Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Are We Accelerating Equity Investment into Impact-Oriented Ventures?

(Published in *World Development*, Vol. 131, July 2020)

Saurabh A. Lall

School of Planning, Public Policy and Management, University of Oregon

1209 University of Oregon, Eugene, 97403

(541) 346 7354

slall@uoregon.edu

Li-Wei Chen

Strome College of Business, Old Dominion University

2052 Constant Hall, Norfolk, VA 23529

(757) 683 3547

l3chen@odu.edu

Peter W. Roberts

Goizueta Business School, Emory University

1300 Clifton Road, Atlanta, GA, 30322

(404) 727-8585

peter.roberts@emory.edu

Please cite as: Lall, S. A., Chen, L. W., & Roberts, P. W. (2020). Are we accelerating equity investment into impact-oriented ventures?. *World Development*, 131, 104952. https://doi.org/10.1016/j.worlddev.2020.104952

Email slall@uoregon.edu for final in-print version.

Keywords: Entrepreneurship, Economic development, Accelerators, Equity investment, Emerging markets, Women entrepreneurs

Are We Accelerating Equity Investment into Impact-Oriented Ventures?

Keywords: Entrepreneurship, Economic development, Accelerators, Equity investment, Emerging markets, Women entrepreneurs

Abstract

Impact-oriented accelerators, a relatively new type of entrepreneur support program, are proliferating as practitioners, philanthropic funders, and investors work to unlock the full potential of entrepreneurship-led economic development. These accelerators aspire to support entrepreneurs, in large part by driving investment into promising ventures that work in marginalized sectors and regions around the world. Given the opportunity costs of the human, organizational, and financial resources required to run accelerators, it is important to determine whether they are having this intended impact. To assess the effect of acceleration on outside equity investment, we analyze application and follow-up data from a matched sample of 1,647 entrepreneurs who applied to 77 impact-oriented accelerators. Our main finding is promising. In the first follow-up year, accelerator program participants attract significantly more outside equity than their rejected counterparts. Further analysis suggests that this positive equity bump is not due to cherry picking obviously promising ventures during selection processes. Moreover, the effect is tied to the number of accelerated months in the follow-up year. Despite these promising observations, we find that the equity investment effect does not extend to ventures working in emerging markets, or to those with women on their founding teams. Thus, the benefits of accelerators for entrepreneurship-led development are not yet reaching the places and people that have the hardest time attracting capital on their own. We conclude the paper by outlining the challenges associated with extending the positive effects of acceleration into entrepreneurial domains that are most challenging from an economic development perspective.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Highlights

1. Impact-oriented accelerators represent a new type of entrepreneurial support program that is spreading around the world.
2. Using data from 77 accelerators, we find accelerated ventures raise more outside equity investment than rejected ventures.
3. This positive equity bump is not due to programs picking obviously-promising ventures during their selection processes.
4. The positive equity bump is tied to the number of accelerated months in the follow-up year.
5. Virtually all the equity gains flow to ventures in high-income countries, and those started by all-male founding teams.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

1. Introduction

A growing number of researchers, practitioners, and policy-makers share a common belief in the importance of entrepreneurial experimentation and success for broad-based economic progress (Naudé, 2010). Whether or not new company founders view themselves as 'social' entrepreneurs (Cieslik, 2016; Santos, 2012; Terjesen *et al.*, 2016), there is excitement about the economic, environmental, and societal benefits that are realized when promising entrepreneurs and ventures reach their full potential. However, the optimism associated with entrepreneurship is tempered by the reality that too many promising entrepreneurs in too many regions and sectors do not get the support they need to develop their ideas into growing businesses (Brixiova *et al.* 2015; Baird, 2017; McKenzie and Sansone, 2019; McMullen, 2011).

When addressing the regional and sectoral deficits of positive entrepreneurial outcomes, there is growing acknowledgment that we must look past the quality of entrepreneurs and consider how under-developed institutional environments and ecosystems hinder widespread entrepreneurial success (Brixiova *et al.*, 2015; Brown and Mason, 2017; Dhahri and Omri, 2018; Thompson *et al.*, 2018). In other words, before inferring a paucity of promising entrepreneurs, we must first recognize and address structural problems like the lack of market connectivity, business training, and appropriate early-stage financing (Beck and Demirgüç-Kunt, 2006; Klinger and Schündeln, 2011; Le and Nguyen, 2009; McKenzie and Woodruff, 2015; McMullen, 2011).

In countries and regions where knowledge, social, and financial capital do not flow naturally toward promising people and ideas, entrepreneurs need help. Accelerator programs are a relatively recent addition to the cadre of initiatives that aspire to support the growth-oriented entrepreneurs who must navigate problematic ecosystems. These programs provide training and

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

technical assistance along with mentorship and networking support (Cohen *et al.*, 2018; Gonzalez-Uribe and Leatherbee, 2018). They also act as certifiers that reduce information asymmetries between entrepreneurs and investors (Kim and Wagman, 2014; Plummer *et al.*, 2016).[1] Thus, an expanding literature suggests that accelerators are integral service providers in established entrepreneurial ecosystems (Brown and Mason, 2017; Spigel and Harrison, 2018; Stam, 2015). They help young companies raise much-needed capital investment (Cohen *et al.*, 2018; Crișan *et al.*, 2019; Gonzalez-Uribe and Leatherbee, 2018; Plummer *et al.*, 2016; Radojevich-Kelly and Hoffman, 2012; Roberts and Lall, 2019) by overcoming barriers identified in past research (Ngoasong & Kimbu, 2016; Le and Nguyen, 2009; McMullen, 2011; Ramachandran and Shah, 1999).

Accessing capital is among the biggest challenges for nascent entrepreneurs in any sector or geography, but especially for those engaging in impact-oriented entrepreneurship (McMullen, 2011). To advance the research on entrepreneur support programs like accelerators, we need to generate more evidence relating investment flows to program participation. In doing so, we must look beyond the most prominent seed and corporate accelerators and analyze data from a broad range of impact-oriented programs. This is the first contribution of our study. Our unique dataset covers entrepreneurs who applied to scores of impact-oriented accelerators that began accepting applications between 2013 and 2016. Our data include information – collected during program applications – about ventures, founding teams, and pre-program performance. They also identify which applicants went on to participate in each program. Finally, these data include follow-up information collected from selected and rejected applicants in the year following each application window.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

To determine whether accelerator program participation influences the inflow of outside equity investment, we estimate simple regression models that relate outside equity investment in the follow-up year to that reported on program applications, plus another variable that indicates program participation. This baseline analysis indicates that program participation is indeed associated with additional outside equity investment. However, we must move past these partial correlations to present effects that are plausibly stimulated by program participation. This is the second contribution of our study. Our basic research aspiration is complicated by the fact that accelerators spend considerable time and effort identifying ventures that are worthy of consideration, and then selecting the most promising of them for participation (Gonzalez-Uribe and Leatherbee, 2018; Pauwels *et al.*, 2016). They do this by employing a range of specialized search and screening practices. Therefore, part of the treatment effect of an accelerator is its ability to find, recruit and work with entrepreneurs whose promise is overlooked, something that might be called an idiosyncratic selection effect.

To focus on idiosyncratic selection plus treatment effects, we cull the rejected ventures in our initial sample and only include those that closely match participants on predictions of what we call their readily observed promise. We then elaborate the basic model to see how the baseline effect of program participation changes when we account for the fact that the placement of the different programs during the calendar year leads to variance in the number of accelerated months in the follow-up year. This allows us to tie the estimated acceleration effect to actual program participation, and not to the simple fact that programs tend to identify and work with ventures that are on trajectories that are more promising. One more model elaboration identifies how much of this more precise participation effect can be attributed to the variance in predictions of readily observed promise.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Finally, we must demonstrate the fault lines in the observed effects. This is the final contribution of our study. Our initial models suggest that impact-oriented accelerators do influence the flow of outside equity investment into participating ventures. However, the evidence is not all positive. Rather, we present some sobering results suggesting that the places (emerging markets) and people (women) that are most in need of equity investment acceleration do not see the same benefits from accelerator program participation. These observations are critical for scholars and policymakers interested in the links between entrepreneurship and economic development and suggest important directions for future research.

The sum of our empirical and methodological contributions only manifest if they also stimulate novel thinking about the efficacy of entrepreneurial support programs in different settings. We therefore conclude the paper by discussing how our findings provoke deeper thinking about the role that entrepreneurship and acceleration might play in stimulating genuine broad-based economic development. This includes thoughts on how accelerators, which seem to work for impact-oriented ventures in institutional environments that resemble Silicon Valley, may not be ready to address the systemic structural challenges encountered in emerging markets. We also discuss how accelerators, which help entrepreneurs reframe their hybrid motivations for traditional equity investors, may not be ready to address the inherent biases faced by traditionally marginalized entrepreneurs, like women, who face documented access barriers when working in normalized entrepreneurial settings.

The remainder of our paper proceeds as follows. To provide context for our analyses, we briefly review the recent history of accelerators. We then describe the *Entrepreneurship Database Program* at Emory University, which provides the data analyzed in the paper. After presenting a preliminary estimate of a significant positive effect of program participation on one-

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

year equity investment growth, two follow-on analyses increase confidence that this effect is not an artifact of problematic selection biases. The final analyses focus on whether impact-oriented accelerators are supporting marginalized entrepreneurs working in the marginalized regions. The paper concludes by discussing the implications of our findings for research on accelerators, and for the continued optimism about the nexus of entrepreneurship and economic development.

2. The Emergence of the Accelerator Model

The best-known accelerators were established in the U.S. technology sector by individuals wanting to close gaps in early-stage financing (Hathaway, 2016; Younger and Fisher, 2018). Y Combinator, launched in 2005, is widely regarded as the first. After its inception, 5,000 US-based startups accelerated between 2005 and 2015 raised nearly $20B in venture capital investment (Hathaway, 2016). These successes, along with the interest in stimulating entrepreneurship in marginalized regions and sectors, led to an explosion in the number of accelerators working all over the world (Gonzalez-Uribe and Leatherbee, 2018; Goswami *et al.*, 2018; Pauwels *et al.*, 2016; Yitshaki and Drori, 2018). While estimates vary, more than 1,000 organizations self-identify as accelerators on platforms like F6S (www.f6s.com) and GUST (www.gust.com). Using more precise definitions, researchers identified more than 300 accelerators in the United States (Hallen *et al.*, 2014) and 130 programs in emerging markets around the world (Aspen Network of Development Entrepreneurs, 2016).

These accelerators share certain features with incubators, which gained prominence in the late 1990s and early 2000s (Hackett and Dilts, 2004; Mrkajic, 2017; Stokan *et al.*, 2015), in that they focus on delivering educational programming to early-stage ventures (Isabelle, 2013; Miller and Bound, 2011). However, they differ in several key respects (Hochberg, 2016). Whereas

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

incubators might temporarily insulate ventures from their external environments (Amezcua *et al.*, 2013; Mrkajic, 2017; Rothaermel and Thursby, 2005), accelerators tend to intensify market interactions and connections with potential funders so that entrepreneurs can quickly develop ventures and obtain growth capital (Cohen, 2013; Drover *et al.*, 2017; Hochberg, 2016). Whereas incubators might work with ventures over several years, accelerators tend to provide shorter and more intense programs of education, mentorship, peer-to-peer learning, and investment facilitation (Cohen, 2013; Cohen *et al.*, 2018; Gonzalez-Uribe and Leatherbee, 2018). Finally, whereas joining incubators is not typically hyper-competitive, accelerators tend to be highly selective, leading to stiff competition for acceptance into programs (Gonzalez-Uribe and Leatherbee, 2018; Younger and Fisher, 2018; Yu, 2019).

Since the early 2000s, the accelerator model has evolved into three sub-types, depending on the strategic focus and funding structure (Pauwels *et al.*, 2016; Yang *et al.*, 2018; Younger and Fisher, 2018). There are now seed, corporate, and impact-oriented accelerators. The most well-known type is the seed accelerator – pioneered by Y Combinator, and followed by programs like Alchemist, Techstars, and 500 Startups – which provides small amounts of seed funding plus programmatic offerings in exchange for equity stakes in participating ventures (Pauwels *et al.*, 2016; Younger and Fisher, 2018). Corporate accelerators, like those run by Microsoft and Nike, aim to identify promising startups that complement existing product or technological portfolios (Kohler, 2016; Shankar and Shepherd, 2018).

Most of the early research on accelerators focuses on these first two program types; see Lall *et al.* (2013) and Pandey *et al.* (2017) for exceptions. However, it is equally critical to examine the third group of impact-oriented accelerators. These programs work with marginalized entrepreneurs (e.g., women or minorities) in marginalized cities, regions or countries, or with

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

entrepreneurs in high-impact sectors like agriculture, education, or healthcare. Thus, they work with ventures that have the potential to address social or environmental challenges, while providing the requisite commercial benefits to investors, employees and customers (Bruton *et al.*, 2013; McMullen, 2011). Some (e.g., Endeavor) work to stimulate general economic development and focus on measures like job creation and income elevation. Others want their ventures to target specific social or environmental impacts. For example, The Toilet Accelerator focuses on sanitation ventures in emerging markets. Still others have more broad-based societal impacts in mind, like promoting an entrepreneurial culture within their country (e.g., Start-Up Chile) or increasing the representation of women and minorities (e.g., SheEO).

Despite the plurality of types, most accelerators share common features and have common conceptions of what it means to be successful (Pauwels *et al.*, 2016). They develop pipelines of entrepreneurs in relatively open application processes and then select the most promising entrepreneurs into their programs. During their programs, they seek to bolster the commercial and investment foundations of the ventures that they engage. In the end, they work with entrepreneurs to provide direct and indirect access to investment capital, usually in the form of outside equity investment (Cohen, 2013; Miller and Bound, 2011).

Although investment is important for all early-stage ventures (Carpenter and Petersen, 2002; Hellmann and Puri, 2000), capital constraints can be more binding for impact-oriented ventures (Austin *et al*., 2006; McMullen, 2011; Sahasranamam and Nandakumar, 2018). The additional degree of difficulty stems from two root causes. First, competing organizational aspirations – commercial plus impact – make it harder for traditional investors to evaluate entrepreneurs and their ventures (Battilana *et al*. 2015). Boundary spanning is inherently problematic for organizations (Hsu *et al.* 2009). Because impact-oriented ventures straddle the

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

traditional for-profit versus nonprofit boundary, they create some uncertainty that makes it more difficult to appeal to equity investors (Ebrahim *et al.* 2014). Second, marginalized entrepreneurs, and those from weaker institutional environments, are more likely to have commitments to specific societal impacts. Hechavarria *et al*. (2012) suggest that women are more likely to launch impact-oriented ventures, partly due to traditional role alignments and prior experiences. Similarly, Chen and Roberts (2013) find that companies in lower-income countries are more likely to express deep commitments to specific societal impacts. While the framing problems that come with hybridity make potential investors uneasy, the additional stigma faced by marginalized people in marginalized places create additional challenges. Deeply held biases about women and minorities as entrepreneurs (Kanze *et al.* 2018; Brooks *et al.* 2014), and well-documented problems sourcing profitable investments in lower-income countries (Ramachandran and Shah, 1999; Aterido, Beck, & Iacovone, 2013; Ngoasong and Kimbu, 2019; Henricson-Briggs, 2017) represent additional challenges for many impact-oriented entrepreneurs. In light of these layered challenges, impact-oriented accelerators support ventures by providing direct seed investments[2] (Cohen, 2013; Miller and Bound, 2011), or by connecting promising participants with potential investors. These latter connections happen during demo days, pitch competitions, and networking sessions (Cohen *et al.*, 2018; Hochberg, 2016; Miller and Bound, 2011; Yu, 2019).

The next three sections present a detailed analysis based on novel data that answers and then elaborates on the question: Does participation in an impact-oriented accelerator lead to increased equity investment?

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

3. Data and Sample

Several research papers examine the effectiveness of entrepreneurial support vehicles like incubators (Amezcua *et al.*, 2013), angel investors (Kerr *et al.*, 2014), and business plan competitions (Klinger and Schündeln, 2011; Fafchamps and Woodruff, 2016; McKenzie, 2017; Fafchamps and Quinn, 2017; McKenzie and Sansone, 2019). However, fewer projects tackle similar questions about whether accelerators influence critical outcome variables, like early-stage investment. This seems odd given that certain characteristics of accelerators – i.e., their relatively short duration and their cohort-based design – provide settings that are appealing to researchers. It is also odd given the tremendous growth in the numbers of accelerators working around the world, particularly impact-oriented programs supported by public and philanthropic resources.

Our analysis leverages data obtained from a global sample of entrepreneurs who applied to impact-oriented accelerators during the 2013 to 2016 period. The data come from the *Entrepreneurship Database Program* (EDP) at Emory University, which operates as part of the *Global Accelerator Learning Initiative* (see www.galidata.org). The EDP launched in 2013 to support research into the cause-and-effect relationships that relate to accelerating impact-oriented ventures (Roberts and Lall, 2019). It deploys a standardized set of questions that every participating accelerator includes in its application processes. Because it is not a separate survey, the EDP leverages the time that entrepreneurs already spend completing program applications. This increases responsiveness and facilitates observation of (close to) the entire pool of serious applicants. When application and selection processes are complete, program managers also record which applicants actually participate in their programs.

To get a sense of the kind of programs that work with the EDP, consider Village Capital, the Unreasonable Institute, and the Points of Light (POL) Civic Accelerator. Village Capital runs

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

programs that focus on five impact areas (health, education, financial inclusion, agriculture, and energy) in multiple regions (Sub-Saharan Africa, South Asia, Latin America, and less-developed regions in the United States). A typical program cohort consists of ten to twelve entrepreneurs recruited in an open application process. The curriculum is delivered in-person during three four-day workshops. At the end of each program, the cohort of entrepreneurs votes for one or two of their peers to receive (typically) $50,000 in funding. The amount of external investment raised by entrepreneurs is a key success metric for Village Capital, and their programs include several training modules that help entrepreneurs build the soft and hard skills required for successful fundraising. The Unreasonable Institute (now called Uncharted) manages or operates programs in the United States, Mexico, and East Africa, but works with entrepreneurs around the world. They select ten to fifteen ventures into each cohort and provide them with a structured five-day boot camp along with ongoing support from mentors and advisors. The program facilitates introductions to a curated group of investors who are relevant to each entrepreneur and provides entrepreneurs with a fundraising coach and individualized training on fundraising. Finally, the POL Civic Accelerator helps social entrepreneurs address difficult societal challenges in the United States by offering ten-week boot camps for cohorts of ten to fifteen founding teams, with a focus on facilitating investments to scale their social impact. Programs offer a combination of educational content, peer-peer learning, and connections to investors, business leaders, and strategic partners. In the end, two ventures from each cohort are selected to receive $50,000 in investment, either as a convertible debt note (for for-profit ventures) or as a revenue share agreement (for nonprofit ventures).

Beginning with every entrepreneur who applied to partnering programs between 2013 and 2016, and who agreed to share their application data with the EDP, we set aside programs

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

with less than ten applications. These more tenuous programs did not attract enough entrepreneurs to create tracking pools of participating and rejected entrepreneurs. We also set aside a few larger programs that, for different reasons, did not generate enough data from both participating and rejected entrepreneurs. We then set aside a small number of entrepreneurs who provided nonsense data on their application or follow-up surveys (e.g., reporting more than $100M of prior-year revenue). Finally, given our emphasis on outside equity investment, we set aside ventures that self-identify as nonprofits on their applications. These organizations do not typically rely as heavily on outside equity investment.[3] This leaves 5,453 entrepreneurs who applied to 77 different accelerator programs run by 29 different organizations. A total of 904 of these entrepreneurs (15.4 percent) participated in programs (see Table 1).

The EDP application data include pre-acceleration information about ventures and venture performance, along with information about founding team backgrounds. In the year after the respective application windows, 2,853 of the entrepreneurs completed follow-up surveys, for an overall response rate of 52.3 percent. As shown in Table 1, the follow-up survey response rate for participating ventures (72.5 percent) is much higher than that for the rejected ventures (48.3 percent). However, there is no evidence that respondents and non-respondents differ – for either participating or rejected ventures – on the levels of outside equity investment reported on application surveys (see Table 1).

The equity investment variables are based on responses to the question "How much equity financing did your venture obtain from all outside sources in [the last] calendar year?" The two waves of EDP data allow us to compare the amount of equity investment reported in the calendar year prior to application with corresponding levels in the next year. However, the problem with simply comparing participating entrepreneurs with those rejected from applicant

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

pools is that we expect the latter ventures to have lower expected potential.

Table 1. The Sample

	N	Prior-Year Equity	Predicted Promise	Follow-Up Response Rate
Full-Sample:	5,453	$16,796	0.17	52.3%
• Rejected	4,549	$15,535	0.16	48.3%
• Participated	904	$23,141	0.18	72.5%
• % Participated	15.4%			
With Follow-Up	2,853	$16,982	0.17	n/a
• Rejected	2,198	$14,626	0.16	n/a
• Participated	655	$24,889	0.18	n/a
• % Participated	23.0%			
Matched Sample	1,647	$23,066	0.18	n/a
• Rejected	1,098	$20,419	0.17	n/a
• Participated	549	$28,361	0.18	n/a
• % Participated	33.3%			
Average Prior-Year Equity; With Follow-up – Without Follow-up:				
Overall	n/a	$186 (t=0.07; p=0.94)	0.0001 (t=1.15; p=0.25)	n/a
• Rejected	n/a	-$909 (t=-0.31; p=0.76)	0.0001 (t=0.09; p=0.92)	n/a
• Participated	n/a	$1,747 (t=0.34; p=0.73)	0.0006 (t=0.21; p=0.83)	n/a
Average Prior-Year Equity; With Follow-up – Matched Sample:				
Overall	n/a	$6,083 (t=1.55; p=0.12)	0.011 (t=6.81; p=0.000)	n/a
• Rejected	n/a	$5,793 (t=1.15; p=0.25)	0.012 (t=6.83; p=0.000)	n/a
• Participated	n/a	$3,472 (t=0.58; p=0.56)	0.003 (t=0.98; p=0.33)	n/a

Any estimated effects of acceleration on venture-level outcomes are conditioned on ventures being chosen to participate in a program.[4] We know that accelerators invest considerable time and effort developing robust applicant pipelines as they hone their ability to identify the most promising entrepreneurs (Cohen, 2013; Hochberg, 2016). These latter choices reflect judgments about each venture's underlying potential. Predicting future entrepreneurial performance and impact are generally acknowledged to be difficult (Fafchamps and Woodruff, 2016; McKenzie and Sansone, 2019), and accelerators typically use many screening criteria and selection heuristics deployed by teams of internal and external selectors. These multi-stage

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

selection processes include reviews of written applications, video pitches, interviews, and in some cases site visits. Selectors scrutinize a combination of objective variables (e.g., reported revenues, employees, and investment levels) and intangible factors (e.g., evidence of resilience, perseverance, leadership, or coachability) (Ciuchta *et al.*, 2017; Cohen *et al.*, 2018; Gonzalez-Uribe and Leatherbee, 2018; Pauwels *et al.*, 2016; Roberts and Lall, 2019). While the specifics that describe each accelerator's selection processes vary, most focus on characteristics of the venture and its founding team. Some, but not all, of these factors are readily observable and interpretable by other potential supporters and funders. In this sense, program participation is determined in part by generic assessments of variables that anyone might observe; something we call readily observed promise.

We use the EDP data to assess the extent to which the various selection decisions are based on readily observed variables that are processed in similar ways by all potential supporters and investors. We do this by leveraging the detailed, but in many ways generic, information about ventures and founding teams collected during the application processes. Using the entire sample of applicants and the decisions made by 77 different selection panels, we estimate a single logit model. This model is based on variables that accelerators and investors claim to emphasize during their selection processes, and that can be accessed by anyone who might want to support the venture. To construct the readily observed promise equation, we begin with roughly 100 variables generated by the EDP application survey data and then employ a backward-reduction process.[5] The Akaike information criteria (AIC) is invoked to sequentially remove variables that do not contribute to the overall fit of the model. This removes most of the variables, leaving the readily observed promise equation reported in Table 2.

Using this equation, every venture in the sample is assigned a predicted promise score,

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

which is the predicted probability (ranging from zero to one) of participating in any accelerator based on the common wisdom of 77 selection committees. As expected, predicted promise is significantly higher for ventures that participate in programs (see Table 1). However, the association is far from perfect, largely because these scores do not incorporate the additional information, insights, and interpretations gleaned during the intensive and idiosyncratic application processes of individual programs.

Table 2. Predicted Promise Equation
(Logistic Regression; DV = Participated in Program)

	Participated
Has Social Motives (Yes = 1)	-0.164 (0.131)
Business Model: Production	-0.217** (0.091)
Business Model: Distribution	0.088 (0.096)
Business Model: Wholesale or Retail	0.200** (0.097)
Business Model: Service	-0.254*** (0.082)
Has a Social Media Page (Yes=1)	0.065** (0.028)
Revenues in Year Prior ($ thousands)	0.0002* (0.0001)
Full-Time Employees in Year Prior (#)	-0.005 (0.004)
Wages Paid in Year Prior ($ thousands)	0.0003 (0.0002)
Own Money Invested in Year Prior ($M)	-0.001 (0.016)
New Debt Incurred in Year Prior ($M)	1.202 (0.666)
Debt Sources (#)	0.207*** (0.052)
Grant Sources (#)	0.076* (0.045)
Multiple Founders (Yes=1)	-0.106 (0.091)
Average Founding Team Age	-0.003 (0.004)
Founders with a Graduate Degree (#)	0.206*** (0.047)
Constant	-1.443*** (0.209)

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

N	5,453
Log Likelihood	-2,405.241
Akaike Inf. Crit.	4,844.482

*p<0.1; **p<0.05; ***p<0.01

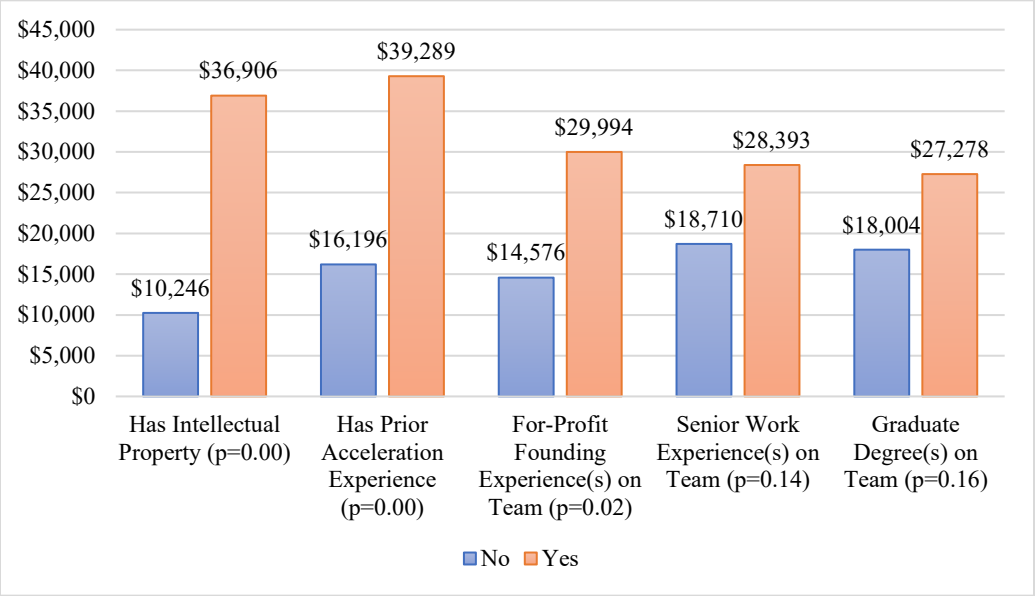
To ensure that the rejected ventures in our analysis resemble those that participate, we use the predicted promise scores to find two matches for each participant. The first is the rejected venture from the same application pool with the closest predicted promise score, and the second is the rejected venture from all other applicant pools operating in the same sector and country with the closest predicted promise score. Table 1 shows how this matching process leaves 549 participants and 1,098 matches. It also shows how the participants and rejected ventures are largely similar, although not identical, when it comes to predicted promise and prior-year equity investment levels. Because of these modest differences, our models include prior-year equity and predicted promise as additional covariates.

Our dependent variable is the level of equity investment (in thousands of US dollars) reported on follow-up surveys. The main independent variable indicates whether a venture participated in the program to which it applied. For reasons that will become obvious later, we multiplied the binary participation variable by twelve. This allows us to estimate the per-month average increment in outside equity investment associated with program participation. The most important control variable in all models is the level of equity reported in the previous year (again in thousands of US dollars). This variable captures the extent to which entrepreneurs are willing and able to secure equity investment on their own before applying to accelerators. In support of this assumption, Figure 1 shows how prior-year equity investment moves with several variables that are known to drive outside equity investment. For example, prior-year equity investment is more than three times higher for ventures that reporting owning patents, copyrights or trademarks. It is almost three times higher when founding teams report prior accelerator program

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

participation and roughly twice as high when they report prior entrepreneurial experience.

Figure 1. Exploring Additional Covariates



The models include additional control variables that also influence equity investment levels, two of which are central to our analysis. The first indicates whether a venture operates in a high-income country (according to the 2015 World Bank classification), which tend to offer a greater supply of potential investment funding. The second indicates whether there is a woman on the founding team. This latter inclusion is mandated by the growing volume of research that documents the difficulties women entrepreneurs have securing outside equity investment. The models also include a set of fixed organization effects to account for the fact that some accelerators are systematically better when it comes to driving investment to entrepreneurs. They also include a set of fixed year effects to account for different funding conditions across years.

Summary statistics and correlations for the variables of interest are reported in Table 3.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Table 3. Summary Statistics and Correlations (N=1,647)

	Mean	Std. Dev.	(1)	(2)	(3)	(4)	(5)
(1) Follow-Up Equity	33,815.45	146,622.70	1.00				
(2) Prior-Year Equity	23,066.20	133,400.20	0.51	1.00			
(3) High-income Country Venture	0.41	0.49	0.17	0.14	1.00		
(4) Woman on Team	0.47	0.50	-0.09	-0.05	-0.09	1.00	
(5) Participated in Program (months)	4.00	5.66	0.06	0.03	0.01	-0.01	1.00

4. Results

According to Table 4, roughly 53 percent of prior-year equity investment carries over into the next year. As expected, ventures working in high-income countries attract significantly more equity in their follow-up year, while teams with women founders attract less outside equity investment, an effect that is marginally significant ($p<0.06$). Finally, accelerator program participation corresponds with an additional $13,176 of equity investment (or $1,098 per month times twelve months); an increment that is significant at the $p<0.05$ level.[6]

Table 4. Effects of Accelerator Program Participation on Equity Investment

	Follow-Up Equity
Prior-Year Equity	0.533**
	(0.023)
High-income Country Venture	31.268**
	(8.762)
Woman on Team	-12.470
	(6.374)
Participated – Each of 12 Months	1.098*
	(0.551)
Adjusted R-squared	0.278
N	1,647

*p<0.1; **p<0.05; ***p<0.01

The significant participation effect supports the prediction that impact-oriented accelerators increase the flow of equity investment funds into early-stage ventures. However, even though we invoke a matching process to construct our sample, some might argue that participating ventures are on trajectories that are conditioned by their inherent promise and a string of difficult-to-predict events and developments, all of which are unaffected by experiences

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

with accelerators. With this mindset, the participation variable simply indicates ventures with more inherent promise, and therefore on more positive trajectories. The counter to this belief is that investment trajectories for participating ventures are more positive after accelerators start working with entrepreneurs.

We distinguish among these beliefs by leveraging the fact that the sampled programs begin in different months during their follow-up years, while some do not begin until after the follow-up calendar year is over. For example, among the various *POL Civic Accelerator* programs; Cohort 3 (2013) launched in October while Cohort 7 (2016) began in March (see Table 5). Therefore, entrepreneurs in Cohort 7 have ten accelerated months in the follow-up data, while those in Cohort 3 have just three. In other cases, programs do not launch until the window covered by the first follow-up surveys is closed. For example, the *Unreasonable Institute's* Mexico (2016) program began soliciting applications in late 2016. However, the program did not start until March of 2017. Therefore, both the application surveys (which capture 2015 information) and the follow-up surveys (which capture 2016 information) lapse in the pre-program window. Neither accepted nor rejected ventures received any acceleration.

If the estimated participation effect would have happened anyway, then changes in equity investment should be indistinguishable in the months before and after a program's launch. In this case, the number of actually accelerated months in the follow-up window will not influence the estimated participation effect. If, on the other hand, accelerator participation produces larger investment increments, then decomposing the participation variable to account for the number of accelerated months in the follow-up year will improve the model's performance.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Table 5. Program Start Dates and Accelerated Months

		Application Year	Program Year	Start Month	Accelerated Months
Village Capital	Africa Fintech	2016	2017	January	0
	Ahmedabad Tech4Impact	2013	2013	April	9
Unreasonable Institute	Mexico 2016	2016	2017	March	0
	East Africa 2015	2015	2015	June	7
POL Civic Accelerator	Cohort 3	2013	2013	October	3
	Cohort 7	2016	2016	March	10

The first model in Table 6 breaks the participation variable into these two components: the first (accelerated months) counts the number of months in the follow-up year that fall on or after the start of the program, while the second (non-accelerated months) counts the months that predate program launch. The coefficient estimates suggest that the equity investment effect reported in Table 4 is entirely due to the number of accelerated months. On average, each month that a participant spends in or after a program results in a significant increment of $3,815. Conversely, each non-accelerated month corresponds with a non-significant decline of $287.

The second column of Table 6 presents a model that includes predicted promise as another covariate. The predicted promise variable has a significant positive effect, which suggests that the generic factors that predict participation in any accelerator are manifest in observed equity improvements. However, the incremental effect of program participation on equity investment is only slightly smaller ($3,321 per month) and still significant ($p<0.05$).

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Table 6. Accounting for Accelerated Months and Predicted Promise

	Follow-Up Equity	Follow-Up Equity	Follow-Up Equity
Prior-Year Equity	0.533** (0.023)	0.528** (0.023)	0.483*** (0.024)
High-income Country Venture	29.507** (8.791)	26.165** (8.803)	18.992** (8.706)
Woman on Team	-12.722* (6.368)	-13.502* (6.346)	-14.091** (6.241)
Participated – Accelerated Months	3.815** (1.385)	3.321** (1.386)	2.951** (1.361)
Participated – Non-Accelerated Months	-0.287 (0.851)	-0.359 (0.848)	-0.584 (0.834)
Predicted Promise	-	233.116** (62.905)	-
Predicted Follow-up Equity	-	-	0.544*** (0.066)
Organization Fixed Effects	Yes	Yes	Yes
Program Year Fixed Effects	Yes	Yes	Yes
Adjusted R-squared	0.280	0.285	0.309
N	1,647	1,647	1,647

*p<0.1; **p<0.05; ***p<0.01

To assess the robustness of these effects, we perform additional tests developed by Chetty *et al*. (2011, 2014a, b). We follow Chetty *et al*. (2011) and perform a two-step test of the effects of variables omitted from our models, but correlated with the follow-up equity variable. In the first step, we examine the correlations between variables omitted from our models and the accelerated months variable. We first regress follow-up equity on the variables omitted from our model but identified as having effects on program selection (see Table 2). Then, we record the amount of follow-up equity predicted by this OLS model. The correlation between predicted follow-up equity and accelerated months is 0.11, indicating the potential for unobserved selection effects. In the second step, we replace predicted promise with predicted follow-up equity in column 2 of Table 6. The result, presented in the final column of Table 6, shows that

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

our main effect holds after controlling for the selection effects attributed to omitted variables.[7] Since the construction of the accelerated months variable simply reflects the variable program start dates (which cannot be influenced by entrepreneurs), we are able to take advantage of this plausibly exogenous variation in our analysis.

All of the observations in Table 6 suggest that participating in an impact-oriented accelerator has a positive average effect on a venture's ability to raise outside equity. However, given the impact-orientation of the accelerators in this study, it is important for scholars and policymakers to know whether this effect is evident in more challenging environments, or among typically marginalized entrepreneurs.

5. A Closer Look at Emerging Markets and Women Entrepreneurs

Along with the general interest in stimulating impact-oriented entrepreneurship are more specific concerns that places like Mexico, Kenya and India do not currently benefit from the value-added transformations that successful entrepreneurs bring to Silicon Valley (Baird, 2017). In these emerging markets, under-developed institutional environments have difficulties channeling bank financing (Brixiova *et al.*, 2015; Bruton *et al.*, 2011; Islam, 2016; Robson *et al.*, 2013) and limit opportunities for equity investment (Dutt *et al*., 2016; Khoury *et al*., 2015). The imperative to double down on impact-oriented ventures in places where development challenges are greatest produces many broad-based efforts to identify and support promising entrepreneurs. For instance, the World Bank's infoDev program oversees "a global network of business incubators and innovation hubs for climate technology, agribusiness, and digital entrepreneurs (see /www.infodev.org/about)." The USAID's Partnering to Accelerate Entrepreneurship initiative works to "catalyze private-sector investment into early-stage enterprises and identify

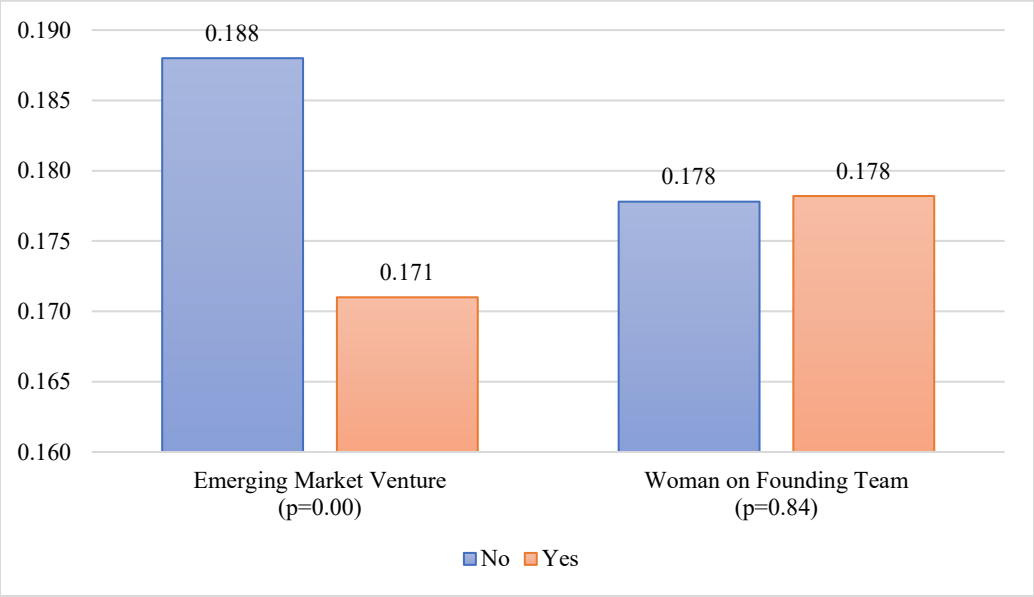
Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

innovative models or approaches that help entrepreneurs bridge the pioneer gap – thus unlocking the potential of thousands of promising enterprises around the world (see www.usaid.gov/PACE)." These global efforts recognize the importance of acceleration and help support a proliferation of accelerators that focus on emerging markets. Because of the heightened need and the greater challenges, it is critical to understand the effects that accelerators have on ventures operating in emerging markets.

There are similar concerns about the outsized challenges that women entrepreneurs face when it comes to raising capital (Terjesen *et al.*, 2016). A study of US entrepreneurs finds that "women started their firms with significantly less capital than men" and that "women also went on to raise significantly smaller amounts of follow-on capital, both debt and equity (Coleman and Robb, 2009)." Numerous additional observations suggest that this general disadvantage is amplified when it comes to attracting outside equity investment (Carter *et al.* 2003; Balachandra *et al.* 2019; Roberts and Lall, 2019). Clearly, promising women entrepreneurs struggle to get recognition for their underlying potential, while facing additional knowledge, network, and capital gaps. Because accelerators are designed to address these ecosystem deficiencies, many feel that they are well positioned to overcome gender biases when it comes to outside equity investment.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Figure 2. Predicted Promise across Sub-Samples



To examine whether the estimated effects of acceleration extend into these twice-marginalized groups, our final analyses isolate two sets of ventures – those that operate in emerging markets, and then those (in all markets) with women on their founding teams. The EDP application data identify the country in which each venture operates. We use this information and the 2015 World Bank country classifications to divide the sample into ventures that operate in a high-income country versus those that operate in low, lower middle, or upper middle-income countries (i.e., emerging markets). The data also identify the gender of the three main founders of each venture. We use this information to mark ventures that have at least one woman on their founding team. Before analyzing the effects of accelerator participation, Figure 2 shows how the average predicted promise score for the 966 emerging-market ventures is significantly lower than that observed among the 681 high-income country ventures. However, there is no such difference between the 772 ventures with woman founders and the 875 all-male teams.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

The first two columns of Table 7 show how the effects of predicted promise and accelerator participation differ in the two regional sub-samples. For ventures operating in high-income countries, we observe the positive effects of predicted promise and accelerated months. The latter coefficient estimate suggests that program participation leads to an annualized increase in outside equity of investment of almost $70,000. However, neither of these variables exerts a significant effect in the emerging-market sub-sample. This suggests that emerging-market ventures are not getting credit for their generic promise. Nor are they getting any significant outside equity acceleration from program participation. Turning to the two gender sub-samples, the data suggest that women entrepreneurs do get credit for predicted promise, although the effect is smaller than that observed among the all-male teams. More important for current purposes, accelerator program participation does not offset this muted effect. Instead, the estimated effect of actual program participation is not significantly different from zero among ventures with women founders. In the end, the positive effect of acceleration on equity investment that we observe in the full sample does not hold for these two important groups of marginalized entrepreneurs.

Table 7. Isolating Emerging-Market Ventures and Ventures with Women Founders

	High-Income Countries	Emerging Markets	All-Men Founding Team	Woman On Founding Team
Prior-Year Equity	0.520** (0.035)	0.634** (0.047)	0.684** (0.033)	0.185** (0.030)
High-income Country Venture	-	-	14.422 (13.414)	37.333** (9.502)
Woman on Team	-20.765 (14.602)	-9.005* (4.017)	-	-
Participated – Accelerated Months	5.774* (2.675)	-1.174 (1.061)	5.158** (2.267)	1.683 (1.382)
Participated – Non-Accelerated Months	-1.232 (2.153)	0.725 (0.519)	-1.589 (1.333)	1.045 (0.882)
Predicted Promise	369.269**	22.245	308.352**	232.031**

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

	(125.432)	(46.713)	(105.836)	(61.344)
Organization Fixed Effects	Yes	Yes	Yes	Yes
Program Year Fixed Effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.280	0.181	0.371	0.117
N	681	966	875	772

*p<0.1; **p<0.05; ***p<0.01

6. Discussion

It is widely believed that impact-oriented entrepreneurship is critical for widespread economic development; that outside equity investment is a critical input into the success of promising early-stage ventures; and that accelerators help stimulate outside equity investments into otherwise-marginalized impact-oriented ventures. It is also believed that the importance of entrepreneurial success – and therefore equity investment - is greater in emerging markets and for marginalized entrepreneurs; and that accelerators are even more important when it comes to overcoming the outsized challenges faced by these entrepreneurs. Our findings paint a 'glass half full' picture of the recent performance of impact-oriented accelerators. Using a matched sample of entrepreneurs who applied to scores of accelerators around the world, we provide evidence that accelerator program participation corresponds with significant increments to the inflows of outside equity investment. According to Table 6, actual program participation corresponds with an annualized average increment of more than $45,000. When we account for the fact that some of this gain is attributable to the ventures' predicted promise, and arguably could have happened anyway, the annualized accelerator bump declines to roughly $40,000.

This optimism about accelerating equity investment fades, however, when we home in on the more marginalized ventures operating in emerging markets or founded by women entrepreneurs. While accelerators may have important effects on other dimensions of new

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

venture performance, they are not obviously helping to overcome the problematic access to outside equity investment in the most challenging ecosystems. Nor are they helping the promising women-led ventures to overcome the systemic gender biases documented across a range of entrepreneurial ecosystems (Alsos *et al.*, 2006; Carter *et al*., 2003; Aterido, Beck, & Iacovone, 2013; Eddleston *et al.*, 2017), and especially in emerging markets, where growth-oriented women-led businesses have been described as "constrained gazelles" (Ngoasong and Kimbu, 2019, p.40). In contrast to the findings of Aterido, Beck, and Iacovone (2013) in sub-Saharan Africa, we find *ex ante,* male and female led ventures show similar promise based on observable characteristics, so the null effect does indicate the persistence of a gender gap. While these companies share many of the same characteristics as male-led businesses, they have slower growth trajectories due to the many gendered challenges they face. Our mixed results suggest that we must think more deeply about the role of accelerators when it comes to stimulating impact-oriented entrepreneurship. Clearly, they are not silver bullets that universally stimulate new venture growth (Roberts and Lall, 2019).

In this spirit, we revisit the main contributions of this study. First, our novel dataset sheds light on an important but understudied entrepreneurial phenomenon: impact-oriented acceleration. Impact-oriented accelerators, often supported by public and philanthropic resources, receive a fraction of the scholarly attention paid to seed and corporate accelerators. They are similar to, but also different from, the other accelerator models because they seek to improve entrepreneurial outcomes in the hope of stimulating economic and societal development. Thus, they are central to the expanding body of literature that probes the nexus of growth-oriented entrepreneurship and economic development. Our sample of programs draws attention to this new and important institutional actor as a candidate for further inquiry (Dhahri

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

and Omri, 2018; Fafchamps and Quinn, 2017; Klinger and Schündeln, 2011; Naude, 2011), while our baseline results provide the motivation for this additional research.

The second contribution, which is both methodological and practical, relates to how we deal with the purposeful selection of ventures into programs. It is practically important because accelerators are not open to anyone who can pay fees (e.g., co-working spaces) and are purposefully more selective than other kinds of interventions (e.g., training courses offered by community colleges or local economic development organizations or business plan competitions). Our empirical approach recognizes that accelerators view selection as a key component of their models, and not a problematic confound. The EDP data allow us to combine the merits of a matched sample with the benefits of some seemingly exogenous variation. Our matched sample of rejected ventures relies on predicted promise based on variables that are readily observable to all potential supporters. Because predicted promise scores do not fully account for differences in outside equity growth, we can infer that there is value inherent in the combination of idiosyncratic (and intangible) selection plus programming. We further refine our estimates by leveraging exogenous variation in the number of accelerated months in the follow-up year for the different ventures in the sample. Overall, while respecting the merits of different causal inference methods, our identification strategies align with the practical and theoretical construct of acceleration, which emphasizes the ability to identify and select promising ventures that are not otherwise recognized.

In the end, we are able to reframe the econometric issue of treatment-versus-selection by recognizing that a non-trivial part of the treatment of acceleration is idiosyncratic selection. Based on our findings, we also suggest that instead of simply controlling for selection, researchers must start asking whether accelerators should focus more effort on pipeline building

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

and entrepreneur selection, or on developing more effective programming. As more entrepreneurial support programs emphasize the importance of selection – i.e., finding the promise hidden in non-traditional people, places and ideas – this methodological contribution can help inform the research that examines the effectiveness of these programs.

The results from our various models have real implications for practitioners and policymakers who are keen to support accelerators as a driver of entrepreneur-led economic development. Viewing our baseline result in the context of prior studies of accelerators and equity investment, impact-oriented acceleration seems to be able to overcome issues related to hybridity and access to finance highlighted by McMullen (2011). As long as the entrepreneur conforms to stereotypes (i.e., is male), and as long as his venture operates in an acceptable place (i.e., a high-income country), then the intense programming offered by accelerators allows the more impact-oriented entrepreneur to learn how to appeal to outside equity investors. However, accelerators are currently less able to address the more fundamental issues associated with marginalization. The various stigma associated with being a female entrepreneur, and the core structural problems associated with working in under-developed ecosystems present challenges that seem beyond the scope of the accelerators in our sample.

The mixture of positive and null findings identifies how the research agenda moving forward must grapple with a few core questions. The first set of questions relates to the operational choices of accelerator program managers. Although we control for fixed organizational effects in our models, our findings do not explain which program choices actually help the most marginalized entrepreneurs secure additional outside equity investment. This begs the twin questions of 'what can accelerators do to be more effective' and 'how can we assess the efficacy of these various choices'? We know that some accelerators are exploring ways to make

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

their programs more inclusive by adopting peer-based assessment processes for the investments they make, reducing their emphasis on demo days, and adjusting the length and timing of their workshops. We call for additional research, including more qualitative studies, to describe and document the practices that lead to real investment acceleration in emerging markets and among women entrepreneurs.

Looking past these programmatic choices, we also need a better understanding of how the external environment influences accelerator program efficacy. Because most of the decisions that drive equity investment happen outside of the programs themselves, we must be reflective about how much agency accelerator program managers actually have on the flow of funds. Our main finding suggest that accelerators are able to work with promising entrepreneurs to influence how they engage investors, and that these efforts do influence investors' decisions. However, we do not have evidence that these same accelerators are influencing the structural biases that stigmatize certain places and people. In this spirit, we encourage researchers to think about and to study what needs to change outside of the context of the accelerator before we can expect to see benefits for twice-marginalized impact-oriented entrepreneurs. Are there roles for programs to engage more deeply with the investment community to improve the reception of these people and places? At the extreme, can we start thinking that the problem might be with equity investment as the dominant type of investment for these entrepreneurs? If there were fewer male-oriented and inflection-oriented venture capitalists making the decisions that drive capital into impact-oriented ventures, then perhaps emerging-market and female entrepreneurs would also be able to benefit from the accelerator model

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

7. Conclusion

As Naudé (2011) points out, the field of economic development tends to overlook the role played by growth-oriented entrepreneurs, electing to focus on informal or survival-oriented micro-entrepreneurs. At the same time, the field of entrepreneurship, which rarely confronts development issues, tends to obsess on a handful of high-tech entrepreneurs in a handful of hotspots (Aldrich and Ruef, 2018). Our study fills this gap by probing the intersection of impact-oriented entrepreneurship and economic development. We do so by examining a recent addition to the population of entrepreneur support programs; impact-oriented accelerators that provide cohort-based and time bound programs, with the aim of improving access to outside investment.

Data from a broad sample of ventures and programs suggest that acceleration does increase the flow of outside equity investment into impact-oriented ventures. This finding is important for policymakers, donors, and other supporters that seek to augment the benefits generated by robust entrepreneurial activity. However, the data also suggest that ventures working in emerging economies and those with female founders are not experiencing the same benefits. These patterns attest to the nuanced thinking that is required to fully understand the effects of accelerators on different kinds of entrepreneurs and entrepreneurial outcomes. The mixed findings suggest that we should continue to support accelerators, while looking for programmatic innovations that address the problematic null effects. We therefore close by calling on scholars to build on these empirical and methodological contributions in further research on impact-oriented accelerators, and for policymakers and practitioners to identify and implement novel approaches to overcome the geographic and gender gaps when it comes to accelerating access to equity finance.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

8. Endnotes

[1] Other studies find that accelerators help entrepreneurs fail faster, which is viewed as another worthwhile outcome because it supports a more efficient allocation of entrepreneurial capital (Smith and Hannigan, 2015; Yu, 2019).

[2] The main objective of these investments is not to maximize the financial return. Instead, impact-oriented accelerators see their primary role as ecosystem builder and tend to rely on philanthropic and government funding as the primary means of support (Global Accelerator Learning Initiative, 2017). As Ross Baird – founder and president of Village Capital – explains, "entrepreneur support organizations may never be 'revenue-sustainable' in a traditional sense. That's actually OK! These organizations, when effective, are critical infrastructure for a city or a community, and should be treated as such (Baird, 2017)."

[3] Only 32 of these 640 nonprofits (roughly 5%) reported receiving any outside equity investment. This rate is substantially lower than that reported by the remaining ventures in the sample (roughly 19%). The average outside equity investment reported by the 640 nonprofits (roughly $1,000) is also lower than the average for the other ventures (see Table 1).

[4] Existing studies of acceleration deal with selection in several ways. Plummer *et al.* (2016) deploy a Heckman two-stage model as a robustness check to rule out concerns about selection. Winston-Smith and Hannigan (2015) use a combination of matching and a two-stage model to compare accelerated ventures with similar businesses that received funding from angel groups. Yu (2019) also uses a matched sample of ventures that appear similar to accelerated ventures, using generally observable criteria such as industry, prior founding experience, founding year, and geographic location. Gonzalez-Uribe and Leatherbee (2018) apply a fuzzy regression discontinuity design to data from Startup Chile to identify the causal effect of participation.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Cohen *et al.* (2018) use a similar approach, comparing ventures that were barely-accepted with those that were barely-rejected.

[5] The backward-induction variable selection technique in a logit model (with the dichotomous participation variable as its dependent variable) allows us to see what this readily observed promise function looks like without any binding assumptions. We also try constructing the model by using BIC rather than AIC and by using different methods, such as Bayesian Model Averaging (Hoeting *et al.*, 1999). The final models from these methods are very restricted, i.e. only three variables in the final model. We pick the model from the AIC approach in consideration of the balance between machine output and existing theory. Model outputs from Bayesian Model Averaging and BIC approach are available upon request.

[6] Given the pronounced skew in the dependent variable, we estimated a variant of this model using logged follow-up equity investment and obtained a similar pattern of effects. In other unreported models, we checked for sector effects, intellectual property effects, and prior accelerator participation effects. None of these additional variables exerted any significant influence on the model.

[7] We also follow Colombo and Murtinu (2017) and Krauth (2016) to implement a sensitivity analysis of correlations with unobservables suggested by Altonji *et al*. (2005). We examine the sensitivity of the model's results by assuming the correlation between omitted variables and the treatment variable, namely accelerated months, falls within a certain range. First, we jointly estimate a system of two OLS models that include the variables found in column 1 of Table 6. The dependent variable for the first equation is the number of accelerated months, while the dependent variable for the second equation is the amount of follow-up equity. The correlation across the two models is 0.07. This low correlation is not surprising because the start date for a

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

program, and therefore its accelerated months, is plausibly unrelated to the underlying equity investment performance of its participants. We then adopt Krauth's (2016) generalization of Altonji *et al*. (2005)'s method to estimate how sensitive our results are to the correlation with unobservables. The (unreported) model shows that the effect of accelerated holds up to the point where the correlation between the treatment variable and the unobservables is 7% higher than that between the treatment and the control variables. In other words, our results depend on the assumption that the treatment variable is largely exogenous to the omitted variables. Since applicants have no influence on the timing of the program's start date (and therefore, the number of accelerated months), we are confident that this requirement holds.

9. References

Aldrich, H.E., Ruef, M. 2018. Unicorns, gazelles, and other distractions on the way to understanding real entrepreneurship in the United States. Academy of Management Perspectives 32, 458-472.

Alsos, G.A., Isaksen, E.J., Ljunggren, E. 2006. New venture financing and subsequent business growth in men- and women-led businesses. Entrepreneurship Theory and Practice, 30, 667–686.

Altonji, J.G., Elder, T.E., Taber, C.R. 2005. Selection on observed and unobserved variables: Assessing the effectiveness of Catholic schools. Journal of Political Economy 113, 151–184.

Amezcua, A.S., Grimes, M.G., Bradley, S.W. 2013. Organizational sponsorship and founding environments: A contingency view on the survival of business incubated firms, 1994-2007. Academy of Management Journal, 56, 1628–1654.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Aspen Network of Development Entrepreneurs. 2016. State of the Small and Growing Business Sector. The Aspen Institute.

Aterido, R., Beck, T., & Iacovone, L. (2013). Access to finance in Sub-Saharan Africa: is there a gender gap?. World Development, 47, 102-120.

Austin, J., Stevenson, H., Wei-Skillern, J. 2006. Social and commercial entrepreneurship: same, different, or both? Entrepreneurship Theory and Practice, 30, 1-22.

Baird, R. 2017. The Innovation Blind Spot: Why We Back the Wrong Ideas—and What to Do About It. Benbella Books.

Balachandra, L., Briggs, T., Eddleston, K., Brush, C. 2019. Don't pitch like a girl! How gender stereotypes influence investor decisions. Entrepreneurship Theory and Practice, 43, pp.116-137.

Beck, T., Demirgüç-Kunt, A. 2006. Small and medium-size enterprises: Access to finance as a growth constraint. Journal of Banking and Finance, 30, 2931–2943.

Ben Spigel, Harrison, R. 2018. Toward a process theory of entrepreneurial ecosystems. Strategic Entrepreneurship Journal, 12, 151–168.

Brixiová, Z., Ncube, M., Bicaba, Z. 2015. Skills and youth entrepreneurship in Africa: Analysis with evidence from Swaziland. World Development, 67, 11-26.

Brooks, A.W., Huang, L., Kearney, S.W. Murray, F.E. 2014. Investors prefer entrepreneurial ventures pitched by attractive men. Proceedings of the National Academy of Sciences, 111, 4427-4431.

Brown, R., Mason, C. 2017. Looking inside the spiky bits: A critical review and conceptualisation of entrepreneurial ecosystems. Small Business Economics, 49, 11–30.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Bruton, G.D., Ketchen, D.J., Jr., Ireland, R.D. 2013. Entrepreneurship as a solution to poverty. Journal of Business Venturing, 28, 683–689.

Bruton, G.D., Khavul, S., Chavez, H. 2011. Microlending in emerging economies: Building a new line of inquiry from the ground up. Journal of International Business Studies, 42, 718–739.

Carpenter, R.E., Petersen, B.C. 2002. Is the growth of small firms constrained by internal finance? Review of Economics and Statistics, 84, 298–309.

Carter, N.M., Brush, C.G., Greene, P.G., Gatewood, E.J., Hart, M.M. 2003. Women entrepreneurs who break through to equity financing: The influence of human, social, and financial capital. Venture Capital 5, 305–324.

Chen, L.-W., Roberts, P.W. 2013. Founders and the Social Performance of B Corporations. Academy of Management Proceedings.

Chetty, R., Friedman, J.N., Rockoff, J.E. 2011. The long-term impacts of teachers: Teacher value-added and student outcomes in adulthood. National Bureau of Economic Research Working Paper Series.

Chetty, R., Friedman, J.N., Rockoff, J.E. 2014a. Measuring the impacts of teachers I: Evaluating bias in teacher value-added estimates. American Economic Review, 104, 2593–2632.

Chetty, R., Friedman, J.N., Rockoff, J.E. 2014b. Measuring the impacts of teachers II: Teacher value-added and student outcomes in adulthood. American Economic Review, 104, 2633–2679.

Cieslik, K. 2016. Moral economy meets social enterprise community-based green energy project in rural Burundi. World Development, 83, 12-26.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Ciuchta, M.P., Letwin, C., Stevenson, R., McMahon, S., Huvaj, M.N. 2017., Betting on the coachable entrepreneur: Signaling and social exchange in entrepreneurial pitches. Entrepreneurship Theory and Practice, 42, 860–885.

Cohen, S.G. 2013. What do accelerators do? Insights from incubators and angels. Innovations, 8, 19–25.

Cohen, S.L., Bingham, C.B., Hallen, B.L. 2018. The role of accelerator designs in mitigating bounded rationality in new ventures. Administrative Science Quarterly, 64, 810-854.

Coleman, S., Robb, A. 2009. A comparison of new firm financing by gender: Evidence from the Kauffman Firm Survey data. Small Business Economics, 33, 397–411.

Colombo, M.G., Murtinu, S. 2017. Venture capital investments in europe and portfolio firms' economic performance: Independent versus corporate investors. Journal of Economics and Management Strategy, 26, 35–66.

Crișan, E.L., Salanță, I.I., Beleiu, I.N., Bordean, O.N., Bunduchi, R. 2019. A systematic literature review on accelerators. The Journal of Technology Transfer, 1-28.

Dhahri, S., Omri, A. 2018. Entrepreneurship contribution to the three pillars of sustainable development: What does the evidence really say? World Development, 106, 64-77.

Drover, W., Busenitz, L., Matusik, S., Townsend, D., Anglin, A., Dushnitsky, G. 2017. A review and road map of entrepreneurial equity financing research: Venture capital, corporate venture capital, angel investment, crowdfunding, and accelerators. Journal of Management, 43, 1820–1853.

Dutt, N., Hawn, O., Vidal, E., Chatterji, A., McGahan, A., Mitchell, W. 2016. How open system intermediaries address institutional failures: The case of business incubators in emerging-market countries. Academy of Management Journal, 59, 818-840.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Ebrahim, A., Battilana, J., Mair, J. 2014. The governance of social enterprises: Mission drift and accountability challenges in hybrid organizations. Research in Organizational Behavior, 34, 81-100.

Eddleston, K.A., Ladge, J.J., Mitteness, C., Balachandra, L. 2017. Do you see what I see? Signaling effects of gender and firm characteristics on financing entrepreneurial ventures:. Entrepreneurship Theory and Practice, 40, 489–514.

Estrin, S., Mickiewicz, T., Stephan, U. 2016. Human capital in social and commercial entrepreneurship. Journal of Business Venturing, 31, 449–467.

Fafchamps, M., Quinn, S. 2017. Aspire. The Journal of Development Studies, 5310, 1615-1633.

Fafchamps, M., Woodruff, C. 2016. Identifying gazelles: Expert panels vs. surveys as a means to identify firms with rapid growth potential. World Bank Economic Review.

Global Accelerator Learning Initiative. 2017. The Global Accelerator Landscape: The 2016 Survey, www.galidata.org.

Gonzalez-Uribe, J., Leatherbee, M. 2018. The effects of business accelerators on venture performance: Evidence from Start-Up Chile. Review of Financial Studies, 31, 1566–1603.

Goswami, K., Mitchell, J.R., Bhagavatula, S. 2018. Accelerator expertise: Understanding the intermediary role of accelerators in the development of the Bangalore entrepreneurial ecosystem. Strategic Entrepreneurship Journal, 12, 117–150.

Hackett, S.M., Dilts, D.M. 2004. A systematic review of business incubation research. The Journal of Technology Transfer, 29, 55–82.

Hallen, B.L., Bingham, C.B., Cohen, S.G. 2014. Do accelerators accelerate? A study of venture accelerators as a path to success? Academy of Management Proceedings, 12955–12955.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Hathaway, I. 2016. Accelerating growth: Startup accelerator programs in the United States. Advanced Industry Series, 81.

Hellmann, T., Puri, M. 2000. The interaction between product market and financing strategy: The role of venture capital. Review of Financial Studies, 13, 959–984.

Henricson-Briggs, K. 2017. Business incubation in Dar es Salaam. Africa Journal of Management, 3, 163-1836

Hochberg, Y.V. 2016. Accelerating entrepreneurs and ecosystems: The seed accelerator model. Innovation Policy and the Economy, 16, 25–51.

Hoeting, J.A., Madigan, D., Raftery, A.E., Volinsky, C.T. 1999. Bayesian model averaging: A tutorial. Statistical Science, 14, 382–401.

Hsu, Greta, Michael T. Hannan, Koçak, Ö. 2009. Multiple category memberships in markets: An integrative theory and two empirical tests. American Sociological Review, 74, 150-169.

Isabelle, D.A. 2013. Key factors affecting a technology entrepreneur's choice of incubator or accelerator. Technology Innovation Management Review, 3, 16–22.

Islam, A. 2015. Entrepreneurship and the allocation of government spending under imperfect markets. World Development, 70, 108-121.

Kanze, D., Huang, L., Conley, M.A., Higgins, E.T., 2018. We ask men to win and women not to lose: Closing the gender gap in startup funding. Academy of Management Journal, 61, 586-614.

Kerr, W.R., Lerner, J., Schoar, A. 2014. The consequences of entrepreneurial finance: Evidence from angel financings. Review of Financial Studies, 27, 20–55.

Khoury, T.A., Junkunc, M., Mingo, S. 2015. Navigating political hazard risks and legal system quality: Venture capital investments in Latin America. Journal of Management, 41, 808-840.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Kim, J.-H., Wagman, L. 2014. Portfolio size and information disclosure: An analysis of startup accelerators. Journal of Corporate Finance 29, 520–534.

Klinger, B., Schündeln, M. 2011. Can entrepreneurial activity be taught? Quasi-experimental evidence from Central America. World Development, 399, 1592-1610.

Kohler, T. 2016. Corporate accelerators: Building bridges between corporations and startups. Business Horizons, 59, 347–357.

Krauth, B. 2016. Bounding a Linear Causal Effect Using Relative Correlation Restrictions. Journal of Econometric Methods, 5(1), 117–141.

Le, N.T., Nguyen, T.V. 2009. The impact of networking on bank financing: The case of small and medium–sized enterprises in Vietnam. Entrepreneurship Theory and Practice, 33, 867-887.

Lall, S., Bowles, L., Baird, R. 2013. Bridging the "pioneer gap": The role of accelerators in launching high-impact enterprises. Innovations: Technology, Governance, Globalization, 8, 105–137.

McKenzie, D. 2017. Identifying and spurring high-growth entrepreneurship: Experimental evidence from a business plan competition. American Economic Review, 107, 2278–2307.

McKenzie, D., Sansone, D. 2019. Predicting entrepreneurial success is hard: Evidence from a business plan competition in Nigeria. Journal of Development Economics, 141.

McKenzie, D., Woodruff, C. 2015. Business Practices in Small Firms in Developing Countries. The World Bank.

McMullen, J.S. 2011. Delineating the domain of development entrepreneurship: A market-based approach to facilitating inclusive economic growth. Entrepreneurship Theory and Practice, 35, 185–193.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Miller, P., Bound, K. 2011. The Startup Factories: The Rise of Accelerator Programmes to Support New Technology Ventures. Nesta.

Mrkajic, B. 2017. Business incubation models and institutionally void environments. Technovation, 68, 44-55.

Naudé, W. 2010. Entrepreneurship, developing countries, and development economics: New approaches and insights. Small Business Economics, 34, 1–12.

Naudé, W. 2011. Entrepreneurship is not a binding constraint on growth and development in the poorest countries. World Development, 39, 33–44.

Ngoasong, M.Z., Kimbu, A.N. 2019 Why hurry? The slow process of growth in women-owned businesses in resource-scarce contexts. Journal of Small Business Management. 57, 40-58.

Ngoasong, M. Z. and Kimbu, A. N. (2016). Informal microfinance institutions and development-led tourism entrepreneurship. Tourism Management, 52, 430-439.

Pandey, S., Lall, S., Pandey, S. K., Ahlawat, S. 2017. The appeal of social accelerators: what do social entrepreneurs value? Journal of Social Entrepreneurship, 8, 88-109.

Pauwels, C., Clarysse, B., Wright, M., Van Hove, J. 2016. Understanding a new generation incubation model: The accelerator. Technovation, 50-51, 13–24.

Plummer, L.A., Allison, T.H., Connelly, B.L. 2016. Better together? signaling interactions in new venture pursuit of initial external capital. Academy of Management Journal, 59, 1585–1604.

Radojevich-Kelly, N., Hoffman, D.L. 2012. Analysis of accelerator companies: An exploratory case study of their programs, processes, and early results. Small Business Institute Journal, 8, 54–70.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Ramachandran, V., & Shah, M. K. (1999). Minority entrepreneurs and firm performance in sub-Saharan Africa. The Journal of Development Studies, 36(2), 71-87.

Roberts, P.W., Lall, S. 2019. Observing Acceleration: Uncovering the Effects of Accelerators on Impact-Oriented Entrepreneurs. Palgrave-Macmillan.

Robson, P., Akuetteh, C., Stone, I., Westhead, P., Wright, M. 2013. Credit-rationing and entrepreneurial experience: Evidence from a resource deficit context. Entrepreneurship and Regional Development, 25, 349–370.

Rothaermel, F.T., Thursby, M. 2005. University–incubator firm knowledge flows: Assessing their impact on incubator firm performance. Research Policy, 34, 305–320.

Sahasranamam, S., Nandakumar, M.K. 2018. Individual capital and social entrepreneurship: Role of formal institutions. Journal of Business Research.

Santos, F.M. 2012. A positive theory of social entrepreneurship. Journal of Business Ethics, 111, 335–351.

Scarlata, M., Walske, J., Zacharakis, A. 2015. Ingredients matter: How the human capital of philanthropic and traditional venture capital differs. Journal of Business Ethics, 145, 623–635.

Shankar, R.K., Shepherd, D.A. 2018. Accelerating strategic fit or venture emergence: Different paths adopted by corporate accelerators. Journal of Business Venturing.

Smith, S.W., Hannigan, T.J. 2015. Swinging for the fences: How do top accelerators impact the trajectories of new ventures? The DRUID Academy Conference.

Stam, E. 2015. Entrepreneurial ecosystems and regional policy: A sympathetic critique. European Planning Studies, 23, 1759–1769.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952

Stokan, E., Thompson, L., Mahu, R.J. 2015. Testing the differential effect of business incubators on firm growth. Economic Development Quarterly, 29, 317–327.

Terjesen, S., Bosma, N., Stam, E. 2016. Advancing public policy for high-growth, female, and social entrepreneurs. Public Administration Review, 762, 230-239.

Thompson, T.A., Purdy, J.M., Ventresca, M.J. 2018. How entrepreneurial ecosystems take form: Evidence from social impact initiatives in Seattle. Strategic Entrepreneurship Journal, 12, 96–116.

Yang, S., Kher, R., Lyons, T.S. 2018. Where do accelerators fit in the venture creation pipeline? Different values brought by different types of accelerators. Entrepreneurship Research Journal, 8, 348.

Yitshaki, R., Drori, I. 2018. The "give and take" of mentorship processes within accelerators. Academy of Management Proceedings, 15669.

Younger, S., Fisher, G. 2018. The exemplar enigma: New venture image formation in an emergent organizational category. Journal of Business Venturing, forthcoming.

Yu, S. 2019. How do accelerators impact the performance of high-technology ventures? Management Science, forthcoming.

Zahra, S.A., Gedajlovic, E., Neubaum, D.O., Shulman, J.M. 2009. A typology of social entrepreneurs: Motives, search processes and ethical challenges. Journal of Business Venturing, 24, 519–532.

Accepted Preprint. Final version (*World Development*) - https://doi.org/10.1016/j.worlddev.2020.104952