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Effectiveness of a Peruvian Dynamic Entrepreneurship Program and the Implications of Participants' Selection

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Abstract*

Entrepreneurship is becoming an important source of economic activity and each time more sophisticated institutional arrangements (ecosystems) are populating more developed markets, as chances to grow fast and big in specific niches of those markets attract all necessary stakeholders for these ecosystems to work (entrepreneurs, investors, universities tech transfer offices, business accelerators, corporate and public procurers, etc.). In front of this, in less developed markets, some innovation agencies have been piloting opportunity driven startup programs, trying to cope with some of the barriers that these markets face so as to identify, select and give to potentially highly productive startups a real chance to succeed. This paper presents the results of an impact evaluation of one of those programs: Startup Peru. In doing so, the paper innovates in three ways, compared to traditional impact evaluations: first, it analyzes and emphasizes the importance of selection of most suitable candidates in the effectiveness of the program, and hence the role of resource reallocation to most productive options that public policy should play when designing and implementing this type of programs. Second, the evaluation exploits a comprehensive set of observables of the entrepreneurs, the entrepreneurial teams, the entrepreneurship and the ecosystem as well as proxies for non-observable traits such as risk aversion, self-confidence, etc. Third, the paper pays attention to impact conditional on survival as to prevent compositional changes induced by mortality of firms. The paper finds positive effects on the performance of the entrepreneurship (sales, hiring, external investment, quality of employment, etc.) but it fails to find impact on entrepreneurs' earnings. Analysis shows that in great extent this is consequence of poor selection heavily reliant on soft skills while evidence confirms the significance of traditional observables such as experience of the lead entrepreneur (as entrepreneur and in the same sector of the entrepreneurship) or the orientation of the entrepreneurship (B2B rather than B2C) as the main drivers of success. Should positive discrimination have been conducted, program's effects could have doubled with equal or lower budget. Policy implications on selection are currently conducting the redesign of the program and the design of similar program in other ecosystems of the region.

JEL Classification: C93, M13, L26, O12, J24

Keywords: ecosystem, entrepreneurship, effectiveness, necessity, opportunity, innovation, selection, startup

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1. Introduction

Entrepreneurial ecosystems and accompanying entrepreneurship programs have increased dramatically during recent decades.¹ Peru, a growing middle-income country with a share of 84%² of young firms, is not an exception. During the last decade, Peru has witnessed the emergence and growth of both the number of young firms entering into the economy³ and the number of programs intended to entertain the needs of these newcomers.⁴ Inspired by international practice, these programs have provided different solutions and services to countervail the shortages faced by entrepreneurs who try to advance a potentially successful business idea. The most emblematic public program of innovative entrepreneurship in Peru is Startup Peru and since 2014 it has provided seed capital and incubation (through participant incubators) to over 300 beneficiaries. Besides the support to entrepreneurs, the program has also provided substantial financing to strengthen the ecosystem through grants for incubators, grants for soft-landing, grants for development of regional ecosystems, funding of venture capital funds, etc. In spite all these efforts, no impact evaluation was conducted to date. This document evaluates if the direct treatment to the entrepreneurs has been impactful in a number of outcomes, ranging from the performance of the startup to the returns to the entrepreneur.

The document addresses a number of questions: Has the program followed appropriate selection mechanism as to identify the most promising startups? Are hard characteristics of the lead entrepreneur (such as previous experience in successful entrepreneurial activity or relevant previous labor experience in the same sector as the one of the startup) more influential on selection? And on effectiveness? How impactful is the program on entrepreneurs' results and on entrepreneurship's results? Are impact heterogeneous by group of beneficiaries? The main lessons drawn are the following:

- Impacts of the most stigmatic innovative entrepreneurship program of Peru are positive and significant, for the entrepreneurship. The evaluation of outcomes at the level of entrepreneur (e.g. earnings) do not show significant difference between the treated and control groups.

¹ Morelix (2015) documents the rise of entrepreneurship in US college campuses (for example, in 1985, there were about 250 courses offered in entrepreneurship at US college campuses across the nation. In 2008, that number was 5,000).

² Figure corresponds to the number of firms that were born up to 12 months prior December of 2016 over the total number of firms observed in December 2016. The computation considers only formal firms of the private sector according to Peruvian administrative records. The percentage for firms born up to 36 months before and up to 60 months before are 62.9% and 45% respectively.

³ In Perú, in 2015, 135 private firms were created (105 were shut down) on average every day (estimate based on administrative records)

⁴ See Honorati and Cho (2014) and McKenzie and Woodruff (2013) for a list of some evaluated entrepreneurship programs around the world.

- Selection matters, and current practices when assignment is not random are inconsistent with intended positive discrimination of better candidates. That is, programs with a sequential selection process in which assignment is determined by a subjective pitch, end up choosing based on the soft skills of pitchers while scores about observables of their business ideas, their actual firms or the entrepreneurs themselves are, for all practical purposes, disregarded as predictors of success and sorted at random.
- Should positive discrimination have been implemented following the sorting criteria suggested by the propensity score, as much as twice the impact, with similar or lower budget, could have been achieved.

These findings have started to influence through sounder monitoring and evaluation practices to improve the design and implementation of entrepreneurship programs. For example, in Startup Perú, the implementation of the impact evaluation after five generations of the program allowed the systematization and digitalization of the application survey, and therefore the automatization of the baseline collection. This substantially improved the monitoring capacities of the agency for this program, and it has allowed more expedite observation of the efficacy of the assignment (regarding positive discrimination of the candidates). In fact, the assignment mechanism also was revised and puts higher attention to the information of those characteristics that proved to be influential on success. While this information is not binding for selection, it is used by the evaluators in the speed dating phase so as to weigh in relevant observables that in previous rounds were systematically disregarded. We expect that these findings will also help to redesign other existing startup programs and will guide policy design related to entrepreneurial development in the region. The remainder of the document is structured as follows: Section II provides a succinct review of the literature of effectiveness of entrepreneurship programs; Section III presents a brief description of Startup Peru; Section IV reports the results and Section V concludes.

2. Do startup programs work? Existing evidence on the effectiveness of startup programs

One of the main drivers of this study is to learn about the effectiveness of startup programs in Peru. Actual national policies put them on the frontline of productive and employment strategies for the promotion of entrepreneurial activity, either to generate self-employment or to spur private

activity and productive business,⁵ and therefore increase job openings. Currently, the most stigmatic opportunity driven entrepreneurship program in the country is Startup Peru⁶. What do existing impact evaluations of similar programs tell about the utility of startup programs to achieve the aforementioned goals? Are there specific differences according to the type of program, region under study or the applied identification strategy? Do specific treatments prove to be more impactful? Is timing between treatment and evaluation an important issue to detect effects?

To begin this review, it is prudent to highlight the main difference between the intended outcomes of employment-oriented entrepreneurship programs – like Fondoempleo - and innovation oriented startup programs – like StartUp Perú. The first ones respond to the necessity of creating jobs through self-employment activities, and therefore they aim at enhancing employment or improving employability. The second one responds to the aim of advancing commercially suitable innovative ideas or solutions. Thus, while the first ones are focused on the entrepreneur, the second are more oriented to the entrepreneurship and all the factors determining its success (entrepreneur, project, ecosystem). This difference will determine the theory of change behind each type of intervention, the target beneficiaries, the specific treatments and the relevant intended outcomes. While literature about the taxonomy of *entrepreneurship* according to its motivational impulse (necessity for work or opportunity of a business) is abundant^{7,8}, existing literature on the effectiveness of *entrepreneurship programs* aimed at improving either of these two types of entrepreneurial activities is not, especially for the innovation oriented startup programs that are quite recent in the region⁹.

One of the most comprehensive systematic studies about the effectiveness of employment-oriented entrepreneurship programs in developing countries to date, is the paper by Honorati and Cho (2014). Their meta-regression analysis reviewed 37 impact evaluations (experimental and quasi-experimental covering 25 countries of all World Bank regions, with 28%

⁵ Various entrepreneurship programs aimed at fostering employability or productive capacities and innovation are active in the Peruvian ministries of labor and production respectively.

⁶ Other relevant existing programs include “*Ideas Audaces Perú*” of CONCYTEC (this program promotes innovative startups with technological base and commercial scalability), and two general entrepreneurship programs: “*Fondoempleo*” (for which an experimental evaluation is currently undergoing) and “*Impulsa Perú*” of the Ministry of Labor (this program is oriented to enhance labor skills in order to improve employability and entrepreneurial capacities of the beneficiaries).

⁷ See Fairlie and Fossen (2017) for a recent and comprehensive recount of significant literature about the taxonomy of entrepreneurship of necessity and opportunity.

⁸ Hosseini et al (2012) propose a taxonomy of entrepreneurial firms distinguishing among entrepreneurial orientation and corporate entrepreneurship. Ramlogan and Rigby (2013) identify in their review two forms of support of entrepreneurship policies. They say “There is a form of support providing advice and information to early stage firms, and a form of support to nascent firms or pre-firms (pre start-up) where the recipient is the entrepreneur or would-be entrepreneur. Schemes of the former type are assessed by reference to the conventional economic impact categories, sales, employment and firm survival. Schemes of the latter type are assessed by reference to the outcomes for the recipient of the support, usually employment status (unemployed, employed (as an entrepreneur)) and income.”

⁹ Startup Chile, the most well-known innovation oriented startup program in the region had its first call in 2010. Other important regional initiatives include Startup Brazil (or FINEP Startup) launched in 2013, iNNpulsa Colombia since 2012, the creation of INADEM in 2013 Mexico and Startup Peru in 2012. See OECD (2016) for a brief summary of most salient Latin America startup programs.

of the estimates concentrated in LAC) and drew lessons from the effects (and the design) of such programs. The paper observes wide variation in program effectiveness across different interventions depending on outcomes, types of beneficiaries, and country context. Overall, they find that entrepreneurship programs have a positive and large impact for youth and on business knowledge and managerial practice, but no immediate translation into business setup and expansion or increased income. That is, these programs can affect managerial behavior among beneficiaries in the short term but do not foster improvements in business performance in the medium/long run. Also of relevance is that in a more recent study on long-term effects of managerial training, Bloom et al (2018) find that half of the management practices adopted by beneficiaries are dropped eight years after treatment. On a related note, Fairlie, Karlan and Zinman (2015) in their paper “Behind the GATE Experiment: Evidence on Effects of and Rationales for Subsidized Entrepreneurship Training” also find that in the US, entrepreneurship training programs have been more effective for unemployed people and only in the short term. Another influential reference in the literature is the qualitative review on business training programs for entrepreneurs conducted by McKenzie and Woodruff (2013). Their review covers 16 RCTs and 1 RDD including an early necessity entrepreneurship experiment conducted in Lima and Ayacucho in 2003, which to date, is the only published reference on the matter in Peru (Karlan and Valdivia 2011). In line with Honorati and Cho (2014), they claim that most studies find that existing firm owners implement some of the practices taught in training, but the magnitude of these improvements in practice is often relatively modest. Few studies find significant impacts on profits or sales, although a couple of the studies with more statistical power have done so. The authors point that to date there is little evidence to help guide policymakers as to whether any impacts found, come from trained firms competing with other businesses and taking their sales, or whether they come from productivity improvements.

On the side of innovation oriented startup programs, the literature on effectiveness is very little. To our knowledge, the impact evaluations of Startup Chile conducted by Verde (2016) and Gonzalez-Uribe and Leatherbee (2015) are the only complete evaluation existing for this kind of program in the region to date¹⁰. Verde (2016) could not find impact on startup continuity, formalization of the firm or any outcome related to the firm’s performance (sales, returns, hiring). Positive effects were only found for financial leverage. New literature is starting to arise. Gonzalez-Uribe and Reyes (2019) evaluate the impact of business acceleration services in Cali,

¹⁰ Bukstein et al (2017) report some preliminary results for an ongoing impact evaluation of the Uruguayan program “Emprendedores Innovadores” (Innovative Entrepreneurs). The authors apply a propensity score matching to conform the control units over a very reduced sample and find positive impacts on leverage of private investments for innovation among the beneficiaries and on the likelihood on achieving an innovation. No impacts are detected on firms’ performance.

Colombia. Authors find that acceleration services increase the revenue of nascent entrepreneurs, doubling the sales of similar projects that were assigned a more strict panel and therefore did not receive acceleration services. Moreover, authors find that the impact is driven by high quality entrepreneurs that are able to accelerate their growth, but have no impact on low and middle quality projects. A noteworthy RCT of the High Impact Entrepreneurship Program of the National Institute of the Entrepreneur (INADEM) of Mexico, currently in progress and expected to report first results after 2019, will also add to this nascent literature¹¹.

3. The Program

StartUp Peru (SUP) was an initiative of the Peruvian government to foster innovation and productivity in the country. In 2014, Innovate Peru, the innovation agency of the country, launched its first call for entrepreneurs which attracted more than 510 projects from all over the country and selected its first generation of beneficiaries (23). SUP has been operating since then and has launched 7 calls until 2019, each one with higher number of applicants. The last call attracted around 1000 projects. This paper focuses on the first five generations, from 2014 to 2017, through which 287 entrepreneurship projects were supported.

Each generation of beneficiaries up to the 5th generation started with an open call for entrepreneurs to apply through Innovate Peru's website where entrepreneurs explained their business model, what is the innovation of their model, and how do they plan to grow its business. Although the call is open for everyone, the selection process admits participants through two channels: On one hand, business incubators and accelerators can "sponsor" projects; if they do so, the first round of evaluation of those projects will be in charge of them. On the other hand, if a project is not sponsored by an incubator, the applicant submits its information for evaluation through the external website and Innovate Peru assigns them to an external evaluator who will score the project on its merits. Both, incubators and external evaluators give a score to each project ranging from 1 to 5 based on the open questions answered by the entrepreneurs in the application form. This first stage evaluates four criteria: how innovative is the proposal (20%), the potential business model (20%), potential of value added and growth (30%) and capacity of execution and commitment of the team (30%).

The second phase of the selection process consists in a 7 minutes pitch that entrepreneurs make in front of a panel of experts comprised by local experts in entrepreneurship, officials of

¹¹ Atkin, D., Iacovone, L. and E. Verhoogen are conducting this study in partnership with INADEM, see <https://www.povertyactionlab.org/fr/evaluation/promoting-high-impact-entrepreneurship-mexico>

Innovate Perú and officials of StartUp Perú. Based on the pitch, the panel decides if the project earns a spot in the program. However, in this phase there is no score or threshold that the committee should apply, the only information available is whether the project was accepted or not. Once a project is selected as a beneficiary, it is assigned to an incubator where it will receive between 12 and 18 months of technical assistance. Also, the incubator will check and approve the disbursement of the seed capital for the projects.

The benefits received by entrepreneurs depend on the type of project they have. The first program line is called “Emprendedores Innovadores” where entrepreneurs with a business idea or a registered company less than a year old can apply. Those who are selected in this line receive about \$15,000 as non-reimbursable seed capital and a year of incubation/acceleration. The second line is called “Emprendimientos Dinamicos”, which is designed for established firms between 1 and 5 years old and who have yearly sales of at least \$10,000. Beneficiaries of this line receive about \$30,000 as non-reimbursable seed capital as well as a year of incubation/acceleration¹². Sponsored projects receive the incubation/acceleration services at the sponsor organization and the ones who were not sponsored are assigned to an incubator/accelerator according to its type and location¹³.

For the purposes of the evaluation, the first 5 generations of SUP consist of 278 supported entrepreneurs, 82% in the “Emprendedores Innovadores” line and 18% in the “Emprendimientos Dinamicos” line. Although information regarding their business model was collected during application, there was no registry of quantitative variables such as sales, profits, or characteristics of the entrepreneur collected at baseline. In 2017, the Inter-American Development Bank (IDB) as part of its knowledge agenda, started working with Innovate Peru in the evaluation of the program. In order to do that, we designed a retrospective survey to obtain information on the entrepreneur, the team, and the project. For the first generation of entrepreneurs meant to recall information from 3 years ago and for the fifth generation only a couple of months ago. We established a strict protocol to collect data and worked with one of the most prestigious survey collection companies in Peru to warrant the quality of the surveyors and therefore, the quality of the information. Overall, we were able to collect information on 224 beneficiaries (81%) and 435

¹² During the fifth generation, a third category was created in order to provide better assistance to innovative young firms that had higher sales and had a clear focus on internationalization: “Empresas de Alto Impacto” (EAI). To participate in this group, firms had to be 3 to 7 years old and have sales higher than S/607,500 (\$190,000). The distribution of applicants across the three categories for the fifth generation was 87%, 10% and 3%, respectively. The evaluation considers only the first two categories, given that the number of EAI beneficiaries is too small.

¹³ This fit usually depends on the location of the project and the available spots at each incubator and as such it is not always the first best for the incubators or the incubated entrepreneurs.

projects that went through the pitch round but were not selected. In 2019, we followed up with those 659 entrepreneurs and reached 86% of them (Table 1).

As explained in the following sections, our identification strategy will rely on finding similar entrepreneurs within the non-beneficiary's sample. Therefore, we designed a very detailed questionnaire that allows us to confirm that some of those non-beneficiaries are really comparable to the beneficiaries and could be used as a valid control units so as to simulate appropriately the counterfactual scenario. Regarding the entrepreneur, we asked questions related to their education, occupation, income, experience in the labor market and experience as an entrepreneur, and basic characterization variable such as age or civil status, among others. However, the literature has shown that starting a successful business does not depend only on those traditional variables but also on soft-variables such as managerial and entrepreneurial skills, risk preferences, motivation, etc. Our questionnaire included different self-assessment tests to identify such variables, that as will be shown in the following section help us explain both selection and future success of projects. We also asked about the team that was part of the project, their involvement and their experience. In terms of the project, we collected data on the initial state of the project, the sales, profits and exports trajectory, whether it had received financing or not before SUP, and characterization regarding the sector, main clients (b2b, b2c or b2g), their offer to the market (physical products, services, or intangible products), and the innovation level of the project (local, national or international). Baseline and follow-up questionnaires will be reported as electronic annexes in a later version of this paper.

4. Results

4.1 Characterization of Applicants at the Baseline

The baseline survey identified that most leaders of the entrepreneurship programs can be characterized as young, educated, single men. 83% entrepreneurship projects are led by men, 70% of all applicants are single, and 93% of them have at least a college degree. However, those leaders are not on their own; 93% of them have an entrepreneurial team, with the average size of the team being 3 people. Those teams are also composed usually of educated young people too; but we see a greater participation of women: 53% of teams are composed just by men, 3% just by women, and 44% of them have a mixed team. Table 2a shows the descriptive statistics for the average applicant to the first five cohorts.

Data show that the distribution of age of the leader of the project is as follows: 25% of them are 26 years old or younger, the median age is 30 years, and 75% of them are 36 years old or younger. Accordingly, the median of years of experience in the labor market of the leader is 9

years while the median for sectoral experience is 4. Moreover, 45% of them already had a previous experience as entrepreneurs, although most of them were not successful. The median maximum number of employees that those previous firms had was 4 employees. However, the main occupation of many of those teams' leaders is not their startup. Only 25% of them work full-time on their ventures, while the rest of them are either in the labor market or working on another previous venture. Along those lines, the data shows that there might be a motivation problem behind the entrepreneurs who are applying to StartUp. Just 55% of the applicants to the program mention that their main motivation behind starting a business is that they either identified a business opportunity or that they have the business skills to be an entrepreneur. The other 45% of the applicants mention that their main reason is the non-pecuniary benefits of being an entrepreneur, such as being their own boss or having flexible time; or that they do it for necessity (must take care of a family member or because it was hard to find a job). These results are similar for beneficiaries and non-beneficiaries.

Continuing with the characterization of the “soft” skills of entrepreneurs (Table 2b), the survey asked entrepreneurs to grade how confident they felt about different aspects of owning a business. The results indicate that applicants feel more confident about tasks related to entrepreneurial skills such as coming up with new ideas, persevering to achieve goals, or planning a project rather than with financial skills. Among the tasks they feel less confident about, are estimating the demand of a product, negotiating skills, valuing a business to buy or sell, and convincing a person to finance their business. Regarding their risk attitudes, the survey administered to StartUp applicants also asked if they preferred \$250,000 for certain (Risk 1) or one million dollars with different probabilities, starting at 25% (Risk 2) and going to 50%, 75%, and 90% (Risk 5). Results indicate that applicants to StartUp are less risk adverse, and many of them preferred the 25% or 50% chance of a million compared to \$250,000 for certain.

An important part of the expected benefits of participating in StartUp Perú is to receive services from an incubator. Although beneficiaries are linked to an incubator, non-beneficiaries can enroll to receive services by any incubator. The data shows that 30% of the non-beneficiaries have received services from an incubator. CIDE, Boincuba and UTEC are the incubators with the highest number of entrepreneurs receiving services from them.

For business ideas, the survey asked entrepreneurs in how many months they were expecting to open a firm when they applied to StartUp. The median answer was 6 months. Also, Table 6 the data shows how many of the entrepreneurs with a business idea had advanced in different aspects of their business like structuring a business model or market testing their

products. Many of them still have to advance further in completing those aspects before starting a firm.

In terms of financing, 60% of them have not looked for financing options and only 8% of them have asked for a loan to start their firms. For those who have estimated how much money they required to establish their firms, on average they expect to need around PEN70,000, while the median is PEN50,000. It is important to clarify that StartUp offers seed capital of PEN50,000 so that might have influenced some of the entrepreneurs' answers. Although most of the entrepreneurs have not looked for financing options or asked for a loan, most of them consider the lack of financing to be their main challenge. The following challenges they identify are related to the entrepreneurs' skills: lack of experience or lack of mentorship. According to the design of the program, this is something that incubators are supposed to give to treatment entrepreneurs.

Almost the entire sample of entrepreneurs with firms have them registered with SUNAT (93%), the tax agency of Peru. However, that does not mean that all firms are completely established and formal. Almost half of them are still located at the entrepreneur's house (51%), and just 36% of them have the municipal license required for businesses. These results make sense in the context of new firms that are just entering in the market. The average age of the firms applying to the program is two years and the median age is one year. The age of the treated entrepreneurs is lower than the candidates for control, given that the requirements of the program is that the firm is 5 years or younger.

Most of the financing sources that these entrepreneurs used to start their firms came from personal savings (85% of the starting capital) and to some extent loans from friends and family (6%). For treatment entrepreneurs, receiving seed capital from contests like StartUp Peru has been another source of financing (11%). In order to quantify the size of the firms, the number of employees provides a good image of the startups' makeup. The median firm had 7 total employees, 3 of which are full-time. In terms of sales, firms registered average sales of PEN136 thousands the previous year of the application to the program. Differences by generation are controlled in the analysis as is discussed later.

4.2 Impact Evaluation

We use a kernel propensity score matching methodology among applicant entrepreneurs with initial scores between 3.5 and 4 (83% of the entrepreneurs are in this range). Table 4a shows strong similarities across observables for both the treatment group and the donor pool group (applicants within the 3.5 and 4 range that went to the pitch phase but were not selected by the panel). This was the first evidence to suspect about the effectiveness of the selection mechanism

as it was not really able to discriminate on most of the observable characteristics of the entrepreneurs, entrepreneurial teams or projects. On the other hand, this caveat allowed for the identification strategy to work as non-treated units were not positively discriminated and selection was carried out independently of most of the observable characteristics that may have influence on the results of the program. In other words, it was as much as likely to find good and not so good candidates in both groups.

Table 5 shows the balance tests for pre-treatment values of selected variables. This includes balance in traditional variables such as age of the firm, initial number of employees, age of the entrepreneur, education, or having an entrepreneurial team, to more complex variables such as risk preferences and skills indexes.

Tables 6 to 11 show the different impacts of the program. First, the program triples the chances for business ideas to survive between the baseline and the follow up line. Conditional on survival, treated startups sold almost PEN200 thousands more compared to their controls. Compared to control units, 14%, 20% and 9% more treated firms reached sales of PEN50,000, PEN100,000 and PEN500,000 in 2018. 4.7 more employments were generated by treated startups, 3.7 of which were permanent ones and the average monthly wages paid to these employees were PEN422 higher than those observed for workers of the control units. Finally, the program also had positive impact on business financing: private investment was received after treatment by 7.8% more treated units than their respective controls and 9.5% more treated startups reached breakeven point. Results are not as good for entrepreneurs' income as controls' incomes are statistically equivalent to those lead entrepreneurs who participated in the program. A decomposition according to the probability of success of the entrepreneurs show a negative and significant impact at the low end of the distribution and a high impact on the high end. This takes us to the discussion about the importance of an effective selection of beneficiaries and the limitations of the effectiveness of productivity oriented policy when unlikely productive beneficiaries distort allocations towards more suitable candidates.

4.3 The Importance of Selection: Some Drawbacks Identified in the Assignment Process

As explained above, the selection of beneficiaries consisted of two stages. The initial scoring and the pitch results. This sub-section tries to explore further how this process works and how the selection process shapes up the kind of beneficiaries that receive the seed capital. Figure 1 shows that 52 percent of the beneficiaries reported incomes lower than their comparable non treated units. For that same group, sales were virtually equal to those observed in their controls. More interesting, the horizontal axis represents the success probability based on characteristics. The

aforementioned 52 percent of low-quality beneficiaries has probability of success slightly higher than 20%. In other words of every 10 beneficiaries selected by the panel, 5 were low quality and of those, only 1 had chances to succeed. The confidence interval of the impact on income is strictly above zero for only 15% of the beneficiaries, which in turn have more than 65% chances of succeed. Should selection have taken into consideration to the predictors of success, the impact of the program would have doubled using the same budget. More interesting, misallocations due to ineffective selection could generate deeper effects on the labor market and on the long run welfare of individuals as the program could be artificially sustaining non-productive startups that in the absence of the program would have failed and induced to their owners to choose a path of labor dependency. Table 12 shows that almost 50% of the non beneficiaries with low quality projects end up working as formal employees, while almost 60% of the low quality entrepreneurs remain as startups.

5. Conclusions

The main lessons drawn are the following:

- Impacts of the most stigmatic innovative entrepreneurship program of Peru are positive and significant, for the entrepreneurship. The evaluation of outcomes at the level of entrepreneur (e.g. earnings) do not show significant difference between the treated and control groups.
- Selection matters, and current practices when assignment is not random are inconsistent with intended positive discrimination of better candidates. That is, programs with a sequential selection process in which assignment is determined by a subjective pitch, end up choosing based on the soft skills of pitchers while scores about observables of their business ideas, their actual firms or the entrepreneurs themselves are, for all practical purposes, disregarded as predictors of success and sorted at random.
- Should positive discrimination have been implemented following the sorting criteria suggested by the propensity score, as much as twice the impact, with similar or lower budget, could have been achieved.

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Table 1. Sample Size

	Total	Follow-Up 1		Follow-Up 2		
		Complete	% of total	Complete	% of total	% of follow-up 1
Beneficiaries	278	224	81%	195	70%	87%
Non beneficiaries	580	435	75%	376	65%	86%

Note: Test of difference in attrition across groups is not significant for both follow-up surveys

Table 2a. Descriptive statistics for observable characteristics at baseline

Program			
Variable		Mean	SD
Generation = 1		8.8%	0.284
Generation = 2		14.7%	0.355
Generation = 3		17.0%	0.376
Generation = 4		31.4%	0.465
Generation = 5		28.1%	0.450
Score		3.6	0.379
Treatment		34.0%	0.474
EDAI		14.0%	0.347
Established firm		40.2%	0.491
Entrepreneur			
Variable		Mean	SD
% Male		83.5%	0.372
Age		32.1	8.494
Education: High school		0.5%	0.067
Education: Technical		2.4%	0.154
Education: College incomplete		4.1%	0.198
Education: College		61.3%	0.487
Education: Graduate		31.7%	0.466
Occupation: Entrepreneur in SUP firm		25.5%	0.436
Occupation: Entrepreneur in other firm		14.0%	0.347
Occupation: Full-time employee		26.4%	0.441
Occupation: Half-time employee		7.1%	0.258
Occupation: Consultant		17.8%	0.382
Occupation: Intern		1.5%	0.122
Occupation: Student		7.7%	0.267
Years of experience		8.6	7.073
Years of sector experience		4.1	4.736
First-time entrepreneur		54.3%	0.499
Serial entrepreneur - Past firms < 5 employees		23.5%	0.424
Serial entrepreneur - Past firms 6-10 employees		10.3%	0.304
Serial entrepreneur - Past firms 11+ employees		11.8%	0.323
Entrepreneurial Team			
Variable		Mean	SD
Has team		93.5%	0.247
Max years of experience (team)		11.5	8.565
Max years of sector experience (team)		6.0	6.033
Max experience as entrepreneur (team)		59.8%	0.491
Project			
Variable		Mean	SD
Clients: B2B		50.3%	0.501
Clients: B2C		48.2%	0.500
Clients: B2G		1.5%	0.121

Offer: Physical product	34.1%	0.475
Offer: Service	44.8%	0.498
Offer: Intangible product / software	21.1%	0.409
Firm age (years) *	2.04	3.400
Family business	17.2%	0.377
Has participated in other contests	19.4%	0.396
Initial sales (soles) *	136,979	477,127
Total initial employees *	6.6	5.928
Total full-time employees *	3.1	3.793

* Only includes established firms

Table 2b. Descriptive statistics for proxied non-observable characteristics at baseline

Variable	Proxy of Non-observables	
	Mean	SD
Skills Index: General	0.0	2.551
Skills Index: Managerial	0.0	1.176
Skills Index: Socioemotional	0.0	1.027
Skills Index: Entrepreneurial	0.0	0.883
Risk 1 (1-more risk adverse / 5 - less risk adverse)	3.8%	0.191
Risk 2	7.3%	0.260
Risk 3	29.0%	0.454
Risk 4	27.2%	0.445
Risk 5 (1-more risk adverse / 5 - less risk adverse)	32.8%	0.470
Motivation: Opportunity	16.1%	0.368
Motivation: Skills	40.8%	0.492
Motivation: Non-pecuniary	35.1%	0.477
Motivation: Necessity	4.9%	0.215
Motivation: Other	3.2%	0.176

Table 3. Attrition

Variable	Program		p-value
	2nd follow-up	No follow-up	
Generation = 1	8.6%	10.2%	0.613
Generation = 2	13.7%	21.6%	0.051
Generation = 3	17.9%	11.4%	0.131
Generation = 4	31.3%	31.8%	0.930
Generation = 5	28.5%	25.0%	0.491
Score	3.54	3.63	0.053
Treatment	34.2%	33.0%	0.826
EDAI	12.6%	22.7%	0.011
Established firm	38.5%	51.1%	0.025
% Male	84.1%	79.5%	0.289
Age	32.2	31.4	0.429
Education: High school	0.5%	0.0%	0.496
Education: Technical	2.3%	3.4%	0.521
Education: College incomplete	4.0%	4.5%	0.820
Education: College	61.5%	60.2%	0.824
Education: Graduate	31.7%	31.8%	0.982
Occupation: Entrepreneur in SUP firm	24.7%	30.7%	0.231
Occupation: Entrepreneur in other firm	14.9%	8.0%	0.081

Occupation: Full-time employee	25.6%	31.8%	0.216
Occupation: Half-time employee	7.5%	4.5%	0.312
Occupation: Consultant	18.6%	12.5%	0.166
Occupation: Intern	1.4%	2.3%	0.534
Occupation: Student	7.4%	10.2%	0.349
Years of experience	8.7	8.2	0.558
Years of sector experience	4.2	3.6	0.292
First-time entrepreneur	53.2%	61.4%	0.155
Serial entrepreneur - Past firms < 5 employees	23.6%	22.7%	0.851
Serial entrepreneur - Past firms 6-10 employees	10.9%	6.8%	0.247
Serial entrepreneur - Past firms 11+ employees	12.3%	9.1%	0.393
Has team	93.3%	94.3%	0.731
Max years of experience (team)	11.6	11.3	0.829
Max years of sector experience (team)	6.0	5.6	0.562
Max experience as entrepreneur (team)	60.2%	56.8%	0.542
Firm age (years) *	2.10	1.73	0.500
Family business	17.2%	0.125	0.274
Has participated in other contests	19.4%	0.159	0.432
Initial sales (soles) *	142,432	110,323	0.682
Total initial employees *	6.6	6.2	0.650
Total full-time employees *	3.2	2.7	0.522
Skills Index: General	-0.1	0.4	0.148
Skills Index: Managerial	0.0	-0.1	0.500
Skills Index: Socioemotional	0.0	-0.1	0.545
Skills Index: Entrepreneurial	0.0	-0.1	0.224
Risk 1 (1-more risk adverse / 5 - less risk adverse)	3.5%	5.7%	0.320
Risk 2	7.2%	8.0%	0.795
Risk 3	29.9%	22.7%	0.165
Risk 4	26.6%	30.7%	0.426
Risk 5 (1-more risk adverse / 5 - less risk adverse)	32.7%	33.0%	0.970
Motivation: Opportunity	16.3%	14.8%	0.719
Motivation: Skills	40.8%	40.9%	0.985
Motivation: Non-pecuniary	35.2%	34.1%	0.839
Motivation: Necessity	4.9%	4.5%	0.885
Motivation: Other	2.8%	5.7%	0.153
N	571	88	

Note: * Only includes established firms

Table 4. Beneficiaries vs Non-Beneficiaries

Variable	Program		p-value
	Beneficiaries	Non-Beneficiaries	
Generation = 1	6.2%	9.8%	0.136
Generation = 2	13.3%	13.8%	0.870
Generation = 3	15.4%	19.1%	0.266
Generation = 4	23.6%	35.4%	0.004
Generation = 5	41.5%	21.8%	0.000
Score	3.7	3.5	0.000
Treatment	100.0%	0.0%	.
EDAI	19.5%	9.0%	0.000
Established firm	48.2%	33.5%	0.001

Entrepreneur			
Variable	Beneficiaries	Non-Beneficiaries	p-value
% Male	77.9%	87.2%	0.004
Age	31.2	32.7	0.057
Education: High school	0.5%	0.5%	0.976
Education: Technical	1.5%	2.7%	0.395
Education: College incomplete	3.1%	4.5%	0.406
Education: College	60.5%	62.0%	0.735
Education: Graduate	34.4%	30.3%	0.326
Occupation: Entrepreneur in SUP firm	31.3%	21.3%	0.009
Occupation: Entrepreneur in other firm	11.8%	16.5%	0.136
Occupation: Full-time employee	23.1%	26.9%	0.326
Occupation: Half-time employee	8.2%	7.2%	0.661
Occupation: Consultant	19.0%	18.4%	0.856
Occupation: Intern	0.0%	2.1%	0.040
Occupation: Student	6.7%	7.7%	0.650
Years of experience	8.2	8.9	0.238
Years of sector experience	3.7	4.4	0.098
First-time entrepreneur	52.8%	53.5%	0.885
Serial entrepreneur - Past firms < 5 employees	21.5%	24.7%	0.395
Serial entrepreneur - Past firms 6-10 employees	11.8%	10.4%	0.605
Serial entrepreneur - Past firms 11+ employees	13.8%	11.4%	0.406

Entrepreneurial Team			
Variable	Beneficiaries	Non-Beneficiaries	p-value
Has team	95.4%	92.3%	0.160
Max years of experience (team)	11.9	11.4	0.483
Max years of sector experience (team)	5.6	6.3	0.182
Max experience as entrepreneur (team)	62.6%	59.0%	0.416

Project			
Variable	Beneficiaries	Non-Beneficiaries	p-value
Clients: B2B	53.8%	48.1%	0.226
Clients: B2C	45.7%	49.8%	0.378
Clients: B2G	0.5%	2.1%	0.174
Offer: Physical product	38.0%	31.6%	0.150
Offer: Service	43.5%	45.6%	0.651
Offer: Intangible product / software	18.5%	22.8%	0.263
Firm age (years)	1.72	2.40	0.166
Family business	15.9%	17.8%	0.564
Has participated in other contests	26.7%	15.7%	0.002
Initial sales (soles)	166,279	124,641	0.553
Total initial employees	6.5	6.8	0.737
Total full-time employees	3.2	3.3	0.863

Table 4. Beneficiaries vs Non-Beneficiaries (continued)

Proxy of Non-observables			
Variable	Beneficiaries	Non-Beneficiaries	p-value
Skills Index: General	0.7	-0.4	0.000
Skills Index: Managerial	0.0	0.0	0.983
Skills Index: Socioemotional	-0.1	0.1	0.024
Skills Index: Entrepreneurial	-0.1	0.1	0.005
Risk 1 (1-more risk adverse / 5 - less risk adverse)	1.8%	4.8%	0.053
Risk 2	4.5%	8.7%	0.046
Risk 3	33.0%	26.9%	0.100
Risk 4	29.0%	26.2%	0.443
Risk 5 (1-more risk adverse / 5 - less risk adverse)	31.7%	33.3%	0.672
Motivation: Opportunity	17.4%	15.4%	0.507
Motivation: Skills	37.5%	42.5%	0.214
Motivation: Non-pecuniary	40.2%	32.4%	0.048
Motivation: Necessity	2.7%	6.0%	0.062
Motivation: Other	2.2%	3.7%	0.318

Table 5. Matching

Program			
Variable	Treatment	Control	p-value
Generation = 1	6.1%	3.0%	0.182
Generation = 2	12.7%	9.8%	0.408
Generation = 3	13.9%	13.8%	0.977
Generation = 4	24.2%	23.4%	0.859
Generation = 5	43.0%	49.9%	0.210
Score	3.6	3.7	0.454
EDAI	20.6%	20.8%	0.967
Established firm	49.7%	48.6%	0.850
Entrepreneur			
Variable	Treatment	Control	p-value
% Male	77.6%	83.0%	0.220
Age	31.5	32.2	0.408
Education: High school	0.0%	0.0%	.
Education: Technical	1.2%	0.6%	0.551
Education: College incomplete	2.4%	1.3%	0.443
Education: College	60.0%	69.2%	0.080
Education: Graduate	36.4%	28.9%	0.150
Occupation: Entrepreneur in SUP firm	32.1%	34.2%	0.686
Occupation: Entrepreneur in other firm	12.1%	9.4%	0.429
Occupation: Full-time employee	23.0%	24.0%	0.831
Occupation: Half-time employee	7.9%	9.9%	0.512
Occupation: Consultant	19.4%	16.4%	0.473
Occupation: Intern	0.0%	0.0%	.
Occupation: Student	5.5%	6.0%	0.821
Years of experience	8.6	8.8	0.775
Years of sector experience	3.7	3.8	0.721
First-time entrepreneur	52.7%	51.7%	0.855
Serial entrepreneur - Past firms < 5 employees	21.2%	24.8%	0.435
Serial entrepreneur - Past firms 6-10 employees	12.1%	11.8%	0.918
Serial entrepreneur - Past firms 11+ employees	13.9%	11.7%	0.543

Entrepreneurial Team			
Variable	Treatment	Control	p-value
Has team	95.2%	97.6%	0.230
Max years of experience (team)	12.2	11.7	0.539
Max years of sector experience (team)	5.6	5.4	0.707
Max experience as entrepreneur (team)	63.6%	62.5%	0.828
Project			
Variable	Treatment	Control	p-value
Clients: B2B	53.9%	51.2%	0.626
Clients: B2C	45.5%	48.1%	0.628
Clients: B2G	0.6%	0.6%	0.982
Offer: Physical product	37.0%	38.8%	0.736
Offer: Service	43.0%	41.8%	0.815
Offer: Intangible product / software	20.0%	19.5%	0.904
Firm age (years)	0.92	0.91	0.983
Family business	17.6%	19.8%	0.612
Has participated in other contests	27.3%	28.5%	0.800
Initial sales (soles)	69,765	53,033	0.645
Total initial employees	3.3	3.0	0.647
Total full-time employees	1.7	1.4	0.549

Table 5. Matching (continued)

Proxy of Non-observables			
Variable	Treatment	Control	p-value
Skills Index: General	0.8	0.9	0.772
Skills Index: Managerial	0.0	0.0	0.926
Skills Index: Socioemotional	-0.2	-0.3	0.300
Skills Index: Entrepreneurial	-0.2	-0.1	0.877
Risk 1 (1-more risk adverse / 5 - less risk adverse)	0.6%	1.3%	0.535
Risk 2	4.8%	4.0%	0.706
Risk 3	36.4%	33.0%	0.528
Risk 4	26.7%	29.5%	0.565
Risk 5 (1-more risk adverse / 5 - less risk adverse)	31.5%	32.2%	0.899
Motivation: Opportunity	18.8%	19.4%	0.893
Motivation: Skills	37.6%	34.2%	0.525
Motivation: Non-pecuniary	40.6%	43.2%	0.630
Motivation: Necessity	2.4%	2.7%	0.883
Motivation: Other	0.6%	0.5%	0.904
N	165	260	

Table 6. Impact on Survival

	All	Business ideas	Established firms
Treatment Effect	0.232*** (0.041)	0.446*** (0.057)	-0.007 (0.045)
Control	0.559	0.212	0.876

Table 7. Impact on Sales

	Sales 2018 (All)	Sales 2018 (survivors)	Reached sales of S/50,000 in 2018	Reached sales of S/100,000 in 2018	Reached sales of S/500,000 in 2018
Treatment Effect	157,457*** (47,628)	197,281*** (52,248)	0.142*** (0.042)	0.206*** (0.040)	0.091** (0.294)
Control	149,108	179,713	0.372	0.212	0.073

Note: Propensity score matching also controls for the expected probability of survival based on observables

Table 8. Impact on Employment

	Total employees (all)	Total employees (survivors)	Became an SME or large firm (+10 employees)	Became a medium or large firm (+50 employees)
Treatment Effect	4.7*** (1.022)	3.7** (1.122)	0.116*** (0.035)	0.018* (0.010)
Control	3.7	5.8	0.114	0.0004

Note: Propensity score matching also controls for the expected probability of survival based on observables

Table 9. Impact on Employment Quality

	Full-Time employees (all)	Full-Time employees (survivors)	Average employee wage (survivors)
Treatment Effect	3.6*** (0.941)	3.5*** (1.109)	422*** (98.12)
Control	2.0	3.1	1,099

Note: Propensity score matching also controls for the expected probability of survival based on observables

Table 10. Impact on Business Financing

	Received investment	Reached breakeven point (survivors)
Treatment Effect	0.078** (0.025)	0.095** (0.046)
Control	0.032	0.594

Note: Propensity score matching also controls for the expected probability of survival based on observables

Table 11. Impact on Entrepreneur's Income

	Monthly Income	Low probability of success	Average probability of success	High probability of success
Treatment Effect	476 (346)	-725** (358)	977 (615)	3243*** (1,140)
Control	3,976	4,051	3,922	3,851

Table 12. Occupations

Occupation at 2nd follow-up	Beneficiaries		
	<i>Low probability of success</i>	<i>Average probability of success</i>	<i>High probability of success</i>
Entrepreneur (SUP firm)	56.00%	83.60%	87.00%
Entrepreneur (other firm)	10.70%	7.30%	4.40%
Formal employee	25.00%	5.50%	4.40%
Informal employee	7.10%	1.80%	0.00%
Student	1.20%	1.80%	4.40%

Occupation at 2nd follow-up	Non - Beneficiaries		
	<i>Low probability of success</i>	<i>Average probability of success</i>	<i>High probability of success</i>
Entrepreneur (SUP firm)	17.10%	49.40%	64.70%
Entrepreneur (other firm)	19.50%	21.20%	17.70%
Formal employee	46.70%	22.40%	17.70%
Informal employee	16.70%	7.10%	0.00%
Student	0.00%	0.00%	0.00%

Figure 1. Heterogeneity

