement (Berk and van Binsbergen, 2021; Broccardo, Hart and Zingales, 2022) appear to be more effective. Identifying investment strategies that are effective is an important challenge for future research, as currently the real societal impact of sustainable investing remains limited (Berg, Heeb and Kölbel, 2022; Duchin, Gao and Xu, 2022; Gosling and MacNeil, 2023).

### **II.iii. Sustainability: A Necessary Yet Insufficient Condition**

The creation in January 2020 of the Belgian social bank we partnered with in the third chapter of this thesis was a significant event. Similarly, the bank's early demise three years later, at the end

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<sup>5</sup> See [https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities\\_en](https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en) (page accessed 13 August 2023).

<sup>6</sup> See <https://www.ecb.europa.eu/press/pr/date/2023/html/ecb.pr230124~c83dbef220.en.html> (page accessed 13 August 2023).

<sup>7</sup> Blanket divestment refers to the practice of wholly excluding specific firms from one's investment portfolio on the basis that those firms' activities are deemed unethical according to an investor's standards.

<sup>8</sup> Tilting is a practice whereby the investor agrees to purchase the stock of a firm that she deems unethical if and only if that firm takes a corrective action regarding its negative externalities. Tilting differs from blanket divestment, a practice under which the investor never buys the firm's stock (Edmans, Levit and Schneemeier, 2022).

of 2022, also raised numerous questions. Among the factors that contributed to the bank's collapse, at least two are of particular interest to the social banking industry, and therefore provide several avenues for future research. The first factor relates to banking regulation. Indeed, we note that the social bank saw its banking license withdrawn by the National Bank of Belgium following its failure to raise EUR 40 million in additional financial capital to meet regulatory requirements. It could therefore be insightful to carry out research on whether the current banking regulatory Basel Framework should be adapted to better meet the specificities of social banks. In fact, several academic works have already contended that this one-size-fits-all set of standards might not be tailored to social banks' features (see, e.g., Cornée, 2019; Cornée, Kalmi and Szafarz, 2020), and might in some cases lead to social banks that behave like conventional banks (Périleux and Nyssens, 2017). Consequently, the role played by potentially inadequate regulation in the collapse of the social bank should be further explored, particularly in an economic environment characterized by low or negative interest rates that threaten bank profitability (Borio, Gambacorta and Hofmann, 2017).<sup>9</sup>

The second factor relates to the unexpectedly weak conversion rate of members to customers—less than 15%. Why did so many private individuals buy shares in the social bank and simultaneously refrained from becoming customers of that same bank? As a matter of fact, most members chose not to buy financial services from the social bank. Unless those members were already customers of another social bank, this appears paradoxical, given that we demonstrate in the third chapter that members exhibit a significant lack of trust towards conventional banks. Yet, there are several potential explanations to this phenomenon that ought to be researched further. Firstly, although they share the social bank's values, members may feel that their money is more secured at a larger and established bank, even though the social bank benefited from the Belgian government's deposit insurance scheme. Secondly, as explained in Krause and Battenfeld (2019), members may not have become customers due to important switching costs and/or cumbersome administrative procedures (e.g., anti-money laundering procedures). Thirdly, members' decision may simply be the result of inertia (Krause and Battenfeld, 2019).

Fourthly, there may have been issues with the range of financial products and services offered by the social bank. Did the bank correctly communicate on those products and services, providing potential customers with the right information? Were costs and management fees too high to attract customers? Did the social bank sufficiently differentiate its products and services compared

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<sup>9</sup> Low and sometimes negative interest rates prevailed in Europe when the Belgian social bank obtained its banking license and launched its activities back in 2019 and 2020. See [https://www.ecb.europa.eu/stats/policy\\_and\\_exchange\\_rates/key\\_ecb\\_interest\\_rates/html/index.en.html](https://www.ecb.europa.eu/stats/policy_and_exchange_rates/key_ecb_interest_rates/html/index.en.html) (page accessed 13 August 2023).

to what conventional banks offer? Were products and services not sustainable enough in members' eyes? Indeed, given that social bank customers have specific sustainable buying patterns (e.g., purchase of organic food; Krause and Battenfeld, 2019), SRI-like investment funds may not be sufficiently attractive to them. As the social bank released its range of products and services progressively, it is also possible that the latter was not perceived as sufficiently broad. Indeed, although social bank customers are not particularly demanding about the set of products and services that is offered (Krause and Battenfeld, 2019), they may nevertheless have minimum expectations. Lastly, individuals may have become members for reasons that have nothing to do with the opportunity to later become a customer of the social bank. Indeed, one can buy shares in the social bank due to the social pressure exerted by relatives, friends, or colleagues (Milgram, 1963; Mas and Moretti, 2009), or due to the impetus provided by the mediatic coverage of the fundraising campaign and notably by social networks. Such herd behavior is common in financial markets, where investors often ignore their own beliefs and make investment decisions based on the market consensus (Galariotis, Rong and Spyrou, 2015; Bernales, Verousis and Voukelatos, 2020). More generally, buying social bank shares may also be a soft form of protest against conventional banking, i.e., through the acquisition of shares, one sends a signal, but does not aim to buy social banking products and services later on.

Although it will likely not be feasible with the database we use in the third chapter, future research could investigate the above-mentioned proposals in other social banking settings, notably by means of surveys and/or qualitative interviews with social bank members and/or customers.

To summarize, this thesis is made of three chapters whose common objective is to contribute to the literature that addresses fundamental questions related to sustainable finance practices. In the first chapter, we contributed to the discussion about whether sustainability is consistent with profitability by drawing an original comparison of impact and conventional listed firms. In the second chapter, we delved into the similarities and differences between impact and socially responsible investments to contribute to the literature that seeks to understand whether there are major differences between sustainable investment strategies. Finally, in the third chapter, we contributed to the literature that aims to shed light on the determinants of sustainable funders' asset allocation decisions by investigating the set of motives that lie behind individuals' acquisition of social bank shares. In addressing each chapter's research question, we ambitioned to clearly expose the implications of our findings, hoping that the latter may pave the way for future research.



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# Appendices

## Appendix A

**Table A.1 Summary of impact companies' business activities**

<b>Company Name</b>	<b>Business Activities</b>
Accsys Technologies	Produce durable and high-performance wood products as an alternative to resource-depleting and carbon-polluting solutions.
Ashley House	Improve access to better services and environments in the health and affordable housing sectors.
Assura	Invest in and manage healthcare buildings to improve access to NHS services, tests and treatments.
Capital for Colleagues	Advise, invest in and support the growth of the employee-owned business sector.
Good Energy Group	Help households and businesses to generate, store and share renewable energy.
HaloSource	Provide clean water technology solutions to the issue of water stress.
ITM Power	Enhance the use of renewable energy through manufacturing of integrated hydrogen energy solutions.
MagneGas	Convert hydrocarbon-based renewable feedstock into fossil fuel substitutes.
Menhaden Capital	Invest in businesses that deliver or benefit from the efficient use of energy and resources.
Obtala Limited	Produce, manufacture and supply sustainable African hardwood.
Primary Health Properties	Invest in flexible and modern healthcare real estate dedicated to local primary healthcare.
ProCredit Holding	Run development-oriented commercial banks that operate in South Eastern and Eastern Europe as well as in South America.
Ripasso Energy	Produce sustainable electricity through the transformation of heat energy.
SurePure	Offer a greener alternative to pasteurization and chemical-based purification processes.
V22	Enhance the production of social artistic events through shared ownership of an art organization.
Walls & Futures REIT	Address social housing needs through providing homes to vulnerable people.

Note: this table provides a brief summary of each impact company's business activities. Additional information is available on impact companies' websites.



Table A.2 Summary characteristics of impact companies

Company Name	Inception Year	Stock Exchange	Sector	Currency	Location	Average Market Cap. (USDm)
Accsys Technologies	2005	AIM (London Stock Exchange)	Construction and Materials	GBP (Pence)	UK	246.49
Ashley House	1991	AIM (London Stock Exchange)	Construction and Materials	GBP (Pence)	UK	18.65
Assura	2003	London Stock Exchange	Real Estate	GBP (Pence)	UK	653.76
Capital for Colleagues	2013	NEX Exchange (London)	Financial Services	GBP (Pence)	UK	7.29
Good Energy Group	1999	AIM (London Stock Exchange)	Energy	GBP (Pence)	UK	31.15
HaloSource	1994	AIM (London Stock Exchange)	Technology	GBP (Pence)	USA	44.91
ITM Power	2001	AIM (London Stock Exchange)	Energy	GBP (Pence)	UK	73.36
MagneGas	2007	NASDAQ	Energy	USD	USA	28.29
Menhaden Capital	2015	London Stock Exchange	Financial Services	GBP (Pence)	UK	77.96
Obtala	2007	AIM (London Stock Exchange)	Consumer Goods	GBP (Pence)	UK	69.33
Primary Health Properties	1995	London Stock Exchange	Real Estate	GBP (Pence)	UK	385.29
ProCredit Holding	1998	Frankfurt Stock Exchange	Financial Services	EUR	DE	809.73
Ripasso Energy	2008	NGM Nordic MTF, Börse Stuttgart	Energy	SEK	SE	42.13
SurePure	2005	OTCQB (OTC Markets Group)	Technology	USD	USA	17.70
V22	2006	NEX Exchange (London)	Retail	GBP (Pence)	UK	0.55
Walls & Futures REIT	2008	NEX Exchange (London)	Real Estate	GBP (Pence)	UK	3.65

Note: summary characteristics of the final impact sample's constituents. Inception Year, Stock Exchange, Sector, Currency and Location data come from constituents' websites and research reports published on the Impact Group's website. Average Market Cap. stands for the USDm average daily market capitalization of the company during its presence in the impact sample. Market capitalization data come from Datastream.

Table A.3 Summary statistics of impact companies' weekly financial return series

Company Name	Start Date	End Date	Annualized Return (%)	Maximum (%)	Minimum (%)	Skewness	Excess Kurtosis
Accsys Technologies	05-01-09	31-05-18	-27.80	25.69	-29.94	0.02	4.02
Ashley House	05-01-09	31-05-18	-22.70	37.09	-23.48	1.11	8.83
Assura	05-01-09	31-05-18	3.13	5.18	-13.83	0.07	4.50
Capital for Colleagues	24-03-14	31-05-18	-11.36	16.10	-20.42	-5.14	44.96
Good Energy Group	05-01-09	31-05-18	4.22	24.28	-35.12	-0.14	10.61
HaloSource	18-10-10	31-05-18	-48.64	25.10	-69.59	-4.21	32.98
ITM Power	05-01-09	31-05-18	-7.64	40.09	-30.76	1.11	3.98
MagneGas	05-01-09	31-05-18	-61.46	81.03	-57.35	1.18	7.40
Menhaden Capital	29-06-15	31-05-18	-17.24	8.36	-10.90	-1.13	5.22
Obtala	05-01-09	31-05-18	-17.76	26.68	-27.86	0.19	4.20
Primary Health Properties	05-01-09	31-05-18	8.89	11.08	-9.50	0.04	3.91
ProCredit Holding	26-12-16	31-05-18	-7.57	21.53	-18.01	0.57	7.51
Ripasso Energy	05-12-16	31-05-18	13.02	50.25	-29.49	1.81	6.65
SurePure	19-09-11	31-05-18	-73.65	74.83	-53.03	0.78	6.19
V22	05-01-09	31-05-18	-13.97	59.26	-68.29	-1.45	30.42
Walls & Futures REIT	05-12-16	31-05-18	-7.29	5.94	-15.67	-2.97	13.87

Note: summary statistics of the USD weekly financial return series of the 16 impact companies. Start Date and End Date are the dates at which the series begin and end, respectively. Skewness measures the degree of asymmetry of the returns' distribution. Excess Kurtosis is evidence of fat tails in the returns' distribution.

**Table A.4 Performance statistics pre- and post-2014**

<b>Index</b>	<b>Annualized Return (%)</b>	<b>Volatility (%)</b>
<i>Panel A: pre-2014</i>		
Impact Investing Index	-15.77	3.40
MSCI UK Micro Cap	26.21	2.28
MSCI UK Small + Micro Cap	26.52	2.72
MSCI Europe Micro Cap	17.50	2.26
MSCI Europe Small + Micro Cap	20.65	2.83
<i>Panel B: post-2014</i>		
Impact Investing Index	3.89	2.16
MSCI UK Micro Cap	2.19	1.74
MSCI UK Small + Micro Cap	3.53	2.13
MSCI Europe Micro Cap	7.01	1.46
MSCI Europe Small + Micro Cap	7.03	1.81

Note: performance statistics of the USD weekly financial return series of the Impact Investing Index and the four MSCI benchmark indices. Series in Panel A start on 5 January 2009 and end on 31 December 2013, while series in Panel B start on 1 January 2014 and end on 31 May 2018. Volatility is proxied by the unconditional standard error of weekly returns.

**Table A.5 Unconditional correlations between reduced impact investing indices and MSCI benchmark indices**

<b>Benchmark Index</b>	<b>MSCI UK Micro Cap</b>	<b>MSCI UK Small + Micro Cap</b>	<b>MSCI Europe Micro Cap</b>	<b>MSCI Europe Small + Micro Cap</b>
<i>Panel A: Impact Investing Index (Ex-US)</i>				
First Half Correlation (%)	42.93***	41.05***	41.45***	40.35***
Second Half Correlation (%)	60.87***	58.05***	53.98***	50.89***
Fisher's r-to-z Test (P-value)	0.00	0.00	0.00	0.00
<i>Panel B: Impact Investing Index (UK-only)</i>				
First Half Correlation (%)	42.93***	41.05***		
Second Half Correlation (%)	63.12***	59.90***		
Fisher's r-to-z Test (P-value)	0.00	0.00		

Note: unconditional correlations (%) between reduced impact investing indices and each of the four MSCI benchmark indices. The Impact Investing Index (Ex-US) consists only of European impact companies (UK firms included; Panel A), whereas the Impact Investing Index (UK-only) consists exclusively of UK impact companies (Panel B). Two correlations, one for the first half and one for the second half of the sampling period, are presented for each pair. Fisher's r-to-z tests test for the null hypothesis of equality between the two correlation coefficients. \*\*\* indicates statistical significance at the 1% level.

Table A.6 Four-factor model estimation results with reduced impact investing indices

Index	$\alpha$	$\beta_{MRP}$	$\beta_{SMB}$	$\beta_{HML}$	$\beta_{WML}$	$R^2$
<i>Panel A: Impact Investing Index (Ex-US)</i>						
Impact Investing Index (Ex-US)	-0.0039*** (0.0012)	0.7375*** (0.0683)	1.1970*** (0.1778)	-0.1982 (0.1423)	-0.1706 (0.1203)	0.28
MSCI UK Micro Cap	-0.0008 (0.0006)	0.2314*** (0.0539)	0.7140*** (0.0902)	0.1939*** (0.0710)	-0.1455*** (0.0509)	0.26
MSCI UK Small + Micro Cap	-0.0001 (0.0007)	0.4115*** (0.0689)	0.7280*** (0.1011)	0.2129** (0.0985)	-0.1874*** (0.0526)	0.33
MSCI Europe Micro Cap	-0.0007 (0.0006)	0.6212*** (0.0296)	1.0743*** (0.0880)	0.0010 (0.0675)	-0.0804 (0.0495)	0.56
MSCI Europe Small + Micro Cap	0.0001 (0.0006)	0.7461*** (0.0381)	1.0408*** (0.0943)	0.0770 (0.0757)	-0.1302*** (0.0488)	0.58
<i>Panel B: Impact Investing Index (UK-only)</i>						
Impact Investing Index (UK-only)	-0.0043*** (0.0013)	0.3608*** (0.0674)	0.7014*** (0.1512)	0.0924 (0.1329)	-0.1633 (0.1089)	0.11

Note: coefficient estimates for the four-factor model linear regressions using factors from European countries. The indices considered are the two reduced impact investing indices and the four MSCI benchmark indices. The Impact Investing Index (Ex-US) consists only of European impact companies (UK firms included; Panel A), whereas the Impact Investing Index (UK-only) consists exclusively of UK impact companies (Panel B). The Impact Investing Index (UK-only) specification from Panel B is to be compared to both MSCI UK specifications from Panel A. The one-month UK government bond yield is used as risk-free rate for specifications with the Impact Investing Index (UK-only) as well as MSCI UK indices. The one-month German government bond yield is used as risk-free rate for specifications with the Impact Investing Index (Ex-US) as well as MSCI European indices.  $\alpha$  is the intercept of the model, while  $\beta_{MRP}$ ,  $\beta_{SMB}$ ,  $\beta_{HML}$  and  $\beta_{WML}$  are the four factor loadings. Robust standard errors are in parentheses. \*\* and \*\*\* indicate statistical significance at the 5% and 1% levels, respectively.

Table A.7 Four-factor model estimation results pre- and post-2014

Index	$\alpha$	$\beta_{MRP}$	$\beta_{SMB}$	$\beta_{HML}$	$\beta_{WML}$	$R^2$
<i>Panel A: pre-2014</i>						
Impact Investing Index	-0.0046** (0.0021)	0.4532*** (0.0959)	1.5083*** (0.3133)	0.5543** (0.2737)	-0.4221*** (0.1276)	0.27
MSCI UK Micro Cap	-0.0007 (0.0009)	0.2068*** (0.0567)	1.1223*** (0.1538)	0.3794*** (0.1212)	-0.3366*** (0.0611)	0.39
MSCI UK Small + Micro Cap	0.0001 (0.0010)	0.3962*** (0.0707)	0.9697*** (0.1760)	0.5489*** (0.1663)	-0.3573*** (0.0735)	0.44
MSCI Europe Micro Cap	-0.0049*** (0.0010)	0.5015*** (0.0427)	1.1073*** (0.1731)	0.2788** (0.1446)	-0.2089*** (0.0704)	0.47
MSCI Europe Small + Micro Cap	-0.0029** (0.0011)	0.6370*** (0.0528)	1.1263*** (0.1967)	0.5070*** (0.1626)	-0.2939*** (0.0802)	0.54
<i>Panel B: post-2014</i>						
Impact Investing Index	0.0004 (0.0013)	0.4063*** (0.1196)	0.6882*** (0.1901)	0.4596*** (0.1707)	0.0597 (0.1385)	0.13
MSCI UK Micro Cap	-0.0015* (0.0008)	0.0762 (0.1163)	0.3670*** (0.1230)	0.2215** (0.1107)	-0.0230 (0.0867)	0.07
MSCI UK Small + Micro Cap	-0.0010 (0.0010)	0.2706 (0.1753)	0.6790*** (0.1725)	0.1843 (0.1366)	-0.1061 (0.1077)	0.15
MSCI Europe Micro Cap	0.0038*** (0.0008)	0.4498*** (0.0655)	0.7346*** (0.1221)	0.3250*** (0.1113)	0.0583 (0.0853)	0.38
MSCI Europe Small + Micro Cap	0.0025*** (0.0009)	0.6524*** (0.0908)	0.8970*** (0.1571)	0.2998** (0.1272)	0.0180 (0.0965)	0.45

Note: coefficient estimates for the four-factor model linear regressions using factors from developed countries. The indices considered are the Impact Investing Index and the four MSCI benchmark indices. Series in Panel A start on 5 January 2009 and end on 31 December 2013, while series in Panel B start on 1 January 2014 and end on 31 May 2018. The one-month US, UK and German government bond yields are used as risk-free rates for specifications with the Impact Investing Index, MSCI UK indices and MSCI European indices, respectively.  $\alpha$  is the intercept of the model, while  $\beta_{MRP}$ ,  $\beta_{SMB}$ ,  $\beta_{HML}$  and  $\beta_{WML}$  are the four factor loadings. Robust standard errors are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table A.8 DCC-MVGARCH estimation results with the Impact Investing Index (Ex-US)

Index	$\mu$	$\alpha_0$	$\alpha_1$	$\beta_1$	$\beta_2$	A	B
Impact Investing Index (Ex-US)	0.0005** (0.0002)	0.1560e-4* (0.0860e-4)	0.2535*** (0.0740)	0.3039*** (0.0973)	0.4078*** (0.1121)		
MSCI UK Micro Cap	0.0006*** (0.0001)	2.3283e-6*** (0.8462e-6)	0.1560*** (0.0360)	0.4295** (0.1851)	0.3906** (0.1738)		
I.I. Index (Ex-US)/MSCI UK Micro Cap						0.0240*** (0.0064)	0.9693*** (0.0097)
Impact Investing Index (Ex-US)	0.0004* (0.0002)	0.1144e-4 (0.0714e-4)	0.1907*** (0.0651)	0.7869*** (0.0770)			
MSCI UK Small + Micro Cap	0.0008*** (0.0002)	0.0335e-4*** (0.0106e-4)	0.1139*** (0.0225)	0.8665*** (0.0224)			
I.I. Index (Ex-US)/MSCI UK Small + Micro Cap						0.0229*** (0.0088)	0.9701*** (0.0154)
MSCI Europe Micro Cap	0.0006*** (0.0001)	1.3516e-6*** (0.5112e-6)	0.0954*** (0.0212)	0.8877*** (0.0235)			
I.I. Index (Ex-US)/MSCI Europe Micro Cap						0.0173** (0.0068)	0.9771*** (0.0104)
MSCI Europe Small + Micro Cap	0.0007*** (0.0002)	0.0216e-4*** (0.0075e-4)	0.0984*** (0.0188)	0.8881*** (0.0205)			
I.I. Index (Ex-US)/MSCI Eu. Small + Micro Cap						0.0415** (0.0181)	0.8558*** (0.1107)

Note: coefficient estimates from univariate GARCH processes and Dynamic Conditional Correlations (DCC). Univariate GARCH processes are estimated for each index in each of the four pairs (the parameters are  $\mu$ ,  $\alpha_0$ ,  $\alpha_1$ ,  $\beta_1$  and  $\beta_2$ ), before the parameters A and B of the DCC are estimated. The indices considered are the Impact Investing Index (Ex-US) (present in each of the four pairs) and the four MSCI benchmark indices (one per pair). Robust standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table A.9 DCC-MVGARCH estimation results with the Impact Investing Index (UK-only)

Index	$\mu$	$\alpha_0$	$\alpha_1$	$\beta_1$	$\beta_2$	$A$	$B$
Impact Investing Index (UK-only)	0.0005** (0.0002)	0.1737e-4* (0.0902e-4)	0.2413*** (0.0725)	0.2894*** (0.0989)	0.4212*** (0.1182)		
MSCI UK Micro Cap	0.0006*** (0.0001)	2.3283e-6*** (0.8462e-6)	0.1560*** (0.0360)	0.4295** (0.1851)	0.3906** (0.1738)		
I.I. Index (UK-only)/MSCI UK Micro Cap						0.0239** (0.0119)	0.9747*** (0.0164)
Impact Investing Index (UK-only)	0.0005* (0.0003)	0.1264e-4* (0.0745e-4)	0.1823*** (0.0645)	0.7864*** (0.0787)			
MSCI UK Small + Micro Cap	0.0008*** (0.0002)	0.0335e-4*** (0.0106e-4)	0.1139*** (0.0225)	0.8665*** (0.0224)			
I.I. Index (UK-only)/MSCI UK Small + Micro Cap						0.0156 (0.0332)	0.9844*** (0.0390)

Note: coefficient estimates from univariate GARCH processes and Dynamic Conditional Correlations (DCC). Univariate GARCH processes are estimated for each index in each of the two pairs (the parameters are  $\mu$ ,  $\alpha_0$ ,  $\alpha_1$ ,  $\beta_1$  and  $\beta_2$ ), before the parameters A and B of the DCC are estimated. The indices considered are the Impact Investing Index (UK-only) (present in each of the two pairs) and the two MSCI UK benchmark indices (one per pair). Robust standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table A.10 DCC-MVGARCH estimation results pre-2014

Index	$\mu$	$\alpha_0$	$\alpha_1$	$\beta_1$	$\beta_2$	A	B
Impact Investing Index	0.0005 (0.0004)	0.1190e-4** (0.0600e-4)	0.1765*** (0.0485)	0.0410 (0.0757)	0.7565*** (0.0981)		
MSCI UK Micro Cap	0.0011*** (0.0002)	1.0190e-6 (0.6507e-6)	0.0890*** (0.0253)	0.2753** (0.1371)	0.6242*** (0.1322)		
I.I. Index/MSCI UK Micro Cap						0.0358* (0.0202)	0.7075*** (0.1226)
Impact Investing Index	0.0004 (0.0005)	0.0974e-4 (0.1295e-4)	0.1322 (0.1053)	0.8491*** (0.1262)			
MSCI UK Small + Micro Cap	0.0011*** (0.0003)	0.0151e-4* (0.0087e-4)	0.0627*** (0.0159)	0.9295*** (0.0169)			
I.I. Index/MSCI UK Small + Micro Cap						0.0362** (0.0151)	0.6141*** (0.2093)
MSCI Europe Micro Cap	0.0010*** (0.0002)	0.0086e-4 (0.0058e-4)	0.0511*** (0.0141)	0.9395*** (0.0166)			
I.I. Index/MSCI Europe Micro Cap						0.0305* (0.0161)	0.6388*** (0.2280)
MSCI Europe Small + Micro Cap	0.0011*** (0.0003)	0.0173e-4 (0.0107e-4)	0.0602*** (0.0146)	0.9310*** (0.0166)			
I.I. Index/MSCI Eu. Small + Micro Cap						0.0292** (0.0138)	0.6243*** (0.2301)

Note: coefficient estimates from univariate GARCH processes and Dynamic Conditional Correlations (DCC). Univariate GARCH processes are estimated for each index in each of the four pairs (the parameters are  $\mu$ ,  $\alpha_0$ ,  $\alpha_1$ ,  $\beta_1$  and  $\beta_2$ ), before the parameters A and B of the DCC are estimated. The indices considered are the Impact Investing Index (present in each of the four pairs) and the four MSCI benchmark indices (one per pair). Series start on 5 January 2009 and end on 31 December 2013. Robust standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.



Table A.11 DCC-MVGARCH estimation results post-2014

Index	$\mu$	$\alpha_0$	$\alpha_1$	$\beta_1$	$A$	$B$
Impact Investing Index	0.0002 (0.0003)	0.1733e-4** (0.0823e-4)	0.2119*** (0.0597)	0.6818*** (0.0744)		
MSCI UK Micro Cap	0.0003 (0.0002)	3.7862e-6* (2.0288e-6)	0.1870*** (0.0528)	0.7591*** (0.0530)		
I.I. Index/MSCI UK Micro Cap					0.0444*** (0.0134)	0.9307*** (0.0221)
MSCI UK Small + Micro Cap	0.0006** (0.0002)	0.0894e-4*** (0.0342e-4)	0.1771*** (0.0365)	0.7334*** (0.0483)		
I.I. Index/MSCI UK Small + Micro Cap					0.0806*** (0.0226)	0.8631*** (0.0448)
MSCI Europe Micro Cap	0.0004** (0.0002)	4.0923e-6** (1.8474e-6)	0.1757*** (0.0432)	0.7323*** (0.0674)		
I.I. Index/MSCI Europe Micro Cap					0.0464*** (0.0157)	0.9322*** (0.0243)
MSCI Europe Small + Micro Cap	0.0006*** (0.0002)	7.9267e-6** (3.1063e-6)	0.1898*** (0.0477)	0.7103*** (0.0726)		
I.I. Index/MSCI Eu. Small + Micro Cap					0.0807*** (0.0235)	0.8634*** (0.0492)

Note: coefficient estimates from univariate GARCH processes and Dynamic Conditional Correlations (DCC). Univariate GARCH processes are estimated for each index in each of the four pairs (the parameters are  $\mu$ ,  $\alpha_0$ ,  $\alpha_1$  and  $\beta_1$ ), before the parameters A and B of the DCC are estimated. The indices considered are the Impact Investing Index (present in each of the four pairs) and the four MSCI benchmark indices (one per pair). Series start on 1 January 2014 and end on 31 May 2018. Robust standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table A.12 Robustness analysis: DCC-MVGARCH estimation results (1)

Index	$\mu$	$\alpha_0$	$\alpha_1$	$\beta_1$	$\beta_2$	A	B
Impact Investing Index (9)	0.0005** (0.0002)	0.1641e-4** (0.0796e-4)	0.2340*** (0.0680)	0.2940*** (0.0975)	0.4261*** (0.1096)		
MSCI UK Micro Cap	0.0006*** (0.0001)	2.3283e-6*** (0.8462e-6)	0.1560*** (0.0360)	0.4295** (0.1851)	0.3906** (0.1738)		
I.I. Index (9)/MSCI UK Micro Cap						0.0273*** (0.0083)	0.9674*** (0.0155)
Impact Investing Index (9)	0.0005* (0.0003)	0.1225e-4* (0.0645e-4)	0.1790*** (0.0590)	0.7901*** (0.0695)			
MSCI UK Small + Micro Cap	0.0008*** (0.0002)	0.0335e-4*** (0.0106e-4)	0.1139*** (0.0225)	0.8665*** (0.0224)			
I.I. Index (9)/MSCI UK Small + Micro Cap						0.0149 (0.0255)	0.9851*** (0.0301)
MSCI Europe Micro Cap	0.0006*** (0.0001)	1.3516e-6*** (0.5112e-6)	0.0954*** (0.0212)	0.8877*** (0.0235)			
I.I. Index (9)/MSCI Europe Micro Cap						0.0193** (0.0086)	0.9726*** (0.0125)
MSCI Europe Small + Micro Cap	0.0007*** (0.0002)	0.0216e-4*** (0.0075e-4)	0.0984*** (0.0188)	0.8881*** (0.0205)			
I.I. Index (9)/MSCI Eu. Small + Micro Cap						0.0138** (0.0066)	0.9846*** (0.0102)

Note: coefficient estimates from univariate GARCH processes and Dynamic Conditional Correlations (DCC). Univariate GARCH processes are estimated for each index in each of the four pairs (the parameters are  $\mu$ ,  $\alpha_0$ ,  $\alpha_1$ ,  $\beta_1$  and  $\beta_2$ ), before the parameters A and B of the DCC are estimated. The indices considered are the nine-firm Impact Investing Index—Impact Investing Index (9)—present in each of the four pairs, and the four MSCI benchmark indices (one per pair). The univariate GARCH(1,2) specification is used for the pair of indices associated with the MSCI UK Micro Cap. The univariate GARCH(1,1) specification is used for the remaining pairs of indices. Robust standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

**Table A.13 Robustness analysis: Summary statistics of indices' weekly financial return series**

Index	Annualized Return (%)	Maximum (%)	Minimum (%)	Volatility (%)	Skewness	Excess Kurtosis	Dickey-Fuller (P-value)
Impact Investing Index	-7.07	12.77	-12.49	2.89	-0.39	3.71	0.00
UK Index	11.20	9.74	-14.16	2.97	-0.47	2.07	0.00
European Index	2.93	8.99	-14.53	2.79	-0.54	2.95	0.00

Note: summary statistics of the USD weekly financial return series of the Impact Investing Index and the two benchmark indices constructed for robustness test purposes. All series start on 5 January 2009 and end on 31 May 2018. Volatility is proxied by the unconditional standard error of weekly returns. Skewness measures the degree of asymmetry of the returns' distribution. Excess Kurtosis is evidence of fat tails in the returns' distribution. Dickey-Fuller tests for the null hypothesis of a unit root.

**Table A.14 Robustness analysis: Unconditional correlations**

Benchmark Index	UK Index	European Index
First Half Correlation (%)	33.73***	31.26***
Second Half Correlation (%)	48.61***	33.27***
Fisher's r-to-z Test (P-value)	0.00	57.55

Note: unconditional correlations (%) between the Impact Investing Index and the two benchmark indices constructed for robustness test purposes. Two correlations, one for the first half and one for the second half of the sampling period, are presented for each pair. Fisher's r-to-z tests test for the null hypothesis of equality between the two correlation coefficients. \*\*\* indicates statistical significance at the 1% level.

**Table A.15 Robustness analysis: Four-factor model estimation results**

Index	$\alpha$	$\beta_{MRP}$	$\beta_{SMB}$	$\beta_{HML}$	$\beta_{WML}$	$R^2$
Impact Investing Index	-0.0021* (0.0012)	0.4517*** (0.0740)	1.1001*** (0.2061)	0.4156** (0.1716)	-0.2711** (0.1168)	0.21
UK Index	-0.0009 (0.0010)	0.3471*** (0.0802)	0.8658*** (0.1688)	0.4832*** (0.1580)	-0.2863*** (0.1004)	0.19
European Index	-0.0022** (0.0010)	0.6066*** (0.0509)	0.9074*** (0.1743)	0.2016 (0.1717)	-0.1898** (0.0862)	0.32

Note: coefficient estimates for the four-factor model linear regressions using factors from developed countries. The indices considered are the Impact Investing Index and the two benchmark indices constructed for robustness test purposes. The one-month US, UK and German government bond yields are used as risk-free rates for specifications with the Impact Investing Index, the UK Index and the European Index, respectively.  $\alpha$  is the intercept of the model, while  $\beta_{MRP}$ ,  $\beta_{SMB}$ ,  $\beta_{HML}$  and  $\beta_{WML}$  are the four factor loadings. Robust standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table A.16 Robustness analysis: DCC-MVGARCH estimation results (2)

Index	$\mu$	$\alpha_0$	$\alpha_1$	$\beta_1$	A	B
Impact Investing Index	0.0004* (0.0002)	0.0961e-4* (0.0527e-4)	0.1744*** (0.0561)	0.8024*** (0.0646)		
UK Index	0.0006** (0.0003)	0.1008e-4** (0.0484e-4)	0.0875*** (0.0303)	0.8728*** (0.0433)		
I.I. Index/UK Index					0.0491 (0.0308)	0.8000*** (0.1818)
European Index	0.0004 (0.0003)	0.0289e-4 (0.0181e-4)	0.0431*** (0.0110)	0.9410*** (0.0139)		
I.I. Index/European Index					0.0149*** (0.0057)	0.9749*** (0.0079)

Note: coefficient estimates from univariate GARCH processes and Dynamic Conditional Correlations (DCC). Univariate GARCH processes are estimated for each index in each of the two pairs (the parameters are  $\mu$ ,  $\alpha_0$ ,  $\alpha_1$  and  $\beta_1$ ), before the parameters A and B of the DCC are estimated. Indices considered are the Impact Investing Index (present in each of the two pairs) and the two benchmark indices constructed for robustness test purposes (one per pair). Robust standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

**Table A.17 Summary statistics of indices' monthly financial return series**

<b>Index</b>	<b>Annualized Return (%)</b>	<b>Maximum (%)</b>	<b>Minimum (%)</b>	<b>Volatility (%)</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>Dickey-Fuller (P-value)</b>
Impact Investing Index	-5.95	-22.95	23.09	6.42	-0.39	2.39	0.00
Impact Investing Index (Ex-US)	-5.61	-24.63	23.48	6.73	-0.49	2.22	0.00
Impact Investing Index (UK-only)	-5.34	-24.63	23.48	6.71	-0.50	2.27	0.00
MSCI UK Micro Cap	13.94	-10.48	19.97	4.79	0.73	2.21	0.00
MSCI UK Small + Micro Cap	15.82	-13.16	17.72	4.45	0.15	2.31	0.00
MSCI Europe Micro Cap	12.57	-11.57	17.82	4.52	0.33	1.54	0.00
MSCI Europe Small + Micro Cap	15.00	-15.21	17.12	4.76	-0.01	2.30	0.00

Note: summary statistics of the USD monthly financial return series of the Impact Investing Index, the two reduced impact investing indices and the four MSCI benchmark indices. All series start on 1 February 2009 and end on 31 May 2018. The Impact Investing Index (Ex-US) consists only of European impact companies (including UK firms), whereas the Impact Investing Index (UK-only) consists exclusively of UK impact companies. The Impact Investing Index comprises all impact firms. Volatility is proxied by the unconditional standard error of monthly returns. Skewness measures the degree of asymmetry of the returns' distribution. Kurtosis is evidence of fat tails in the returns' distribution. Dickey-Fuller tests for the null hypothesis of a unit root.

**Table A.18 Monthly performance statistics pre- and post-2014**

<b>Index</b>	<b>Annualized Return (%)</b>	<b>Volatility (%)</b>
<i>Panel A: pre-2014</i>		
Impact Investing Index	-15.25	8.13
MSCI UK Micro Cap	24.68	5.60
MSCI UK Small + Micro Cap	26.29	5.10
MSCI Europe Micro Cap	16.91	5.52
MSCI Europe Small + Micro Cap	21.13	5.80
<i>Panel B: post-2014</i>		
Impact Investing Index	5.60	3.61
MSCI UK Micro Cap	3.07	3.55
MSCI UK Small + Micro Cap	5.18	3.43
MSCI Europe Micro Cap	7.92	3.05
MSCI Europe Small + Micro Cap	8.54	3.21

Note: performance statistics of the USD monthly financial return series of the Impact Investing Index and the four MSCI benchmark indices. Series in Panel A start on 1 February 2009 and end on 31 December 2013, while series in Panel B start on 1 January 2014 and end on 31 May 2018. Volatility is proxied by the unconditional standard error of monthly returns.

Table A.19 Four-factor model estimation results

Index	$\alpha$	$\beta_{MRP}$	$\beta_{SMB}$	$\beta_{HML}$	$\beta_{WML}$	$R^2$
<i>Panel A: Impact Investing Index</i>						
Impact Investing Index	-0.0081 (0.0056)	0.4210*** (0.1514)	1.0277** (0.4197)	0.2782 (0.3905)	-0.2099 (0.2943)	0.18
MSCI UK Micro Cap	0.0068** (0.0031)	0.1685 (0.1044)	0.9105*** (0.2088)	0.0883 (0.2005)	-0.2691** (0.1189)	0.28
MSCI UK Small + Micro Cap	0.0066** (0.0030)	0.3759*** (0.1015)	0.8446*** (0.1858)	0.0754 (0.1879)	-0.2028** (0.0967)	0.39
MSCI Europe Micro Cap	0.0042 (0.0031)	0.3657*** (0.0843)	0.8469*** (0.2180)	0.1238 (0.2006)	-0.1055 (0.1235)	0.29
MSCI Europe Small + Micro Cap	0.0051 (0.0033)	0.5187*** (0.0942)	0.8896*** (0.0942)	0.1058 (0.2054)	-0.1403 (0.1236)	0.40
<i>Panel B: Impact Investing Index (Ex-US)</i>						
Impact Investing Index (Ex-US)	-0.0129* (0.0070)	0.6291*** (0.1359)	1.5425*** (0.4763)	-0.2299 (0.2190)	-0.0778 (0.2857)	0.24
MSCI UK Micro Cap	0.0058** (0.0029)	0.2547** (0.1017)	0.9353*** (0.1957)	0.1244 (0.1639)	-0.1582 (0.1147)	0.36
MSCI UK Small + Micro Cap	0.0061** (0.0028)	0.4095*** (0.0941)	0.9033*** (0.1549)	0.1184 (0.1348)	-0.1043 (0.0948)	0.51
MSCI Europe Micro Cap	0.0029 (0.0029)	0.4395*** (0.0829)	1.0435*** (0.1955)	0.1348 (0.1353)	-0.0128 (0.1070)	0.46
MSCI Europe Small + Micro Cap	0.0040 (0.0031)	0.5785*** (0.0909)	1.0839*** (0.1880)	0.1109 (0.1227)	-0.0303 (0.1123)	0.55
<i>Panel C: Impact Investing Index (UK-only)</i>						
Impact Investing Index (UK-only)	-0.0107* (0.0062)	0.4307*** (0.1188)	1.3420*** (0.4116)	-0.0419 (0.2394)	-0.1409 (0.2494)	0.21

Note: coefficient estimates for the four-factor model linear regressions using monthly data. The indices considered are the Impact Investing Index, the two reduced impact investing indices and the four MSCI benchmark indices. The Impact Investing Index comprises all impact firms (Panel A). The Impact Investing Index (Ex-US) consists exclusively of European impact companies (including UK firms; Panel B), whereas the Impact Investing Index (UK-only) consists exclusively of UK impact companies (Panel C). Factors in Panel A are from developed countries, whereas factors in panels B and C are from European countries. The Impact Investing Index (UK-only) specification from Panel C is to be compared to both MSCI UK specifications from Panel B. The one-month US government bond yield is used as risk-free rate for the specification with the Impact Investing Index. The one-month UK government bond yield is used as risk-free rate for specifications with the Impact Investing Index (UK-only) as well as MSCI UK indices. The one-month German government bond yield is used as risk-free rate for specifications with the Impact Investing Index (Ex-US) as well as MSCI European indices.  $\alpha$  is the intercept of the model, while  $\beta_{MRP}$ ,  $\beta_{SMB}$ ,  $\beta_{HML}$  and  $\beta_{WML}$  are the four factor loadings. Robust standard errors are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

**Table A.20 Specification choice: DCC vs ADCC**

<b>Pair of Indices</b>	<b>GARCH</b>	<b>EGARCH</b>	<b>Reject <math>H_0</math></b>
MSCI UK Micro Cap – Impact Investing Index	0.98	1.36	No
MSCI UK Small + Micro Cap – Impact Investing Index	0.08	0.34	No
MSCI Europe Micro Cap – Impact Investing Index	2.08	3.22	No
MSCI Europe Small + Micro Cap – Impact Investing Index	2.66	1.32	No
MSCI UK Micro Cap – Impact Investing Index (Ex-US)	1.16	1.52	No
MSCI UK Small + Micro Cap – Impact Investing Index (Ex-US)	0.06	0.30	No
MSCI Europe Micro Cap – Impact Investing Index (Ex-US)	1.84	2.70	No
MSCI Europe Small + Micro Cap – Impact Investing Index (Ex-US)	0.42	5.22	No
MSCI UK Micro Cap – Impact Investing Index (UK-only)	1.84	2.48	No
MSCI UK Small + Micro Cap – Impact Investing Index (UK-only)	0.08	0.24	No

Note: this table presents the results of log-likelihood ratio tests for conditional correlation specification choice between Dynamic Conditional Correlation (DCC) and Asymmetric Dynamic Conditional Correlation (ADCC). Column 1 presents the pairs of indices for which the choice is being made. Columns 2 and 3 present the statistic of the test for each pair, using either GARCH or EGARCH as the univariate specification. Under the null hypothesis, one should opt for the DCC model. The critical value for the test, derived from a Chi-squared distribution, is 6.635.

**Table A.21 Univariate specification choice: GARCH vs EGARCH**

<b>Pair of Indices</b>	<b>GARCH-DCC</b>	<b>EGARCH-DCC</b>	<b>Univariate Specification</b>
MSCI UK Micro Cap – Impact Investing Index	-12.827	-12.822	GARCH
MSCI UK Small + Micro Cap – Impact Investing Index	-12.128	-12.128	GARCH
MSCI Europe Micro Cap – Impact Investing Index	-12.854	-12.857	EGARCH
MSCI Europe Small + Micro Cap – Impact Investing Index	-12.169	-12.178	EGARCH
MSCI UK Micro Cap – Impact Investing Index (Ex-US)	-12.738	-12.733	GARCH
MSCI UK Small + Micro Cap – Impact Investing Index (Ex-US)	-12.040	-12.041	EGARCH
MSCI Europe Micro Cap – Impact Investing Index (Ex-US)	-12.764	-12.767	EGARCH
MSCI Europe Small + Micro Cap – Impact Investing Index (Ex-US)	-12.081	-12.088	EGARCH
MSCI UK Micro Cap – Impact Investing Index (UK-only)	-12.753	-12.748	GARCH
MSCI UK Small + Micro Cap – Impact Investing Index (UK-only)	-12.057	-12.057	GARCH

Note: this table presents Akaike Information Criteria (AIC) for the univariate specification choice between GARCH and EGARCH in the context of Dynamic Conditional Correlation (DCC) modeling. Column 1 presents the pairs of indices for which the choice is being made. Columns 2 and 3 present the AIC for both GARCH and EGARCH as the univariate specification, with the choice reported in column 4. When the AIC is identical for both univariate specifications, the GARCH model is automatically selected.

Table A.22 Three-step DCC-MV(E)GARCH estimation results

Index	$\mu$	$\alpha_0$	$\alpha_1$	$\beta_1$	$\gamma$	$A$	$B$
<i>Panel A: Impact Investing Index</i>							
Impact Investing Index	0.0004* (0.0002)	0.0001*** (0.0001)	0.1744*** (0.0268)	0.8024*** (0.0317)			
MSCI UK Micro Cap	0.0006*** (0.0001)	0.0001 (0.0001)	0.1206*** (0.0417)	0.8608*** (0.0380)			
I.I. Index/MSCI UK Micro Cap						0.0261*** (0.0075)	0.9631*** (0.0115)
MSCI UK Small + Micro Cap	0.0008*** (0.0002)	0.0001 (0.0001)	0.1139*** (0.0208)	0.8665*** (0.0220)			
I.I. Index/MSCI UK Small + Micro Cap						0.0256*** (0.0099)	0.9659*** (0.0162)
Impact Investing Index	0.0004*** (0.0001)	-0.3179 (0.2035)	0.0061 (0.0256)	0.9601*** (0.0244)	0.3110*** (0.0909)		
MSCI Europe Micro Cap	0.0005*** (0.0001)	-0.1893*** (0.0281)	-0.0278** (0.0117)	0.9797*** (0.0027)	0.1874*** (0.0374)		
I.I. Index/MSCI Europe Micro Cap						0.0184** (0.0090)	0.9696*** (0.0139)
MSCI Europe Small + Micro Cap	0.0005*** (0.0002)	-0.1866*** (0.0234)	-0.0657*** (0.0135)	0.9788*** (0.0025)	0.1871*** (0.0294)		
I.I. Index/MSCI Eu. Small + Micro Cap						0.0483*** (0.0137)	0.8374*** (0.0809)
<i>Panel B: Impact Investing Index (Ex-US)</i>							
Impact Investing Index (Ex-US)	0.0004* (0.0003)	0.0001*** (0.0001)	0.1907*** (0.0293)	0.7869*** (0.0310)			
MSCI UK Micro Cap	0.0006*** (0.0001)	0.0001 (0.0001)	0.1206*** (0.0418)	0.8608*** (0.0381)			
I.I. Index (Ex-US)/MSCI UK Micro Cap						0.0232*** (0.0065)	0.9689*** (0.0094)
Impact Investing Index (Ex-US)	0.0004*** (0.0001)	-0.4266 (0.2965)	-0.0038 (0.0282)	0.9463*** (0.0359)	0.3570*** (0.1119)		



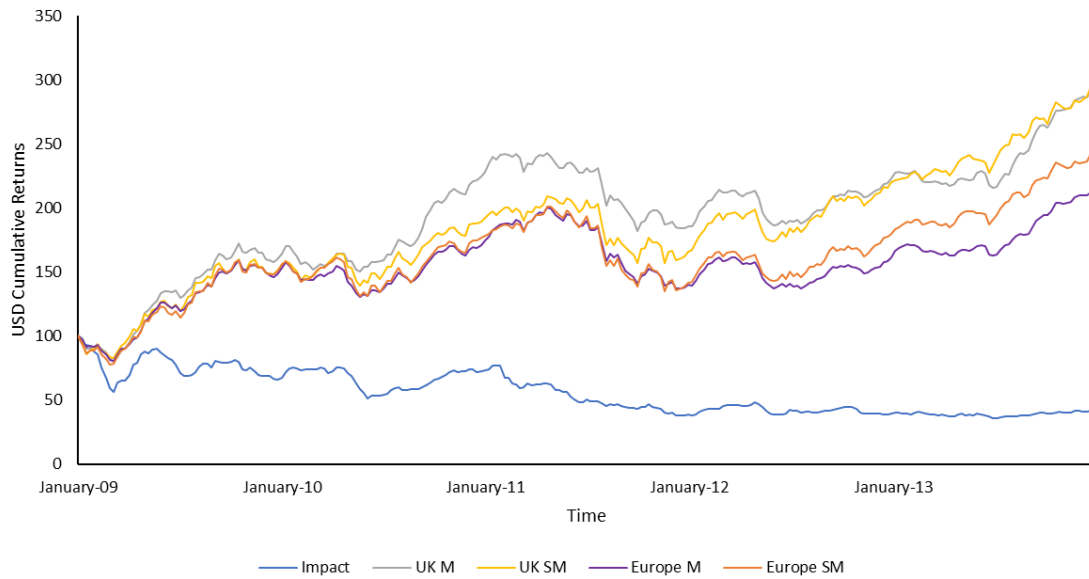
MSCI UK Small + Micro Cap	0.0005*** (0.0002)	-0.2391 (0.0512)	-0.0624 (0.0218)	0.9726*** (0.0053)	0.2117*** (0.0436)		
I.I. Index (Ex- US)/MSCI UK Small + Micro Cap						0.0220** (0.0091)	0.9683*** (0.0166)
MSCI Europe Micro Cap	0.0005*** (0.0001)	-0.1893*** (0.0281)	-0.0278** (0.0117)	0.9797*** (0.0027)	0.1874*** (0.0374)		
I.I. Index (Ex- US)/MSCI Europe Micro Cap						0.0163** (0.0069)	0.9757*** (0.0101)
MSCI Europe Small + Micro Cap	0.0005*** (0.0002)	-0.1866*** (0.0234)	-0.0657*** (0.0136)	0.9788*** (0.0025)	0.1871*** (0.0294)		
I.I. Index (Ex- US)/MSCI Eu. Small + Micro Cap						0.0403*** (0.0155)	0.8524*** (0.0898)

*Panel C: Impact Investing Index (UK-only)*

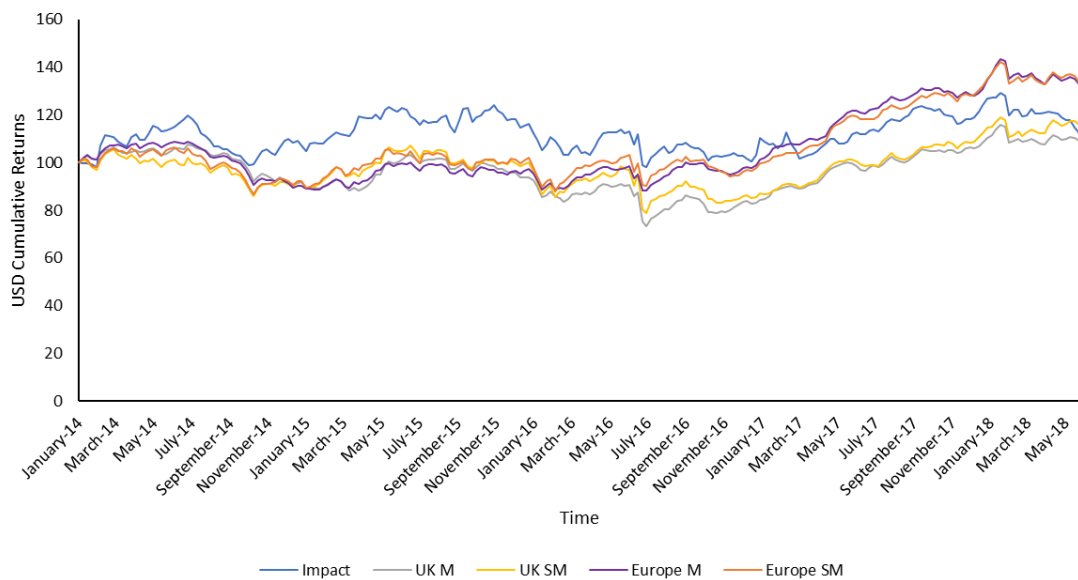
Impact Investing Index (UK- only)	0.0005* (0.0003)	0.0001*** (0.0001)	0.1823*** (0.0255)	0.7864*** (0.0284)			
MSCI UK Micro Cap	0.0008*** (0.0002)	0.0001 (0.0001)	0.1139*** (0.0207)	0.8665*** (0.0222)			
I.I. Index (UK- only)/MSCI UK Micro Cap						0.0195 (0.0159)	0.9794*** (0.0213)
MSCI UK Small + Micro Cap	0.0006*** (0.0001)	0.0001 (0.0001)	0.1206*** (0.0419)	0.8608*** (0.0381)			
I.I. Index (UK- only)/MSCI UK Small + Micro Cap						0.0247*** (0.0082)	0.9699*** (0.0116)

Note: coefficient estimates from univariate (E)GARCH processes as well as Dynamic Conditional Correlations (DCC). The parameters of univariate (E)GARCH processes ( $\mu$ ,  $\alpha_0$ ,  $\alpha_1$ ,  $\beta_1$  and  $\gamma$ ) and the parameters of the DCC (A and B) are estimated following a three-step estimation procedure (correlation targeting). The indices considered in Panel A are the Impact Investing Index (present in each of the four pairs) and the four MSCI benchmark indices (one per pair). The indices considered in Panel B are the Impact Investing Index (Ex-US) (present in each of the four pairs) and the four MSCI benchmark indices (one per pair). The indices considered in Panel C are the Impact Investing Index (UK-only) (present in each of the two pairs) and the two MSCI UK benchmark indices (one per pair). Standard errors are in parentheses. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively.

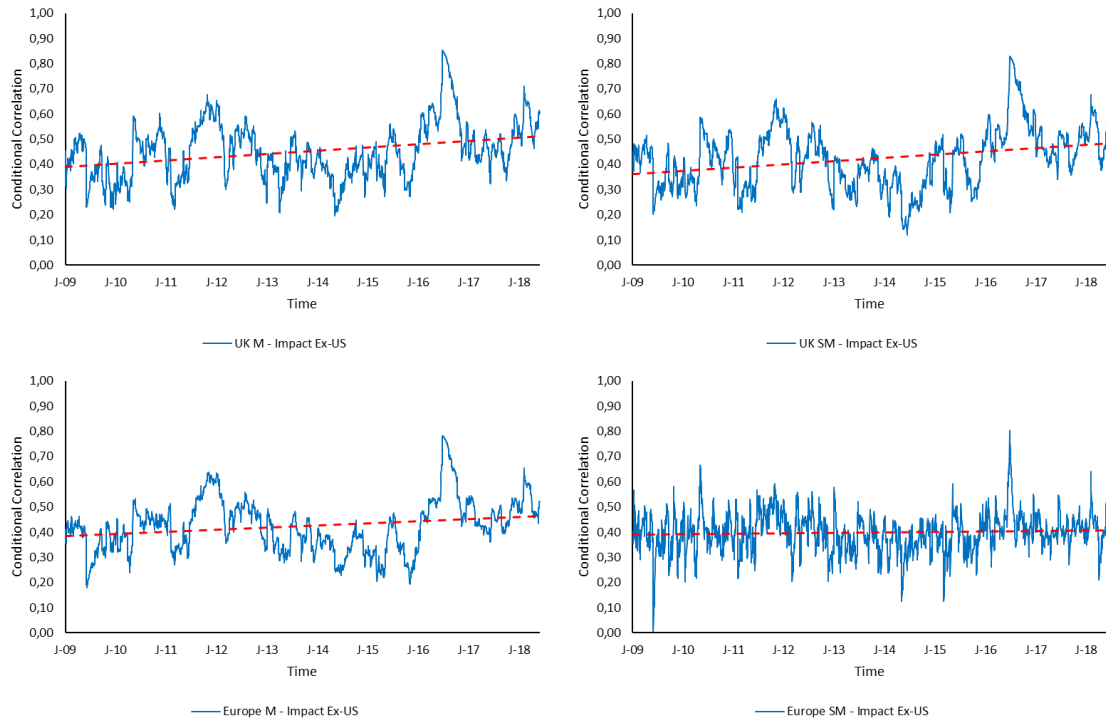
**Figure A.1 Evolution of the Impact Investing Index and the four MSCI benchmark indices between 5 January 2009 and 31 December 2013, USD weekly cumulative returns (starting value of 100 on 5 January 2009).**



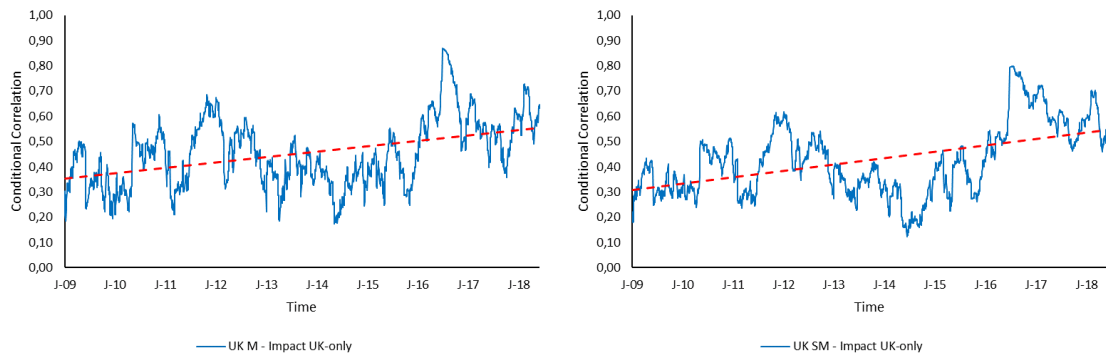
**Figure A.2 Evolution of the Impact Investing Index and the four MSCI benchmark indices between 1 January 2014 and 31 May 2018, USD weekly cumulative returns (starting value of 100 on 1 January 2014).**



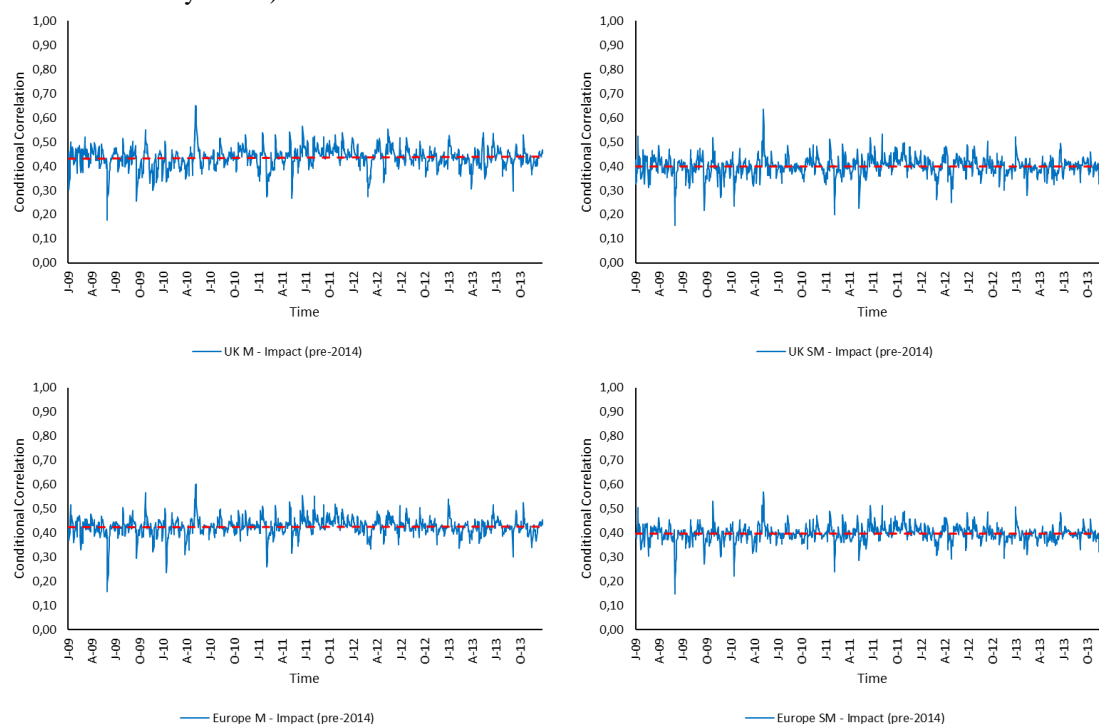
**Figure A.3 Dynamic Conditional Correlation (DCC) between the Impact Investing Index (Ex-US) and the four MSCI benchmark indices (“J-09” stands for “January 2009”).**



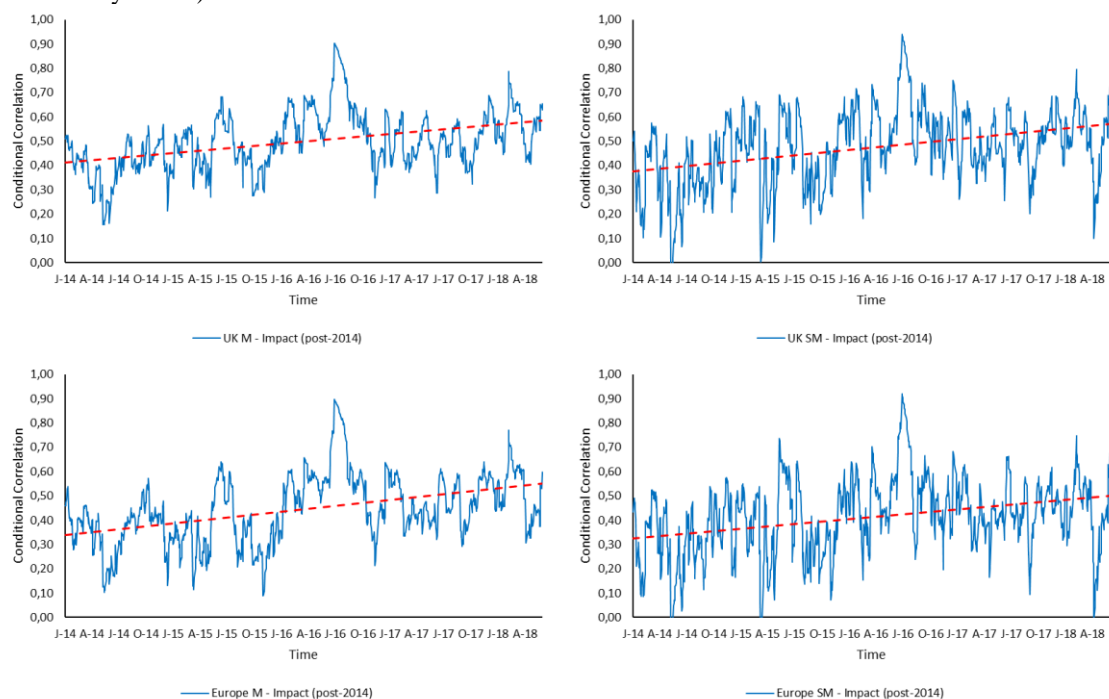
**Figure A.4 Dynamic Conditional Correlation (DCC) between the Impact Investing Index (UK-only) and the two MSCI UK benchmark indices (“J-09” stands for “January 2009”).**



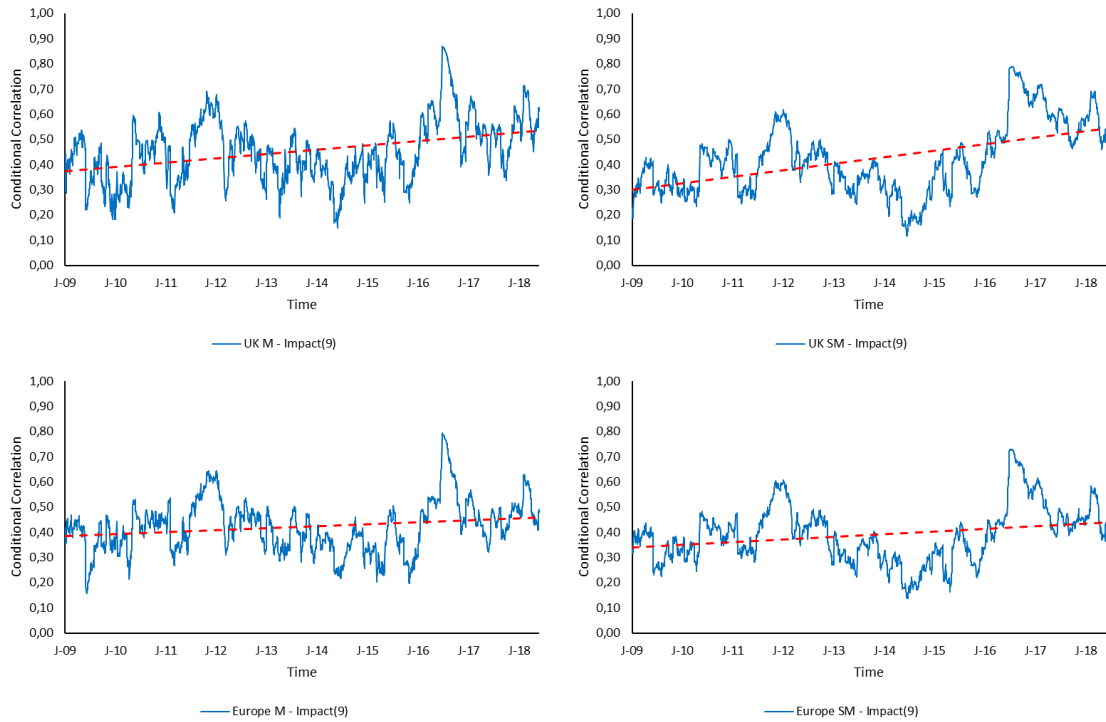
**Figure A.5 Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the four MSCI benchmark indices.** Series start on 5 January 2009 and end on 31 December 2013 (“J-09” stands for “January 2009”).



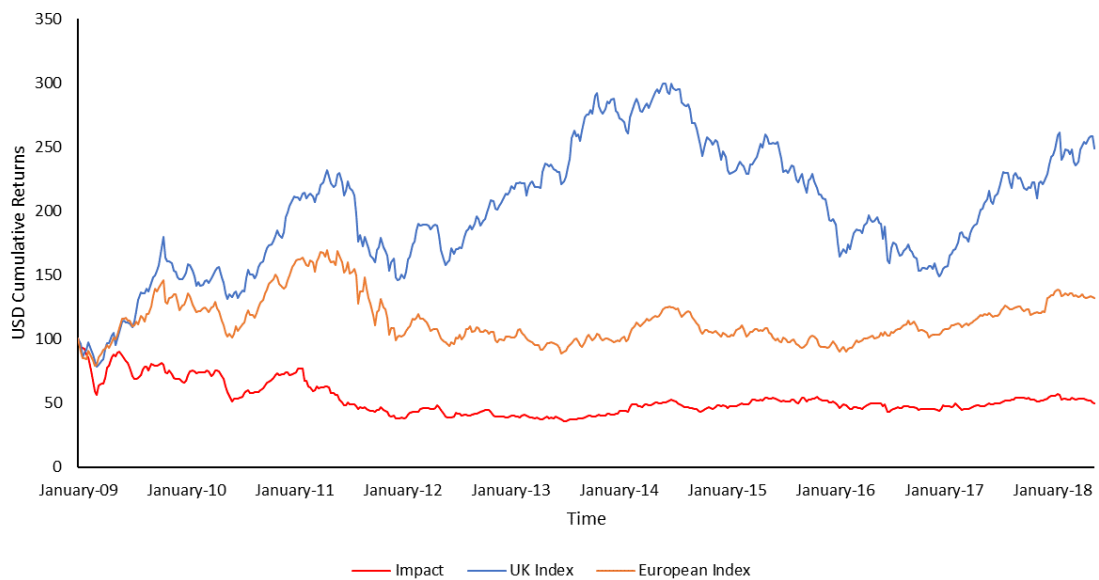
**Figure A.6 Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the four MSCI benchmark indices.** Series start on 1 January 2014 and end on 31 May 2018 (“J-14” stands for “January 2014”).



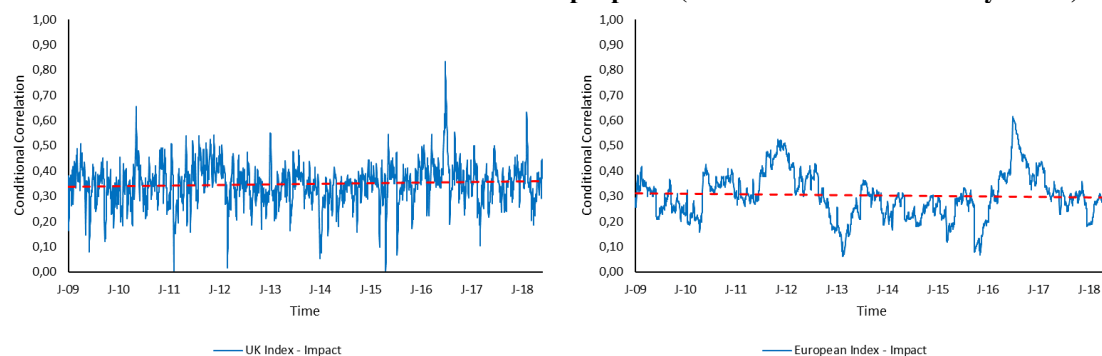
**Figure A.7 Dynamic Conditional Correlation (DCC) between the nine-firm Impact Investing Index and the four MSCI benchmark indices (“J-09” stands for “January 2009”).**



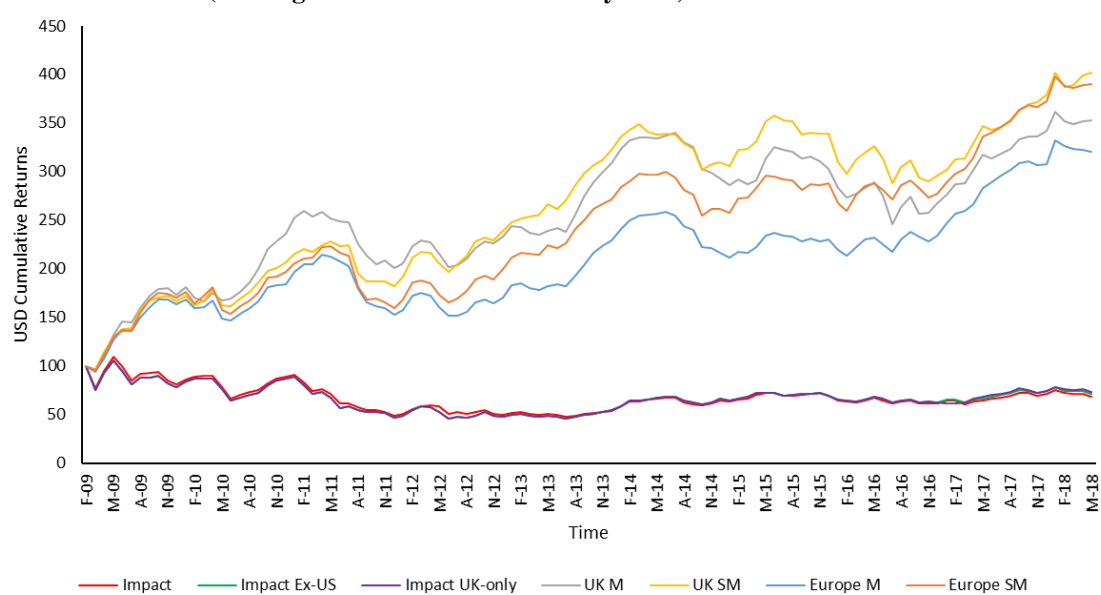
**Figure A.8 Evolution of the Impact Investing Index and the two benchmark indices constructed for robustness test purposes between 5 January 2009 and 31 May 2018, USD weekly cumulative returns (starting value of 100 on 5 January 2009).**



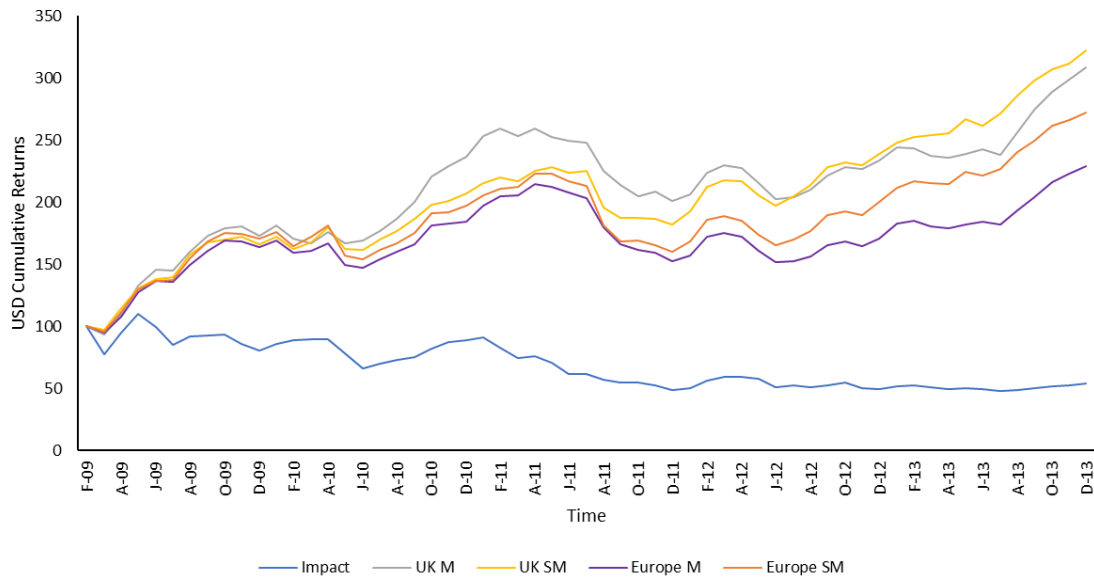
**Figure A.9 Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the two benchmark indices constructed for robustness test purposes (“J-09” stands for “January 2009”).**



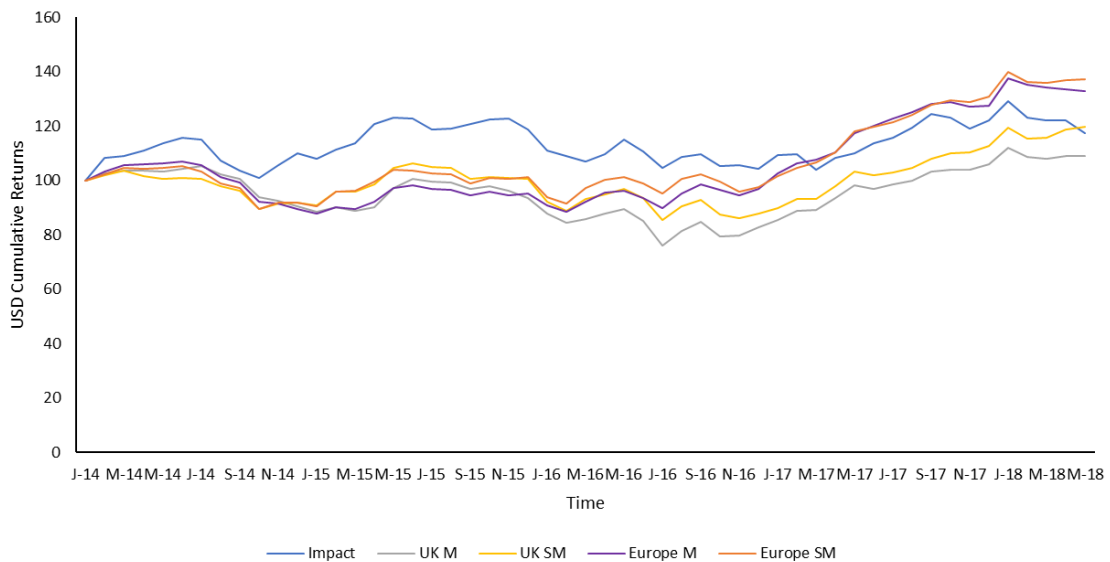
**Figure A.10 Evolution of the Impact Investing Index, the two reduced impact investing indices and the four MSCI benchmark indices between 1 February 2009 and 31 May 2018, USD monthly cumulative returns (starting value of 100 on 1 February 2009).**



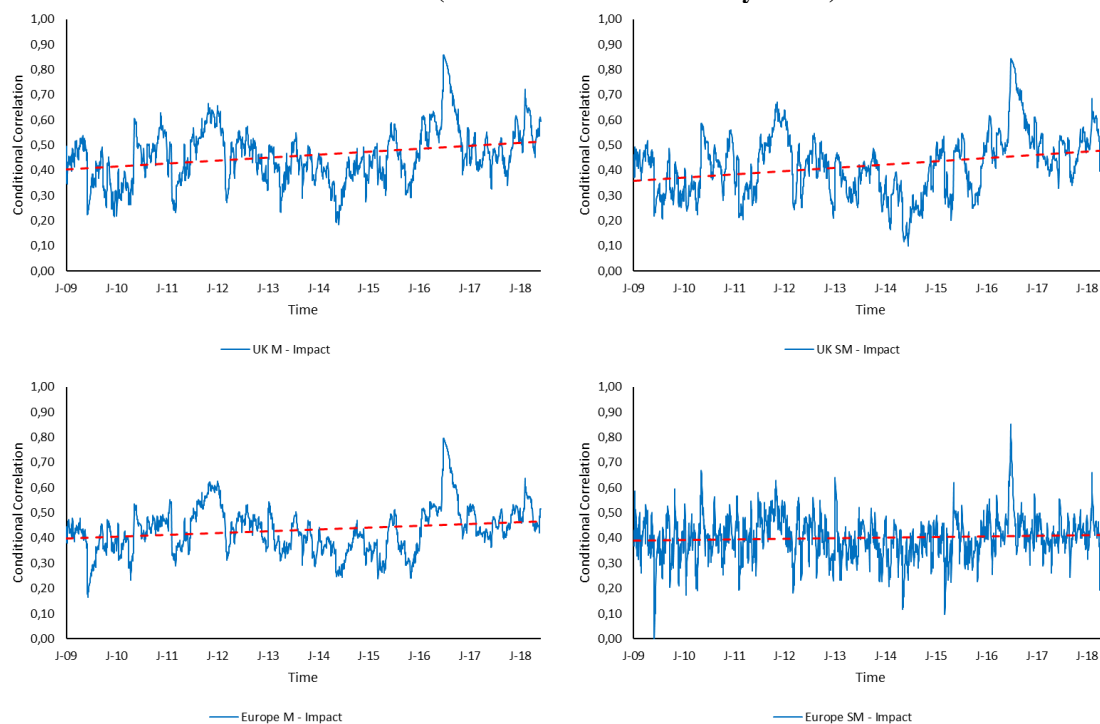
**Figure A.11 Evolution of the Impact Investing Index and the four MSCI benchmark indices between 1 February 2009 and 31 December 2013, USD monthly cumulative returns (starting value of 100 on 1 February 2009).**



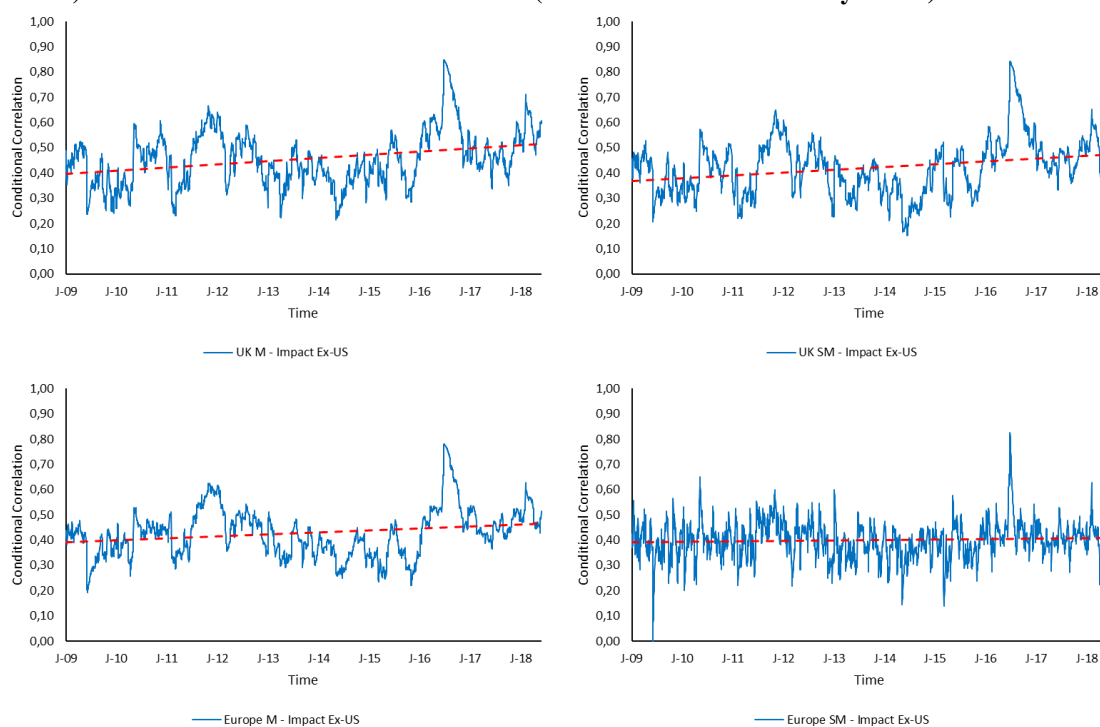
**Figure A.12 Evolution of the Impact Investing Index and the four MSCI benchmark indices between 1 January 2014 and 31 May 2018, USD monthly cumulative returns (starting value of 100 on 1 January 2014).**



**Figure A.13 Three-step Dynamic Conditional Correlation (DCC) between the Impact Investing Index and the four MSCI benchmark indices (“J-09” stands for “January 2009”).**

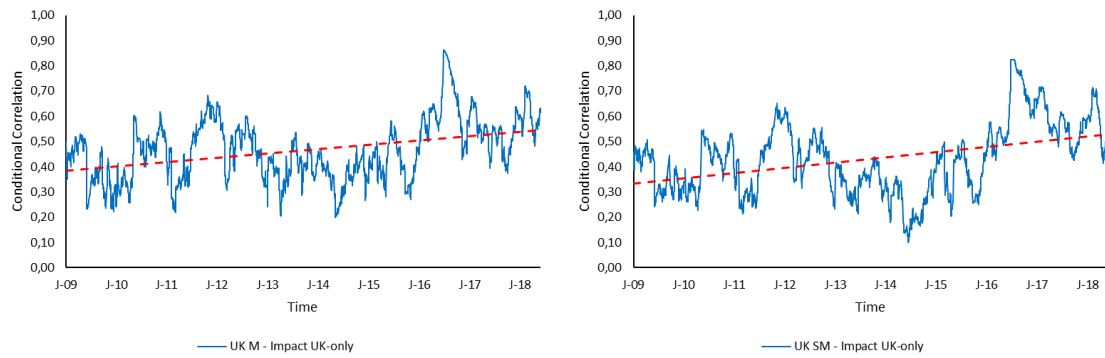


**Figure A.14 Three-step Dynamic Conditional Correlation (DCC) between the Impact Investing Index (Ex-US) and the four MSCI benchmark indices (“J-09” stands for “January 2009”).**





**Figure A.15 Three-step Dynamic Conditional Correlation (DCC) between the Impact Investing Index (UK-only) and the two MSCI UK benchmark indices (“J-09” stands for “January 2009”).**



## Appendix B

**Table B.1 Examples of impact funds' impact metrics**

	Impact metric	Numerical example
BNP Paribas Funds Climate Impact	Net CO2 emissions avoided	The fund's constituents avoided 690 000 tons of CO2 over the year, which corresponds to taking 449 800 cars off the road.
	Total renewable electricity generated	The fund's constituents generated 183 510 megawatt-hour of renewable electricity over the year, which corresponds to the annual consumption of 50 980 households.
	Total water treated, saved, or provided	The fund's constituents treated, saved, or provided 120 100 megaliters of water over the year, which corresponds to the annual consumption of 758 210 households.
	Total materials recovered and waste treated	The fund's constituents recovered and/or treated 13 870 tons of materials over the year, which corresponds to the annual wastes of 14 740 households.
	ESG controversy exposure	None of the fund's constituents (0.00%) was exposed to ESG controversies over the year, compared to 6.4% of the benchmark's constituents.
NN Global Equity Impact Opportunities	UN Sustainable Development Goals (SDG) exposure	The fund had yearly exposure to SDG 1 (no poverty), SDG 3 (good health and well-being), and SDG 8 (decent work and economic growth) of 9%, 16%, and 20%, respectively.
	Solutions exposure	The fund had yearly exposure to affordable healthcare, energy transition, and water management solutions of 21%, 19%, and 9%, respectively.
	Greenhouse gas emissions	The fund's constituents produced 75% less greenhouse gas emissions than the benchmark's constituents.
Triodos Pioneer Impact Fund	Water consumption	The fund's constituents consumed 91% less water than the benchmark's constituents.
	Landfill waste	The fund's constituents produced 18% less landfill waste than the benchmark's constituents.
	Commitment to/alignment with the Science Based Targets initiative (in line with the Paris Agreement)	21% of the fund's constituents committed to or aligned with the Science Based Targets initiative.

Note: this table presents examples of impact funds' impact metrics. For each metric, a numerical example is provided. Numerical examples for the BNP and Triodos impact funds come from 2021 publicly available impact reports. Numerical examples for the NN impact fund come from a 2022 publicly available impact report.

Table B.2 Summary characteristics of funds

	Inception Year	Fund Type	Fund (Manager) Location	Fund Currency	Front-End Fees	Back-End Fees	Accumulation Fund	Asset Class	Morningstar Style	Investment Focus	Average AUM (EURm)	
<i>Impact funds</i>												
BNP Paribas Funds Climate Impact	2009	SICAV	Luxembourg (Luxembourg)	EUR	Yes	No	Yes	Public equity	Mid-cap/growth	Global	544.70	
NN Global Equity Impact Opportunities	2006	SICAV	Luxembourg (Luxembourg)	EUR	Yes	No	Yes	Public equity	Large-cap/growth	Global	396.34	
Triodos Pioneer Impact Fund	2010	SICAV	Luxembourg (Netherlands)	EUR	Yes	No	Yes	Public equity	Mid-cap/growth	Global	227.11	
<i>SRI funds</i>												
Swisscanto Equity Fund Sustainable Global Climate	2007	Open-end	Luxembourg (Switzerland)	EUR	Yes	No	Yes	Public equity	Mid-cap/growth	Global	56.75	
Swisscanto Equity Fund Sustainable Global Water	2007	Open-end	Luxembourg (Switzerland)	EUR	Yes	No	Yes	Public equity	Mid-cap/growth	Global	168.27	
Nordea 1 Global Climate and Environment Fund	2008	SICAV	Luxembourg (Luxembourg)	EUR	Yes	No	Yes	Public equity	Large-cap/growth	Global	1020.85	
KBC Eco Fund Climate Change	2006	SICAV	Belgium (Belgium)	EUR	Yes	No	Yes	Public equity	NA	Global	26.19	
BNP Paribas Funds Global Environment	2008	SIVAV	Luxembourg (Luxembourg)	EUR	Yes	No	Yes	Public equity	Large-cap/growth	Global	653.78	
Robeco Sustainable Global Stars Equities	2008	SICAV	Luxembourg (Luxembourg)	EUR	Yes	No	Yes	Public equity	Large-cap/growth	Global	168.25	
ERSTE Responsible Stock Global	2003	Open-end	Austria (Austria)	EUR	Yes	No	Yes	Public equity	Large-cap/growth	Global	204.67	

Note: summary characteristics of impact and socially responsible mutual funds. All data come from Bloomberg Fund (Manager) Location refers to both the location of the mutual fund and the location of the mutual fund manager (between brackets). Accumulation funds are funds that pay no profit out to investors. They differ from income funds that regularly distribute profits to investors. All funds belong to the public equity asset class, meaning that funds invest at least 90% of their assets in public equities. Morningstar Style provides Morningstar's assessment of the fund's investment style on the spectra value-growth and small-cap-large-cap. Funds' investment focus is global, meaning that funds may allocate assets globally. Average AUM is the EURm average daily fund assets under management over the period under study.

Table B.3 Summary of funds' sustainable investment policy

	SFDR Article	Morningstar Sustainability Rating	Summary of Sustainable Investment Policy
<i>Impact funds</i>			
BNP Paribas Funds Climate Impact	Art. 9	5 globes	The fund mainly invests in companies with business activities that aim to improve adaptation to and to tackle climate change, and generally contribute to accelerate the sustainability transition. Examples of targeted activities include renewable and efficient energies, sustainable food systems, and waste and pollution management. The fund also integrates ESG criteria in its investment process and complies with both the UN Global Compact principles and the OECD Guidelines for Multinational Enterprises.
NN Global Equity Impact Opportunities	Art. 9	4 globes	The fund aims to invest in companies that deliver a positive social and environmental impact and contribute to the fulfilment of the following UN Sustainable Development Goals: the sustainability of natural resources, a sustainable economic growth, and the promotion of good health and well-being. In addition, securities must align with the UN Global Compact principles. Finally, the fund also integrates ESG criteria and impact assessment in its investment process.
Triodos Pioneer Impact Fund	Art. 9	4 globes	The fund's objective is to maximize positive impact and contribute to positive change by investing mainly in companies that comply with minimum standards on human dignity, planet awareness, and governance, and address issues such as natural resource scarcity, climate change, biodiversity loss, unstable social systems, and inequality. To tackle such issues, the fund aims to mainly select companies based on seven transition themes: sustainable food and agriculture, sustainable mobility and infrastructure, renewable resources, circular economy, prosperous and healthy people, innovation for sustainability, and social inclusion and empowerment.
<i>SRI funds</i>			
Swisscanto Equity Fund Sustainable Global Climate	Art. 9	4 globes	The fund mainly invests in companies with business activities that contribute to addressing climate change and its consequences. The fund also integrates ESG criteria in its investment process to invest in above-average ESG securities and aims to identify securities that contribute to the fulfilment of the UN Sustainable Development Goals and align with the 2015 Paris Agreement.
Swisscanto Equity Fund Sustainable Global Water	Art. 9	4 globes	The fund mainly invests in companies with business activities that contribute to improve the water supply chain. Examples of targeted activities include water supply, treatment, purification, and recycling. The fund also integrates ESG criteria in its investment process to invest in above-average ESG securities and aims to identify securities that contribute to the fulfilment of the UN Sustainable Development Goals and align with the 2015 Paris Agreement.
Nordea 1 Global Climate and Environment Fund	Art. 9	4 globes	The fund's objective is to have a positive environmental impact by investing mainly in companies that produce climate and environmentally friendly goods and services, and that contribute to the objectives of the EU Taxonomy and the 2015 Paris Agreement. As a signatory of the Principles for Responsible Investment, the fund also integrates ESG criteria in its investment process.

KBC Eco Fund Climate Change	Art. 8	NA	The fund mainly invests in companies with business activities that aim to combat climate change and reduce greenhouse gas emissions. Examples of targeted activities include water preservation, alternative energy, energy saving, recycling, and waste processing. In addition, fund securities must comply with minimum ESG standards, such as the UN Global Compact principles, the OECD Guidelines for Multinational Enterprises, or Sustainalytics' Global Standards Screening, and cannot be misaligned with one of the UN Sustainable Development Goals.
BNP Paribas Funds Global Environment	Art. 9	5 globes	The fund mainly invests in companies with business activities that aim to accelerate the sustainability transition with a focus on environmentally friendly markets such as renewable and efficient energies, pollution and waste management, and sustainable agriculture. The fund also integrates ESG criteria in its investment process and complies with both the UN Global Compact principles and the OECD Guidelines for Multinational Enterprises.
Robeco Sustainable Global Stars Equities	Art. 8	5 globes	The objective of the fund is to have a better sustainability profile than its benchmark, which is a broad market index that does not promote the ESG characteristics of the fund. The fund particularly targets environmental footprint. This means doing better than the benchmark on issues such as greenhouse gas emissions, water and energy use, and waste generation. The fund aims to do so by promoting specific ESG business activities and managing sustainability risks. In addition, the fund aims to comply with international standards such as the UN Global Compact principles and the OECD Guidelines for Multinational Enterprises.
ERSTE Responsible Stock Global	Art. 8	4 globes	The fund's aim is to invest according to ethical and sustainability criteria. As a signatory of the Principles for Responsible Investment, the fund integrates ESG criteria in its investment process by means of a proprietary rating system. It also complies with minimum standards regarding, for instance, human rights, corruption, and sin industries such as fossil fuels, tobacco, and gambling, and aligns its selection of securities with the principles of the International Labour Organization and the UN Global Compact.

Note: this table presents a non-exhaustive summary of impact and socially responsible mutual funds' sustainable investment policy. In the second column, we report the fund's article under the Sustainable Finance Disclosure Regulation (SFDR) as of 2021. The SFDR proposes three categories of funds. Article 6 gathers funds that do not promote sustainability criteria. Article 8 gathers funds that promote social and/or environmental characteristics, though they do not consider sustainable investing as a core objective. Article 9 gathers funds that have a sustainable investment objective, i.e., funds that contribute to social and/or environmental objectives. In the third column, we report the fund's July 2023 Morningstar sustainability rating that assesses the fund's ESG risk management practices relative to peers. Funds receive five globes if they belong to the top 10% of funds that best manage ESG risks. Funds receive four globes if they belong to the next 22.5%. In the fourth column, we summarize the main features of the fund's sustainable investment policy based on its 2021 prospectus.

Table B.4 Proximity scores between impact and candidate socially responsible mutual funds

BNP Paribas Funds Climate Impact		Triodos Pioneer Impact Fund		NN Global Equity Impact Opportunities	
Candidate SRI Fund	Score	Candidate SRI Fund	Score	Candidate SRI Fund	Score
KBC Eco Fund Climate Change	1.93	BNP Paribas Funds Global Environment	3.72	ERSTE Responsible Stock Global	1.15
Swisscanto Equity Fund Sustainable Global Climate	2.56	Swisscanto Equity Fund Sustainable Global Water	6.54	BNP Paribas Funds Global Environment	1.83
Nordea 1 Global Climate and Environment Fund	5.19	Robeco Sustainable Global Stars Equities	8.73	Robeco Sustainable Global Stars Equities	3.84
Swisscanto Equity Fund Sustainable Global Water	5.99	Sparinvest Ethical Global Value	9.96	KBC Eco Fund Climate Change	4.19
Robeco Sustainable Global Stars Equities	7.54	Nordea 1 Global Climate and Environment Fund	10.02	Swisscanto Equity Fund Sustainable Global Water	4.83
Sparinvest Ethical Global Value	7.64	LGT Sustainable Equity Fund Global	12.44	Swisscanto Equity Fund Sustainable Global Climate	5.71
LGT Sustainable Equity Fund Global	8.93	JSS Sustainable Equity Global Dividend	14.05	Sparinvest Ethical Global Value	10.01
JSS Sustainable Equity Global Dividend	12.64	Celsius Sustainable Emerging Markets Fund	25.87	Nordea 1 Global Climate and Environment Fund	12.01
JSS Sustainable Equity Real Estate Global	13.66			JSS Sustainable Equity Real Estate Global	16.67
Celsius Sustainable Emerging Markets Fund	17.88				

Note: this table presents proximity scores between impact and candidate socially responsible mutual funds. For each of the three impact funds, the table provides the list of eligible candidate SRI funds and their associated scores. Eligibility is determined on the basis of several criteria such as age, asset class, and load fees structure, that aim to make impact and SRI funds as comparable as possible. Scores for candidate SRI funds are computed based on proximity to impact funds in terms of both size and risk exposures. A lower score between two funds implies greater similarity.

**Table B.5 Terminology of funds' sustainable investment policies**

	Negative Screening	Positive Screening	Engagement
<i>Impact funds</i>			
BNP Paribas Funds Climate Impact	Filters, exclusion	Integration of ESG criteria	Stewardship, engagement, dialogue, vote
NN Global Equity Impact Opportunities	Investment exclusion, exclusion filters	ESG analysis	Engagement, dialogue, active ownership, voting rights
Triodos Pioneer Impact Fund	Exclusion	Material contribution to transition themes, ESG assessment	Dialogue, active engagement, voting
<i>SRI funds</i>			
Swisscanto Equity Fund Sustainable Global Climate	Exclusions	Integration of ESG criteria	Engagement, dialogue, voting rights
Swisscanto Equity Fund Sustainable Global Water	Exclusions	Integration of ESG criteria	Engagement, dialogue, voting rights
Nordea 1 Global Climate and Environment Fund	Exclusion filters/list, filtering	ESG integration	Shareholder activism, engagement, dialogue, voting
KBC Eco Fund Climate Change	Exclusion criteria/policy, negative screening	Positive screening	Engagement, dialogue, voting rights
BNP Paribas Funds Global Environment	Filters, exclusion	Integration of ESG criteria	Stewardship, engagement, dialogue, vote
Robeco Sustainable Global Stars Equities	Exclusions	ESG integration	Active ownership, engagement, voting, dialogue
ERSTE Responsible Stock Global	Exclusion criteria, standard-based screening	Best-in-class approach	Active dialogue strategy, engagement, voting rights

Note: this table summarizes the main terms used by impact and socially responsible mutual funds to denote negative and positive screening practices as well as engagement. The terminology mainly comes from funds' prospectuses, though additional documents sourced on funds' websites have also been used for some funds. The list is non-exhaustive and additional terms may apply for certain funds.

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## Appendix C

### C.1 Survey Structure

Members and non-members received the same survey, which was administered by the external company to guarantee complete anonymity to respondents (who were informed about this). All selected members and non-members first received an email with some general information to introduce the survey.<sup>1</sup> Notably, they were told that they would be participating in an experiment incentivized with actual money. In the email, we also informed them about our collaboration with the social bank. However, we purposely did not reveal that the main focus of our research was to study the determinants of capital flows to social banks. Instead, we were non-specific, and explained that the research project concerned private individuals' investment decisions. Finally, the email contained a link to the online survey. The first page of the survey provided respondents with additional information about data collection and anonymity. It also provided further details about the experiment, as well as the procedure regarding possible actual monetary earnings (see Section C.2 in Appendix C). In the first part of the survey, respondents were asked socio-demographic, investment, and behavioral questions.<sup>2</sup> In the second part of the survey, they took part in the incentivized experiment designed to elicit their social preferences. Respondent members and non-members took on average 11 and 10 minutes, respectively, to complete the whole survey.

### C.2 Additional Details about the Game

The game involves two players. Based on the rules presented in Section 3.3.1.1, at the end of the game, the first mover earns EUR 50 minus the amount sent plus the amount that the second mover returned. As for the second mover, she earns EUR 50 plus triple the amount received from the first mover minus the amount returned.

Each participant in the survey was either a first or a second mover. More precisely, one participant in two was assigned the role of first mover and one participant in two was assigned the role of second mover.<sup>3</sup> When the survey ended, we randomly matched first movers to second movers. Members and non-members were matched within their respective groups, i.e., a member could not be matched with a non-member. For each pair, we then linked the transfer choice of the first

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<sup>1</sup> All texts (emails, survey instructions and questions, etc.) were sent in both French and Dutch, which are Belgium's two main official languages.

<sup>2</sup> As explained above, the survey was sent to members in two parts. The first part contained a subset of the (mostly socio-demographic) questions found in the whole survey.

<sup>3</sup> We therefore measure social preferences for 253 members (out of 507) and 275 non-members (out of 561).



mover to the corresponding back transfer decision of the second mover to determine the outcome of the game (see Section 3.3.1.1).<sup>4</sup>

At the beginning of the survey, participants were informed that there was a probability of 1 in 50 that they would earn a sum of actual money.<sup>5</sup> On completing the survey, participants were asked the question “How many people do you think will participate in this survey?”. When the survey ended, we selected the 2% of participants who had provided the answers that were closest to the actual number of survey participants. The selected participants received an actual sum of money based on the outcome of the experiment, which means that the payment they received depended both on their own decisions and the decisions of the other player in their pair. The external company we hired processed payments to the selected participants via bank transfer.

When conducting an incentivized experiment, the size of the amount of money that is at stake is a legitimate concern. Although generally speaking, behavior is not significantly affected by stake sizes (Oosterbeek, Sloof and Van De Kuilen, 2004), however, as demonstrated by Camerer and Hogarth (1999), unreasonably low stakes may have adverse consequences. First, they may lead participants to be more generous than they would have been, had incentives been higher. Second, they increase variance in responses, thereby lowering statistical power. We therefore aligned our stakes with those commonly used in experiments similar to ours. Such potential payoffs are comparable to sums of money people are used to dealing with on a daily basis (Falk and Heckman, 2009), and are likely close to participants’ opportunity costs, given the time they spent on completing the survey (Riedl and Smeets, 2017).

The specific features of the procedure (double anonymity<sup>6</sup>, absence of repeat interactions) ensure that the measure of social preferences is unaffected by strategic motives and reputation effects<sup>7</sup> (Berg, Dickhaut and McCabe, 1995; Bertrand and Mullainathan, 2001; Dohmen et al., 2011). Moreover, the fact that participants are led to view every decision as consequential for their potential actual monetary gains creates an incentive-compatible environment, which further improves the reliability of our measure (Falk and Heckman, 2009; Dohmen et al., 2011; Gneezy

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<sup>4</sup> For instance, let us assume that the first mover decided to send EUR 20 to the second mover, and that the second mover had ex ante decided to send EUR 30 back to the first mover in case the latter had sent her EUR 20. In this scenario, the first mover would earn 50 (show-up fee) – 20 + 30 = EUR 60, while the second mover would earn 50 (show-up fee) + (3 × 20) – 30 = EUR 80. In cases where the first mover decides not to send anything to the second mover, both players earn their show-up fee of EUR 50.

<sup>5</sup> The procedure for selecting participants for payment with a certain probability (e.g., at random) is common in the related literature. See, for instance, Laury (2005), Dohmen et al. (2011) and Gneezy et al. (2012).

<sup>6</sup> Anonymity between participants and vis-à-vis the experimenter.

<sup>7</sup> Moreover, Baran, Sapienza and Zingales (2010) show that laboratory experiments are not systematically altered by an experimenter effect.

et al., 2012). We also made sure that most participants understood the experiment: we did this by asking them to answer two comprehension questions before the experiment started<sup>8</sup> (see, e.g., Bauer, Ruof and Smeets, 2021). All four answers (two per question) were correctly provided by 80.08% of the members and 70.05% of the non-members. In Section C.3 in Appendix C below, we conduct robustness tests that exclude participants who provided at least one incorrect answer from our database and demonstrate that our results are qualitatively unchanged.

### C.3 Robustness Tests

In this section, we briefly comment on several complementary analyses that we conducted to test the robustness of our main results. All tables referred to below can be found in Appendix C. In Table C.6, we replicate the analysis of Table 3.2 to investigate the drivers of capital flows to social banks using the measure of social preferences derived from our experimentally-validated survey question. In Table C.7, we replicate specification (7) of Table 3.2 using the *Strong social preferences (experiment)* variable in specification (1), and the *Strong social preferences (question)* variable in specification (2). As explained in Section C.2 in Appendix C, to make sure that most participants understood the experiment, we asked them to answer two comprehension questions before the experiment started. Therefore, in Table C.8, we still replicate specification (7) of Table 3.2, this time excluding from our sample any participants who had given at least one incorrect answer. The results presented in those three tables demonstrate that our findings are qualitatively robust to these variations.

In Table C.9, we replicate the analysis of Table 3.3 of the factors that influence the amount spent by members to acquire social bank shares. This time, however, we use a Probit regression in which the dependent variable takes the value of one if the member spent an amount greater or equal to EUR 500, and zero otherwise. Finally, in Table C.10, we replicate the analysis of Table 3.3 using an OLS regression in which the dependent variable *Amount* is divided into the original 11 categories, from 1 “Less than EUR 50” to 11 “At least EUR 500”. Apart from minor significance changes for the variables *Signaling* and *Low income* in Table C.9, and the variable *Trust banks* in Table C.10, the results demonstrate that our findings are qualitatively robust to these alternative specifications.

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<sup>8</sup> In the questions, participants were asked to calculate the payoffs of both players in fictitious scenarios. They were made aware of their mistakes in case they answered a question incorrectly.

## C.4 Tables

**Table C.1 Comparisons of sample means**

<i>Panel 1: early versus late respondents within the sample of 2508 members</i>			
<b>Variable</b>	<b>Mean for early respondents</b>	<b>Mean for late respondents</b>	<b>Mann-Whitney U Test (p-value)</b>
Female	44.40%	47.20%	0.5304
Age	51.21 years old	48.64 years old	0.0663
University degree	62.00%	64.00%	0.6439
Location (Brussels)	27.20%	32.80%	0.1724
Language (French)	82.00%	83.60%	0.6362
Investor	62.00%	54.40%	0.0853
Socially responsible investor	47.60%	52.40%	0.2838
<i>Panel 2: larger sample versus final sample of members</i>			
<b>Variable</b>	<b>Mean for larger sample</b>	<b>Mean for final sample</b>	<b>Mann-Whitney U Test (p-value)</b>
Female	38.00%	29.39%	0.0002
Age	49.98 years old	51.18 years old	0.0856
University degree	62.96%	61.34%	0.4923
Location (Brussels)	28.79%	26.63%	0.3253
Language (French)	81.46%	79.68%	0.3513
Investor	61.80%	66.67%	0.0390
Socially responsible investor	49.32%	57.00%	0.0016

Note: this table presents comparisons of sample means for seven different variables. Panel 1 compares the means of two subsamples of early and late respondents drawn from the initial larger sample of 2508 members. The subsample of early (late) respondents contains the first (last) 10% of respondents from the larger sample. Panel 2 compares the means of the initial larger sample of 2508 members with the means of the final sample of 507 members. The variable *Location (Brussels)* captures the proportion of sample individuals who live in the capital city of Belgium, while the variable *Language (French)* captures the proportion of sample individuals who speak French. The description of all remaining variables can be found in Table C.3 in Appendix C. P-values are from two-sided Mann-Whitney U tests with the null hypothesis that the two samples derive from the same population.

Table C.2 Representativeness of the sample of non-members

Criteria	Belgian population aged 21+	Non-member sample
<i>Gender</i>		
Male	0.4873	0.5169
Female	0.5127	0.4831
<i>Age</i>		
21-24	0.0605	0.0392
25-34	0.1689	0.0873
35-44	0.1689	0.1676
45-54	0.1748	0.2121
55-64	0.1748	0.2282
65+	0.2520	0.2656
<i>Belgian province</i>		
Anvers	0.1631	0.1194
Brabant Flamand	0.1006	0.0838
Brabant Wallon	0.0352	0.0517
Bruxelles	0.1025	0.1105
Hainaut	0.1152	0.1480
Liège	0.0957	0.1087
Limbourg	0.0781	0.0731
Luxembourg	0.0244	0.0446
Namur	0.0430	0.0517
Flandre orientale	0.1348	0.1034
Flandre occidentale	0.1074	0.1052

Note: this table reports proportions for three variables (gender, age, and province) to assess the representativeness of the sample of non-members (N=561) vis-à-vis the population of Belgian private individuals aged 21 or over. Figures for the Belgian population come from StatBel, the Belgian statistical office.

**Table C.3 Description of variables**

<b>Variable</b>	<b>Description</b>
Female	Dummy variable equal to one if the individual reports being a woman.
Age	The individual's self-reported age.
University degree	Dummy variable equal to one if the individual reports having (a degree equivalent to) a university degree.
Perceived knowledge	The individual's response to the statement "My investment knowledge is good" (1 fully disagree, ..., 7 fully agree).
Risk preferences	The individual's response to the question "On a scale from 1 to 10, are you someone who is generally willing to take risks?" (1 unwilling, ..., 10 willing).
Investor	Dummy variable equal to one if the individual has already invested money in at least one of the following financial products: stocks, bonds, investment funds (mutual funds, real estate investment trusts, etc.), complex financial products (options, futures, ETF, etc.).
Socially responsible investor	Dummy variable equal to one if the individual has been investing money in socially responsible, sustainable, or "green" investments and/or savings accounts for at least three years.
Donations	The individual's response to the question "On average, how much do you donate each year to charities, non-governmental organizations, or foundations?" Between EUR 0 and EUR 100 Between EUR 100 and EUR 200 Between EUR 200 and EUR 300 Between EUR 300 and EUR 400 Between EUR 400 and EUR 500 Between EUR 500 and EUR 600 Between EUR 600 and EUR 700 Between EUR 700 and EUR 800 Between EUR 800 and EUR 900 Between EUR 900 and EUR 1000 More than EUR 1000" (1 between EUR 0 and EUR 100, ..., 11 more than EUR 1000).
Low income	Dummy variable equal to one if the individual's reported annual net family income is at most EUR 50 000.
High income	Dummy variable equal to one if the individual's reported annual net family income is at least EUR 100 000.
Low wealth	Dummy variable equal to one if the individual's self-reported wealth (investments, life insurances, real estate, savings accounts, etc.) is at most EUR 150 000.
High wealth	Dummy variable equal to one if the individual's self-reported wealth (investments, life insurances, real estate, savings accounts, etc.) is at least EUR 500 000.
Perceived risk	The individual's response to the statement "Buying one or more shares in the social bank is a riskier-than-average financial investment" (1 fully disagree, ..., 7 fully agree).
Expected return	The individual's response to the question "In your opinion, what financial return might one expect from keeping a share in the social bank for ten years?" Less than 0% per year (= money loss) 0% per year (= no money gain or loss) More than 0% and at most 5% per year More than 5% and at most 10% per year More than 10% per year"

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	(1 less than 0% per year, ..., 5 more than 10% per year).
Trust banks	The individual's response to the statement "I do trust banks" (1 fully disagree, ..., 7 fully agree).
Perceived social impact	The individual's response to the statement "Sustainable finance (responsible investments, ethical banks, etc.) has a positive influence on society" (1 fully disagree, ..., 7 fully agree).
Signaling	The individual's response to the statement "I often talk about investment with others" (1 fully disagree, ..., 7 fully agree).
Social preferences (experiment)	We measure social preferences by computing the mean return ratio, using the behavior of second movers in the trust game experiment. First, we compute the return ratio for each of the 10 decisions made by a second mover, by dividing the amount returned by the amount initially sent by the first mover. For instance, if the first mover sends EUR 20 (the second mover receives $20 \times 3 = \text{EUR } 60$ ) and the second mover decides to return EUR 40, the return ratio is $40/20 = 2$ . Second, we average a second mover's 10 return ratios to get a mean return ratio which ranges from 0 to 3.
Social preferences (question)	The individual's response to the question "On a scale from 1 to 10, how willing are you to give money to charities or humanitarian associations without expecting anything in return?" (1 unwilling, ..., 10 willing).
Social bank identification	The average of the individual's responses to the five following statements: "I feel attached to this social bank It feels good to be a member of this social bank I like people to know that I am a member of this social bank This social bank's success is my success When someone praises this social bank, it feels like a personal compliment" (1 fully disagree, ..., 7 fully agree).
Amount	The individual's response to the question "How much did you spend to buy one or more shares in the social bank during the fundraising that took place between October 2019 and December 2019?" Less than EUR 50 Between EUR 50 and EUR 99 Between EUR 100 and EUR 149 Between EUR 150 and EUR 199 Between EUR 200 and EUR 249 Between EUR 250 and EUR 299 Between EUR 300 and EUR 349 Between EUR 350 and EUR 399 Between EUR 400 and EUR 449 Between EUR 450 and EUR 499 At least EUR 500 (1 less than EUR 50, ..., 11 at least EUR 500).

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Note: this table presents the description of all variables used in this chapter.

**Table C.4 Ordered Probit models – Frequency table**

<b>Categories</b>	<b>Ordered Probit (4 categories)</b>		<b>Ordered Probit (3 categories)</b>	
	<b>Actual</b>	<b>Predicted</b>	<b>Actual</b>	<b>Predicted</b>
1	0.2465	0.2434	0.2465	0.2442
2	0.1972	0.1947	0.3629	0.3629
3	0.1657	0.1697	0.3905	0.3930
4	0.3905	0.3922		

Note: this table presents actual and predicted frequencies for Ordered Probit regressions with an ordered dependent variable divided into either four or three categories.

Table C.5 What determines the amount spent on social bank shares? – Marginal effects

	Ordered Probit (4 categories)				Ordered Probit (3 categories)		
	(1) €1 - €99	(2) €100 - €199	(3) €200 - €499	(4) At least €500	(1) €1 - €99	(2) €100 - €499	(3) At least €500
<i>Non-financial motives</i>							
Social preferences (question)	0.0028 (0.0065)	0.0007 (0.0016)	-0.0001 (0.0003)	-0.0034 (0.0079)	0.0027 (0.0067)	0.0005 (0.0014)	-0.0032 (0.0081)
Signaling	0.0089 (0.0107)	0.0022 (0.0027)	-0.0004 (0.0005)	-0.0107 (0.0129)	0.0089 (0.0109)	0.0018 (0.0023)	-0.0107 (0.0132)
Trust banks	0.0157* (0.0092)	0.0039* (0.0024)	-0.0006 (0.0005)	-0.0190* (0.0111)	0.0156* (0.0094)	0.0032 (0.0021)	-0.0188* (0.0114)
Perceived social impact	-0.0003 (0.0125)	-0.0001 (0.0031)	0.0001 (0.0005)	0.0004 (0.0150)	-0.0024 (0.0128)	-0.0005 (0.0026)	0.0029 (0.0154)
Social bank identification	-0.0422*** (0.0118)	-0.0104*** (0.0033)	0.0017 (0.0011)	0.0509*** (0.0142)	-0.0411*** (0.0121)	-0.0084** (0.0033)	0.0495*** (0.0145)
<i>Financial motives</i>							
Perceived risk	-0.0189** (0.0080)	-0.0047** (0.0021)	0.0008 (0.0006)	0.0228** (0.0098)	-0.0175** (0.0081)	-0.0036* (0.0020)	0.0210** (0.0099)
Expected return	-0.0386* (0.0206)	-0.0095* (0.0053)	0.0016 (0.0013)	0.0465* (0.0248)	-0.0364* (0.0209)	-0.0074 (0.0047)	0.0439* (0.0252)
<i>Individual characteristics</i>							
Female	0.0063 (0.0337)	0.0015 (0.0081)	-0.0003 (0.0015)	-0.0076 (0.0403)	0.0023 (0.0341)	0.0005 (0.0069)	-0.0028 (0.0409)
Age	-0.0007 (0.0011)	-0.0002 (0.0003)	0.0001 (0.0001)	0.0008 (0.0013)	-0.0006 (0.0011)	-0.0001 (0.0002)	0.0008 (0.0014)
University degree	0.0056 (0.0306)	0.0014 (0.0076)	-0.0002 (0.0012)	-0.0068 (0.0370)	0.0136 (0.0311)	0.0028 (0.0067)	-0.0165 (0.0377)
Perceived knowledge	-0.0097 (0.0116)	-0.0024 (0.0029)	0.0004 (0.0005)	0.0118 (0.0140)	-0.0116 (0.0117)	-0.0024 (0.0025)	0.0139 (0.0141)
Risk preferences	-0.0128* (0.0077)	-0.0031 (0.0019)	0.0005 (0.0004)	0.0154* (0.0093)	-0.0146* (0.0078)	-0.0030* (0.0018)	0.0176* (0.0094)
Investor	-0.0114 (0.0342)	-0.0028 (0.0083)	0.0005 (0.0017)	0.0137 (0.0408)	-0.0035 (0.0348)	-0.0007 (0.0070)	0.0042 (0.0418)
Socially responsible investor	-0.1074*** (0.0319)	-0.0263*** (0.0089)	0.0062* (0.0036)	0.1275*** (0.0374)	-0.0990*** (0.0324)	-0.0185** (0.0078)	0.1175*** (0.0380)
Donations	-0.0247*** (0.0053)	-0.0061*** (0.0014)	0.0010 (0.0007)	0.0298*** (0.0060)	-0.0244*** (0.0055)	-0.0050*** (0.0015)	0.0294*** (0.0062)
Low income	0.0386 (0.0318)	0.0100 (0.0088)	-0.0013 (0.0013)	-0.0474 (0.0396)	0.0471 (0.0325)	0.0108 (0.0087)	-0.0579 (0.0408)
High income	-0.1570*** (0.0454)	-0.0735** (0.0343)	-0.0244 (0.0219)	0.2549*** (0.0994)	-0.1628*** (0.0411)	-0.1046** (0.0523)	0.2674*** (0.0915)
Low wealth	0.0398 (0.0404)	0.0091 (0.0085)	-0.0023 (0.0031)	-0.0466 (0.0458)	0.0465 (0.0417)	0.0076 (0.0057)	-0.0542 (0.0468)
High wealth	-0.0028 (0.0345)	-0.0007 (0.0086)	0.0001 (0.0013)	0.0034 (0.0418)	0.0052 (0.0356)	0.0010 (0.0069)	-0.0062 (0.0425)

Note: this table presents marginal effects of Ordered Probit regressions presented in Table 3.3. The ordered dependent variable *Amount*, initially divided into 11 categories, has been reorganized into either four or three categories. The description of all explanatory variables can be found in Table C.3 in Appendix C. Standard errors are reported in parentheses. \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.



Table C.6 What prompts individuals to buy social bank shares? (Robustness A)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Non-financial motives</i>							
Social preferences (question)	0.0464*** (0.0037)						0.0223*** (0.0042)
Signaling	-0.0358*** (0.0078)						-0.0312*** (0.0069)
Strong social preferences (question)		0.2442*** (0.0275)					
Trust banks			-0.0433*** (0.0073)				-0.0371*** (0.0060)
Perceived social impact				0.0986*** (0.0068)			0.0700*** (0.0063)
<i>Financial motives</i>							
Perceived risk					-0.0134* (0.0077)		-0.0037 (0.0058)
Expected return					-0.1346*** (0.0164)		-0.1094*** (0.0128)
<i>Individual characteristics</i>							
Socially responsible investor						0.0709*** (0.0259)	0.0544*** (0.0210)
Donations						0.0476*** (0.0055)	0.0191*** (0.0047)
Female	-0.2216*** (0.0245)	-0.2234*** (0.0253)	-0.2068*** (0.0262)	-0.2059*** (0.0246)	-0.1933*** (0.0259)	-0.2031*** (0.0249)	-0.1659*** (0.0217)
Age	-0.0035*** (0.0009)	-0.0029*** (0.0009)	-0.0023** (0.0009)	-0.0021** (0.0009)	-0.0018** (0.0009)	-0.0041*** (0.0009)	-0.0032*** (0.0008)
University degree	0.2181*** (0.0276)	0.2433*** (0.0281)	0.2709*** (0.0285)	0.2224*** (0.0273)	0.2674*** (0.0276)	0.2194*** (0.0276)	0.1135*** (0.0230)
Perceived knowledge	-0.0610*** (0.0089)	-0.0842*** (0.0079)	-0.0790*** (0.0085)	-0.0834*** (0.0076)	-0.0834*** (0.0083)	-0.0915*** (0.0078)	-0.0435*** (0.0076)
Risk preferences	0.0275*** (0.0063)	0.0255*** (0.0063)	0.0350*** (0.0065)	0.0270*** (0.0063)	0.0367*** (0.0063)	0.0291*** (0.0064)	0.0257*** (0.0052)
Investor	0.0331 (0.0265)	0.0206 (0.0282)	0.0390 (0.0294)	0.0139 (0.0270)	0.0692** (0.0291)	0.0255 (0.0276)	0.0046 (0.0238)
Low income	0.0595** (0.0269)	0.0622** (0.0275)	0.0490* (0.0281)	0.0549** (0.0266)	0.0444 (0.0274)	0.0701*** (0.0274)	0.0389* (0.0220)
High income	-0.1335*** (0.0496)	-0.1609*** (0.0500)	-0.1769*** (0.0523)	-0.1456*** (0.0495)	-0.1996*** (0.0516)	-0.2063*** (0.0463)	-0.1510*** (0.0409)
Low wealth	-0.1773*** (0.0282)	-0.1955*** (0.0294)	-0.2053*** (0.0300)	-0.1612*** (0.0288)	-0.1984*** (0.0295)	-0.1867*** (0.0291)	-0.1129*** (0.0254)
High wealth	0.0856** (0.0353)	0.0838** (0.0354)	0.0944** (0.0374)	0.0909*** (0.0344)	0.0719** (0.0365)	0.0636* (0.0366)	0.0380 (0.0308)
McFadden's R <sup>2</sup>	0.3675	0.3215	0.2877	0.3802	0.3115	0.3429	0.5406
N	1068	1068	1068	1068	1068	1068	1068

Note: this table presents marginal effects of Probit regressions. The dependent variable is *Member*, which takes the value of one if the individual is a member of the social bank and zero otherwise. The description of all explanatory variables can be found in Table C.3 in Appendix C. Specifications (1) to (6) have correct prediction rates that lie between 76.97% and 81.18%. Specification (7) has a correct prediction rate of 86.14%. Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.

**Table C.7 What prompts individuals to buy social bank shares? (Robustness B)**

	(1)	(2)
<i>Non-financial motives</i>		
Strong social preferences (experiment/question)	0.1095*** (0.0261)	0.0914*** (0.0222)
Signaling	-0.0329*** (0.0090)	-0.0332*** (0.0069)
Trust banks	-0.0306*** (0.0080)	-0.0360*** (0.0060)
Perceived social impact	0.0754*** (0.0083)	0.0739*** (0.0062)
<i>Financial motives</i>		
Perceived risk	-0.0026 (0.0085)	-0.0053 (0.0059)
Expected return	-0.0953*** (0.0181)	-0.1124*** (0.0129)
<i>Individual characteristics</i>		
Socially responsible investor	0.0677** (0.0301)	0.0567*** (0.0215)
Donations	0.0206*** (0.0058)	0.0230*** (0.0046)
Female	-0.1345*** (0.0286)	-0.1626*** (0.0219)
Age	-0.0039*** (0.0011)	-0.0032*** (0.0008)
University degree	0.1015*** (0.0309)	0.1197*** (0.0232)
Perceived knowledge	-0.0442*** (0.0105)	-0.0446*** (0.0077)
Risk preferences	0.0336*** (0.0076)	0.0271*** (0.0053)
Investor	0.0398 (0.0325)	0.0046 (0.0245)
Low income	0.0252 (0.0299)	0.0400* (0.0222)
High income	-0.2069*** (0.0566)	-0.1593*** (0.0387)
Low wealth	-0.0826*** (0.0322)	-0.1132*** (0.0258)
High wealth	0.1027** (0.0445)	0.0342 (0.0307)
McFadden's R <sup>2</sup>	0.5667	0.5305
N	528	1068

Note: this table presents marginal effects of Probit regressions. The dependent variable is *Member*, which takes the value of one if the individual is a member of the social bank and zero otherwise. Specifications (1) and (2) use the variables *Strong social preferences (experiment)* and *Strong social preferences (question)*, respectively. The description of all remaining explanatory variables can be found in Table C.3 in Appendix C. Specifications (1) and (2) have correct prediction rates of 86.93% and 86.14%, respectively. Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.

**Table C.8 What prompts individuals to buy social bank shares? (Robustness C)**

<i>Non-financial motives</i>	
Social preferences (experiment)	0.0680*** (0.0212)
Signaling	-0.0329*** (0.0093)
Trust banks	-0.0336*** (0.0086)
Perceived social impact	0.0776*** (0.0089)
<i>Financial motives</i>	
Perceived risk	0.0001 (0.0093)
Expected return	-0.1003*** (0.0194)
<i>Individual characteristics</i>	
Socially responsible investor	0.0545* (0.0326)
Donations	0.0234*** (0.0063)
Female	-0.1331*** (0.0321)
Age	-0.0040*** (0.0011)
University degree	0.0888*** (0.0335)
Perceived knowledge	-0.0500*** (0.0115)
Risk preferences	0.0371*** (0.0080)
Investor	0.0157 (0.0378)
Low income	0.0211 (0.0317)
High income	-0.2577*** (0.0621)
Low wealth	-0.1110*** (0.0363)
High wealth	0.0623 (0.0470)
McFadden's R <sup>2</sup>	0.5751
N	434

Note: this table presents marginal effects of a Probit regression. The dataset is restricted to second movers who answered both comprehension questions correctly prior to taking part in the incentivized experiment. The dependent variable is *Member*, which takes the value of one if the individual is a member of the social bank and zero otherwise. The description of all explanatory variables can be found in Table C.3 in Appendix C. The model has a correct prediction rate of 86.41%. Robust standard errors are reported in parentheses. \*\*\* and \* indicate significance at the 1% and 10% level, respectively.

**Table C.9 What determines the amount spent on social bank shares? (Robustness D)**

<i>Non-financial motives</i>	
Social preferences (question)	-0.0130 (0.0089)
Signaling	-0.0275* (0.0155)
Trust banks	-0.0247* (0.0128)
Perceived social impact	0.0074 (0.0171)
Social bank identification	0.0577*** (0.0158)
<i>Financial motives</i>	
Perceived risk	0.0430*** (0.0106)
Expected return	0.0612** (0.0266)
<i>Individual characteristics</i>	
Female	0.0190 (0.0455)
Age	0.0017 (0.0015)
University degree	-0.0046 (0.0422)
Perceived knowledge	0.0153 (0.0165)
Risk preferences	0.0301*** (0.0104)
Investor	0.0139 (0.0483)
Socially responsible investor	0.1450*** (0.0421)
Donations	0.0314*** (0.0065)
Low income	-0.0929** (0.0452)
High income	0.2185** (0.1087)
Low wealth	-0.0212 (0.0535)
High wealth	-0.0253 (0.0482)
McFadden's R <sup>2</sup>	0.1788
N	507

Note: this table presents marginal effects of a Probit regression. As we are analyzing the determinants of the amount spent on social bank shares, the dataset is restricted to members only. The dependent variable takes the value of one if the member spent an amount greater than or equal to EUR 500 and zero otherwise. The description of all explanatory variables can be found in Table C.3 in Appendix C. The model has a correct prediction rate of 71.01%. Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.

**Table C.10 What determines the amount spent on social bank shares? (Robustness E)**

<i>Non-financial motives</i>	
Social preferences (question)	-0.0728 (0.0773)
Signaling	-0.1971 (0.1272)
Trust banks	-0.1791 (0.1094)
Perceived social impact	-0.0152 (0.1375)
Social bank identification	0.5486*** (0.1342)
<i>Financial motives</i>	
Perceived risk	0.2936*** (0.0941)
Expected return	0.5070** (0.2288)
<i>Individual characteristics</i>	
Female	-0.0966 (0.3993)
Age	0.0089 (0.0131)
University degree	0.0980 (0.3642)
Perceived knowledge	0.1011 (0.1410)
Risk preferences	0.1956** (0.0898)
Investor	0.1810 (0.4084)
Socially responsible investor	1.3526*** (0.3669)
Donations	0.2803*** (0.0578)
Low income	-0.5172 (0.3843)
High income	1.9270*** (0.7286)
Low wealth	-0.4213 (0.4567)
High wealth	-0.0401 (0.4124)
Constant	-0.2913 (1.4036)
R <sup>2</sup>	0.2260
N	507

Note: this table presents coefficients of an OLS regression. As we are analyzing the determinants of the amount spent on social bank shares, the dataset is restricted to members only. The dependent variable *Amount* is divided into eleven categories, ranging from less than EUR 50 to at least EUR 500. The description of all explanatory variables can be found in Table C.3 in Appendix C. Robust standard errors are reported in parentheses. \*\*\* and \*\* indicate significance at the 1% and 5% level, respectively.

Table C.11 Social determinants of trust in banks (interaction effects)

<i>Social determinants</i>	
Social preferences (experiment)	-0.2012* (0.1065)
Perceived social impact	0.2021*** (0.0579)
Perceived social impact × Member	-0.1137*** (0.0439)
Socially responsible investor	0.7103*** (0.2105)
Socially responsible investor × Member	-0.6103** (0.2900)
<i>Other individual characteristics</i>	
Signaling	0.0047 (0.0521)
Female	0.0170 (0.1501)
Age	-0.0053 (0.0053)
University degree	-0.2047 (0.1620)
Perceived knowledge	0.1247** (0.0615)
Risk preferences	0.0518 (0.0385)
Investor	-0.2005 (0.1753)
Donations	-0.0141 (0.0258)
Income	-0.0345 (0.0806)
Wealth	0.0063 (0.0306)
Constant	2.7407*** (0.4737)
R <sup>2</sup>	0.1546
N	528

Note: this table presents coefficients of an OLS regression. The dependent variable is *Trust banks*, which is the individual's response to the statement "I do trust banks" (1 fully disagree, ..., 7 fully agree). In the above regression, the variables *Income* and *Wealth* are not binary variables, and instead are scales made up of 6 and 10 categories, respectively. The description of all remaining explanatory variables can be found in Table C.3 in Appendix C. The regression uses the sample made of members and non-members (N=528, see Table 3.2). Robust standard errors are reported in parentheses. \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level, respectively.