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Impact orientation and venture capital financing: The interplay of governmental, social impact and traditional venture capital

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ABSTRACT

In addition to traditional venture capital (VC), governmental VC and social impact VC investors have emerged as alternatives to fund entrepreneurial ventures, especially start-ups that incorporate social and/or environmental objectives into commercial operations. Using a sample of 15,510 VC-backed start-ups, we show that impact-oriented ventures are more likely to receive funding from alternative VCs. Both social and environmental orientations increase the chances that a start-up secures funding from impact VCs while social orientation drives results for government VCs. Importantly, we also show that impact-oriented ventures are more likely to secure investment from traditional VCs when impact and governmental VCs co-invest.

1. Introduction

Impact-oriented entrepreneurial ventures aim to incorporate a social or/and environmental objective through commercial activities (Austin et al., 2006). As such, they contribute to the public good. At the same time, impact-oriented start-ups likely face additional difficulties to access external finance since they need to resolve information asymmetries related to both financial and social value creation (Reichert et al., 2019). Social mission poses distinct legitimization challenges in their quest for funding from traditional venture capital firms (VCs) and banks, while environmental orientation usually implies a long and risky R&D phase that restrains profit-maximizing investors (Schätzlein et al., 2023).

Nevertheless, developments in the venture capital industry suggest impact-oriented firms can benefit from the entrance of “niche” market players. Alongside the boom of VC in recent decades (Lerner and Nanda, 2020), some of the fastest growing segments of the VC market include governmental venture capital funds (GVCs)^c and social impact venture capital funds (SIVCs).^d GVCs are typically financed by government resources and motivated by a public purpose of addressing market failure and contributing to local innovation and economic growth (Colombo et al., 2016). GVCs, often affiliated to development banks, have been shown to increasingly align their mission towards social and environmental impact and incorporate the pursuit of the United Nation’s Sustainable Development Goals

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^c Recent accounts suggest that GVC may reach 50% in the EU and other parts of the world (Bai et al., 2021).

^d The Global Impact Investing Network (GIIN), a leading data aggregator for the sector, estimated the assets under management (AuM) of >3,349 impact investing organizations at USD 1.164 trillion as of 2021 (Anon., GIIN, 2022). Estimates using Dealroom Impact data suggest the combined value of impact startups reached \$2.4 trillion by 2023, up 70% from 2020 (Le Pendeven and Gouiffès, 2024).

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(SDGs) into their investment policies (Le Pendeven and Gouiffès, 2024). SIVCs are private VCs that are required by their limited partners to invest in companies that combine financial profitability, typical of traditional venture capital investors (TVCs), with the intentional generation of measurable social and/or environmental value (Hehenberger et al., 2019).

As deal flow to impact-oriented ventures remains a complex and open question, in this paper we aim to reduce this gap by investigating whether and how impact-oriented ventures secure financing from different types of investors. We expect that impact-oriented ventures are more likely to receive funding from GVCs and SIVCs as compared to TVCs. Since SIVCs and GVCs combine traditional and social/environmental criteria in their evaluation process (Agrawal and Hockerts, 2021; Le Pendeven and Gouiffès, 2024), impact-oriented ventures may be more attractive to these investors (Grimes, 2010), possibly also depending on whether a social or environmental mission is emphasized (Hörisch and Tenner, 2020). At the same time, securing TVC is crucial for these companies, as TVC-backed ventures have been found to outperform SIVC-backed or GVC-backed ventures (Hirschmann and Fisch, 2023; Cumming et al., 2017). Therefore, we also explore the syndication configurations under which impact-oriented ventures attract TVC funding.

To explore these questions, we employ a set of trivariate probit specifications that allow for the simultaneous examination of the probability of receiving investments for each funder type using a dataset of 15,510 VC-backed ventures from Dealroom. Our results confirm that impact-oriented ventures are more likely to receive funding from SIVCs and GVCs relative to TVCs. While both social and environmental orientation are positively rewarded by SIVCs, social orientation drives results related to GVC investment. Nevertheless, analysis of syndication composition reveals that the chances of impact-oriented ventures to secure TVC investment increase when SIVC or GVC co-invest – suggesting impact-oriented ventures can benefit from syndication across investor types.

2. Methodology

2.1. Data and sample

From Dealroom, we extract information on 21,861 ventures that have received their first round of VC investment since 2015, the implementation year of the SDG framework. We then restrict our sample to ventures that received investment within their first 15 years of operations and which we could match with Bureau Van Dijk Orbis's database, where we retrieve industry NACE codes, and to companies with full information on their VC investors (i.e., the name and/or the website). This reduces our sample to 15,510 ventures that received their first round of financing between 2015 and 2023 from 6,702 VC investors.^e

Since Dealroom does not categorize VC investors as GVC, SIVC, or TVC, we manually code VCs based on information from their websites and Orbis. Following the approach of Bertoni et al. (2019), we classify GVCs as VCs initiated and managed by an investment firm predominantly owned by public entities and operating with an explicit public purpose. To identify SIVCs, we adapt the approach introduced by Barber et al. (2021) to the European context. We consider SIVCs as investors that belong to impact-focused associations^f and as those with an explicit “dual-objective” to achieve both financial and social/environmental impact in their mission. This process yields a total of 6,702 classified investors: 326 GVCs, 317 SIVCs and 6,059 TVCs.

The impact orientation of start-ups is retrieved using Dealroom's SDG classification. Dealroom's research team manually assigns relevant SDGs (if any) to each venture based on the venture's mission statement and other public information.^g To isolate SDGs that align with social and environmental impact, we follow the “SDG wedding cake” method developed by the Stockholm Resilience Center.^h Based on the framework, we define a dummy *Social Orientation* that is equal to 1 for start-ups associated with SDG 1 (“No poverty”), SDG 2 (“Zero hunger”), SDG 3 (“Good health and well-being”), SDG 4 (“Quality education”), SDG 5 (“Gender equality”), SDG 7 (“Affordable and clean energy”), SDG 11 (“Sustainable cities and communities”) or SDG 16 (“Peace, justice and strong institutions”). A second dummy variable *Environmental Orientation* is equal to 1 for start-ups associated with SDG 6 (“Clean water and sanitation”), SDG 13 (“Climate action”), SDG 14 (“Life below water”) or SDG 15 (“Life on Land”). A third variable, *Impact Orientation*, is equal to 1 for ventures that are associated with either a social or environmental SDG.

Table 1 reports the sample distribution of VC-backed start-ups by industry, country of operations, investment year, investment stage, and impact orientation. Table 1 also reports the frequency of investment by TVC, GVC, SIVC and syndicates with multiple investor types. Most ventures receive funding from TVC investors (87.5 %), followed by GVC (14.4 %) and SIVC (6.9 %). In total, 8.5 % of deals are syndicated. Fig. 1 illustrates the syndication patterns across investor types. Of TVC-backed ventures, 6.0 % are also backed by GVCs, 2.9 % are backed by SIVCs and 0.4 % are syndicated amongst all three categories of investors.

^e Dealroom is a Europe-based global data aggregator that provides information on >3 million high-growth start-ups and 200,000 investors/actors in the entrepreneurial ecosystem. Data is crowdsourced from users (including founders, VCs, accelerators, government programs), or sourced by web crawlers and machine learning methods. Data is maintained by an internal research team. We extracted data in June 2023.

^f Relevant associations include ImpactBase, ImpactAssets' Impact50 list, Community Development VC Association (CDVCA), Impact Capital Manager (ICM), Global Impact Investing Network (GIIN), Operating Principles for Impact Management, European Venture Philanthropy Association (EVPA), and PEI Award winners of “Impact Investment Firm of the Year” for the years 2018–2022.

^g Methodological details available here: <https://impact.dealroom.co/methodology-38-definitions>. We coded impact-oriented start-ups as those with SDGs as “core” values, excluding start-ups with SDG “side” values.

^h See <https://www.stockholmresilience.org/research/research-news/2016-06-14-the-sdgs-wedding-cake.html>

Table 1
Sample distribution by company industry, country, investment year, investment stage and impact, social and environmental orientation.

	N	%	SIVC%	GVC%	TVC%	Synd.%
Company industry						
Computer programming, consultancy and related activities (NACE: 62)	5079	32.75	4.80	13.82	88.86	7.25
High tech Professional activities (NACE: 69–75)	3002	19.36	9.33	19.82	84.34	12.79
Wholesale and retail (NACE: 45–47)	1272	8.20	7.78	11.08	89.62	8.10
Public services (NACE: 84–88, 90–98)	801	5.16	8.86	12.48	85.27	6.24
Information service activities (NACE: 63)	795	5.13	5.41	11.19	90.31	6.79
High Tech Manufacturing (NACE: 20–21, 26–30)	781	5.04	7.43	24.97	81.05	12.29
Administrative activities (NACE: 77–82)	749	4.83	5.87	9.48	91.19	6.41
Financial activities (NACE: 64–66)	657	4.24	4.87	7.46	91.93	4.26
Low Tech Manufacturing (NACE: 10–11, 13–19, 22–25, 31–33)	616	3.97	10.55	15.75	82.63	8.60
Other sectors	614	3.96	11.24	12.21	86.48	9.12
Publishing activities (NACE: 58)	575	3.71	4.87	11.48	91.13	7.48
Tourism activities (NACE: 49–53, 55–56)	361	2.33	7.76	8.86	89.47	5.82
Information and communication (NACE: 59–61)	208	1.34	6.25	9.13	89.42	4.33
Company country						
United Kingdom	4189	27.01	8.90	5.30	91.62	5.61
Germany	1989	12.82	6.13	23.58	81.10	10.56
France	1910	12.31	9.48	21.78	88.06	18.48
Netherlands	1088	7.01	11.58	25.46	74.17	10.39
Sweden	655	4.22	4.73	21.22	82.14	7.94
Belgium	649	4.18	5.08	15.56	90.45	9.71
Italy	604	3.89	4.80	16.06	88.25	8.61
Spain	549	3.54	3.64	17.67	87.43	8.38
Poland	457	2.95	6.56	8.10	87.53	2.19
Finland	413	2.66	5.33	14.77	92.01	11.62
Denmark	402	2.59	3.98	22.39	81.84	7.71
Baltic area	260	1.68	3.46	1.54	96.92	1.92
Ireland	138	0.89	5.80	42.03	73.91	21.74
Greece	15	0.10	0.00	53.33	46.67	0.00
Other*	2192	14.13	3.38	7.07	92.66	2.97
First investment year						
2015	1518	9.79	5.60	13.37	87.48	6.32
2016	1788	11.53	5.76	14.71	85.74	6.04
2017	1894	12.21	5.07	14.10	89.02	7.97
2018	1892	12.20	5.92	15.12	85.89	6.40
2019	1678	10.82	6.44	14.42	86.41	7.09
2020	1729	11.15	7.23	18.22	84.90	9.43
2021	2260	14.57	8.76	12.92	88.19	9.56
2022	2083	13.43	9.03	12.87	90.69	11.95
2023 (till June 2023)	668	4.31	8.83	14.22	90.87	13.47
Investment stage						
Seed stage	6077	39.18	5.10	14.76	86.37	6.04
Early stage	6420	41.39	8.04	16.45	87.12	11.01
Late stage	3013	19.43	8.23	9.23	90.84	7.93
Impact orientation						
Impact Orientation =1	1289	8.31	19.78	21.18	78.04	17.38
Impact Orientation =0	14,221	91.69	5.76	13.77	88.41	7.66
Social orientation						
Social Orientation =1	1044	6.73	18.97	22.61	77.20	17.24
Social Orientation =0	14,466	93.27	6.06	13.79	88.30	7.83
Environmental orientation						
Environmental Orientation =1	720	4.64	21.53	19.58	79.03	18.06
Environmental Orientation =0	14,790	95.36	6.21	14.13	87.96	8.00
Total	15,510	100	6.92	14.38	87.55	8.47

This table reports the sample distribution and frequency by deal characteristics, as well as the incidence of deals in which at least one social impact venture capital (SIVC), one governmental venture capital (GVC) or one traditional venture capital (TVC) fund invested (the three middle columns). The last column presents the incidence of syndicated deals in which at least two different investor types are involved. Row percentages do not add to 1 because a deal might fall in more than one category.

* The category “Other” contains the following countries, which were aggregated due to the small number of individual observations: Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Georgia, Hungary, Iceland, Kosovo, Liechtenstein, Luxembourg, Malta, North Macedonia, Norway, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Switzerland, Ukraine.

2.2. Model specification

We start by adopting a trivariate probit specification that allows for the simultaneous examination of the probability of receiving investments from each funder type: GVC, TVC, and SIVC. The trivariate probit has three binary dependent variables, each equal to 1 if a given start-up receives financing from each respective investor type. The three dummy variables are not mutually exclusive since more

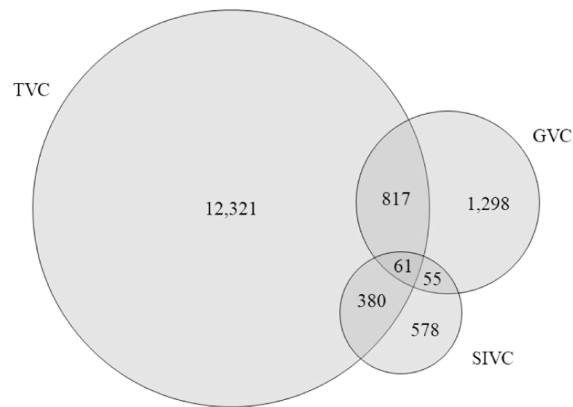


Fig. 1. Sample distribution by investor types (N = 15,510 first-round investments).

than one investor type can be present in syndicated deals.ⁱ Our main independent variables are captured by the dummy variables: *Impact Orientation*, *Social Orientation* and *Environmental Orientation*. For control variables, we use venture age, headquarters country, industry, investment year, and the stage of investment round (i.e., seed, early, or later stage). As a robustness check, we also include proxies for company size and performance at the time of investment, i.e., the logarithms of the number of employees (available for 10,623 observations, 68.5 % of sample) and revenue (available for 3,914 observations, 25.2 %).

We adopt further econometric specifications to analyze investor syndicates and to understand the “mixes” of investor types that impact-oriented start-ups are more likely to secure. We construct a categorical variable, *Investor mix*, with seven potential values: *TVC only*, *GVC only*, *SIVC only*, *GVC and SIVC*, *GVC and TVC*, *SIVC and TVC*, and *GVC, SIVC and TVC*. We use *Investor mix* as the dependent variable of a multinomial logit model, using the same regressors as in the previous models. We also add an additional control variable, *Syndication size*, to capture the number of investors in the deal.

Finally, we also employ alternative probit specifications in which we model the receipt of the most frequent investor type (TVC), followed by a bivariate model on the subsample of TVC-backed companies that estimates the simultaneous receipt of either GVC or SIVC financing. To correct sample-induced endogeneity, we run a two-stage analysis using the Heckman two-step procedure (Heckman, 1979). The first step estimates the probability that a venture receives TVC. The second step regresses the probability of receiving GVC or SIVC on the impact orientation variables, a set of control variables and a selection parameter (the inverse Mills ratio).^j Although we use multiple statistical techniques to identify these relationships, it is important to keep in mind that our methodology does not enable us to make causal claims. Descriptive statistics and pairwise correlations are reported in Table 2.

3. Results

3.1. Impact orientation and investor types

Table 3 reports the results from trivariate probits that model the probability of receiving support from SIVC, GVC and/or TVC. Model I investigates the role of impact orientation and supports our expectations. Panel A shows positive coefficients for start-ups’ impact orientation in the SIVC and GVC equations, and negative coefficient in the TVC equation (all with p-value <1 %). Panel B reports the significance of differences of the coefficients across the three equations (all with p-value <1 %). The marginal effects of impact orientation, reported in Panel C, depict a clear “hierarchy” in the chances of receiving financing from different investor types: impact-oriented ventures have a 12.6 % higher chance to receive SIVC support, 5.4 % higher chance to receive GVC support and 7.7 % lower chances to receive TVC, compared to non-impact-oriented ventures.

Next, we disentangle social and environmental impact orientation. Table 3 Model II shows that socially-oriented ventures have higher chances to receive financing from SIVC (marginal effect of +7.3 %, p-value <1 %) and GVC (+6.0 %, p-value <1 %), and lower chances to receive TVC support (−7.0 %, p-value <1 %). The coefficients are significantly different from each other across the three equations (p-values at least <5 %).

Environmentally-oriented ventures have higher chances to receive SIVC support (marginal effect of + 7.7 %, p-value <1 %) and lower chances to receive TVC (−2.2 %, p-value <1 %). Environmental orientation does not play a significant role in predicting the chances to receive GVC support: Panel B indicates that the coefficient is not significantly different from TVC, while it is significantly lower than SIVC (p-value <1 %). Results remain robust when controlling for company size and performance (see Appendix A).

ⁱ The models are run using the “trivariate” Stata command, which estimates simulated maximum-likelihood three-equation probit models using the GHK smooth recursive simulator (Greene, 2000, p. 184-185). We used 25 draws in the simulation process.

^j Absent valid exclusion restrictions, we rely on the binomial normal distribution assumption for identification in the second step (Heckman, 1979; Lee, 2009; Honoré and Hu, 2024). Results are qualitatively similar if we do not control for sample selection.

Table 2

Descriptive statistics and correlation matrix.

		N	Mean	SD	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
(1)	SIVC	15,510	0.069	0.254	0.000	1.000	1.00									
(2)	GVC	15,510	0.144	0.351	0.000	1.000	-0.03	1.00								
(3)	TVC	15,510	0.875	0.330	0.000	1.000	-0.34	-0.60	1.00							
(4)	Impact Orientation	15,510	0.083	0.276	0.000	1.000	0.13	0.07	-0.09	1.00						
(5)	Social Orientation	15,510	0.067	0.251	0.000	1.000	0.11	0.08	-0.09	0.92	1.00					
(6)	Environmental Orientation	15,510	0.046	0.210	0.000	1.000	0.09	0.04	-0.04	0.71	0.55	1.00				
(7)	Age	15,510	3.569	3.592	0.000	15.000	0.03	0.00	-0.02	-0.06	-0.05	-0.03	1.00			
(8)	Syndication size	15,510	1.417	0.927	1.000	17.000	0.19	0.20	0.13	0.07	0.05	0.07	-0.04	1.00		
(9)	Employees	10,623	1.986	1.145	0.000	9.047	0.04	-0.03	0.03	-0.05	-0.04	-0.04	0.48	0.07	1.00	
(10)	Sales	4746	5.604	4.333	0.000	20.651	-0.01	-0.04	0.03	-0.06	-0.05	-0.06	0.42	-0.02	0.56	1.00

Notes. This table presents the descriptive statistics and correlation matrix of the variables used in the analysis.

Table 3

Trivariate probit models on the first-round investor type: The role of impact orientation, social orientation and environmental orientation.

Panel A	Model I			Model II		
	SIVC	GVC	TVC	SIVC	GVC	TVC
Impact Orientation	0.606*** (0.040)	0.221*** (0.042)	-0.351*** (0.043)			
Social Orientation				0.389*** (0.047)	0.243*** (0.052)	-0.325*** (0.052)
Environmental Orientation				0.400*** (0.054)	0.024 (0.061)	-0.114* (0.064)
Age	-0.003 (0.004)	0.014*** (0.003)	-0.010*** (0.004)	-0.004 (0.004)	0.013*** (0.003)	-0.011*** (0.004)
Constant	-1.269*** (0.082)	-1.591*** (0.079)	1.653*** (0.085)	-1.263*** (0.082)	-1.588*** (0.079)	1.645*** (0.084)
Rho SIVC-GVC		0.369*** (0.019)			0.371*** (0.019)	
Rho SIVC-TVC		-0.965*** (0.022)			-0.971*** (0.022)	
Rho GVC-TVC		-1.263*** (0.025)			-1.260*** (0.025)	
Industry, Country, Year, Stage dummies		Yes			Yes	
N		15,510			15,510	
Chi ²		2,533.2750			2467.19	
log likelihood		-12,372.9834			-12381.7467	
Panel B		Model I		Model II		
		Impact Orientation		Social Orientation		Environmental Orientation
GVC-SIVC		-0.385***		-0.146**		-0.376***
GVC-TVC		0.572***		0.568***		0.138
SIVC-TVC		0.957***		0.714***		0.514***
Panel C		Model I		Model II		
		Impact Orientation		Social Orientation		Environmental Orientation
GVC		0.054***		0.060***		0.005***
SIVC		0.126***		0.073***		0.077***
TVC		-0.077***		-0.070***		-0.022***

Notes. Panel A of the table reports the estimated coefficients and, in brackets, the robust standard errors of the coefficients of trivariate probit models, whose dependent variables are the presence of different investor types in each sample first investment. Industry, Year, Country and Stage dummies are included in the model but omitted in the table. Panel B shows the differences in the coefficients and the significance levels for the *Impact Orientation*, *Social Orientation* and *Environmental Orientation* variables across the three equations of the trivariate probit. Panel C reports the estimated marginal effects of *Impact Orientation*, *Social Orientation* and *Environmental Orientation* have on obtaining investments from different investors type. Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

3.1.1. Impact orientation and syndicate composition

Tables 4 reports results from the multinomial logit regressions that analyze syndicate composition. We use “TVC only” as baseline category and analyse the coefficients pertaining to each of the other six possible outcomes. Model III focuses on impact orientation and syndicate composition. With positive and significant coefficients for all outcomes (p-values at least <5 %), results indicate that receiving pure TVC support is the least likely outcome for impact-oriented start-ups. Nevertheless, the positive coefficients of impact orientation for “GVC and TVC” and “SIVC and TVC” syndicates reveal that impact-oriented ventures are more likely to secure TVC when GVC and SIVC co-invest. Table 5 reports the marginal effects of impact orientation. Findings suggest that impact orientation lowers a venture’s odds of securing pure TVC syndicates by 10.4 %, while it improves a venture’s chances to secure pure SIVC syndicates by 4.1 % and pure GVC syndicates by 3.0 %. Interestingly, the marginal effect is also positive and significant for SIVC-TVC syndicates (2.3 %).

Table 4 Model IV considers the individual effects of social and environmental impact orientation. For socially-oriented start-ups, the chances of receiving funding by GVC, SIVC or mixed syndicates are higher than those of being financed by TVC alone (all p-values <1 %), confirming the general results for impact orientation. Marginal effects reported in Table 5 indicate that social orientation reduces a start-up’s chances to receive pure TVC financing by 9.9 %. However, social orientation increases a start-up’s probabilities to obtain pure GVC (+3.3 %), pure SIVC (+3.1 %), GVC-TVC syndication (+1.4 %), or SIVC-TVC syndication (+1.4 %). By contrast, environmentally-oriented start-ups’ chances to secure GVC (alone or in syndicate) are not significantly different with respect to those

Table 4

Multinomial logit models for syndicate composition of first investments: the role of impact orientation, social orientation and environmental orientation.

	Model III					
	GVC only	SIVC only	GVC and SIVC	GVC and TVC	SIVC and TVC	GVC, SIVC and TVC
Impact Orientation	0.538*** (0.102)	1.299*** (0.119)	0.980*** (0.354)	0.321** (0.138)	1.327*** (0.142)	1.770*** (0.297)
Age	0.025*** (0.009)	0.025** (0.012)	0.017 (0.039)	0.054*** (0.011)	-0.001 (0.018)	0.086** (0.038)
Syndication size	-1.210*** (0.100)	-1.792*** (0.216)	0.882*** (0.056)	1.156*** (0.049)	1.104*** (0.059)	1.584*** (0.089)
Constant	-2.963*** (0.267)	-1.189*** (0.371)	-8.144*** (0.869)	-6.172*** (0.292)	-5.237*** (0.345)	-11.017*** (0.955)
Industry, Country, Year, Stage dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	15,510					
Pseudo R ²	0.2008					
log likelihood	-9926.416					

	Model IV					
	GVC only	SIVC only	GVC and SIVC	GVC and TVC	SIVC and TVC	GVC, SIVC and TVC
Social Orientation	0.571*** (0.126)	1.000*** (0.181)	1.376*** (0.394)	0.559*** (0.160)	0.891*** (0.208)	1.152** (0.462)
Environmental Orientation	0.053 (0.161)	0.563*** (0.211)	-0.650 (0.598)	-0.222 (0.204)	0.682*** (0.221)	0.910* (0.480)
Age	0.025*** (0.009)	0.023** (0.012)	0.014 (0.039)	0.054*** (0.011)	-0.005 (0.018)	0.079** (0.038)
Syndication size	-1.211*** (0.100)	-1.788*** (0.216)	0.892*** (0.057)	1.158*** (0.049)	1.101*** (0.059)	1.576*** (0.089)
Constant	-2.950*** (0.267)	-1.166*** (0.371)	-8.095*** (0.854)	-6.169*** (0.292)	-5.204*** (0.344)	-10.892*** (0.948)
Industry, Country, Year, Stage dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	15,510					
Pseudo R ²	0.2002					
log likelihood	-9934.027					

Notes. The table reports the estimated coefficients and, in brackets, the robust standard errors of the coefficients of Multinomial logit models, whose dependent variable is the categorical variable describing the syndicate composition. The baseline of the model are deals backed by TVC only. Industry, Year, Country and Stage dummies are included in the model but omitted in the table. Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 5

Marginal effects of impact orientation, social orientation and environmental orientation on syndicate composition.

	Model III		Model IV	
	Impact Orientation	Social Orientation	Social Orientation	Environmental Orientation
GVC only	0.030*** (0.007)	0.033*** (0.009)	0.033*** (0.009)	0.002 (0.011)
SIVC only	0.041*** (0.004)	0.031*** (0.006)	0.031*** (0.006)	0.019*** (0.007)
TVC only	-0.104*** (0.010)	-0.099*** (0.013)	-0.099*** (0.013)	-0.022 (0.016)
GVC and SIVC	0.003** (0.001)	0.004*** (0.001)	0.004*** (0.001)	-0.002 (0.002)
GVC and TVC	0.002 (0.005)	0.014** (0.006)	0.014** (0.006)	-0.013* (0.008)
SIVC and TVC	0.023*** (0.003)	0.014*** (0.004)	0.014*** (0.004)	0.014*** (0.004)
GVC, SIVC and TVC	0.005*** (0.001)	0.003 (0.002)	0.003 (0.002)	0.003* (0.002)

Notes. The table reports the estimated marginal effects and, in parenthesis, the standard errors, of *Impact Orientation* (from Model III), *Social Orientation* and *Environmental Orientation* (from Model IV) have on obtaining investments from different syndicate compositions. Standard errors are in the line below marginal effects. Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 6
Probit and conditional bivariate probit models on TVC backed deals.

Model	V	VI		VII	VIII	
	Probit	Bivariate probit		Probit	Bivariate probit	
Sample	All	TVC deals		All	TVC deals	
Dep. Var	TVC	SIVC	GVC	TVC	SIVC	GVC
Impact Orientation	-0.421*** (0.045)	1.163*** (0.084)	0.844*** (0.086)			
Social Orientation				-0.383*** (0.059)	0.816*** (0.103)	0.968*** (0.106)
Environmental Orientation				-0.123* (0.072)	0.621*** (0.112)	-0.006 (0.125)
Age	-0.013*** (0.004)	0.007 (0.008)	0.056*** (0.007)	-0.012*** (0.004)	0.005 (0.008)	0.055*** (0.007)
Syndication size	0.580*** (0.033)	0.059** (0.029)	-0.164*** (0.034)	0.581*** (0.033)	0.069** (0.028)	-0.156*** (0.034)
Inverse Mills ratio		-6.886*** (0.506)	-10.098*** (0.451)		-6.737*** (0.498)	-9.974*** (0.446)
Constant	1.065*** (0.103)	-1.304*** (0.172)	-1.266*** (0.167)	1.056*** (0.103)	-1.304*** (0.171)	-1.271*** (0.166)
Rho			-0.273*** (0.046)			-0.268*** (0.046)
Industry, Country, Year, Stage dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	15,509	13,578		15,509	13,578	
r ² _p	0.105			0.1048		
log likelihood	-5215.766	-3118.342		-5217.9045	-3127.6331	
chi ²	954.355	2587.001		953.678	2583.775	

Notes. The table reports the estimated coefficients and, in brackets, the robust standard errors of the coefficients of probit (Models V and VII) or bivariate probit (Models VI and VIII) models, whose dependent variable is reported in the head of the table. The bivariate probit models include a sample selection correction term (Heckman two-step procedure). Sample includes all ventures in Models V and VII, and only TVC-backed ventures in Models VI and VIII. Industry, Year, Country and Stage dummies are included in the model but omitted in the table. Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

of securing TVC. Instead, environmentally-oriented start-ups are more likely to obtain pure SIVC (+1.9 %) or SIVC-TVC syndicate (+1.4 %) investment compared to pure TVC (p-value<1 %). Interestingly, GVC-TVC syndicates are 1.3 % less likely for these ventures.^k

Table 6 reports results related to the specification that models syndication patterns between TVC, SIVC and GVC, in which we give more centrality to the receipt of TVC financing. Model V estimates a probit specification with TVC as the dependent variable and again indicates that impact orientation is associated with lower chances of receiving TVC (p-value<1 %). Conditional upon receipt of TVC, Model VI shows that impact orientation increases the chances of ventures to also obtain GVC or SIVC financing (p-value<1 %). In other words, while impact-oriented companies are not the typical target of TVC investors, their chances to obtain TVC increase when GVC and SIVC co-invest. We repeat the analysis to consider social and environmental impact orientation individually. Model VII shows that both social orientation and environmental orientation lower the probability of obtaining TVC (p-value<10 % or better). Conditional upon receipt of TVC, Model VIII indicates that both social and environmental orientation improve a venture's chances to obtain SIVC (p-value<1 %); however, only social orientation is relevant for GVC investors (p-value<1 %).

Overall, results indicate that socially-oriented start-ups' probabilities of receiving TVC investment increase in syndicated deals with GVC or SIVC. For environmentally-oriented ventures, securing TVC investment only increases when SIVCs are involved in the deal.

4. Conclusion

By comparing the investment preferences of SIVC, GVC, and TVC investors, our study examines how impact-oriented ventures can bridge financing gaps. Findings show that impact orientation improves the odds of funding support from SIVC and GVC (to a lesser extent) and lowers the probability of raising from TVC. Further analysis reveals that this hierarchy is largely driven by social orientation; environmental orientation only appears to be rewarded by SIVCs. Importantly, for impact-oriented ventures, securing TVC investment is more likely with co-investment from SIVC or GVC investors. However, for environmentally-oriented start-ups the

^k The trivariate probit analysis (Table 3) indicates that impact orientation lowers the odds of securing TVC by 7.6%. The multinomial logit model (Table 4) indicates that impact orientation lowers the odds of receiving pure TVC by 10.4%; however, the odds of impact-oriented ventures to receive TVC increase by 0.2%, 2.3% and 0.05% when SIVC, GVC, or both SIVC and GVC investors co-invest, respectively. Taken together, the marginal effects of the trivariate probit estimates are generally in line with those of the multinomial logit. Similar analysis shows that SIVC and GVC are also consistent across both models.

probability of securing TVC investment increases only when SIVCs are involved in the deal.

Our findings contribute to the literature on impact-oriented ventures by demonstrating the role of GVC and SIVC investors in the direct provision of funds. Additionally, our findings suggest that both GVC and SIVC might act as catalyst of TVC investments towards impact-oriented start-ups. These insights inform impact-oriented ventures about potential funding strategies to secure support from investors who typically may not prioritize social and environmental impact. Future research could strengthen our findings by exploring and comparing the investment preferences of GVC, SIVC and TVC investors in more detail and via methodologies that permit stronger causality claims. Future studies could also investigate how the outcomes of impact ventures vary based on the types of VCs involved.

CRedit authorship contribution statement

Valentina Lo Mele: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Anita Quas:** Writing – review & editing, Writing – original draft, Resources, Methodology, Formal analysis, Data curation, Conceptualization. **Patrick Reichert:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **Stefano Romito:** Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no conflict of interest.

Data availability

The authors do not have permission to share data.

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Appendix A

[Table A1](#), [Table A2](#)

Table A1

Trivariate probit models on the first-round investor type: controlling for company size.

Panel A	Model I-A			Model II-A		
	SIVC	GVC	TVC	SIVC	GVC	TVC
Impact Orientation	0.578*** (0.050)	0.206*** (0.051)	-0.367*** (0.050)			
Social Orientation				0.323*** (0.062)	0.288*** (0.064)	-0.332*** (0.063)
Environmental Orientation				0.424*** (0.073)	-0.078 (0.078)	-0.079 (0.074)
Age	0.008 (0.005)	0.008* (0.005)	-0.006 (0.005)	0.007 (0.005)	0.008 (0.005)	-0.005 (0.005)
Employees (Ln)	-0.022 (0.018)	-0.041** (0.018)	0.007 (0.019)	-0.023 (0.018)	-0.041** (0.018)	0.007 (0.019)
Constant	-1.383*** (0.097)	-1.431*** (0.091)	1.665*** (0.102)	-1.386*** (0.097)	-1.428*** (0.090)	1.660*** (0.102)
Rho SIVC-GVC		0.371*** (0.019)			0.339*** (0.023)	
Rho SIVC-TVC		-0.971*** (0.022)			-0.932*** (0.029)	
Rho GVC-TVC		-1.260*** (0.025)			-1.264*** (0.032)	
Industry, Country, Year, Stage dummies	Yes	Yes	Yes	Yes	Yes	Yes
N		10,623			10,623	

(continued on next page)

Table A1 (continued)

Panel A	Model I-A			Model II-A		
	SIVC	GVC	TVC	SIVC	GVC	TVC
log likelihood		-8480.5860			-8479.6492	

Panel B	Model I-A		Model II-A	
	Impact Orientation	Social Orientation	Environmental Orientation	
GVC - SIVC	-0.372***	-0.035	-0.502***	
GVC - TVC	0.573***	0.620***	0.001	
SIVC - TVC	0.945***	0.356***	0.503***	

Notes. Panel A of the table reports the estimated coefficients and, in brackets, the robust standard errors of the coefficients of trivariate probit models, controlling for the size of the company, whose dependent variables are the presence of different investors in each first round. Industry, Year, Country and Stage dummy variables are included in the model but omitted in the table. In Panel B we show the differences in the coefficients for the *Impact Orientation*, *Social Orientation* and *Environmental Orientation* variables across the three equations of the trivariate probit. The number of employees is collected by combining available information from Orbis and Dealroom and refers to the year before the investment (or investment year in case previous year data is unavailable). Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table A2

Trivariate probit models on the first-round investor type: controlling for sales and employees.

Panel A	Model III-A			Model IV-A		
	SIVC	GVC	TVC	SIVC	GVC	TVC
Impact Orientation	0.537*** (0.087)	0.334*** (0.084)	-0.420*** (0.083)			
Social Orientation				0.386*** (0.111)	0.368*** (0.104)	-0.557*** (0.105)
Environmental Orientation				0.310** (0.139)	0.227 (0.132)	0.027 (0.135)
Age	-0.008 (0.011)	0.010 (0.009)	-0.021** (0.009)	-0.005 (0.010)	0.011 (0.009)	-0.022*** (0.009)
Sales (Ln)	-0.027** (0.011)	-0.020** (0.009)	0.024*** (0.009)	-0.024** (0.011)	-0.022** (0.009)	0.028*** (0.009)
Employees (Ln)	0.012 (0.037)	-0.044 (0.032)	0.034 (0.033)	-0.000 (0.038)	-0.049 (0.032)	0.031 (0.031)
Constant	-2.019*** (0.480)	-1.214*** (0.233)	1.394*** (0.243)	-2.461** (0.963)	-1.181*** (0.233)	1.397*** (0.239)
Rho SIVC-GVC		0.332*** (0.040)			0.307*** (0.042)	
Rho SIVC-TVC		-0.869*** (0.052)			-0.829*** (0.056)	
Rho GVC-TVC		-1.375*** (0.074)			-1.440*** (0.067)	
Industry, Country, Year, Stage dummies		Yes			Yes	
N		3914			3914	
log likelihood		-2978.3551			-2971.1048	

Panel B	Model III-A		Model IV-A	
	Impact Orientation	Social Orientation	Environmental Orientation	
GVC-SIVC	-0.203*	-0.018	-0.200	
GVC-TVC	0.754***	0.925***	0.258	
SIVC-TVC	0.957***	0.943***	0.458	

Notes. Panel A of the table reports the estimated coefficients and, in brackets, the robust standard errors of the coefficients of trivariate probit models, whose dependent variables are the presence of different investor types in each sample first investment. Industry, Year, Country and Stage dummies are included in the model but omitted in the table. Panel B shows the differences in the coefficients and the significance levels for the *Impact Orientation*, *Social Orientation* and *Environmental Orientation* variables across the three equations of the trivariate probit. The number of employees and sales were collected by combining available information from Orbis and Dealroom and refer to the year before the investment (or investment year in case previous year data is unavailable). Significance: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

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