STEG WORKING PAPER

HUNTING TALENTS AND NURTURING ENTREPRENEURSHIP IN LOW INCOME COUNTRIES:

Quasi-Experimental Evidence from Business Plan Competition in Ethiopia

Abebe Ambachew Ayana

AUGUST 2023
STEG WP075
PhD 527

Hunting Talents and Nurturing Entrepreneurship in Low-income Countries: Quasi-Experimental Evidence from Business Plan Competition in Ethiopia

Abebe Ambachew Ayana

August 2023

Hunting Talents and Nurturing Entrepreneurship in Low-Income Countries: Quasi-Experimental Evidence from Business Plan Competition in Ethiopia

Abebe Ambachew Ayana[1]

Abstract

Business plan competition and business incubation and acceleration programs are emerging industrial policy instruments which intend to catalyze industrialization and job creation through identifying and supporting high-growth potential entrepreneurs (gazelles) and nurturing local entrepreneurship. However, empirical evidence on the effectiveness of these policies is scant. This study evaluates the causal effect of the training intervention of the business plan competitions in Ethiopia on business entry and expansion using a fuzzy regression discontinuity design by exploiting business plan scores and exogenous cut-off points. Outcome data from the universe of about 500 applicants were collected about a year after applying to the competitions through by a carefully designed survey, and self-reported outcomes were independently verified with administrative data whenever possible.

The result revealed that, in any measure of business success, the business performance of the training beneficiaries of the program was not better than their rejected counterparts. This is due to the fact that, at least partly, about 75% of the rejected applicants were able to get similar trainings in other programs and thus they are not pure controls. Though the study is not informative about the effectiveness of the program, the substantial take-up of the control group in substitute programs documented in this study could be helpful to explain the modest or negligible impacts the entrepreneurship training programs reported in previous studies.

Key Words

Entrepreneurship, business plan competition, growth, startups, training, RDD

[1] The author can be contacted at abebeamba@gmail.com

I acknowledge generous funding from STEG program of CEPR (a program funded by the Foreign, Commonwealth & Development Office (FCDO)) and the National Graduate Institute for Policy Studies (GRIPS) PhD research grant. I own special thanks to Prof. Litschig Stephan for his unwavering support and mentorship in the development of this paper. I am also grateful for Prof. Tetsushi Sonobe and Prof. Akio Yamazaki for their insightful comments.

1. Introduction

There is a wide consensus that entrepreneurship plays a key role in economic growth and structural transformation of nations. Even historically, it has been argued that the shift towards new technologies and movement from stagnation to growth was made possible through the 'advent of entrepreneurship' (Murphy et al., 2006). By following the same sectorial classification with Lewis model of duality, Gries & Naudé, (2010) formally show how entrepreneurial start-up firms can drive structural transformation. Consistent with such theoretical predictions, various empirical works document the positive roles that start-ups and small firms play in growth and transformation (Fritsch, 2008; Noseleit, 2013), job intensity (Ayyagari et al., 2011; Bigsten & Gebreeyesus, 2007), poverty reduction and industrial development (Sonobe & Otsuka, 2006; 2011). These could justify the renewed commitments of governments, policy makers, NGOs, donors, and other development organizations operating in low- and middle-income countries to stimulate new business formation, improve the business environment, and support startups and small businesses to thrive.[2]

Again practically, in low-income countries where wage employment opportunities are limited, self-employment or microentrepreneurs are ubiquitous. This phenomenon could also be partly associated with economic structure and low aggregate productivity (Gollin, 2008; Davis et al., 2023). Even when opportunities to work for large industries are available, entrepreneurship could be preferred to industry jobs, particularly when the latter one is either under remunerated or involve high health risks (Blattman & Dercon, 2018). Despite the increasing recognition to the roles of small business and startups, these fledgling enterprises face various constraints which primarily stem from size-induced market failure (Vandenberg et al., 2016). It is not only in the credit market failure and financial constraints impede growth of small businesses as well documented in the literature (World Bank, 2008; Beck &

[2] As opposed to this widely accepted narrative, there is another strand of literature which argues the role of entrepreneurs is overestimated and supporting SMEs is just a waste of money (see Hessels & Naudé (2019) for review of this view).

Demirguc-Kunt, 2006; Nichter & Goldmark, 2009), but there is also a considerable market failure to access entrepreneurial capital (Bruhn et al., 2010).

These calls for an active policy intervention that aims at correcting these market failures and labeling the playground for small and young firms to join the market and improve their productivity. However, as to what policy could unlock potentials of constrained entrepreneurs remains an open question in the policy and academic dialogues.

Recent empirical studies in developing countries demonstrate that business plan competition could be one of the potential policy options to identify high growth-potential firms (i.e. gazelles) and nurture entrepreneurship through directly its skill development and grant interventions or indirectly through facilitating the development and fundability of the business ideas (McKenzie, 2017; Brinckmann et al., 2010). This intervention is a recent phenomenon in low-income countries usually targeting both startups to help them successfully establish enterprises or existing small businesses to help expand their operation. Business plan competition usually involves direct financial rewards (money prize) for final winners which could be helpful to relax the financial constraint. In some cases, the design of the business plan competition may also include non-monetary supports such as group training, coaching, one-on-one counselling or advice, networking, publicity, and others for participants depending on their advancement in a competition.

However, empirical studies that disentangle the causal impact of these new and innovative forms of interventions are scant (Mckenzie et al., 2020). Most of the existing literature in this area is about the traditional business trainings due to the fact that it is one of the most widely available support programs for small firms across the globe (see McKenzie & Woodruff (2014) and Mckenzie et al. (2020) for review).[3] Nonetheless, the nature of the business plan competition is different from the ordinary training interventions by contents and modality of the training, composition of participants, and other intangible benefits with a far-reaching

[3] For evaluation of managerial and Kaizen training programs in developing countries see Higuchi et al. (2019) and Higuchi et al. (2015).

business implication that contestants gain during and after the competition. As a result, it needs to be evaluated as a one independent area of intervention for policy learning.

Some studies on impacts of business plan competitions that address the self-selection issue have been published over the last few years, and in general, these studies show that the grant component of the business plan competitions positively affect entrepreneurship activities (McKenzie, 2017; Fafchamps & Quinn, 2017). Nonetheless, evidence on the effects of skill development (or training) interventions inherent to business plan competitions are mixed (Klinger & Schündeln, 2011; Fafchamps & Woodruff, 2017).[4] While the previous findings about the training components mostly reported to have no detectable impact on business operations of participants, oftentimes adequate explanations are not provided why programs fail. The literature also commonly ignores the possibility of treatment by close substitute programs for the control groups in researching impacts of such entrepreneurship development programs which could potentially cause flawed conclusion about programs' effectiveness. In short, the existing studies are not only inconclusive but also diverse in their nature, underlining environment, and population, as noted in Kaboski (2021), which is a caveat to generalization and a need for further micro-level studies.

This study is, therefore, designed to examine the causal effect of an entrepreneurship program in Ethiopia consisting of two national business plan competitions on startups business entry and expansion using a quasi-experimental design. These entrepreneurship competitions, called *Bruh* and *EDC* startups' competition, were conducted by two organs of the federal government of Ethiopia with the aim to nature high-growth potential firms. The program involves two main interventions: non-monetary support (hereafter training) and cash grant. The training, particularly for Bruh, was provided intensively for about one-month within a bootcamp. The entire process of the program is a combination of incubation and competition (thus, *incupetion*).

[4] Detailed reviews of the literature is available in (Ayana, 2022).

The panel of judges scored business plans of more than 500 eligible applicants of the first editions of the competitions and placement to the training was determined based on average score. By exploiting the business plan scores and exogenous cut off points of the competitions, I used the fuzzy regression discontinuity (RD) design to disentangle the causal effect of training component of the program by comparing applicants just above and below the cutoff.[5]

A year after the application to the business plan competitions (or about 8 months after the completion of the program), I traced the universe of applicants and collected data, mainly on their business outcomes, to evaluate the short-term impacts of the program. The first-stage estimates of the model shows that marginally scoring above the cutoff (offered for the training slot) increases the training probability by about 60 percentage points more as compared to the rejected applicants who scored below the cutoff. This is a ***Nominal First-Stage (NFS)*** as it only accounts for treatment within the program of interest.

However, tracking the related training exposure of all applicants in the follow-up survey revealed that rejected applicants of the business plan competitions (the intended control group of the study) had similar training by other substitute programs in the same period. Then I ran the first-stage regression by considering treatment (training in this case) by any programs and I called it ***Effective First-Stage (EFS)***. Surprisingly, the strong first-stage we have seen in the nominal case disappeared in the estimation of the effective first-stage.

As a result, the reduced-form estimate become negligible, implying business outcomes of offered applicants of the business plan competition were not different from that of their rejected counterparts. However, it does not mean that the program is ineffective. Given the substitute treatment of the control groups, the result is not informative about the program effectiveness. This study provides a caveat for any impact study to consider the possibility of substitute treatments of the control group before claiming any causal result and concluding

[5] In this study, I am interested in the training components of the program as the other arm (grant) had too small beneficiaries to consider it for quantitative evaluation.

about effectiveness of policies and programs. It is essential to estimate the effective first-stage from the self-reported treatment status and see its significance before attributing any change of outcomes to a program's intervention.

Our qualitative data also revealed that the entrepreneurship ecosystem is not enabling for startups to flourish. Supports aimed at overcoming skill and financial constraints need to be accompanied by regulatory reforms. For instance, the huge minimum capital requirement for foreign investors in Ethiopia which is usually the need for the level of investment many innovative startups look for, the inability of the current industry classifications and existing legal framework to accommodate the new digital businesses which did not exist before, the requirements to provide proof own or rented business premises to get registered as a business for any business including those that do not require physical space, and the lack of payment mechanisms for startups to purchase items/services abroad by foreign currency were identified as the main barriers for startups in Ethiopia.

This paper contributes to the existing literature at least in three arenas. First, this study provides additional evidence on the current spares literature about the new entrepreneurship policy options designed to foster entrepreneurship in developing countries. Second, this study is one of the first to document evidence on the control group's non-compliance by seeking alternative training programs elsewhere. As a result, this situation could be taken as one of the plausible reasons for the negligible impact estimates of the entrepreneurship training programs reported everywhere even under experimental and quasi-experimental settings. Third, the study also contributes to the improvement of future research design of impact studies by introducing the issue of effective first-stage and indicating the need for tracking subjects for similar treatments after the baseline to ensure validity of the counterfactuals. In addition, to improve the credibility of the evaluation through minimizing self-reporting bias in the follow-up data, I made the data collection process a completely program-blind whereby it was not mentioned for enumerators and respondents that the survey was meant for evaluating a specific program. Further, I cross-checked the self-reported data on the main outcome variable (business entry) with the administrative data from local authorities. These

additions make the study to have valuable contributions in the area of entrepreneurship development policy.

The remaining section of the paper are organized as follows. Section 2 presents the review of related literature. The third part outlines the empirical strategy and the test results of the basic identification assumption of the fuzzy RD model. In the fourth part of the paper, I presented results and discussion. The last section makes concluding remarks.

2. Context and about the program

2.1. The macro-Context

Ethiopia is one of the old independent states which is located in the horn of Africa. This landlocked country is the second most populous country in Africa next to Nigeria with an estimated population of more than 115 million. About 80% of the population lives in rural area where agriculture is the main livelihood. Agriculture, industry and services contributed about 23.5%, 29.3%, and 39.6% of the Ethiopian GDP, respectively (NBE, 2022). Ethiopian economy is one of the fast-growing economy with an average growth rate of 9.5% over the last 15 years(World Bank, n.d.) The informal sector provides more than 60% of the urban employment. The country's labor force increases by 2 million every year and the absorptive capacity of the labor market is being challenged. As a result, youth unemployment particularly in urban area are high(CSA (Central Statistical Agency, 2021).

The government of Ethiopia is known for its active industrial policies including construction of large industry parks with the aim to be the African manufacturing hub. To promote self-employment and local industrialization, the government hugely supports the development of Micro, Small, and Medium Enterprises (MSMEs). The first full-fledged micro and small enterprises development strategy was introduced 1997 and then revised in 2011 with a clear support framework for the sector. Since then, several government and NGO programs aiming at enterprise development have been implemented. These programs focus on skill development, technical training, kaizen, facilitation of market linages, microfinancing,

development of working premises like industry clusters and working shades, among others(Gebreeyesus et al., 2018).

Despite these efforts, the entrepreneurship landscape is not enabling for startups and small businesses. Ethiopia ranked 159 from 190 economies in recent report of the World Bank in ease of doing business (World Bank, 2020). Access to finance is a top problem to do businesses due to high collateral requirement and complicated procedures to get bank loan (World Bank, 2015). Though training opportunities seem to be relatively easily accessible due to the expansion of TVET colleges and universities, the skill mismatch is raised as a serious concern by industrialist.

To improve the business environment the Ethiopian government has been undertaking series of economic reforms. The amendment of the Ethiopian commercial law in 2021 and drafting startups' proclamation very recently are among the examples of this effort. Nonetheless, our qualitative survey (key informant interviews with various relevant agencies and experts), we conducted to understand the entrepreneurial ecosystem of the country for startups, uncovers that still there are several regulatory bottlenecks that hamper the development of small business, particularly innovative startups. Some of these challenges are highlighted as follows.

Key Legal and regulatory barriers for startups in Ethiopia

Barriers to alternative source of finance: Collateral requirements inhibit startups from accessing bank loan in Ethiopia. Most startups often have business ideas, not physical assets. However, legal framework for idea financing in the banking sector was non-existence till recently. This year, the national bank of Ethiopia (Central bank) approved a law for banks to finance innovative business ideas. Nonetheless, no financial institution has implemented it so far.

The other alternative source of external finance for startups would be foreign investors (venture capitalists or angel investors). However, the minimum capital requirement of 200,000 USD set for foreign investors in Ethiopia (or 150,000 USD for joint venture) have

been hindering venture capitalist and other investors from investing/funding startups. While this rule could be good for medium and large FDI firms, the capital requirement here is beyond the financial need of most startups in Ethiopia. Not only the banking sector but also equity financing is not accessible for startups. According to a legal expert we interviewed, the draft startups proclamation attempts to address this. However, that fails to recognized foreign investors who invests less amount of capital than stated by the commercial code as foreign investor. That would be a disincentive for foreigner to invest since they will not be allowed to repatriate profit.

Foreign exchange shortage allocation system: Nowadays, lack of foreign currency is a serious challenge in Ethiopia. The current allocation system is highly selective which do not allow for startups to access FOREX to import some required inputs and services for their business. That detaches them from the global value chain.

Licensing procedure: for new entrants to get business license in Ethiopia, the licensing regulation forces them to have a legal proof of physical address including the ownership certificate or rent contract authenticated by the responsible government agency. Having such business premises requires finance, but access to formal finance again requires being a formal business. Surprise, the proof of dedicated business premises is equally applicable for anyone including startup that are engaged in software development business that could be done at home. This vicious circle of problems creates huge barrier for startups to set up formal business. The new commercial code only abandons the need for authenticating the rental contract if the land lord has rental license.

Inability to cope up the newly emerging forms of business: The commercial code have only lists of old forms of business/ordinary business and the current industry classification is unable to accommodate new forms of businesses. Particularly, new IT based business including e-commerce have been confusing for licensing agencies. Sometimes, the officers pushes the startups to register/engaged in other common sectors for the mere reason that they are able to categorized the proposed business under any of the existing list. Some other register them under some related categories, but that exposes the startups for penalties or

even closures during post-license inspection for the reason that they found operating in sectors other than that they were licensed for.

In short, Ethiopia is a country with untapped opportunities for business including the huge size of the local market, strategic location of the country to access markets of Europe and Middle East but some challenges to do business including the regulatory hurdles and current political instability.

2.2. Description of the program

Our program of interest is broadly the entrepreneurship support program for startups which comprises of two nation-wide business plan competitions. The first competition is called *Bruh which* is a nation-wide business plan competition program for startups designed and implemented by the federal government of Ethiopia, specifically by the Jobs Creation Commission (JCC), in collaboration with the Master Card Foundation and Target Business Consultants. The second competition is known as *EDC start-ups' incubation* which is implemented by the Entrepreneurship Development Center (EDC) in Ethiopia. While *Bruh* is designed to have a life span of three years with the plan to organize two business plan competitions each year, EDC envisages to conduct the same competition every year.

The program targets young entrepreneurs with innovative business ideas or startups businesses with no more than 2 years of operation, in case of Bruh for instance. By tackling their constraints, the program aims to encourage young entrepreneurs with a good growth potential to start their own business, accelerate business growth, and expand their level of operation. Though the program is implemented as two independent projects, the fact that both are broadly similar in term of objective, target group, geographical coverage, type of intervention, and timeline gave us the opportunity to consider both cases for this study. Both combine incubation and competition (thus, *incupetion*) to select high-growth potential enterprises (gazelles) and provide them with grants of about 5000 USD for final winners and business development supports like training for applicants who can pass the first-round screening.

The first version of both competitions was conducted in 2021and attracted about 640 applicants in total. These applicants are the target group of this study. After removing illegible and duplicated applicants within each competition, a total of 545 eligible contenders' business plans got scored by a panel of judges or experts assigned by the competition organizers, which is the first-round screening. In case of Bruh, after the applications are collected centrally in Addis Ababa, JCC assigned 5 external judges to form a panel and each judge scored the business ideas of each applicant based on the 5 pre-determined criteria. Whereas, the application as well as the first-round screening of EDC was clustered into four centers (regional offices), namely, Addis Ababa, Amhara, Oromia, and SNNP, and the scoring was made by EDC experts of the respective center using 5 major pre-determined criteria consisting of 20 cues.[6]

Based on their average scores, top 248 of the applicants passed the first screening and they were offered for the slots for the training intervention and also advance to the next round competition. These applicants are those who scored above the cutoff in their respective competition and considered as treatment group. Whereas the remaining applicants who scored below the cutoff were rejected and eliminated from the competition; and this group is control group.[7] Among the 248 offered applicants, 168 have attended the training provided by the competitions designed as part of the program. This implies that in the actual implementation this intervention, there were some cases of no-shows while there were not any crossovers.

The training was offered in a bootcamp for about one month in case of Bruh while it was a standard Entrepreneurship Training Workshop (ETW) for 6 days (48 hours) for EDC participants. The training covers a wide range of topics including in entrepreneurship competency, business model/plan development, Visual Prototype and Product Development, Market Research and Unique Selling Proposition (USP), and other related issues. In the next

[6] These criteria are available upon request.

[7] In this study, applicants who scored above the cutoff are referred as 'offered' group which is also called in the literature as accepted applicants, successful applicants, winners, and qualified applicants, among other. On the other hand, for applicants below the cutoff, I will use the term 'rejected' applicants, which is synonymous with terminologies such as runners-up, losers, unsuccessful, non-winners, and non-qualified applicants.

rounds of the competitions, contestants were provided more customized supports to further develop their business idea and business plan. The competitions were concluded by final pitch competition based on which top 26 startups (20 in case of *Bruh* and 6 in EDC) were selected as final winners who were entitled to get the prize money (cash grant). The first editions of both competitions have come to end in June 2021. The complete timeline, process of the program, and key activities of the program are summarized in Appendix 2, Figure 2.A.1.[8]

3. Methodology

3.1. Data and measurement issues

This study utilized administrative and survey data from first editions of *Bruh* and *EDC startups* business plan competitions. The data collection task was started early 2021, while the competitions were ongoing, from the administrative data by collecting and reviewing of administrative records of both competitions. By doing so, important information including profiles of all applicants, completed application forms, business plan of each contestant, the rules of the competitions, the scores given by judges for each business plan at various stages of the competition, the cut-off points of the scores used to select winners in each round, information about judges, status of each contestant in the competition (offered Vs rejected), the types of interventions each contestant got, and the take-up rate the training intervention among those offered slot.

Using these records, I constructed administrative dataset consisting of treatment indicator, score (the running variable), baseline covariates, and other variables about the entrepreneurs' characteristics and their (proposed) businesses at the start of the program. In addition, I have also conducted personal interviews with program owners by visiting JCC and EDC offices in-person and continuous virtual meeting with coordinators and consultants of the program.

[8] Detail description for each competition is available in Ayana (2022)

Therefore, at that stage, the missing information to answer the research questions of this study was mainly the outcome variables. This is where conducting my own follow-up survey was required and to this end, I prepared the sampling frame using the entire lists of applicants of both competitions. From the total of 545 eligible applicants who got scored by the panel of judges, I found that 29 applicants were duplicates due to the fact some applicants applied to the competition in more than one project and some other had applied for both Bruh and EDC. After cleaning the list for the duplicates, my final sampling frame remains with a clean list of 516 eligible (potential) entrepreneurs and a census of these applicants were considered for this study. The follow-up survey was fielded from January to February 2022, just a year after application to the competitions, using Computer Assisted Telephone Interview (CATI) method.

This method of data collection is appropriate in this context for at least four reasons. First, about 70% of the target groups had only business ideas, not operational firms, at the time of application and I was aware about this situation from the administrative data. It is also expected that at least some of them will remain in the same status even during the follow-up survey. Thus, it would be completely infeasible to try to physically trace these potential entrepreneurs who are scattered throughout the country to do a face-to-face interview, the other alternative method. Second, the volume of data (number of variables) required to answer the research questions are small and their measurements are simple to manage using about a 15-20 minutes-long phone survey. I also used a direct simple question to elicit information on profit and other outcomes as suggested by de Mel et al. (2009).

Third, phone survey helped us avoid physical contact between enumerators and respondents amid the COVID-19 crises so that everyone stayed safe and the survey was completed smoothly. Finally, I had already secured mobile numbers of all the potential respondents from their respective application documents and at that moment mobile networks are available in all areas of the country except the then conflict area of Tigray region where no applicant was part of the program in the first place.

To reduce bias of self-reported data on my main outcome variable, which is setup a business, I triangulated the self-reported self-employment status with valid trade license for those claimed to have registered formally in the survey response. Two methods were used to collect their trade license. First, depending on the business status of respondents, enumerators were tasked to ask the respondent at the end of the interview to send them the photo or scanned copy of the trade license as email attachment or through social media platforms (WhatsApp, telegram, viber, etc). This method was applicable for educated respondents who can use internet and own social media. The good thing is most of the respondents are educated as more than 82% of them graduated from university or college or TVET. One concern we had was it costs respondents to send files (data usage cost). As a response to this, a 50 Birr worth mobile airtime top up was paid as incentive payment for all respondents participated in the survey. Through this we collected considerable number of licenses for our verification purpose.

Second, for those respondents either unable or unwilling to send copy of their license, an independent data verifying expert was hired after the completion of the phone survey to cross-check their existence with administrative records of federal and local regulatory agencies. Using the tax identification number (TIN), business name, and other identifiers collected in the phone survey, the expert was tasked to verify the claim of operating a business with up-to-date records of ministry of trade and regional integration, the federal urban job creation and food security agency, and Addis Ababa trade bureau. Using both methods, we managed to independently verify the operation of 61.5% formally registered businesses to date.

Other outcome variables like employment, sales, and profit are based on self-reported data since administrative data are not available. Even in a situation where administrative data are available on business performance indicators, its reliability as compared to self-reported ones is not guaranteed. I do not expect businesspersons to report performance data like profit more accurately for local authorities than for that of researchers. There are also empirical evidences showing misreporting of business data to authorities (Pomeranz, 2015; Kumler & Verhoogen, 2020; Carrillo et al., 2017). Similarly McKenzie (2017) reported that administrative data on

employment is unreliable. As a results, self-reported profit, sales and employment data are used in this study.

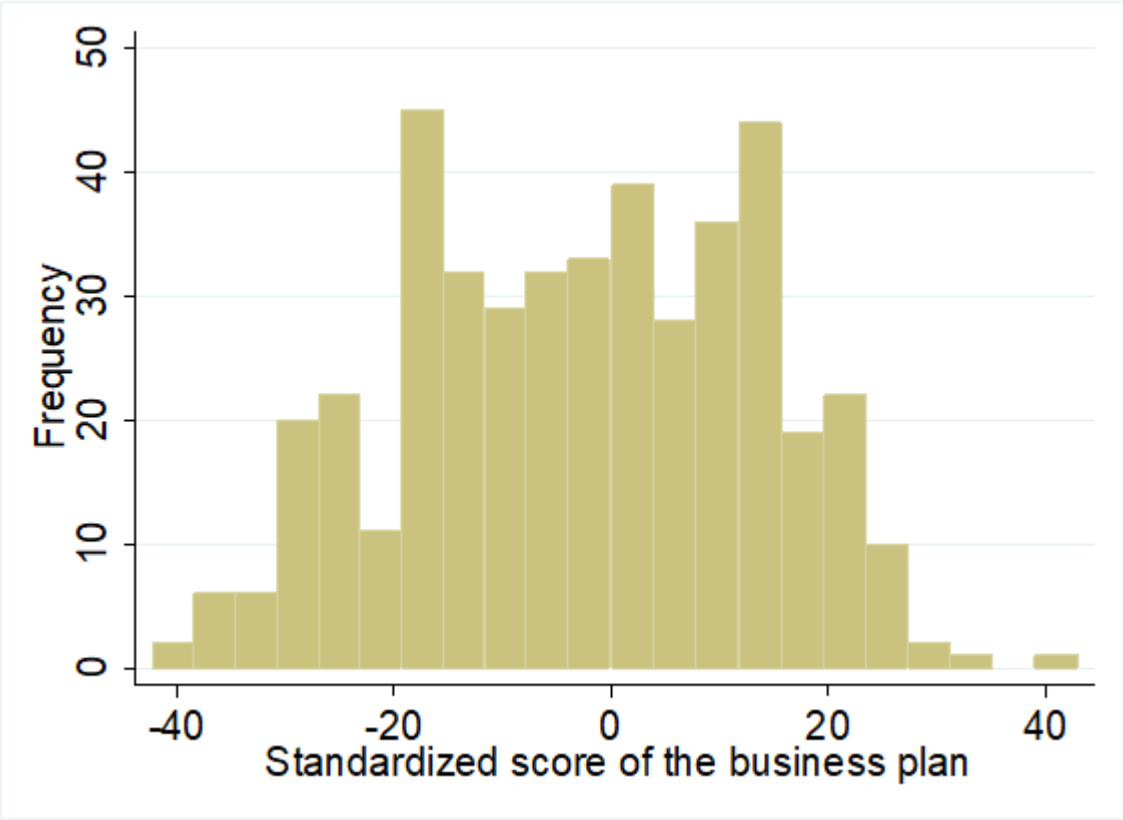
3.2. Description of the Data

i. Score of the business plan

Score is the one of the key variables I compiled from the administrative records of the competitions. As stated in the previous sub-section, judges or experts scored the business plan of each applicants using pre-determined criteria. The score averaged over the criteria and judges were used to the training placement. In order to make the scores comparable across competitions considered in this study, I standardized the score by centering it at the cutoff.

Throughout this study, I excluded 38 applicants that were given zero score by the special decision of the committee in Bruh competition for missing information about their business model since this is an exceptional score which do not reflect their potential. This case is just the same as those excluded as illegible applicant. Thus, the whole analysis is based on the sample size of 456 observation. The distribution of standardized score for this matched sample is depicted in Figure 1 using a histogram drawn with the frequency distribution. In this figure and all other analysis where score is used, zero is the cutoff point for the standardized score. Applicants with a standardized score of zero and above are applicants who managed to pass the first-round screening of the competition and offered for the training slot. On the other hand, those below the score of zero (negative standardized score) are applicants who got rejected in the first screening of the respective competitions.

Figure 1: Distribution of standardized score of the business plan.



Notes: *This score is the standardized value of the first-round screening result of each applicant of the competitions. Zero is the cutoff.*

ii. Summary statistics of selected variables

Summary statistics of key variables from the baseline data and follow-up survey used in this study are presented in Table 1. Considering the full data matched with the follow-up survey, 51% my sample is from Bruh competition while the rest 49% is from that of EDC. About 27.8% of the applicants had operational young business at the time of application while this proportion jumps to 41.7% after a year. This shows that business ownership rate increased by about 14 percentage points.

Table 1: Summary statistics of selected variables used in this study

Variable	Obs	Mean	Std. Dev.	Min	Max
Sample					
Case (Bruh=1; EDC=0)	494	0.510	0.500	0	1
Entrepreneur's and enterprise characteristics					
Existing business at baseline	494	0.287	0.453	0	1
Operates Business (currently)	494	0.417	0.494	0	1
Works for wage (currently)	494	0.449	0.498	0	1
Gender (male=1)	494	0.826	0.380	0	1
High school or below education	494	0.176	0.381	0	1
TVET or some College education	494	0.101	0.302	0	1
Has university Education	494	0.723	0.448	0	1
Firm age in years(currently)	206	2.576	2.995	0.083	28.6
Number of total workers (currently)	206	7.864	9.788	1	80
Sector dummies					
Agriculture	494	0.140	0.347	0	1
IT	494	0.275	0.447	0	1
Manufacturing g	494	0.310	0.463	0	1
Retail	494	0.219	0.414	0	1
Construction	494	0.057	0.231	0	1
Region					
Addis Ababa	494	0.623	0.485	0	1
Oromia	494	0.095	0.294	0	1
Amhara	494	0.194	0.396	0	1
Other regions	494	0.087	0.282	0	1

Notes: *Currently refer the time of the follow-up, which is a year after the application to the competition. Means of firm age and numbers of workers are conditional on operating a business.*

Looking deep into the profile of applicants, most businesses are owned and managed by male and the participation of female in this respect is low. The applicants are much more educated than an average Ethiopian youth with more than 72% of have university degree. This is consistent with the business plan applicants reported in other developing countries as the competition requires paper works, more able ones self-select to the competition. Businesses which were being operated by the applicant at the time of the follow-up survey are small and

young business with about, average, 7.8 number of workers and 2.5 years since operation, implying 1.5 years on average when applied for the competition.[9]

iii. Training status: introducing the nominal versus effective treatment indicator

In this study, treatment is attending the training that the business plan competition offered as an integral part of the competition process right after the first screening. In my matched sample, 142 of 494 (28.74%) of the respondent attended the training offered by the business plan competition and this group is my treatment group based on this treatment indicator. However, this indicator is ***nominal treatment indicator*** which considers training only within the program of interest and disregards the possibility of treatment by substitute programs as such programs are ubiquitous in the market as discussed in the context section. Therefore, I called the resulting first-stage equation estimated using the nominal treatment indicator as ***Nominal First-Stage.***

In the follow-up survey, however, in addition to measuring the business outcomes of participants respondents were asked if they had taken any entrepreneurship training in other similar programs. The very reason why I asked this is that I wanted to ensure that rejected applicants of the business plan competition (our control group) should not be treated elsewhere for this group to serve as a clean control group in this evaluation. If the rejected applicants are found to have taken similar training in other programs particularly after they got rejected from Bruh and EDC business plan competitions, they cannot be the ideal control group that I aspire to have for a precise causal estimate of the program's effect.

Surprising, in the follow-up survey, I found that about 78% of the applicants have had entrepreneurship training in any program (the business plan competition under evaluation and others). Note that this program has reached out only 28.74% of the applicants in its training intervention, implying that the remaining 71.3% are rejected applicants that are supposed to be my control group. However, 74.5% of this rejected applicants have ever had

[9] One applicant reported a firm with the age of 28.6 years which could be acquired either through inheritance or purchasing of an existing business. Some applicants with a medium sized firm, in Ethiopian standard, have applied to EDC competition with the intention to get their business development supports.

similar training in other programs. When I limit the timeline to be since these business plan competitions, again about 60.7% of all applicants and near to 53.7% rejected applicants of the business plan competition reported that they got at least one entrepreneurship training (Appendix 3, Table 3.A.1). In appendix 3, Table 3.A.1, I presented the cross-tabulation between treatment status in this program and treatment in any program disaggregated by Bruh and EDC; while in Table 3.A.2 the distribution of trainees who got trained by any program by the types of training provider is presented.

These results clearly show that training opportunity for startups in the market is ubiquitous and many of my control groups have been treated by substitute program. Therefore, the nominal training indicator is not reflective of one's real status since many applicants below the cutoff got trained in elsewhere in the same period even if they were rejected for the training by Bruh and EDC. What matters is getting the training regardless of who offer it. That is why I call the previous indicator as nominal indicator. Then, I constructed a new treatment indicator from the self-reported data which takes the value 1 if an entrepreneur had ever taken any entrepreneurship training and 0 otherwise. This is the true or ***effective treatment indicator*** that considers not just the treatment within the program of interest, but also other substitute treatments offered elsewhere. The first-stage estimate stemmed from this treatment indicator would be a realistic estimate and thus I call this first-stage the ***Effective First-Stage (EFS),*** which will be presented in the next sections**.**

3.3. Empirical strategy

3.3.1. Specification of the model

This paper intends to examine the causal impact of the program's intervention on self-employment (or business establishment) and business expansion (measured by employment, sales, and profit). Throughout this study, I will be limited to the training intervention of the program since the recipients of the other intervention of the program, that is grant, are too small (just 26) to do meaningful quantitative impact evaluation for this arm. As discussed

earlier, in both competitions, judges scored business plans of each applicant based on pre-determined criteria and average score of the first-round screening was used to determine placement for the training program.

The competition organizers had determined their admission capacity to the training beforehand while the judges were tasked to score all the eligible applicants. Then, the organizers invited top applicants for the training based on their score and availability for the entire duration of the training period starting from the highest scorer until their capacity is filled. For instance, the training program in *Bruh* was designed to be offered in a bootcamp for one month and JCC had already determined to admit top 70 applicants based on their first-round screening result. The judges scored 275 applicants and delivered to JCC. JCC started inviting applicants starting from the applicants ranked first and during invitation applicants were required to commit one-month full time for the bootcamp. At this stage, some applicants who were among the top 70 declined the offer for various reasons and JCC replaced them with the next best applicants again based on their score. Through this process, JCC had to invite top103 applicants to fill the 70 quota and 63.05% was the cutoff. Similarly in EDC, each center determined the number of applicants admitted for the training and the scoring was done by the respective centers, each center had its own cutoff.

Therefore, as a rule of the competitions, applicants above the cut-off were offered slots for the training intervention and pass to next step of the competition while those below the cut-off did not have that chance to access the training prepared by these business plan competitions. This allows us to exploit the scores given to each contestant and the exogenous cut-off points used to select best applicants to estimate the causal effect of the training interventions using regression discontinuity (RD) technique.

Closely looking at the implementation of the training program, there was no crossovers, meaning that all applicants below the cut-off did not receive for the training intervention (thus, they perfectly complied). However, some of those above the cut-off did not show-up because of various reasons as discussed in section 2. Thus, there was imperfect compliance above the cutoff and thus the attainment of the training program is not a deterministic

function of score. This lends itself to a fuzzy Regression Discontinuity Design (RDD). Thus, in this paper, I employed a fuzzy RDD to identify the causal impacts of the training intervention through comparing offered applicants who are just above the cutoff (treatment group) and rejected applicants just below the cutoff (control group). Considering the treatment in substitute program as a crossover case and with the fact that there are cases of no-shows, the estimated causal parameter would be the Local Average Treatment Effect (LATE).

Our generic fuzzy RD model is specified as three sets of equations as follows.

The Outcome equation:

$$Y_{ij} = \beta T_{ij} + f\left(S_{ij} - \bar{S}_j\right) + \delta X_{ij} + \upsilon_{ij} \quad (1)$$

The First stage equation:

$$T_{ij} = \pi \mathrm{I}\left\{S_{ij} - \bar{S}_j \geq 0\right\} + h\left(S_{ij} - \bar{S}_j\right) + \theta X_{ij} + \nu_{ij} \quad (2)$$

Reduced-form equation:

$$Y_{ij} = \beta\pi \mathrm{I}\left\{S_{ij} - \bar{S}_j \geq 0\right\} + g\left(S_{ij} - \bar{S}_j\right) + \gamma X_{ij} + \varepsilon_{ij} \quad (3)$$

Where the subscript *i* represents applicant and *j* indicates the competition centers based on which the jury and the cutoff vary (Bruh and 4 centers of EDC separately); Y_{ij} denotes the outcome variable of applicant *i* competed in competition *j* or evaluated by a jury *j*. Outcome variables includes measures of business entry and survival (operating a firm) as well as expansion (total numbers of workers, monthly sales in Ethiopian Birr, monthly profit) which were observed 8 months after the intervention. T_{ij} represents the treatment indicator which takes the value 1 if an applicant attended the training and 0 otherwise; S_{ij} is the average score in the first screening and $\bar{S}_j$ the cutoff point to be admitted for the training program; $S_{ij} - \bar{S}_j$ is the average score centered at the cutoff which is my running variable; $\mathrm{I}\left\{S_{ij} - \bar{S}_j \geq 0\right\}$ is an indicator function for applicant *i* to be above the center j's cutoff; $f(.)$, $h(.)$ and $g(.)$ are the polynomial functions of the standardized score; X_{ij} is a vector of exogenous controls; β is the parameters of interest for the outcome equation (causal parameter) that measures effect of the training on business outcomes; and π represents the first-stage parameter which captures the effect of qualifying for the training (i.e. scoring

above the cutoff) on training participation. The product of the two parameters (βπ) gives the reduced form estimate, another parameter of interest in eq (3). If the first stage is negligible, the reduced form is expected to be small for any value of $\beta. \theta, \delta, and\ \gamma$ are coefficients of the control variables; and $\upsilon_{ij}, \nu_{ij}\ , and\ \varepsilon_{ij}$ are the error terms.

In estimation of these equations, an optimal bandwidth selection method recently developed by Cattaneo et al. (2020) and Cattaneo et al. (2021) is utilized to avoid the bias that stemmed from the subjective selection of bandwidth.

3.3.2. Test of the basic identification assumption: Manipulation test of score

Before presenting results from estimation of the model, the validity of the basic identification assumption of the RDD should be tested in my data. The basic identification assumption of the model is that entrepreneurs who are just above or below the cut-off are similar in their observable and unobservable characteristics, implying that participants are unable to manipulate the running variable (the score). This is also referred in the literature as continuity assumption (Lee & Lemieux, 2010). If the scores are not manipulated, the training probability function is expected to be smooth at the cutoff. Since I have transformed the score as indicated in the specification of the model, the cutoff in this study is zero.

Using the first-round screening scores data obtained from the administrative records of *Bruh* and *EDC*, I tested the plausibility of this assumption using two methods: Falsification test on pre-determined covariates (Lee, 2008; Lee & Lemieux, 2010), and the density test (McCrary, 2008 and Cattaneo *et al*., 2020). The test results of each method are presented as follows.

3.3.2.1. **Falsification test on pre-determined covariates**

The first simple method available to test the continuity assumption is that the falsification test of pre-determined exogenous covariates (Lee, 2008; Lee & Lemieux, 2010). Accordingly, the distribution of the pre-determined covariates must be continuous at the cutoff if scores are not manipulated. This is analogous to the balance test of treatment and control groups using their baseline characteristics in case of random experiments.

Table 2: Falsification test results of the running variable based on pre-determined covariates

Dependent Variable	Full sample	Bruh	EDC
Female owner	-0.0279	0.0857	-0.187
	(0.110)	(0.126)	(0.193)
High school lor below education	0.185*	0.142	0.502
	(0.102)	(0.168)	(0.324)
TVET or some college level	-0.0136	0.186*	-0.303
	(0.0806)	(0.112)	(0.186)
Undergrad or grad degree	-0.170	-0.366**	0.0950
	(0.118)	(0.181)	(0.209)
Existing business at the application	-0.0921	0.128	-0.435*
	(0.107)	(0.119)	(0.226)
Manufacturing sector	0.0156	0.352*	-0.230
	(0.119)	(0.212)	(0.243)
Construction sector	-0.0323	-0.104	0.165
	(0.0759)	(0.102)	(0.100)
Agriculture sector	0.155*	-0.0914	0.306*
	(0.0925)	(0.0705)	(0.171)
IT sector	-0.0204	-0.0623	-0.0410
	(0.111)	(0.148)	(0.175)
Retail sector	-0.140	-0.174	-0.118
	(0.126)	(0.195)	(0.203)
Addis Ababa	0.142	0.196	0.0962
	(0.151)	(0.210)	(0.205)
Oromia region	-0.00281	-0.0830	0.103
	(0.0723)	(0.114)	(0.0708)
Amhara region	-0.0723	-0.0005	-0.232
	(0.124)	(0.150)	(0.210)
Other regions	-0.0170	-0.0583	0.0188
	(0.0789)	(0.119)	(0.139)

Notes: The reported coefficients are the RD estimates for coefficients of standardized score on exogenous covariates. For each regression, data-driven and varying optimal bandwidth to the left and right side of the cut-off (MSE-optimal bandwidth) are used. Robust Standard error in parenthesis. *, **, *** denote significance at the 10, 5, and 1 percent levels respectively.

I conducted the test using the entrepreneur and enterprise characteristics data which were collected at the baseline (application period) as pre-determined exogenous covariates. These includes the entrepreneur's gender (dummy for female owner), education (measured as three categories: high school or below, Technical and Vocational Education & Training (TVET) or some college level education, and undergraduate or graduate degree), dummy for having

existing business at the time of application, sector dummies of the (proposed) businesses applied for the competitions, and regional dummies. Using these exogenous covariates as outcome variables and the running variable (score) as a regressor, I estimated the RD estimators of the coefficients with data-driven automatic bandwidth selection proposed by Cattaneo et al. (2020) by allowing variations in bandwidth to the left and right of the cutoff. As shown in Table 3.2, the estimated coefficients in almost all the models are not statistically different from zero, suggesting that the score is continuous at the cutoff and continuity assumption is satisfied.

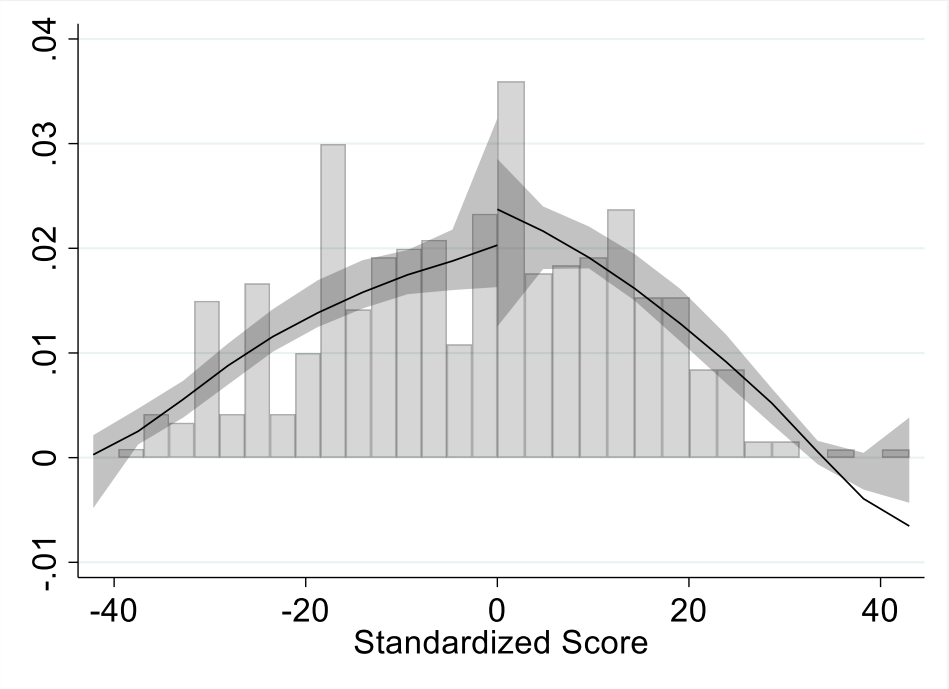
3.3.2.2. The Density Test

The second and formal method to test the continuity of the running variable at the cutoff is the density test. This test was introduced by McCrary (2008) and recently improved by Cattaneo et al., (2020) for the generating local polynomial density estimators and by Cattaneo et al. (2021b) and Cattaneo et al. (2022) for graphical procedures with valid confidence bands. The idea of this test is by obtaining a histogram of the running variable and see if the estimated densities obtained from the local polynomial regression separately run in the left and right sides of the cutoff are similar in both sides. The null hypothesis of this test is that there is no manipulation of the running variable or densities of the running variable is the same to the right and left of the cutoff.

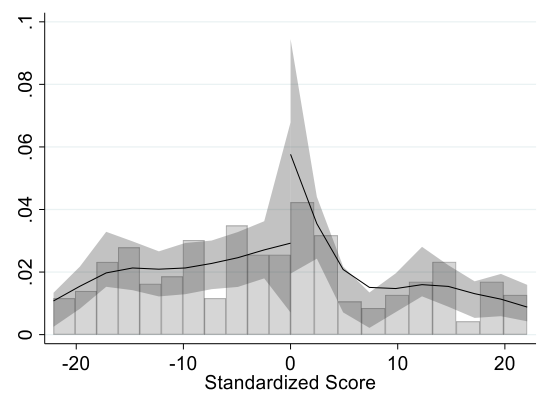
The test results of this hypothesis are presented in Figure 2 for the full sample (panel A) and for the disaggregated one by types of competition (Panel B and Panel C). In this test, the smoothness of the distribution at the cutoff is objectively gauged from the resulting test-statistics. For the full sample, I fail to reject the null hypothesis of no manipulation with a p-value of 0.7097 implying that the density function is smooth at the cutoff. This is consistent with what we visualize in Figure 2, panel A. Similarly, by disaggregating the data into Bruh and EDC cases, I fail to reject the null hypothesis with a p-values of 0.4936 and 0.9656 for Bruh and EDC, respectively. This again bolsters the finding that score was not manipulated by subjects of this study.

Figure 2: Density Test for manipulation of scores

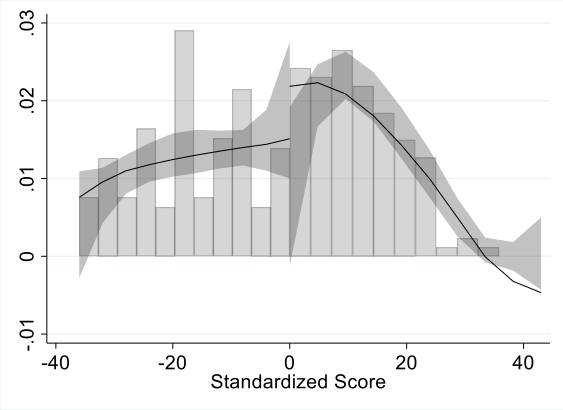
Panel A: For the full sample



Panel B: For Bruh sub-sample



Panel C: For EDC sub-sample



Note: Thes graph summarize the density test for manipulation of the running variable (score) for the full sample, Bruh sub-sample, and EDC sub-samples. The resulting P-values of the test is 0.7097, 0.4936, and 0.9656 for tests displayed in Panel A, Panel B, and Panel C, respectively. The null hypothesis is that there is no manipulation of the running variable (score).

As suggested by both the statistical tests performed so far, the model passes the main identification assumption, that is, continuity of the running variable at the cutoff. This is quite consistent with the intuition of the program. The fact that scores are given by a panel of

judges where the average score from all criteria and all judges determine final placement. In this situation, there is no way for a contestant to know the scores of any competitor before the result is revealed. Similarly, a member of the jury cannot know what other score is given by other members before the score is submitted for the computation of the average score. This situation rules out the possibility of manipulation of scores by the contestant as well as a member of judges.

In addition, the number of contestants who pass to the next stage is already determined beforehand. Once the scores are averages and top scorers are selected in order of their scores until the pre-planned capacity (quota) for a given intervention is filled. That also makes the cutoff purely exogenous. Other assumptions to identify the model are exclusion restriction and monotonicity assumptions. These assumptions are easily satisfied in this application as scores affects the outcomes through only allowing access to training of the program, for the former, and as contestants below the cutoff are unlikely to refuse to get the training, for the latter assumption. All these tests clearly imply that RD is a valid design for this study.

4. Estimation results of the models

4.1. The First-Stage Estimates

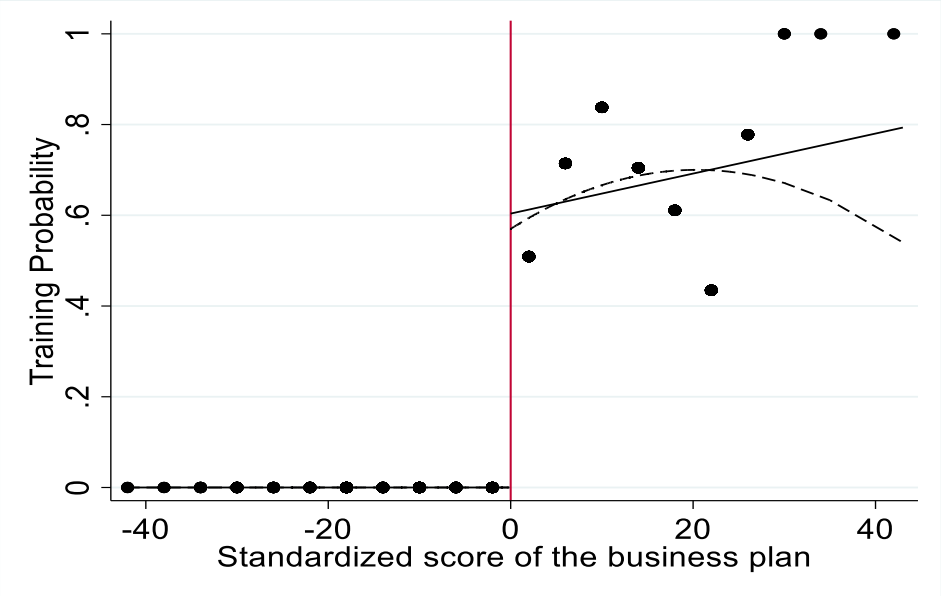
4.1.1. The Nominal First-Stage (NFS)

The dependent variable for the first-stage of my fuzzy RD model is attendance of the entrepreneurship training (treatment) which takes the value 1 if an entrepreneur attended the training of the business plan competitions and 0 otherwise. As discussed earlier, this is a nominal indicator and the resulting first-stage is the Nominal Fist-Stage (NFS). Data about the status of training attendance was taken from the administrative records of the competition.

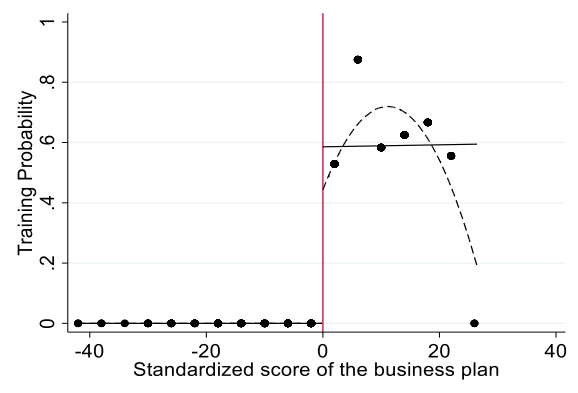
Figure 3 depicts the nominal first-stage result in binned scattered graph which summarizes the probability of attending the entrepreneurship training offered by the program under study (Bruh and EDC business plan competitions) as a function of score. Panel A, panel B, and panel C presents the results for the full sample, Bruh sub-sample, and EDC sub-sample, respectively. In these figures and all others presented next, the scattered dots are the bin

means which are computed with a bin width of 4. The solid line and the dashed curve are the linear and quadratic regression fits separately estimated to the left and right of the cutoff (zero). Rejected applicants in the first-round screening of the competition are those below zero and their offered counterparts are those of zero and above.Figure 3: Nominal First-stage (NFS) result of the probability of attending training of the program.

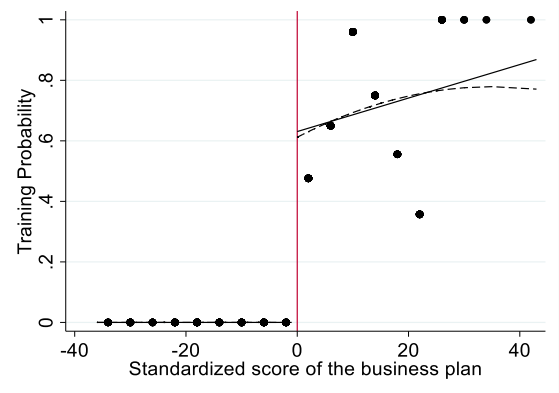
Panel A: NFS for the full sample



Panel B: NFS for Bruh



Panel C: NFS for EDC



Note: The dependent variable in all cases is the dummy for attending the entrepreneurship training prepared by the competition organizers. Zero is the cutoff for the running variable (score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

This nominal first-stage estimates show that there is a clear jump in training probability at the cutoff in all the three panels. The difference in the training probability between applicants above and below the cutoff is the first-stage parameter, which is estimated to be about 60%

and 57% in the linear and quadratic specification, respectively, for the full sample for instance. The point estimates of the first stage parameter for each sub-sample (full, Bruh, or EDC) are also presented in Table 3 which reaffirms that I have a strong first-stage as the reported parameter is statistically significant at 1% level in all cases (Figure 3 and Table 3).

To the left of the cutoff, the regression fit lines coincide to the horizontal axis at $Y = 0$, implying that there are no crossovers in the training of the program while a less than one training probability to the right of the cutoff indicates the existence of no-shows, consistent with my discussion in the program description. The fact that score is a strong predictor of treatment (i.e. training participation) with a clear jump at the cutoff coupled with the satisfaction of the main identification assumption tested in the previous section make the fuzzy RD a perfect design for this study.

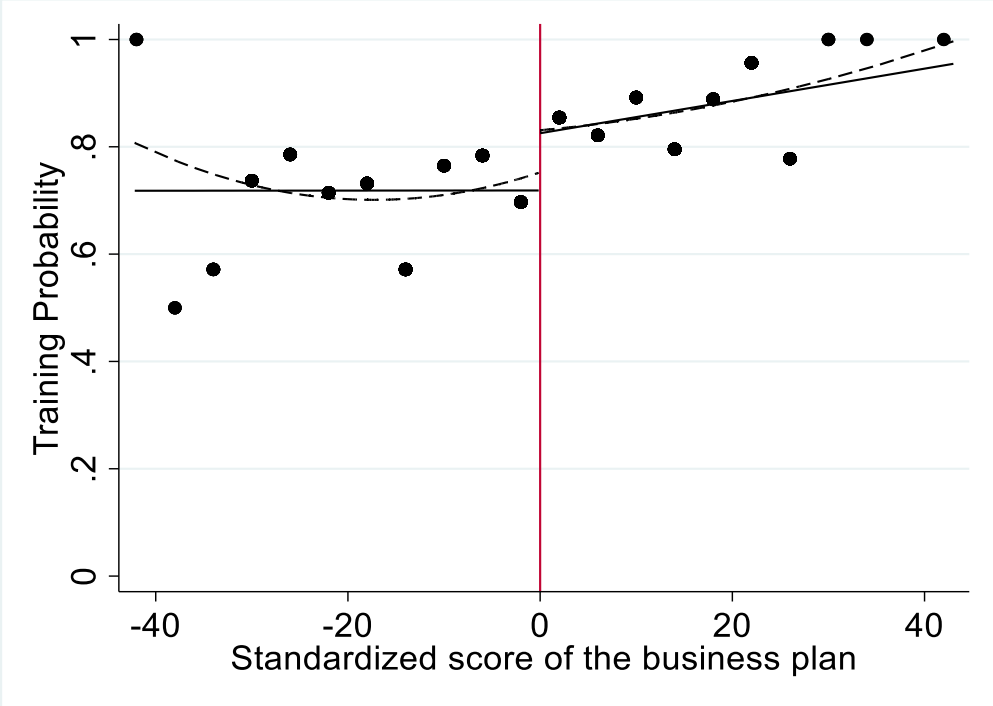
4.4.2. The Effective First-Stage (EFS): The main EFS result

As described above, I had the nominal firs-stage result which shows a perfect set up for RDD before going for the follow-up survey. In the follow-up survey, however, I documented the training status of all applicants in substitute programs, and I found that many of the control groups were actually treated elsewhere by substitute program as described in the previous section. Using the effective treatment indicator which takes the value 1 if an entrepreneur had ever taken any entrepreneurship training and 0 otherwise, I have re-estimated the first-stage equation, which is the Effective First-Stage (EFS).

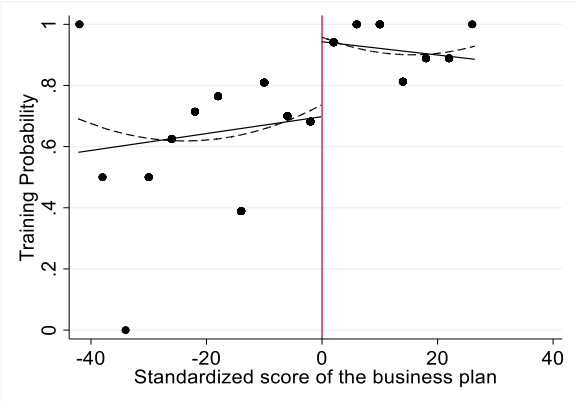
The results of the effective first-stage presented in Figure 4 and Table 3.4 reveal that the first-stage we observed for the nominal case disappeared when we take the substitute treatments into account. For instance, if we look at the full sample case in panel A of Figure 4, we find that both applicants to the right and left of the cutoff have high and comparable level of training probability. At the cutoff in the linear specification, applicants that were rejected in

Figure 4: Effective First-stage (EFS) result of the probability of attending entrepreneurship training from any program

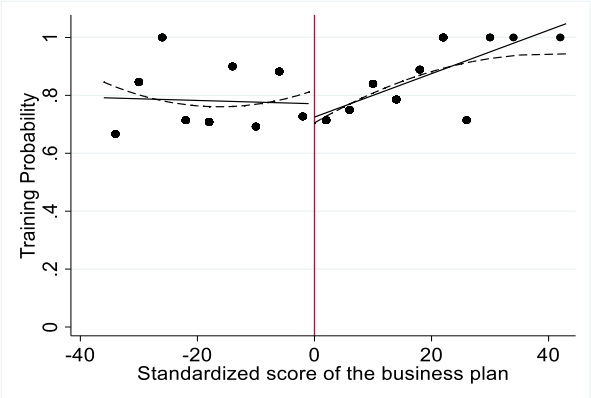
Panel A: EFS for the full sample



Panel B: EFS for the Bruh



Panel C: EFS for the EDC



Note: These graphs show the effective first-stage results for the full sample (Panel A), for *Bruh* (panel B), and *EDC* (panel C) sub-samples. The dependent variable in all cases is the dummy for attending the entrepreneurship training ever offered by any program or training provider including the program of interest. Zero is the cutoff for the running variable(score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

the business plan competition (left of the cutoff) has a training probability of more than 0.7 while it is a little bit higher than 0.8 for their offered counterparts (right of the cutoff). As a result, the estimated effective first-stage parameter dwindled to about 10 percentage points.

Even this estimate reduces to 7 percentage points if we consider the quadratic specification and in both specification the coefficients are not statistically significant as shown in Table 4, column 1 and column 2. This implies that both control and treatment groups have the same status in terms of attending training when we consider substitute programs.

Table 3: Nominal First-Stage Estimates of the Effect of Scoring above the Cutoff on Training Attendance

	Full sample		Bruh		EDC	
	Linear (1)	Quadratic (2)	Linear (3)	Quadratic (4)	Linear (5)	Quadratic (6)
π	0.6038***	0.5700***	0.5857***	0.4434***	0.6308***	0.6120***
	(0.0548)	(0.0710)	(0.0869)	(0.1087)	(0.0707)	(0.0984)
Observations	456	456	214	214	242	242
R-squared	0.4965	0.4982	0.4536	0.4803	0.5228	0.5232

Notes: Robust Standard error in parenthesis. *, **, *** denote significance at the 10, 5, and 1 percent levels respectively. Dependent variable is Dummy for attending the training offered by the business plan competitions under study. The reported coefficients are estimates of the first-stage parameter(π); the standardized scores and its interaction with the indicator of being above the cutoff have been controlled; Estimations are based on the full support. Linear and Quadratic are linear are types of functional forms of the model.

Table 4: Effective First-Stage Estimates of the Effect of Scoring above the Cutoff on Training Attendance

	Full sample		Bruh		EDC	
	Linear (1)	Quadratic (2)	Linear (3)	Quadratic (4)	Linear (5)	Quadratic (6)
π	0.1066	0.0784	0.2449***	0.2206*	-0.0460	-0.1130
	(0.0667)	(0.0905)	(0.0825)	(0.1160)	(0.1007)	(0.1444)
Observations	456	456	214	214	242	242
R-squared	0.0303	0.0314	0.0969	0.0992	0.0141	0.0161

Notes: Robust Standard error in parenthesis. *, **, *** denote significance at the 10, 5, and 1 percent levels respectively. Dependent variable is Dummy for attending entrepreneurship training offered by any program at any time. The reported coefficients are estimates of the first-stage parameter (π); the standardized scores and its interaction with the indicator of being above the cutoff have been controlled; Estimations are based on the full support. Linear and Quadratic are linear are types of functional forms of the model.

Disaggregating the analysis into the two types of competitions yields similar pattern. The strong first-stage parameter I have estimated in nominal case for Bruh sub-sample (about 59% in linear and 44% in quadratic specification from Table 3) has sharply declined to about

24% and 22% in linear and quadratic specification, respectively, as shown in panel B of Figure 4 and column 3 and column 4 of Table 4. Though the magnitudes of the estimated coefficients have declined, it is still statistically significant implying that the first-stage has somehow sustained for Bruh even after accounting for training by substitute programs. On the other hand, alike the full sample, the first-stage for EDC has completely disappeared, even it turned to negative though insignificant, when I estimate the effective first-stage (Colum 5 and column 6 of Table 4 and Panel C of Figure 4).

To sum up, when treatment only within the program under evaluation (the business plan competitions) is considered, as many researchers do, there is a strong first-stage for all sub-samples. Nonetheless, I argue that balance of the treatment and control group at the baseline line (time of application in my case) is not enough to ensure the validity of the counterfactual. It is also essential to check the exposure of the control groups for substitute treatments after the placement of the program. My follow-up data in this study revealed that the control group of this study when designed (rejected applicants) got trained elsewhere by substitute programs. Given this situation, we do not expect the business outcomes of training beneficiaries to be better than that of their rejected counterparts as the latter group (controls) had similar training from other trainers.

4.4.3. Additional Robustness Checks on the Effective First-Stage

A) Effective First-Stage by contents of the training

In the effective first-stage result presented so far, I have demonstrated that both group of applicants had the same level of treatment (training) no matter where they got treated. One possible concern which could weaken this conclusion is that the two groups may not necessarily had the same contents of the entrepreneurship training. For instance, the types of training modules developed for offered applicants of the business plan competitions were more tailored for startups. On the other hand, my control groups who got entrepreneurship training elsewhere may not have had the same contents of training and its relevance to their business development may be questionable. If there is variation in the contents of the training

each group covered, the effective first-stage may not necessarily be effective, and the nominal first-stage could rather be more relevant.

In order to address this potential concern, I collected detailed information in the follow-up survey regarding the types of training modules they have ever covered in the training programs they attended. By doing so, I uncovered that the respondents have had various type of entrepreneurship or business trainings which are categorized into 11 themes or modules. Comparing these 11 modules with the types of training modules covered by the business plan competitions gives us two major categories of modules. These are:

i. Modules (training contents) which are ***the same*** as the modules covered in the program of interest (the competitions). This group consists of six modules, namely, entrepreneurship competency, business idea development and business plan preparation, pitching skills, marketing, visual prototype and product development, and legal business setup
ii. Modules which have ***different content*** as compared to the trainings covered by the business plan competitions. Kaizen, technical training, bookkeeping, management training, and other trainings like time management are the types of modules included in this category.

If applicants to the right of the cutoff are found to have higher probability of accessing training of category one as compared to their counterparts to the left of the cutoff, the training that the latter group had in other programs cannot be considered as a close substitute for the training offered by the program of interest. Statistically speaking, if the groups have similar access to the same contents of this program's training, the concern we had about substitute treatment as well as my effective first-stage remain valid.

To test this claim, I defined two treatment indicators associated to the two categories of the training modules and estimated the first-stage for each types of training. For instance, related to the first category, the treatment indicator is defined to take a value 1 if a respondent has ever covered one of the six modules of category one (which are the same as offered in the business plan competitions) and 0 otherwise. Again, for the second category, an indicator for having different contents of training as compared to that of Bruh/EDC is constructed to take

the value 1 if the entrepreneur has ever covered at least one of the 5 modules in category two and 0 otherwise. The first-stage results which are generated using these treatment indicators are presented in Figure 5.

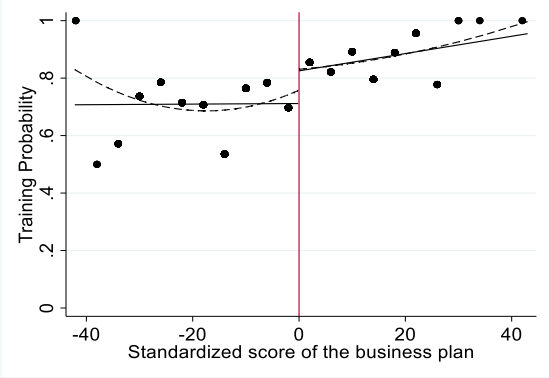
For each sub-sample, I reported a pair of graphs that compare the effective first-stages for the same content (category 1) and different content (category 2) trainings. The results shown from panel A to panel F in Figure 5 again confirmed the previous finding that the effective first stage is generally negligible as we do not see clear and big jumps in the training probabilities at the cutoff. To be precise about the estimated first-stage parameter, the results depicted in panel A, C, and E, for instance, entails us that marginally qualifying for the training increased access to alike-program's type training by 11.4% for the whole sample, 25.5% for Bruh, and almost nil for EDC. This result is the same as the result I reported in Figure 4 for the aggregates treatment indicator which disregards the contents.

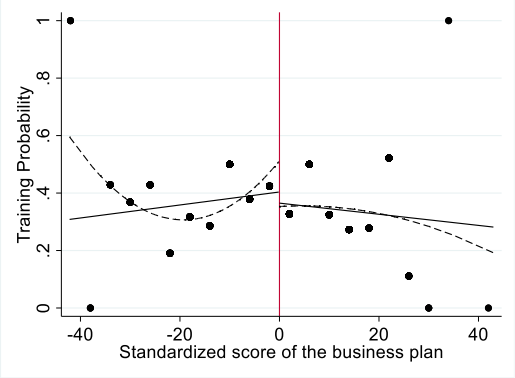
This finding implies that the trainings that my rejected applicants accessed elsewhere are of the same content as the trainings offered by Bruh and EDC business plan competitions for the accepted applicants. The fact that the close substitutability of treatment by other programs is confirmed and thus results of my effective first-stage is more realistic than that of the nominal one.

Another observation we can have from results in Figure 5 is that the level of training probabilities in the two categories of trainings. For instance, if we compare training probabilities in panel A and panel B of Figure 5 for the full sample, the training probability for the first category (panel A) is on average more than 70% while it is not more than 40% for the second group (B). This shows that the types of trainings designed and offered to the successful business plan applicants by the competition organizers is among the types of training which are widely available in the market. Had it been of a unique content, applicants to the left of the cutoff would not have reported the same level of access and content of training.

Figure 5: Effective First-stage result disaggregated by contents of the training covered

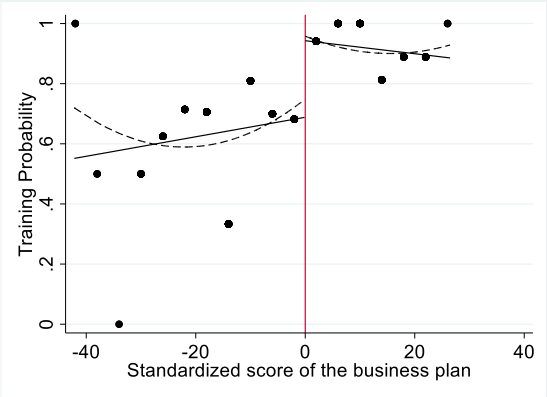
Panel A: Full sample's EFS for similar contents Panel B: Full sample's EFS for different contents

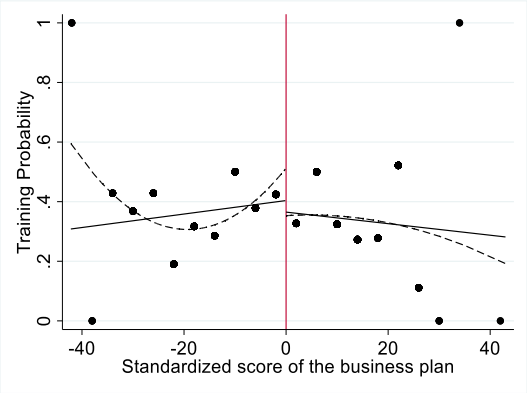




Panel C: Bruh's EFS for similar contents

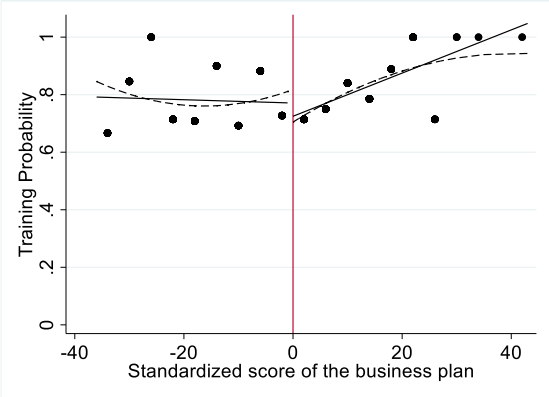
Panel D: Bruh's EFS for different contents

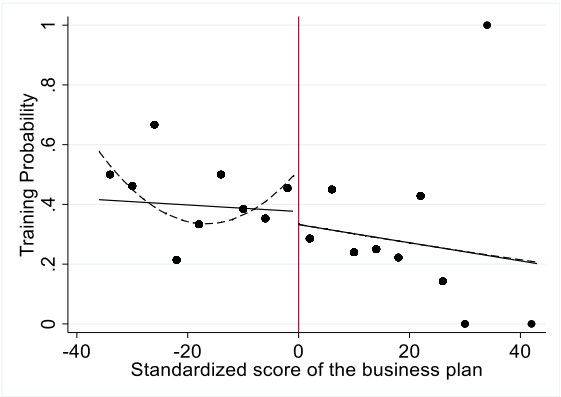




Panel E: EDC's EFS for similar contents

Panel F: EDC's EFS for different contents





Notes: Similar content means training modules trainees covered is the same as that of used by the program under evaluation, and different content otherwise. Dependent variable used in panel A, C, and E is a dummy for covering at least one of the 6 training modules offered by the competitions. Dependent variables used in panel B, D, and F are dummy for covering at least one module which are categorized as different from that of the program of interest. Zero is the cutoff for the running variable(score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

B) First-stage for more disaggregated measures of training content

Even though the training experience of respondent was further qualified by disaggregating it into similar and dissimilar to the contents covered by the program of interest in the previous sub-section, there has been still much aggregation in each category which could potentially mask the intra-group variations. For instance, in the previous analysis, an entrepreneur was categorized to have accessed a training of similar content like that of Bruh or EDC if she/he ever covered ***at least one*** module among the six modules in this category. This definition of the treatment indicator does not differentiate between respondents who had covered just one module from those who covered more or all the modules. This situation sparks a potential concern that the training intensity is not well captured by treatment indicator and thus the rejected applicants who got treated elsewhere could have covered only few modules while the offered applicants by default covered almost all the modules in this category.

In order to address this potential concern, I further disaggregated the analysis of the first group (similar content) into four. That is, I run separate first-stage for access of each of three major modules (business idea development and business plan preparation, entrepreneurship competency, and marketing) without any aggregation and the remaining three minor modules (pitching skills, visual prototype and product development, and legal business setup) together as '*other training of the program'*. The effective first-stage result associated with these four treatment indicators are presented in Figure 6 just for the full sample.[10]

As shown Figure 6, the training probabilities for each type of module (represented by panel A to panel D) are the same for both groups of applicants at the cutoff. That means rejected applicants have equally accessed trainings that offered applicants enjoyed within the program of interest. The only difference between the two groups may be the type of the training provider: the business plan competitions and other programs for the offered applicants while it is exclusive by other programs for applicants rejected in this program.

The additional results I reported here further bolster the validity of the effective first-stage results and weakens the potential concerns about it. Despite the attempts I made in this and

[10] Results for the Bruh and EDC sub-samples are also generally the same, with a relatively higher positive first-stage for Bruh. These results are not reported here to keep the document readable.

previous sub-section to account for the intensity of the trainings while defining treatment group, I believe that treatment indicators used for the effective first-stage still have a couple of common limitations.

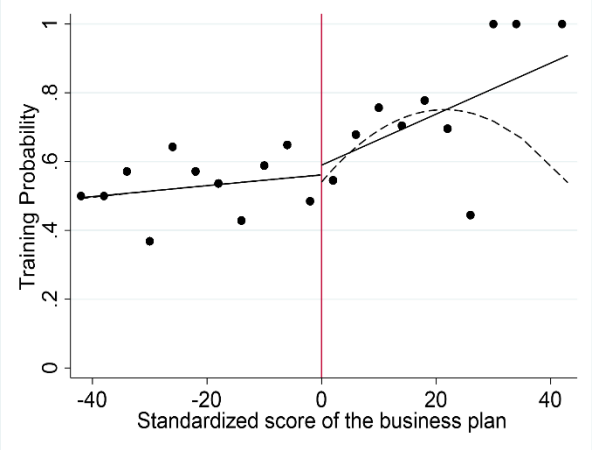
First, unlike the indicator I used for the nominal first-stage, the treatment indicators for all effective first-stage results are based on self-reported data. This suffers from some self-reported bias as I learnt from the cross checking of the self-reported status with the actual status in accepted applicants of this program. Second, I do not have data to measure the quality and duration of the self-reported trainings which could be important to explore.

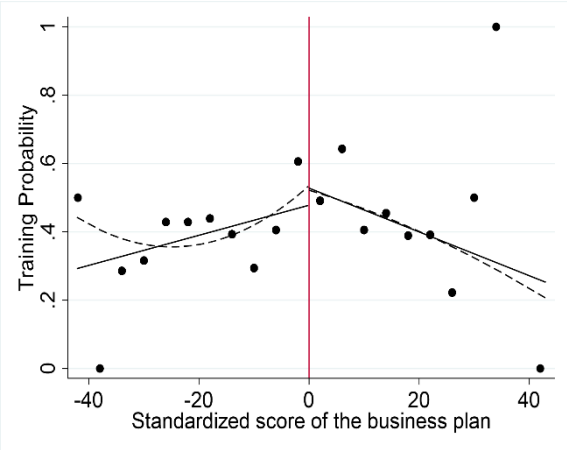
If our treatment indicator for the effective first stage is significantly imprecise due to these two limitations, we can expect a significant parameter estimate for the reduced-form equation. On the other hand, if we do not see any change in the reduced form equation at the cutoff, these limitations will have negligible effect on my effective first-stage estimate. I will prove shortly in the upcoming sections that the latter one is true. Before that let me address other concerns on the effective first-stage.

Figure 6: Effective first-stage for covering major training modules of the program separately (Full sample)

Panel A: EFS for Business idea development and business plan preparation

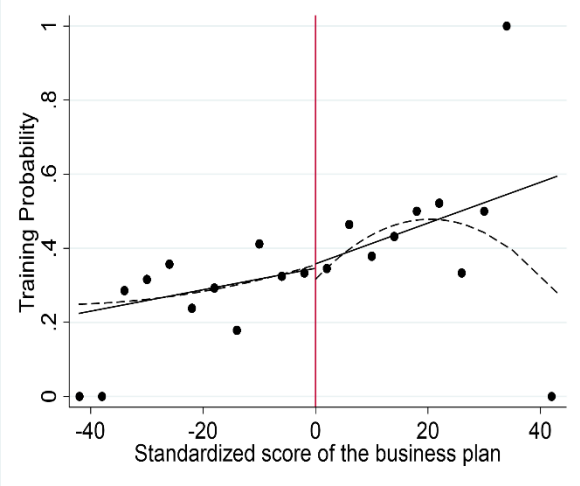
Panel B: EFS for Entrepreneurship Competency training

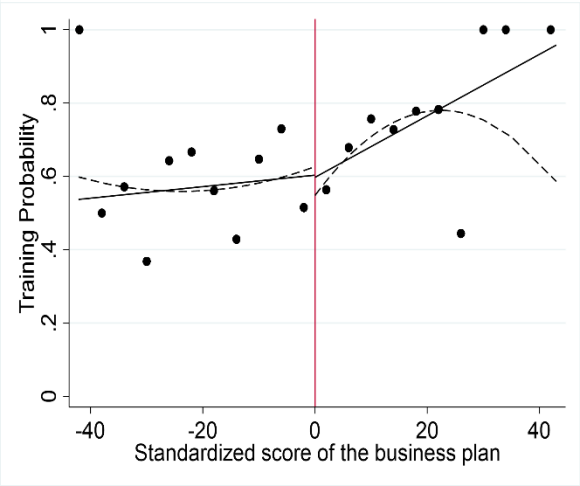




Panel C: EFS for Marketing training

Panel D: EFS for other trainings of the program





Notes: Dependent variable for each panel is dummy for taking the type of training specified in each panel. The types of training themes (modules) presented from panel A to panel D are those offered by the business plan competition. Data for access of each training are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

C). Effective first-stage by Synchronizing the timeline

In all the effective first-stage results presented so far, the treatment indicator (training dummy) was constructed by considering the training experience of the respondents they have

"ever" had. This time-unbounded experience included the training they had before the business plan competitions were launched. One potential concern here is the substitute treatment for the rejected applicants may have been done before the program. If so, what we perceived as a substitute treatment during the program period may have been driven by the baseline balance, which is desirable, between the rejected and offered applicants regarding their prior training exposure.

As a response to this concern, the respondents were asked if they have attended any entrepreneurship training over the last one year, which covers from the start of the business plan competition to the follow-up survey. From this information, I constructed another treatment indicator that takes the value 1 if an entrepreneur attended any entrepreneurship training since her/his participation in Bruh/EDC and 0 otherwise.

The effective first-stage results estimated using this indicator are reported in Appendix 4.1, from Figure 4.A.1 to Figure 4.A.3. Still, the results remain the same as what are presented before with a first-stage parameter of 11% to 15% which is insignificant parameter for the full-sample, about 22% to 27%, depending on the specification, and significant coefficient for Bruh and almost zero for EDC. Therefore, the conclusion about the effective first-stage finding remains the same even after synchronizing the timeline to be consistent with the program period. Further, this result also shows that a large fraction of entrepreneurs got trained in a single year which again ensures the proliferation of training opportunities. As shown in Table 2.A.2 in the appendix most of the training program are offered by different types of government organizations followed by NGOs and international organizations.

D). Effective First-stage by types of training providers or programs

Though applicants above and below the cutoff do not significantly vary by the contents as well as timing of the training each group had in any program (particularly in the full sample and EDC sub-sample), it would be also important to account for the variations in training providers. Because some organization or programs could be more effective than others due to either the variation the variation in the delivery mechanism or any other measures of

quality. In this regard I did two additional analyses: by organizations of interest (EDC or JCC) or type of program.

First, I tested for the difference of rejected and offered applicants' access to trainings provided by EDC or JCC at anytime as these organizations have been providing entrepreneurship training in the programs in addition to the business plan competitions. No matter what the type of program is training provided by a given organization, it is likely to be of the same content at any time, particularly in the organization which provide standardized training like EDC. If the two groups of applicants are found to have the same level of access to trainings by these organization, one can simply rule out the variations I found in the nominal first-stage and further consolidate the claim for effective first-stage.

To this effect, I restricted the training experiences of respondents to only JCC and EDC at any time in constructing the treatment indicator and generated the first-stage results which are reported in Appendix 4.1, Figure 4.A.4 to Figure 4.A.6. This result varies by the type of competition. For Bruh applicants, marginally qualifying for the training in this business plan competition helped its participants to access training by these organizations by 36.6 percentage points more than their rejected counterparts and this estimate is statistically significant at 1% (linear specification of Figure 4.A.5). For EDC sub-sample, on the other hand, this estimate is not more than 10 percentage points and statistically not different from zero (Figure 4.A.6). This could be because Bruh applicants are younger, more with new business ideas, or with a younger startup as compared that of EDC and thus the former group had generally lower exposure for prior training opportunities than the letter one. On average, for the full sample (Figure 4.A.4), the program allowed offered participants to enjoy JCC or EDC's training by about 25 percentage points higher than reject applicants. In sum, in these business plan competitions, these organization, specially JCC, managed to benefit considerable number of entrepreneurs that would not have been trained otherwise.

Second, when the variation of training intensity by the nature of the program is considered, we witness from Bruh bootcamp as well as other incubators and accelerators that the training provided by incupetion programs is different from other ordinary business or

entrepreneurship trainings. As a result, I run first-stage regression for access to training programs exclusively offered by incupetion related programs which includes training by any business plan competitions, Bruh or EDC programs, business incubation, and acceleration programs.

The results presented in the appendix Figure 4.A.7 to Figure 4.A.9 show that marginally scoring above the cutoff significantly increased the probability of attending trainings organized by incupetion programs, particularly for the full sample (by about 22 percentage point in the linear specification) and Bruh (40 percentage points) whereby the former is driven by the result of the latter. In Figure 4.A.10 to Figure 4.A.12, I estimated participation in incubations programs other than that of JCC and EDC and I did not find a significant first-stage. This implies that overall experience of incupetion program for the applicants is largely driven by their experience in the program of interest (Bruh and EDC). Likewise, in case of EDC, the estimated parameter in Figure 4.A.9 is negligible whereas in Figures 4.A.12 rejected applicants have more (about 19 percentage point) access to other incupetion programs. This shows that this business plan competition helped offered applicants of EDC competition to close the gap that would have been created otherwise by opening-up the opportunity for training within the program of interest.

Then, whether this relatively better access to trainings of incupetion programs for applicants above the cutoff will create a difference in their business outcomes will be tested in the reduced-form analysis in the next section. Before embarking on that, however, let us conclude this section by summarizing the results of the first-stage equation.

4.4.4. Summarizing the findings of the first-stage

The key takeaways of the first-stage findings are summarized as follows.

- There is a strong first-stage when program-specific treatment (training prepared as an integral part of Bruh and EDC business plan competitions) is used, which is true for the full sample, Bruh, and EDC sub-samples. I called this first-stage nominal first stage.
- I ran another first-stage where treatment (training) by other substitute programs is considered in addition to training by the program of interest. I called this as effective first-stage. In this case, the first-stage estimate becomes negligible for the full sample and EDC sub-sample, but it remains significant for Bruh even if the magnitude of the coefficient largely diminished as compared to the nominal first-stage estimate.
- The training that rejected applicants of the program enjoyed elsewhere is comparable with the training that JCC and EDC offered for their accepted applicants both in terms of contents covered and timeline, as confirmed in the robustness checks. This implies that substitute treatments were indeed too close substitutes though the provider and the format of the program are different.
- Marginally qualifying the first screening was more important for Bruh applicants than their EDC counterparts to get training opportunity. It seems that the latter group gets training anyway.
- There have been many entrepreneurship training programs run by various government organization and NGOs, as I learned from the interaction that the applicants of our business plan competitions reported to have. The shares of JCC and EDC were found to be considerable in provision of entrepreneurship training in their various programs.

4.4.5. Estimation of the Reduced form equation

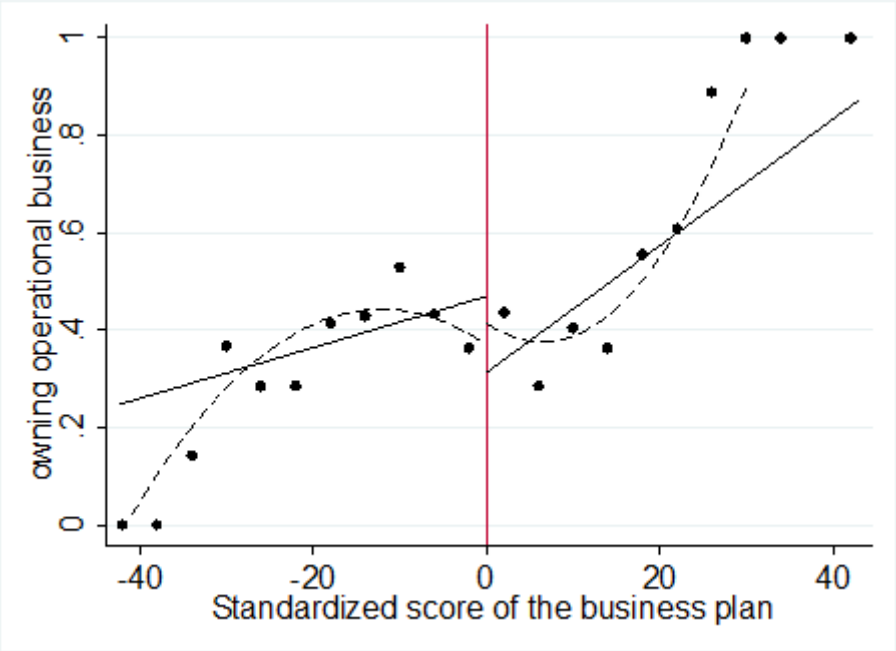
In this section, results and discussions of the reduced form equation specified in equation (3) are presented. I will start with results associated with the outcomes that measure business entry followed by outcomes which intends to measure business expansion. In order to ease the understanding of the findings and for more transparent communication of results, I presented the findings mainly using binned scattered graphs like that of the first-stage. To keep a good balance between readability of the document and provision of detailed information, attempt is made to focus on results of the full sample in the main body while additional results for Bruh and EDC sub-samples are also provided in the appendix.

4.4.5.1. Reduced form results for business entry and survival

This program mainly intends to support startups to facilitate to the establishment and survival of businesses that could be a source of employment for the owners as well as other people. Cognizant to this objective of the program, launching a business and have subsequently survived is the main outcome of interest for this study. To this effect, I defined the outcome variable, owing or operating a business, which takes the value 1 if the entrepreneur owns an operational business enterprise either in group or alone a year after the application to the business plan competition, and 0 otherwise.

The reduced form equation estimated for this outcome using the full sample is depicted in Figure 7. As shown in this graph, the probability of operating a business at the cutoff is statistically the same for applicants below and above the cutoff. This implies that marginally qualifying for the training program of the business plan competition did not make any difference on business ownership or self-employment. This is consistent with my expectation particularly after I learned from the effective first-stage estimates that the two groups are virtually the same in terms of their training probability (the treatment).

Figure 7: Reduced form results on probability of owning a business (self-employment) for the full sample

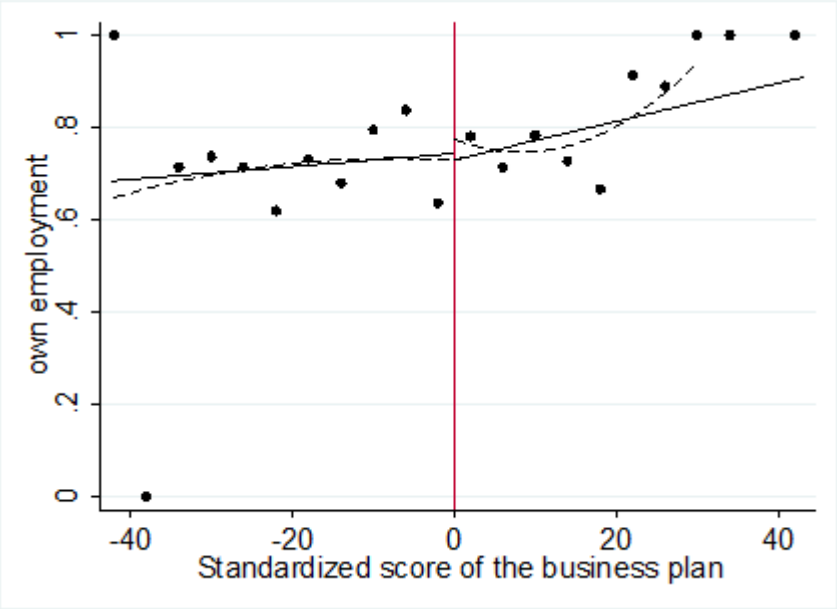


Notes: Dependent variable is dummy for owing (or operating) a firm one year after the application to the business plan competitions. Data about firm ownership is self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

It is also to consider the wage employment outcome of applicants while assessing their self-employability as one affects the other. I defined an outcome called 'own employment' which takes a value 1 if the respondent is either self-employed or wage-employed, or both at the time of the follow-up survey; and 0 otherwise.[11] The reduced form estimates for the full sample depicted in Figure 8 shows no jump in probability of own employment at the cutoff which means both rejected and offered applicants are not different from each other in this respect. The result in Figure 8 further informs that about three-fourth (or 75%) of the applicants are employed and more than half of this is attributed to self-employment (Figure 7).

Figure 8: Reduced form results on probability of own employment for the full sample

[11] The definition of this outcome was taken from McKenzie (2017).



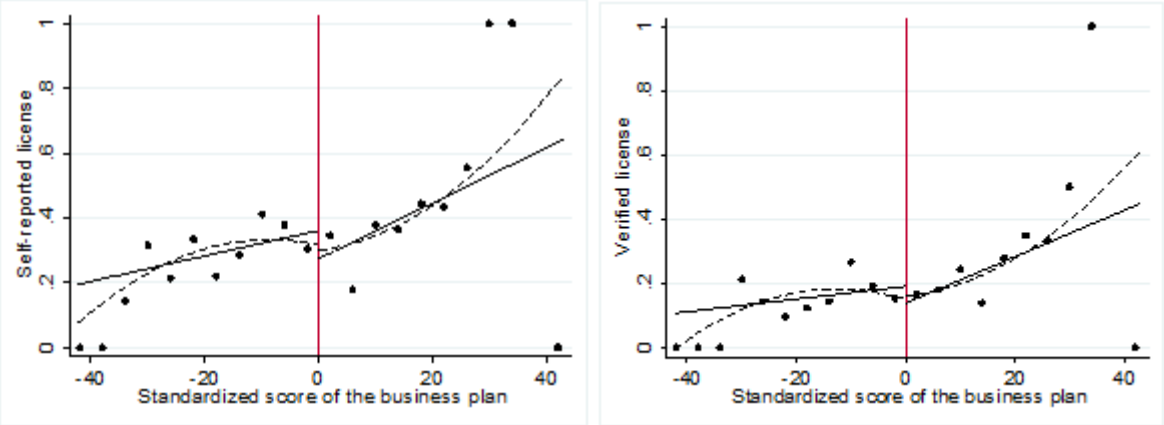
Notes: Dependent variable is dummy for own employment which takes the value 1 if the respondent is either self-employed or wage employed or both one year after the application to the business plan competitions. Data about employment status is self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Formalizing the operation of the small businesses through facilitating licensing of their business is one of objectives of government organizations working on entrepreneurship development like JCC, for instance. In this study, I have also evaluated if the program has any effect of owning licensed businesses. The reduced form results reported in Figure 9 are based on two different measures license outcomes. In panel A, the probability of operating licensed business based on self-reported license status of businesses is displayed while panel B presents for license which we independently verified its existence in the local and federal government agencies responsible for licensing business. In both panels, the estimates are unconditional estimates which are not conditional on operating a business. To this end, the outcomes of respondents who did not own businesses one year after the start of the program are coded to zero. Doing so is quite important to address the issue of sample selection.

The result in both panels of Figure 9 revealed that applicants who scored above the cutoff are not better off in terms of operating formally registered businesses as compared to their counterparts rejected in the first round of the competitions.

Figure 9: Reduced form results on owning licensed (or formal) business

Panel A: Self-reported license Panel B: Verified license



Notes: Dependent variable for each panel is dummy for owing (or operating) licensed business one year after the application to the business plan competitions. The results are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Data about license status of the firm in panel A is self-reported in the follow-up survey while in panel B it is independently verified from local regulatory agencies. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

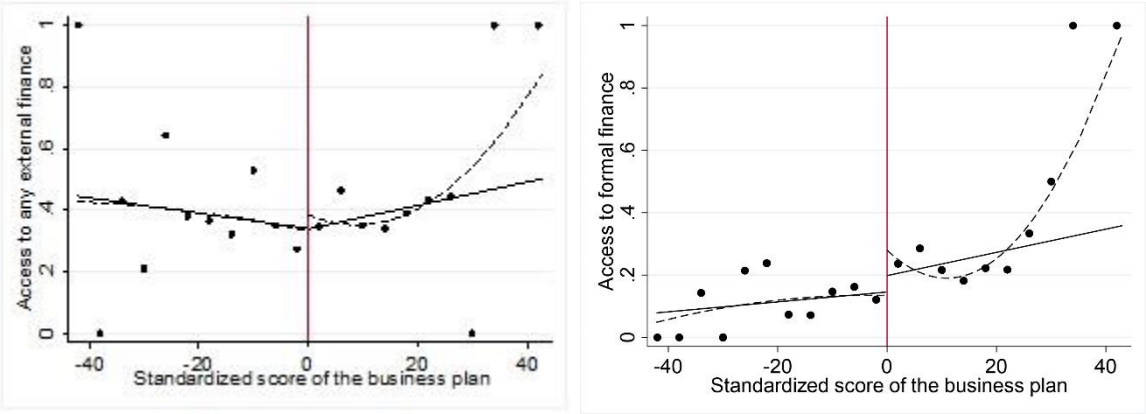
Finance is one of the biggest challenge for startups and small businesses in Ethiopian entrepreneurship landscape (Gebreeyesus et al., 2018; World Bank, 2015). Cognizant to this challenge, the business plan competitions under study were designed to relax this constraint by providing direct grants for final winners and facilitate external financing at least for accepted participants. Trainings on business plan preparation, pitching skills, networking with investors, and related activities of the competitions were primarily to improve the fundability of the business ideas. When these interventions are effective, we can see a higher probability of attracting external finance which includes bank loan, micro finance Institutions loan, equity investment, angel capital, grants from formal organizations, and other formal sources. When entrepreneurs' access to external finance is improved, their reliance on

informal financial sources such as borrowing from families, friends, local money lender, and local traditional associations (like *Ikub* and *Idir* in Ethiopian case) is expected to diminish.

In figure 10, the reduced-form results for access to any external finance (Panel A) which included both formal and informal sources and for the formal financing (panel B) are reported. In both cases, the estimated coefficients are not statistically different from zero. This implies that even successful applicants in these business plan competitions are at low penetration rate of the formal financial sources. This group is no different from the rejected ones at least within one year since their participation in the program. This is also consistent with the direct responses of applicants in my follow-up survey where lack of finance is still the first business obstacles, as it was reported by a third of the respondents as their number one constraint of business operation.

Figure 10: Reduced form results on access to finance

Panel A: Access to any external finance Panel B: Access to finance from formal sources



Notes: Dependent variable is dummy for getting loan or grant for the business from both formal and informal sources (for panel A) and from formal sources only (from panel B) since application to the business plan competitions. Data about access to finance of the entrepreneur is self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

In a nutshell, the business entry and survival, formality, and access to finance outcomes of offered applicants are not statistically different from rejected applicants of the business plan

competition a year after the application. These findings remain the same when we disaggregate the analysis into Bruh and EDC, as shown in the appendix 4.2 Figure 4.A.13 (for Bruh) and appendix 4.3 Figure 4.A.16 (for EDC). The reduced form equation estimates of all outcomes presented graphically and discussed so far disaggregated by the competition type are also summarized in Table 3.5.

Table 3. 1 Reduced form Estimates of the effect of scoring above the cutoff on business entry for the full sample

Outcome	Full sample		Bruh		EDC	
	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic
	(1)	(2)	(3)	(4)	(5)	(6)
Operating firm	-0.1557*	0.0450	-0.1707	0.0703	-0.1823	0.0298
	(0.0801)	(0.107)	(0.1092)	(0.143)	(0.1215)	(0.172)
Own employment	-0.0134	0.0448	-0.0594	-0.0227	-0.0145	0.0912
	(0.0707)	(0.0982)	(0.1071)	(0.148)	(0.0947)	(0.139)
formal finance	0.0526	0.1460*	0.1186	0.1460	-0.0150	0.1120
	(0.0644)	(0.0811)	(0.0933)	(0.121)	(0.0927)	(0.125)
External finance	-0.0011	0.0510	-0.0238	-0.0378	0.0094	0.1570
	(0.0794)	(0.1040)	(0.1105)	(0.144)	(0.1184)	(0.165)
Licensed (self-reported)	-0.0871	-0.0162	-0.1341	-0.0220	-0.1102	-0.0474
	(0.0775)	(0.1040)	(0.0969)	(0.127)	(0.1217)	(0.174)
Licensed (Verified)	-0.0519	0.0108	-0.0925	0.0157	-0.0661	-0.0234
	(0.0627)	(0.0810	(0.0653)	(0.0793)	(0.1074)	(0.1540)
Observations	456	456	214	214	242	242

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variables are as defined before. The reported coefficients are estimates of the reduced-form parameter; the standardized scores and its interaction with the indicator of being above the cutoff have been controlled for; Estimations are based on the full support. The results are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Linear and Quadratic are linear are types of functional forms of the model.

4.4.5.2. Reduced form results for performance indicators

Entry to the market is not the ultimate objective of businesses as well as for entrepreneurship support policies and programs. It is from the growth and expansion of the new entrants or incumbent firms that an economy would benefit either in terms of job creation or productivity gains or any other metrics. That is why this program has also included existing young business as one of the target groups with the aim of helping them expand their operation. In

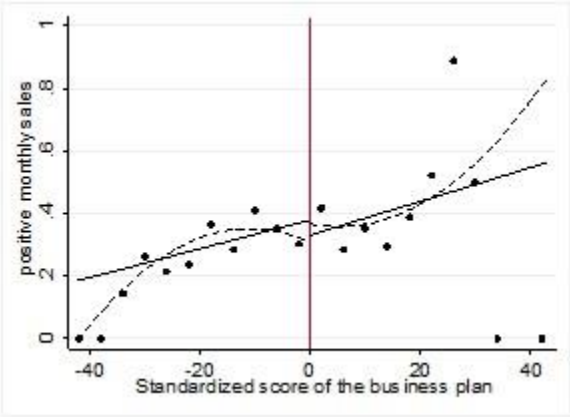
line with this intention of the program, levels of sales, profit, and employment are selected as additional outcomes worth considering evaluating the effectiveness of the program.

Considering more multiple outcomes in evaluation of small business interventions is much common in the literature as well. I argue that having multiple outcomes in this study is justified from different grounds. First, the credibility of self-reported business data is usually questionable and thus supporting findings of one measure of performance by other alternative measures enhances the robustness of the result.

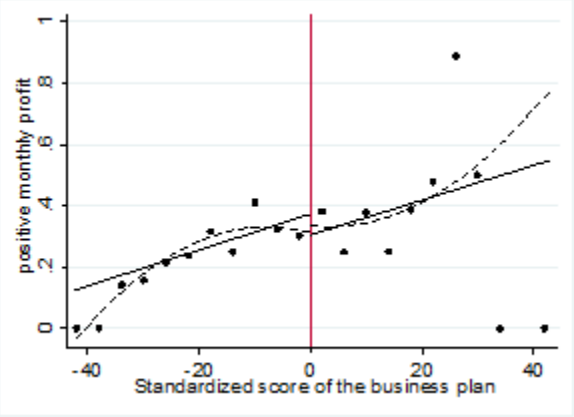
Second, usually a program is designed and implemented to achieve multiple objectives of various stakeholders. Sometimes, in a social or economic setting, there may be contradicting objectives in which the failure in one objective of the program could be partly due to the success in the other. For instance, supporting the informal business to get registered and licensed by the local regulatory agencies could help apply for formal loans as having business license is the first criteria of banks or microfinance institutions in Ethiopia. However, doing so also automatically makes businesses subject to different taxes by local authorities which could negatively affect their net profit and survival. This condition demands the researcher to consider more outcome variables for the research to be informative about the policy makers. Therefore, the choices of the outcome variables should be synchronized with the program theory.

Figure 11: Reduced form results on dichotomous measures of firm performance (Full sample)

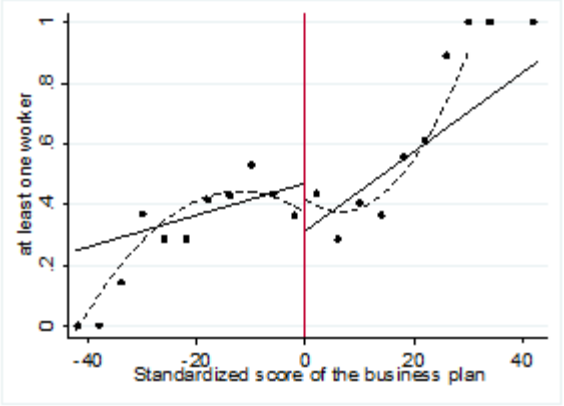
Panel A: Reporting Monthly sales



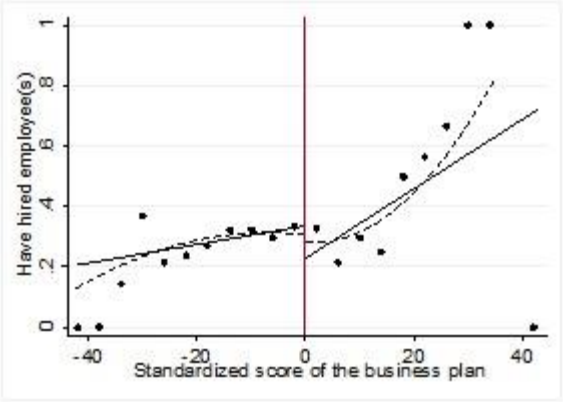
Panel B: Reporting Monthly profit



Panel C: Having at least one worker



Panel D: Having hired employee



Notes: Dependent variable for each panel is dummy for reporting any sales, profit, worker, and salaried worker (hired employee) for panel A, B, C, and D, respectively, one year after the application to the business plan competitions. The results are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Data about these outcomes are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Coming back to the reduced form results pertaining to the three performance indicators (sales, profit, and employment), I started by taking a simple indicator of each for reporting any sale,

profit, or employment. For instance, for sales, the outcome variable takes 1 if the business owner reports any positive monthly sales a year after the start of the program or 8 months after the training of the program was completed. Redefining continuous business outcomes could be important to minimize measurement errors caused by misreporting of the actual figure.

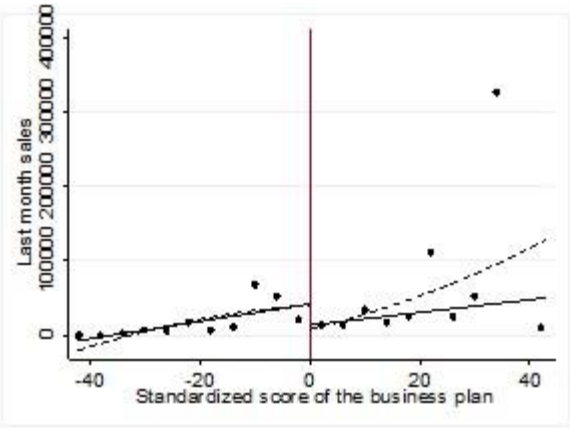
The reduced form results reported in Figure 11 for probability of reporting any sales (panel A), profit (Panel B), any worker (panel C), and any hired or salaried workers (panel D) show that scoring above the cutoff and qualified for the program's training did not improve any of these business outcomes. While Figure 11 is for the full sample, similar results are also reported in appendix 4.2 and appendix 4.3 separately for Bruh and EDC, respectively.

Last, but not least, I have also examined my reduced form equation on four continuous measures of business performance indicators as the dichotomous measures I presented above collapse variations within each group. Since exploiting the variations in these performance measures could give us a good insight, considering the continuous measures is also important. Here, sales and profit are last month sales (profit) in Ethiopian Birr measured a year after the application of the program. Employment is measured by the total numbers of workers and amount of external finance raised is the sum of all loans, grants, equity investment, and any other finance raised from formal and informal sources in Ethiopian Birr.

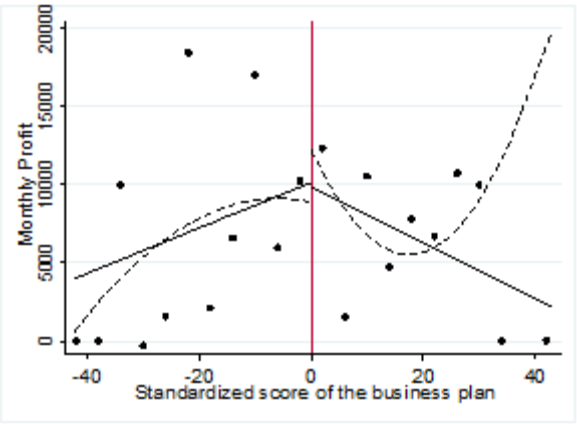
As it can be viewed in all panels of Figure 12 (for the full sample) and appendix 4.2 and 4.3 (for Bruh and EDC), the reduced form parameter is significant in none of the four outcomes in both linear and quadratic specifications. Even the coefficient on employment in case of Bruh is significantly negative (appendix 4.2 Figure 4.A.15 panel C). For the rest, applicants to the left and right of the cutoff are statistically the same in terms of various measures of business outcomes. In short, for both measures of business entry and expansion, there is not any evidence about the improvement of the outcomes at the cutoff showing that offered applicants are indistinguishable from the rejected ones.

Figure 12: Reduced form results on continuous measures of firm performance (Full sample)

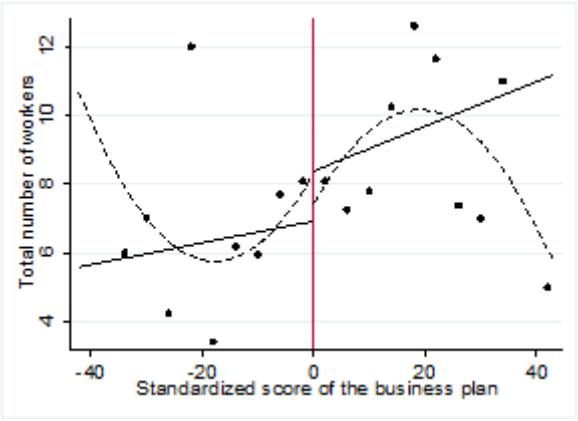
Panel A: Monthly sales



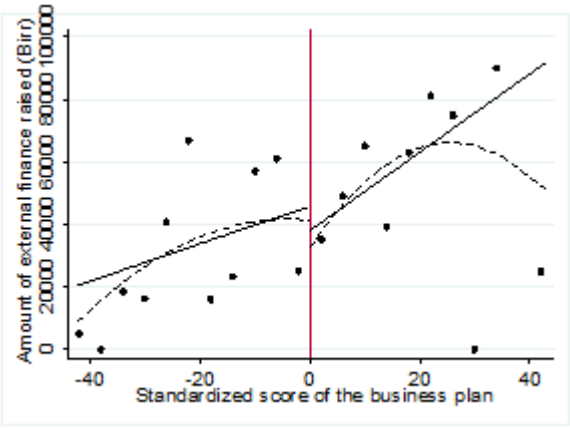
Panel B: Monthly profit



Panel C: Employment level



Panel D: Amount of external finance raised



Notes: Dependent variable for each panel the level of last month's sales (panel A) and profit (panel B) in Ethiopian Birr, total numbers of worker (panel C), and amount of external finance raised over a year in Ethiopian Birr (panel D), all as reported by the respondents a year after the application to program. The results are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Final remarks on the findings

The finding of the reduced form parameter is consistent with our prior expectation based on the first-stage results. In the case of the EFS, the first-stage parameter (π) is near to zero. Therefore, the reduced-form parameter ($\pi\beta$) will also be almost zero for any value of β. We have contaminated controls due to participation in substitute programs means the score would be a weak instrument and the estimation of the program effect using this framework (RD) would underestimate the true program effect. That is why I did not need to report the IV estimate, or the ITT parameter estimates with various specifications.

One potential solution for this seems estimating the causal parameter using the nominal first-stage using only non-contaminated part of the controls. However, I argue that this approach is flawed since the resulting parameter would also be biased dues to self-selection to the substitute programs. That means since treatment in the substitute programs were not assigned randomly a mere exclusion of the contaminated controls adds fuel to the flame. Similarly, comparing participants who had entrepreneurship training in any program against those who did not have any is the other option one could think of. However, leaving the weak instrument issue aside, this approach can only inform about the effect of entrepreneurship training in general, not about the causal effect of the program (Bruh and EDC) which I intend to evaluate. As a result, what we know in this study is not whether the program works; rather, the failure of the offered applicants to stood out of the crowed since they did not have a better access to treatment than their comparison group in the first place. Stopping the story here is by far better than reaching wrong conclusion about the program's effectiveness without ensuring the validity of the counterfactual, which is common in previous studies.

4.5. Discussion and Concluding remarks

This paper aimed at disentangling the causal effect of the training (or bootcamp) program since it was the main intervention of Bruh and EDC business plan competitions. Though it was a perfect set up for the fuzzy RD design with a large effect of the first-stage estimate using treatment within the program, the follow-up survey uncovered that the rejected applicants of the competition (who were supposed to be the control group) got treated elsewhere. That means the significant first-stage I found in the nominal case disappeared when substitute treatments were taken into account (effective first-stage became negligible).

Since both groups of applicants had the same level of training and thus the first-stage is insignificant, we could not see any jump in the reduced form graphs when business performance measures are plotted against score. As implied by the reduced form parameter, I can conclude that training beneficiaries of the business plan competitions did not perform better than their rejected counterparts in both business entry and expansion. This does not mean that the program was not effective to impact business outcomes; nor the entrepreneurial skill constraint or training does not matter. Despite my initial intention, I cannot tell about the effectiveness of the program. The evidence provided in this study only tells that the program's effect, as implied by the reduced form estimates, is negligible because control groups got substitute treatment in similar programs.

Previous studies were not able to figure out as to why the training component of business plan competitions yielded negligible impact on entrepreneurship activities. For instance, McKenzie (2017) reported large estimates the first-stage (74 to 90 percentage points). However, his reduced form graphs did not show any jump at the cutoff and the estimated causal parameter became insignificant. Though he did not explore why the effect appeared to be negligible, it could be because there would not been strong first-stage in the first place had the effective first-stage been considered. Similarly, Fafchamps & Woodruff (2017) were not able to tell why their training were ineffective thought they had rightfully suspected the issue of substitute treatment as a possible reason.

This paper provided clear empirical evidence on substitute treatments of the control groups with a far-reaching implication for future research designs. This could be part of the explanations for the modest or small positive impacts of entrepreneurship training programs we witness around the globe (Mckenzie et al., 2020).

This study implies that it is important for impact researchers to go beyond the baseline balance check-up. Documenting the necessary information about the possible substitute treatments that subjects may have enjoyed during the program period or after that should be part of the follow-up data collection task. Then it is essential to estimate both the nominal and effective first-stage. If the estimates of the two types of first-stages converge, then we can be confident on the cleanness of the control group. Otherwise, the control group would be a contaminated control based on which one cannot say anything about the program effectiveness unless it is justified by any possible variations in treatment intensity or quality.

Many program evaluation studies try to provide explanations how the program works when it works through exploring various channels usually taken from the theoretical models. Nonetheless, it is not common, at least in this area, to see plausible and evidence-based explanations when the program fails. Figuring out why a program did not work would be much helpful for the policy makers. Most importantly, the result would be misleading if we conclude that the program is ineffective while our control group is contaminated by substitute treatment. Therefore, exploring the reasons behind any finding should be a prerequisite to accept any result. This is one of the key messages of this study.

4.6. Policy Implications

The following policy implication can be drawn from the findings of this study which could be utilized by policy makers, program implementers, researchers, and other stakeholders.

- For policy makers, it is worth considering business plan competition as one of the innovative approaches to foster entrepreneurship. As confirmed in Ayana (2022), it helps at least to differentiate promising businesses from the mass and could facilitate financing by serving as a bridge between interested investors and constrained gazelles.

- Any support for startups including interventions aimed to relax skill and capital constraints should be complemented by regulatory reforms to avoid administrative bottlenecks. The regulatory agencies should capacitate themselves and play a proactive role to cope up with the new forms digital businesses in order for them to properly regulate and support. It would be also imperative to customize the commercial law for startups as they have unfavorable entrepreneurial landscape with the existing system.
- Awarding winners go beyond the private return for the recipient firms and target businesses with growth potentials has huge social benefit including formation of sustainable businesses, productive employment, enhancing competitiveness and creativity, and improve resource allocations. As stated in Shane (2009) "getting economic growth and jobs creation from entrepreneurs is not a numbers game. It is about encouraging high quality, high growth companies to be founded." However, in low income countries like Ethiopia, supporting survivalist enterprises could be totally unavoidable from poverty reduction or political perspectives, it is important for policy makers to have a clear understanding of the expected outcomes of such policies and make the right balance between policies favoring gazelles versus policies supporting the survivalists.
- For business plan competition organizers, the first source of success for startups' intervention stems from the ability to properly hunt talents. We witnessed considerable variations among applicants of the business plan competitions in communicating their ideas, which could mask the real potential of applicants from being detected by the evaluators. Therefore, it is advisable to have a briefing session (virtual or face-to-to-face) on how to present businesses ideas just before or during the application period. It would be also important for the evaluators to focus on the potential of the business idea rather than the quality of its presentation.
- Unlocking the potentials of startups through overcoming their skill constraints requires going beyond entrepreneurship training. Many applicants also look for hard skill and technical trainings whereas the trainings given through the process of the

competitions are usually limited to business trainings and development of soft skills. Probably, organizing business plan competition by sectors or themes (like Energy, or IT) and including technical supports could be helpful. Bruh seems to recognize this as it organized Bruh ICT competition recently; and such practices should be further consolidated.

- To attract talented and high-growth potential applicants for the program to succeed, it is also essential to improve the program design in a way that creates incentive for competent applicants to enroll. With small grants, the program will end up attracting typical startups with low potential to growth.
- The main message of this study for researchers is associated with ensuring the validity of counterfactual while conducting impact studies. Our finding about substantial take-up of substitute treatments poses a serious question on many of previous impact studies. The cleanness of the control group for any design cannot be confirmed unless data prove that they stayed away from substitute programs. Therefore, it is important to consider it as an important task while designing follow-up surveys. Otherwise, insignificant estimates of program effects would be erroneously associated with program failure, which results in misleading policy implications.

4.7. Limitations and future research

Though attempt is made to carefully design this study and thoroughly analyze the data throughout the paper, it is also subject to some limitations. Alike almost all the studies in this area, this study also suffers from problem of small sample size. It is important to conduct more study using larger sample size whenever there are opportunities to get such natural experiments with large numbers of applicants. Having an alternative design that can identify impacts of the program both at individual firm and system level without disregarding substitute treatments could be the other path of future research.

References

Ayana, A. (2022). *Hunting and Nurturing Gazelles : Evidence from Business Plan Competitions in Ethiopia. PhD Dissertation.* (Issue August). National Graduate Institute for Policy Studies (GRIPS).

Ayyagari, M., Demirguc-Kunt, A., & Maksimovi, V. (2011). Small vs. Young Firms across the World: Contribution to Employment, Job Creation, and Growth. In *World Bank Policy Research Working Paper 5631*. https://www.researchgate.net/publication/228319883_Small_vs_Young_Firms_Across_the_World_Contribution_to_Employment_Job_Creation_and_Growth

Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, *30*(11), 2931–2943. https://doi.org/10.1016/J.JBANKFIN.2006.05.009

Bigsten, A., & Gebreeyesus, M. (2007). The small, the young, and the productive: Determinants of manufacturing firm growth in Ethiopia. *Economic Development and Cultural Change*, *55*(4), 813–840. https://doi.org/10.1086/516767

Blattman, C., & Dercon, S. (2018). The Impacts of Industrial and Entrepreneurial Work On Income and Health: Experimental Evidence from Ethiopia. *American Economic Journal: Applied Economics*, *10*(3), 1–38.

Brinckmann, J., Grichnik, D., & Kapsa, D. (2010). Should entrepreneurs plan or just storm the castle? A meta-analysis on contextual factors impacting the business planning–performance relationship in small firms. *Journal of Business Venturing*, *25*(1), 24–40. https://doi.org/10.1016/J.JBUSVENT.2008.10.007

Bruhn, M., Karlan, D., & Schoar, A. (2010). What Capital is Missing in Developing Countries ? *The American Economic Review*, *100*(2), 629–633.

Carrillo, P., Pomeranz, D., & Singhal, M. (2017). Dodging the Taxman: Firm Misreporting and Limits to Tax Enforcement. *American Economic Journal: Applied Economics*, *9*(2), 144–164. https://doi.org/10.1257/APP.20140495

Cattaneo, M. D., Jansson, M., & Ma, X. (2020). Simple Local Polynomial Density Estimators. *Journal of the American Statistical Association*, *115*(531), 1449–1455. https://doi.org/10.1080/01621459.2019.1635480

Cattaneo, M. D., Jansson, M., & Ma, X. (2021a). Local regression distribution estimators. *Journal of Econometrics*, *xxxx*, 1–18. https://doi.org/10.1016/j.jeconom.2021.01.006

Cattaneo, M. D., Jansson, M., & Ma, X. (2021b). Local regression distribution estimators. *Journal of Econometrics*. https://doi.org/10.1016/j.jeconom.2021.01.006

Cattaneo, M. D., Jansson, M., & Ma, X. (2022). lpdensity: Local Polynomial Density Estimation and Inference. *Journal of Statistical Software*, *101*(2), 1–25. https://doi.org/10.18637/jss.v101.i02

CSA (Central Statistical Agency, E. (2021). *2021 LABOUR FORCE AND MIGRATION SURVEY* (Issue August). https://www.statsethiopia.gov.et/wp-content/uploads/2021/08/Final-2021-LABOUR-FORCE-AND-MIGRATION-SURVEY_Key-finding-Report-.17AUG2021.pdf

Davis, A., Hsu, E., & Vanvuren, M. (2023). *Self Employment , Micro- Entrepreneurship , and Development*. https://steg.cepr.org/sites/default/files/2023-04/PP12

DavisHsuVanVuren SelfEmploymentMicroEntrepreneurshipAndDevelopment_0.pdf
de Mel, S., McKenzie, D. J., & Woodruff, C. (2009). Measuring microenterprise profits: Must we ask how the sausage is made? *Journal of Development Economics*, *88*(1), 19–31. https://doi.org/10.1016/j.jdeveco.2008.01.007
Fafchamps, M., & Quinn, S. (2017). Aspire. *The Journal of Development Studies*, *53*(10), 1615–1633.
Fafchamps, M., & Woodruff, C. (2017). Identifying gazelles: Expert panels vs. surveys as a means to identify firms with rapid growth potential. *World Bank Economic Review*, *31*(3), 670–686. https://doi.org/10.1093/wber/lhw026
Fritsch, M. (2008). How does new business formation affect regional development? Introduction to the special issue. *Small Business Economics*, *30*(1), 1–14. https://doi.org/10.1007/s11187-007-9057-y
Gebreeyesus, M., Ambachew, A., Getahun, T., Assefa, B., Abebe, G., Hassen, S., & Medhin, H. (2018). *Main Features of Micro and Small Manufacturing Enterprises in Ethiopia*. EDRI.
Gollin, D. (2008). Nobody's business but my own: Self-employment and small enterprise in economic development. *Journal of Monetary Economics*, *55*(2), 219–233. https://doi.org/10.1016/j.jmoneco.2007.11.003
Gries, T., & Naudé, W. (2010). Entrepreneurship and structural economic transformation. *Small Business Economics*, *34*(1), 13–29. https://doi.org/10.1007/s11187-009-9192-8
Hessels, J., & Naudé, W. (2019). the Intersection of the Fields of Entrepreneurship and Development Economics: a Review Towards a New View. *Journal of Economic Surveys*, *33*(2), 389–403. https://doi.org/10.1111/joes.12286
Higuchi, Y., Mhede, E. P., & Sonobe, T. (2019). Short- and medium-run impacts of management training : An experiment in Tanzania. *World Development*, *114*, 220–236. https://doi.org/10.1016/j.worlddev.2018.10.002
Higuchi, Y., Nam, V. H., & Sonobe, T. (2015). Sustained impacts of Kaizen training. *Journal of Economic Behavior and Organization*, *120*, 189–206. https://doi.org/10.1016/j.jebo.2015.10.009
Kaboski, J. P. (2021). *Financial Frictions , Financial Market Development , and Macroeconomic Development ∗*(Path nding Paper for the CEPR-led research programme on Structural Transformation and Economic Growth (STEG)).
Klinger, B., & Schündeln, M. (2011). Can Entrepreneurial Activity be Taught? Quasi-Experimental Evidence from Central America. *World Development*, *39*(9), 1592–1610. https://doi.org/10.1016/j.worlddev.2011.04.021
Kumler, T., & Verhoogen, E. (2020). Enlisting Employees in Improving Payroll Tax Compliance: Evidence from Mexico. *The Review of Economics and Statistics*, *102*(5), 881–896. https://doi.org/10.1162/REST_A_00907
Lee, D. S. (2008). Randomized experiments from non-random selection in U.S. House elections. *Journal of Econometrics*, *142*(2), 675–697. https://doi.org/10.1016/j.jeconom.2007.05.004
Lee, D. S., & Lemieux, T. (2010). Regression discontinuity designs in economics. *Journal of Economic Literature*, *48*, 281–355. https://doi.org/10.1210/endo-127-4-1934

McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics*, *142*(2), 698–714. https://doi.org/10.1016/j.jeconom.2007.05.005

McKenzie, D. (2017). Identifying and spurring high-growth entrepreneurship: Experimental evidence from a business plan competition. *American Economic Review*, *107*(8), 2278–2307. https://doi.org/10.1257/aer.20151404

McKenzie, D., & Woodruff, C. (2014). What are we learning from business training and entrepreneurship evaluations around the developing world? *World Bank Research Observer*, *29*(1), 48–82. https://doi.org/10.1093/wbro/lkt007

Mckenzie, D., Woodruff, C., Bjorvatn, K., Bruhn, M., Cai, J., Gonzalez-uribe, J., Quinn, S., Sonobe, T., & Valdivia, M. (2020). Training Entrepreneurs. *VoxDevLit*, *1*(1), 1–23.

Murphy, P. J., Liao, J., & Welsch, H. P. (2006). A conceptual history of entrepreneurial thought. *Journal of Management History*, *12*(1), 12–35. https://doi.org/10.1108/13552520610638256

NBE. (2022). *2020-21 Annual Report*. https://nbebank.com/wp-content/uploads/pdf/annualbulletin/Annual Report 2020-2021/2020-21 Annual Report.pdf

Nichter, S., & Goldmark, L. (2009). Small Firm Growth in Developing Countries. *World Development*, *37*(9), 1453–1464. https://doi.org/10.1016/j.worlddev.2009.01.013

Noseleit, F. (2013). Entrepreneurship, structural change, and economic growth. *Journal of Evolutionary Economics*, *23*(4), 735–766. https://doi.org/10.1007/s00191-012-0291-3

Pomeranz, D. (2015). No Taxation without Information: Deterrence and Self-Enforcement in the Value Added Tax. *American Economic Review*, *105*(8), 2539–2569. https://doi.org/10.1257/AER.20130393

Shane, S. (2009). Why encouraging more people to become entrepreneurs is bad public policy. *Small Business Economics*, *33*(2), 141–149. https://doi.org/10.1007/s11187-009-9215-5

Sonobe, T., & Otsuka, K. (2006). Cluster-based industrial development: An East Asian model. In *Cluster-Based Industrial Development: An East Asian Model*. https://doi.org/10.1057/9780230596061

Sonobe, T., & Otsuka, K. (2011). Cluster-Based Industrial Development: A Comparative Study of Asia and Africa. In *Cluster-Based Industrial Development: A Comparative Study of Asia and Africa*. https://doi.org/10.1057/9780230295124

Vandenberg, P., Chantapacdepong, P., & Yoshino, N. (2016). SMEs in Developing Asia: New Approaches to Overcoming Market Failures. In *Asian Development Bank Institute*. https://www.adb.org/sites/default/files/publication/214476/adbi-smes-developing-asia.pdf%0Ahttps://www.adb.org/sites/default/files/publication/214476/adbi-smes-developing-asia.pdf#page=41

World Bank. (n.d.). *Ethiopia Overview: Development news, research, data | World Bank*. Retrieved June 30, 2022, from https://www.worldbank.org/en/country/ethiopia/overview

World Bank. (2008). *Finance for All? Policies and pitfalls in expanding access*.

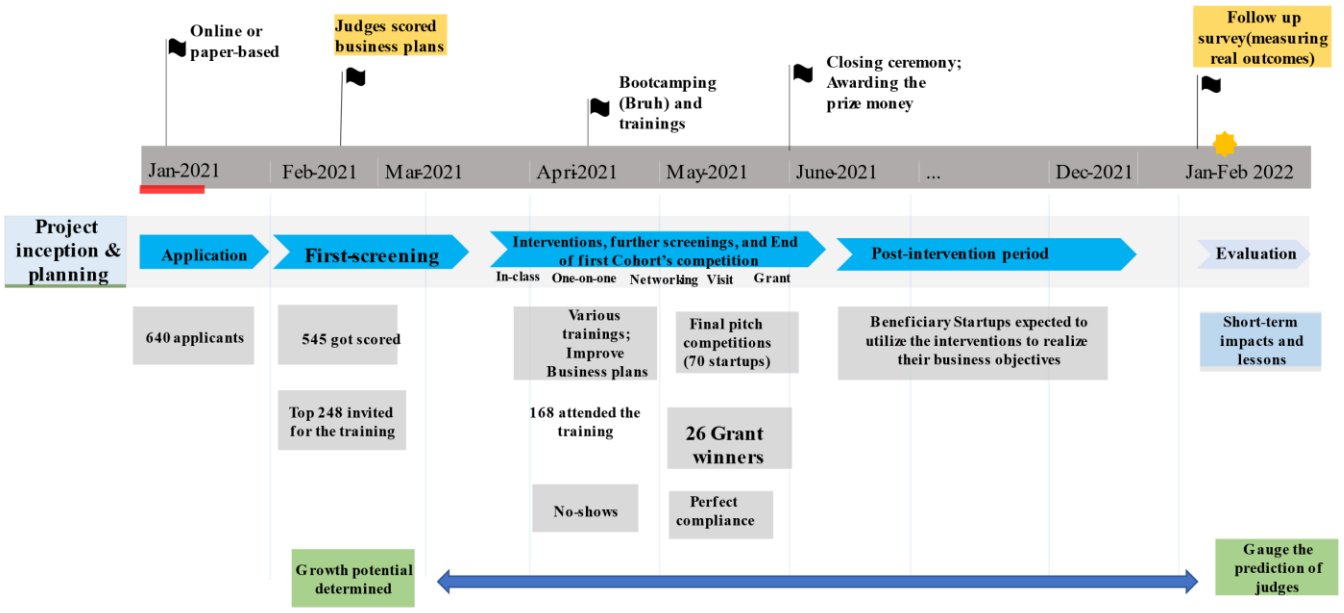
World Bank. (2015). SME Finance in Ethiopia : Addressing the Missing Middle Challenge.

World Bank. (2020). *Doing Business 2020: Comparing business regulations in 190 economies.* https://doi.org/10.7256/1812-8688.2014.6.12196

APPENDICES

Appendix 2: Timeline and steps of the project

Figure 2.A.1: Timeline and key procedures of the program



Appendices 3.

Appendix 3.1. Some descriptive results about training

Table 3.A.1. Cross tabulation of training status of the applicants (our sample) within the program of interest Versus any program.

	Any training over the last one year (self-reported) (%)					
Training status	Bruh sub-sample		EDC sub-sample		Full sample	
in our Program	Not trained	Trained	Not trained	Trained	Not trained	Trained
Not Trained	50.25	49.75	41.18	58.82	46.31	53.69

Trained	5.66	94.34	31.46	68.54	21.83	78.17
Total	40.87	59.13	37.6	62.4	39.27	60.73

Notes: this report shows more than half of the non-trainees (our potential controls) got trained by other programs in the same period. About 78% of our treated sample reported training access in the self-reported data too implying that there are some misreporting errors in the self-reported data. Trained status in our program is obtained from administrative data.

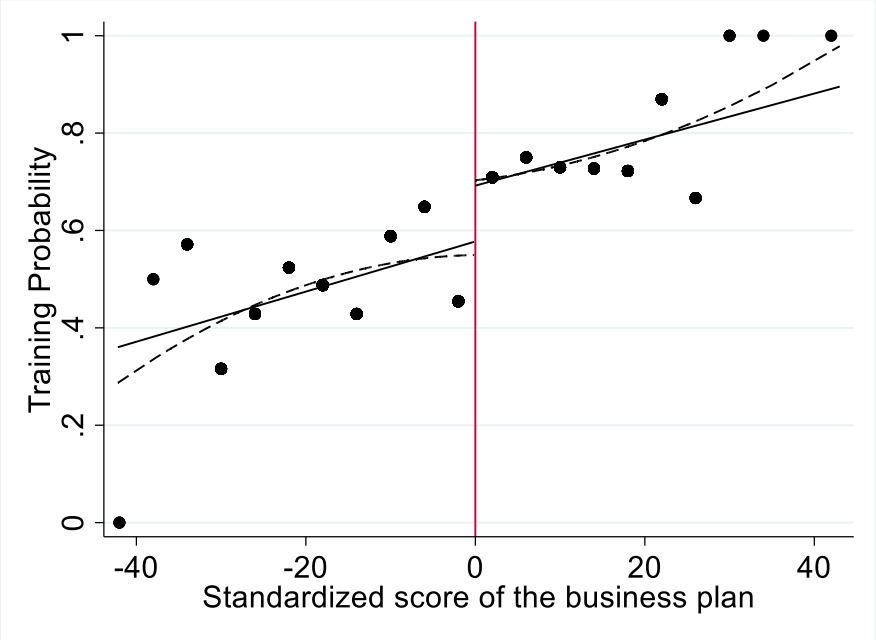
Table 3.A.2. Distribution of respondents who have ever had entrepreneurship training offered by various institutions or entrepreneurship development programs.

Training Providers	**percent**
Government offices (SME office, cooperative agency, FeSMMIPA etc)	22.9%
NGOs and International organizations (ILO, DOT, British council…)	28.1%
TVET institutions	5.5%
Universities	16.6%
Specialized institutes (Kaizen institute, leather institute, etc)	1.0%
EDC	15.6%
Jobs Creation commission (JCC) (Bruh)/Ministry of labor and skills	18.4%
Business plan competition programs (SolveIT, Chigign, Ethio-Talent power series	3.8%
Private Incubators and accelerators (Bluemoon, ICEADDIS, X-hub..)	12.3%
Financial Institutions (Banks and MFIs)	0.2%

Appendix 4

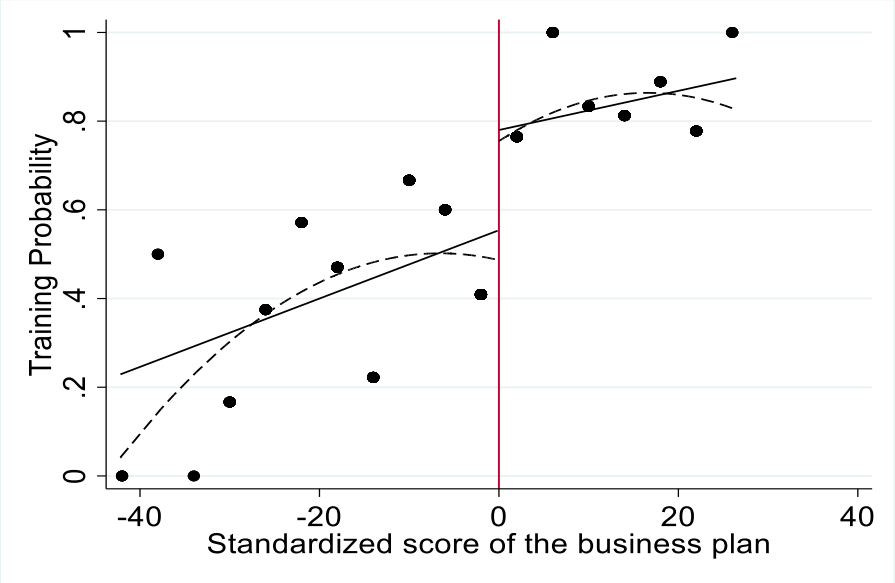
Appendix 4.1. Results for additional robustness checks for the effective first-stage

Figure 4.A.1. Effective first-stage for training by any program after the start of the business plan competition (Full sample)



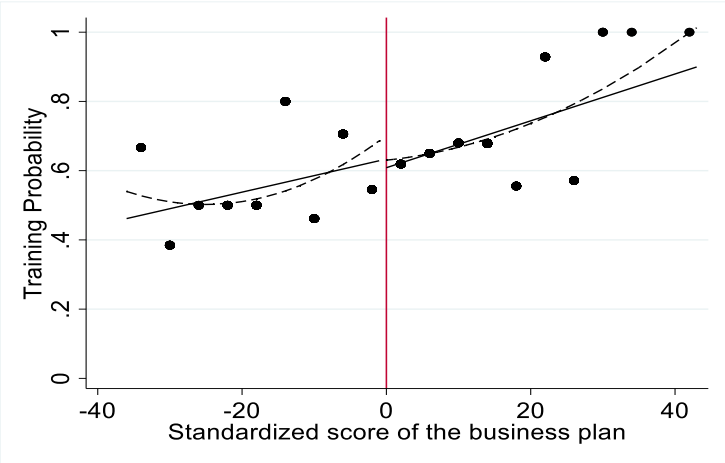
Notes: Dependent variable (treatment indicator) for this effective first-stage is dummy for taking any type of entrepreneurship training since participated in the Bruh/EDC business plan competitions. The timeline is synchronized (or limited) to be the same period with the implementation of the program of interest. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.2. Effective first-stage for training by any program after the start of the business plan competition (Bruh sub-sample)



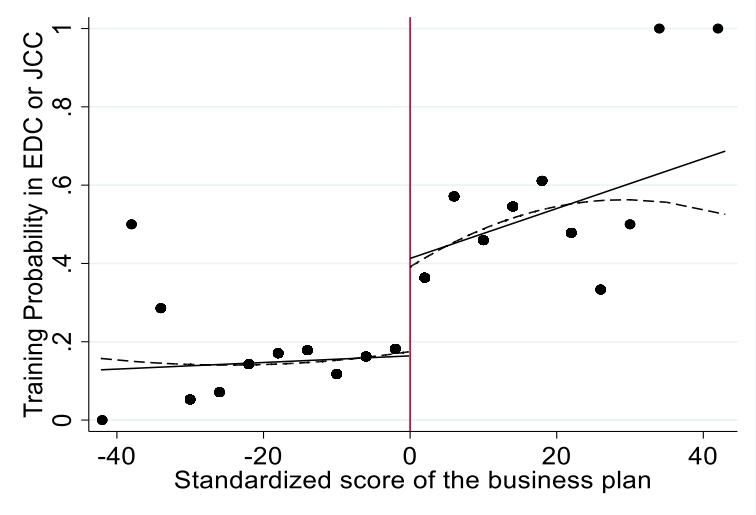
Notes: Dependent variable for this effective first-stage is dummy for taking any type of entrepreneurship training since participated in the Bruh/EDC business plan competitions. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.3. Effective first-stage for training by any program after the start of the business plan competition (EDC sub-sample)



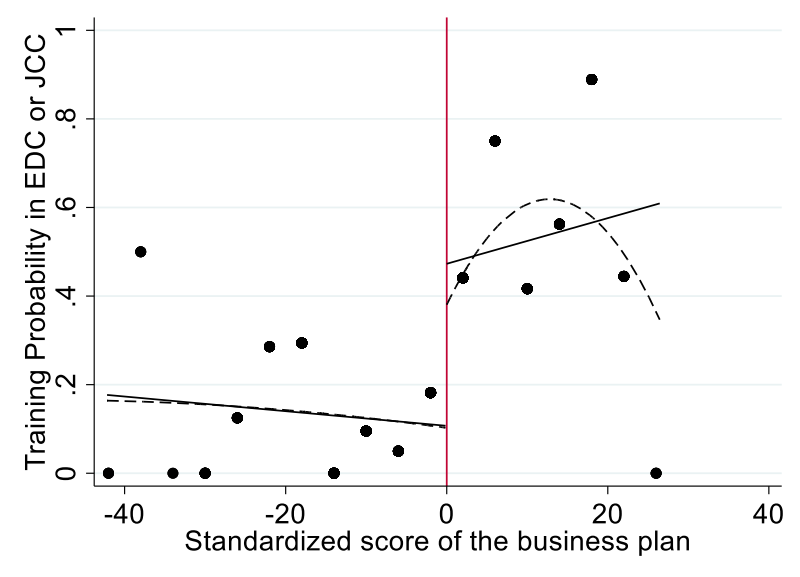
Notes: Dependent variable is dummy for taking any type of entrepreneurship training since participated in the Bruh/EDC business plan competitions. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.4. Effective first-stage for training in EDC or JCC in anytime (Full sample)



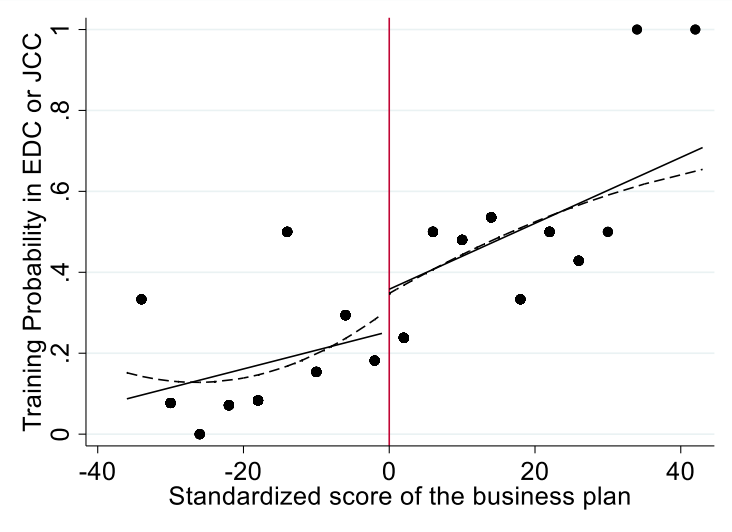
Notes: Dependent variable is dummy for taking any type of entrepreneurship training in JCC or EDC (organizers of the business plan competitions) at any time. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.5. Effective first-stage for training in EDC or JCC in anytime (Bruh sub-sample)



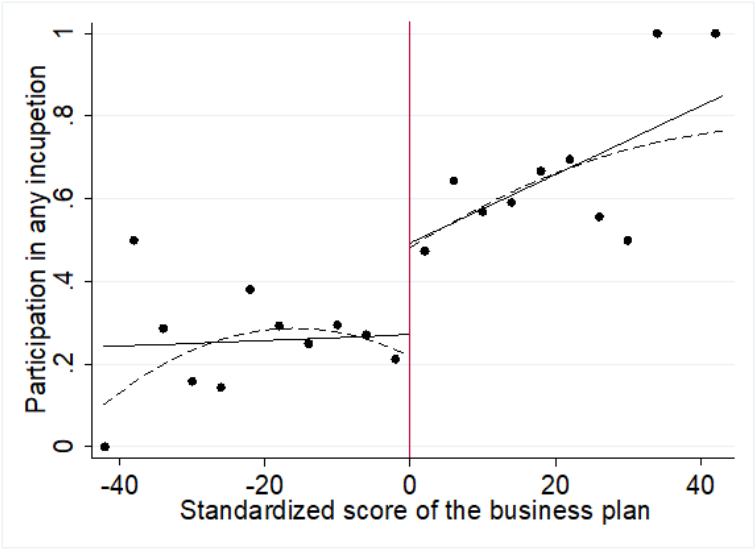
Notes: Dependent variable (treatment indicator) is dummy for taking any type of entrepreneurship training in JCC or EDC (organizers of the business plan competitions) at any time. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.6. Effective first-stage for training in EDC or JCC in anytime (EDC sub-sample)



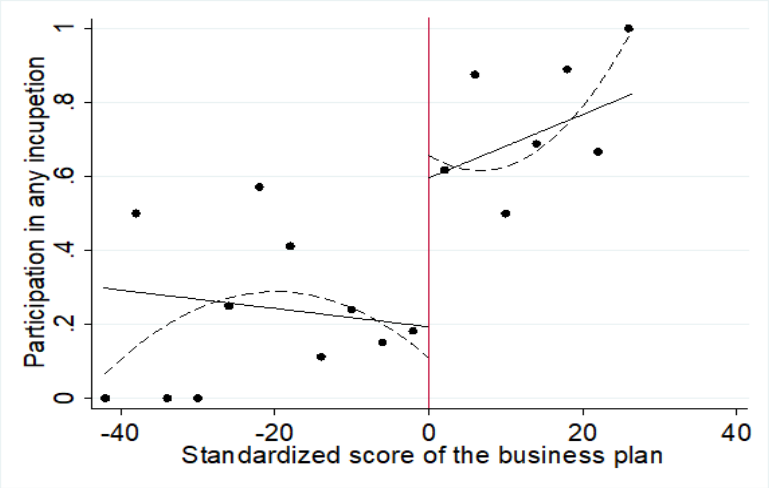
Notes: Dependent variable (treatment indicator) is dummy for taking any type of entrepreneurship training in JCC or EDC (organizers of the business plan competitions) at any time. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.7. Effective first-stage result for access to training offered by any incupetion related program (full sample)



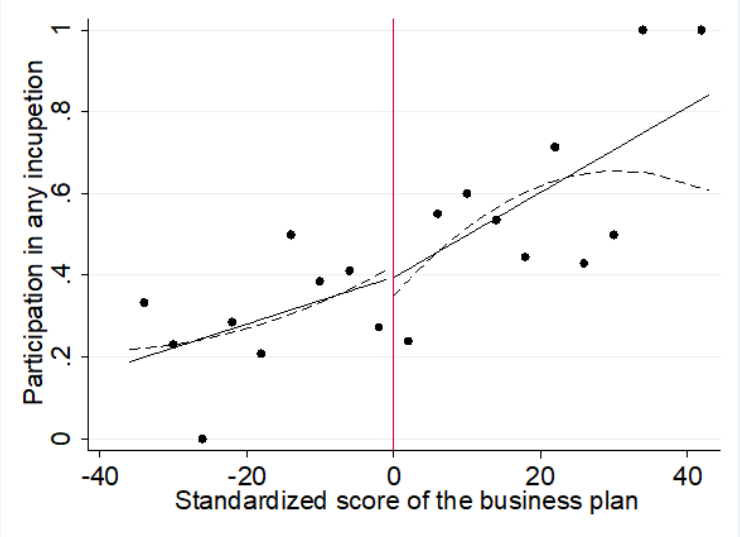
Notes:. Dependent variable (treatment indicator) is dummy which takes 1 if the entrepreneur has ever had entrepreneurship training in any business plan competitions, or JCC/ EDC (organizers of the business plan competitions under study) or business incubators or accelerators; and 0 otherwise. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.8. Effective first-stage result for access to training offered by any incupetion related program (Bruh sub-sample)



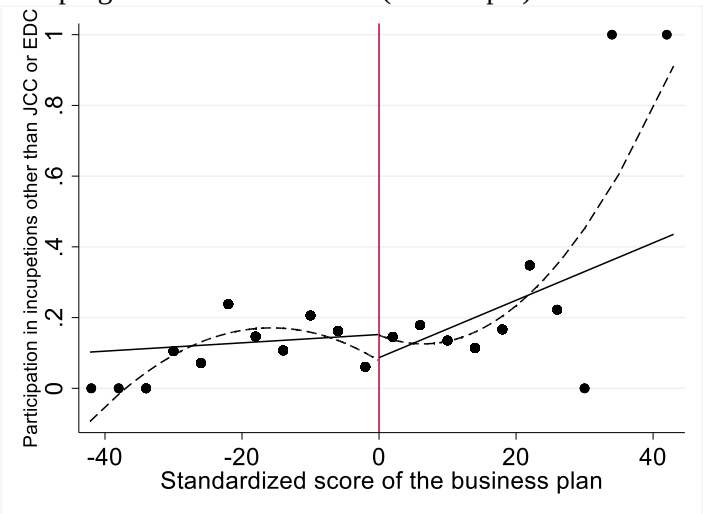
Notes: Dependent variable (treatment indicator) is dummy which takes 1 if the entrepreneur has ever had entrepreneurship training in any business plan competitions, or JCC/ EDC (organizers of the business plan competitions under study) or business incubators or accelerators; and 0 otherwise. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.9. Effective first-stage result for access to training offered by any incupetion related program (EDC sub-sample)



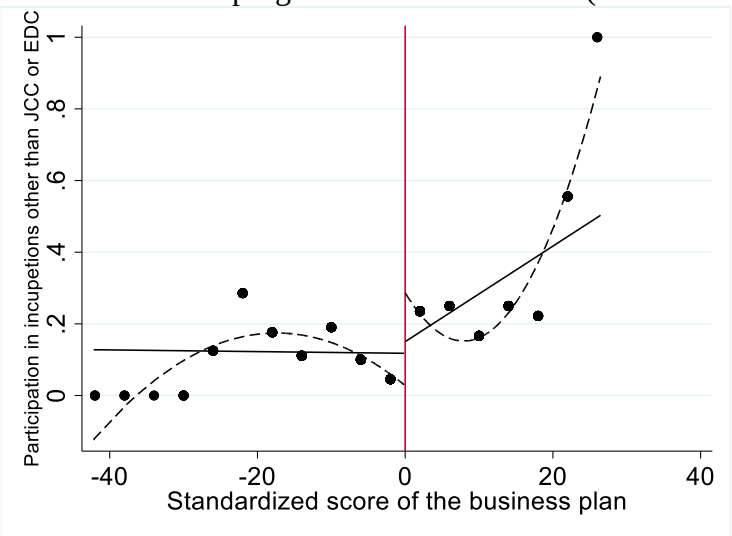
Notes: Dependent variable (treatment indicator) is dummy which takes 1 if the entrepreneur has ever had entrepreneurship training in any business plan competitions, or JCC/ EDC (organizers of the business plan competitions under study) or business incubators or accelerators; and 0 otherwise. Data for the treatment indicator (access to training) are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.10. Effective first-stage result for access to training offered by any incupetion related other than programs of JCC and EDC (full sample)



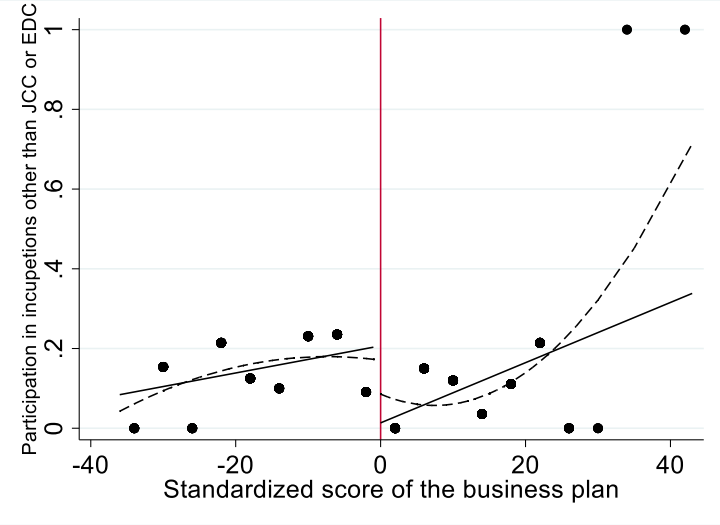
Notes: Dependent variable (treatment indicator) is dummy which takes 1 if the entrepreneur has ever had entrepreneurship training in any business plan competitions excluding the business plan competition and incubation (or incupetion) under study or business incubators or accelerators; and 0 otherwise. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.11. Effective first-stage result for access to training offered by any incupetion related other than programs of JCC and EDC (Bruh sub-sample)



Notes: Dependent variable (treatment indicator) is dummy which takes 1 if the entrepreneur has ever had entrepreneurship training in any business plan competitions excluding the business plan competition and incubation (or incupetion) under study or business incubators or accelerators; and 0 otherwise. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.12. Effective first-stage result for access to training offered by any incupetion related other than programs of JCC and EDC (EDC sub-sample)

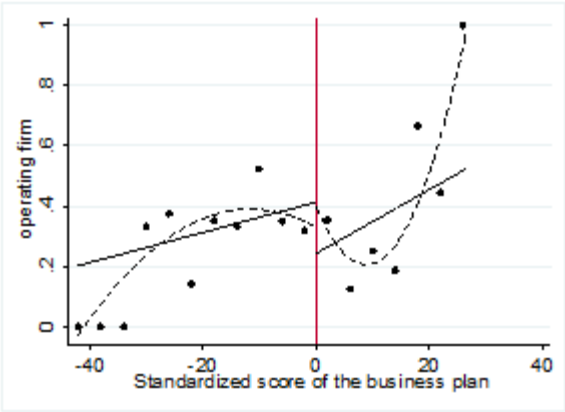


Notes: Dependent variable (treatment indicator) is dummy which takes 1 if the entrepreneur has ever had entrepreneurship training in any business plan competitions excluding the business plan competition and incubation (or incupetion) under study or business incubators or accelerators; and 0 otherwise. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

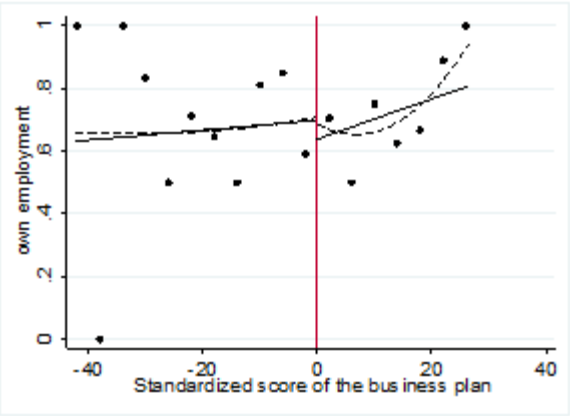
Appendix 4.2. Reduced form results for *Bruh* sub-sample

Figure 4.A.13. Reduced form results on measures of business entry (*Bruh* sub-sample)

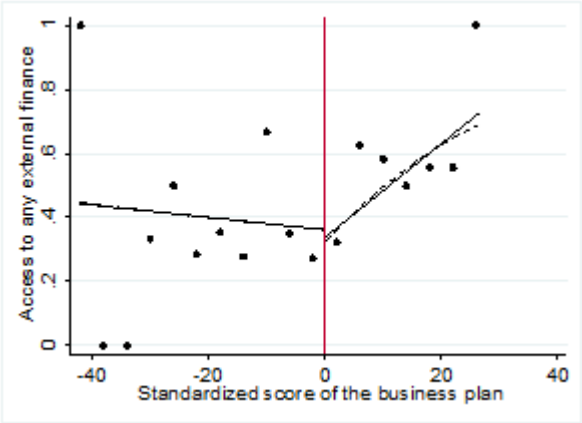
Panel A: Owning Operational business



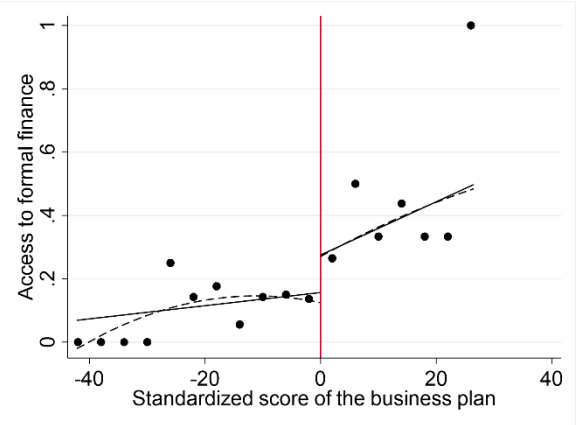
Panel B: Own employment



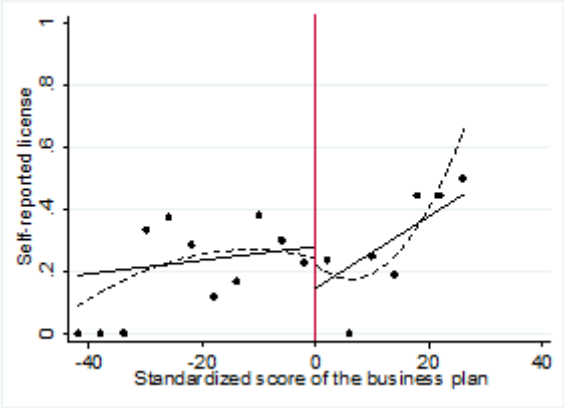
Panel C: Access to any external finance



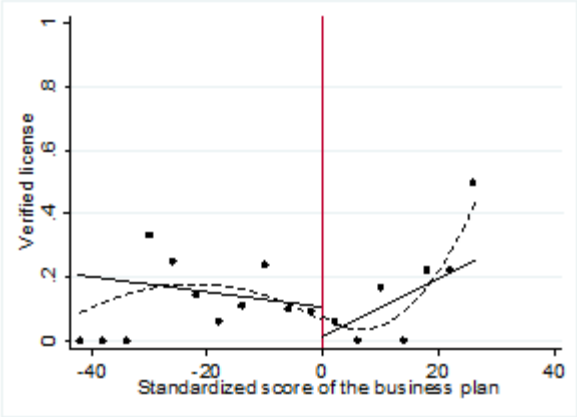
Panel D: Access to finance from formal sources



Pane E: licensed business (self-reported)



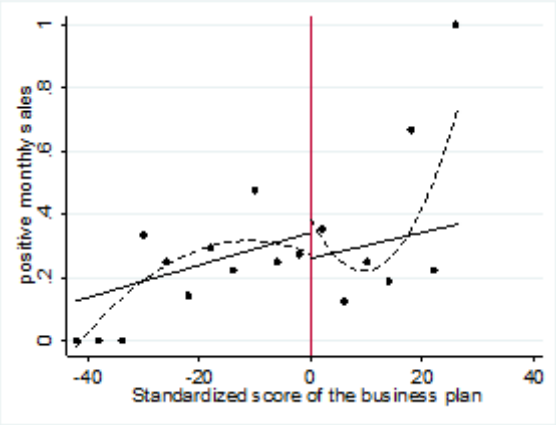
Panel F: licensed business (Verified)



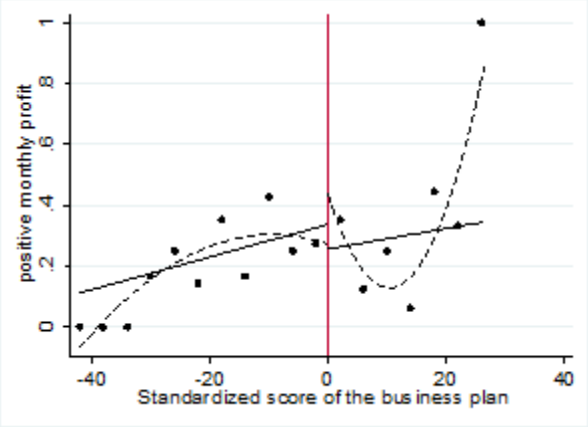
Notes: The results in panel E and F are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Data about outcomes from A to E self-reported in the follow-up survey while for panel F it is independently verified from local regulatory agencies. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.14. Reduced form results on dichotomous measures of firm performance (Bruh sub-sample)

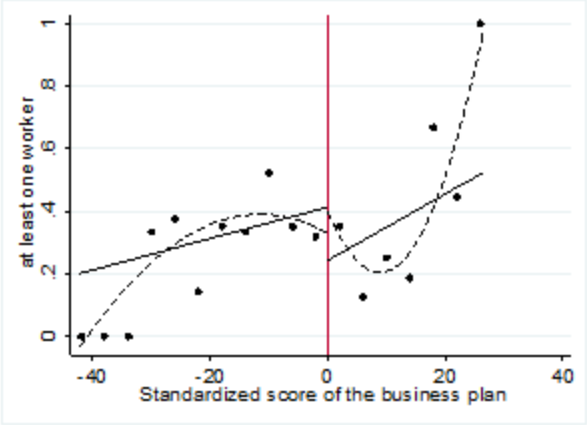
Panel A: Reporting Monthly sales



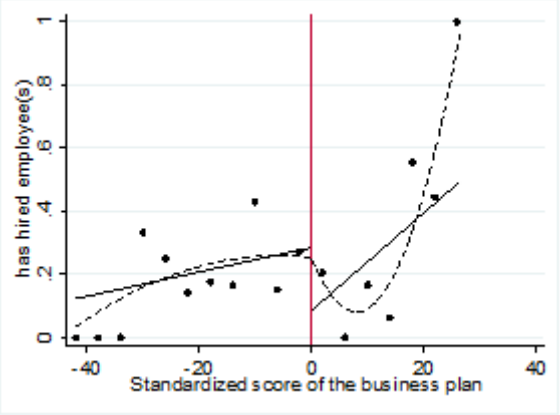
Panel B: Reporting Monthly profit



Panel C: Having at least one worker



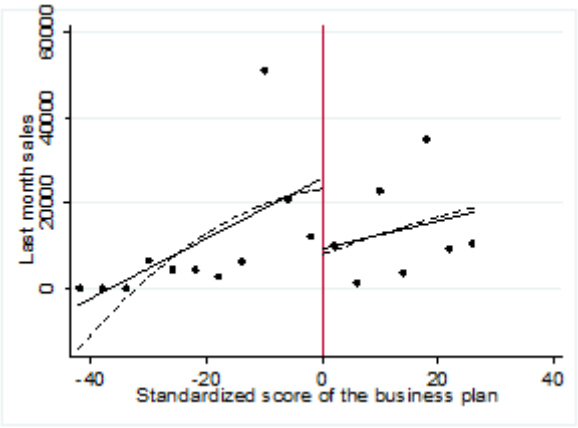
Panel D: Having hired employee



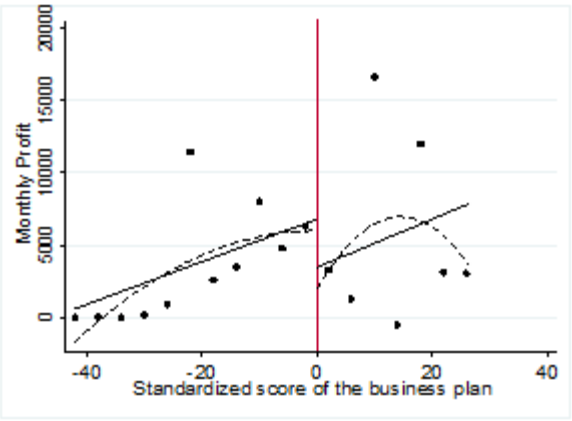
Notes: Dependent variable for each panel is dummy for reporting any sales, profit, worker, and salaried worker (hired employee) for panel A, B, C, and D, respectively, one year after the application to the business plan competitions. The results are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Data about these outcomes are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 3.A.15. Reduced form results on continuous measures of firm performance (Bruh sub-sample)

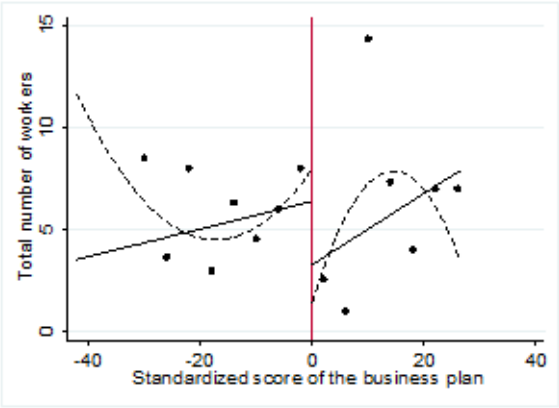
Panel A: Monthly sales



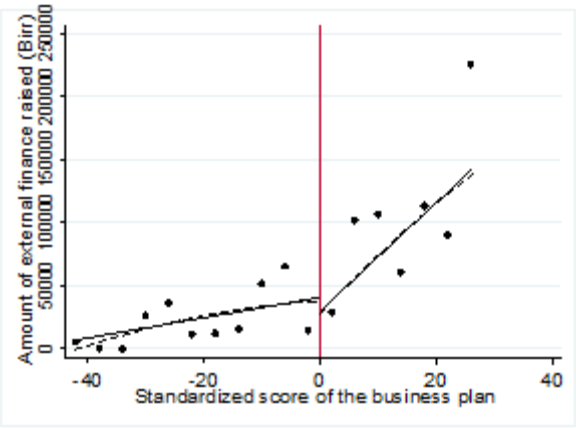
Panel B: Monthly profit



Panel C: Employment level



Panel D: Amount of external finance raised

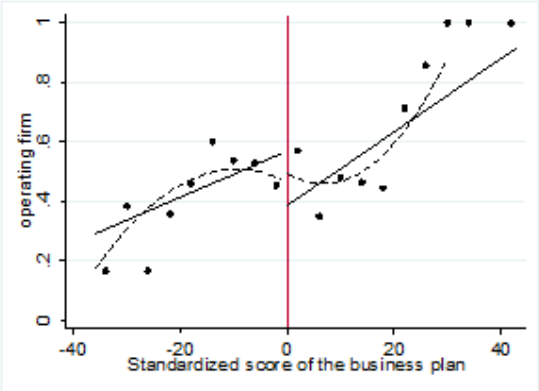


Notes: These graphs show results for Bruh sub-sample. Dependent variable for each panel the level of last month's sales (panel A) and profit (panel B) in Ethiopian Birr, total numbers of worker (panel C), and amount of external finance raised over a year in Ethiopian Birr (panel D), all as reported by the respondents a year after the application to program. The results are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

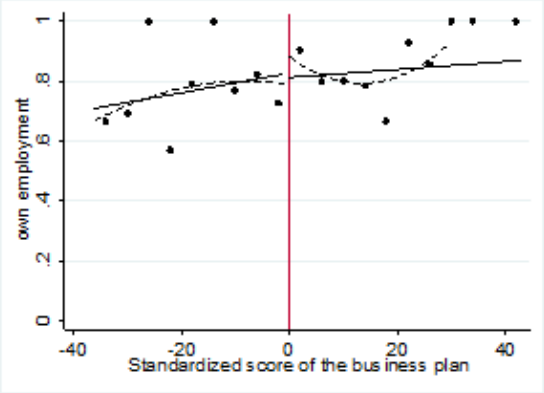
Appendix 4.3. Reduced form results for EDC sub-sample

Figure 4.A.16. Reduced form results on measures of business entry (EDC sub-sample)

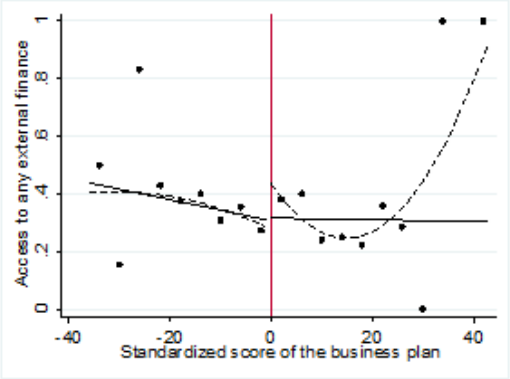
Panel A: Owning Operational business



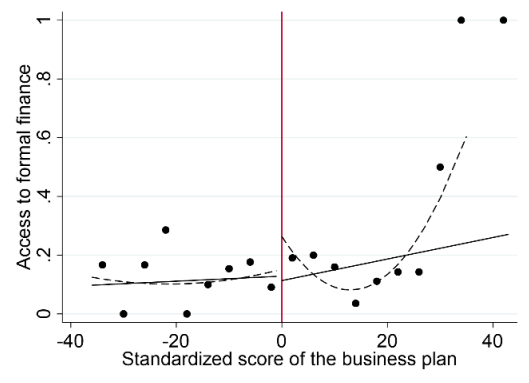
Panel B: Own employment



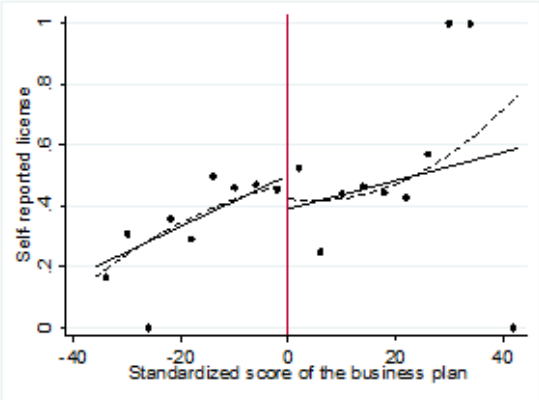
Panel C: Access to any external finance



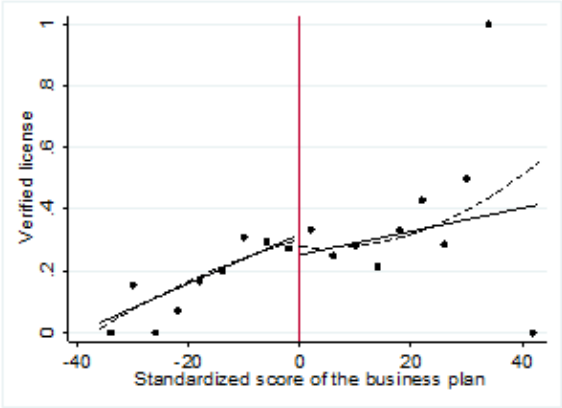
Panel D: Access to formal Loan



Panel E: licensed business (Self-reported)



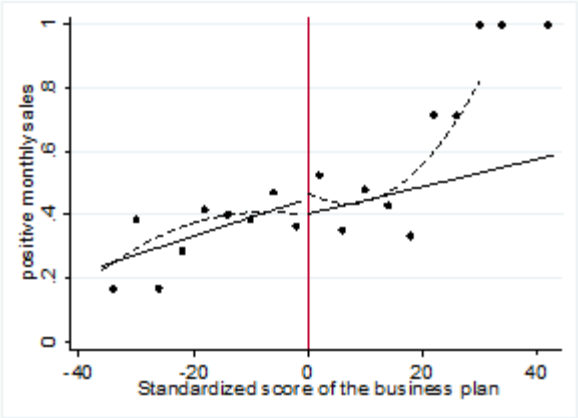
Panel F: Owning licensed business(Verified)



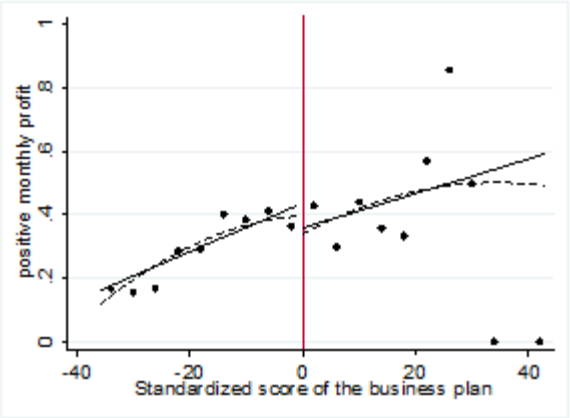
Notes: The results in panel E and F are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Data about outcomes from A to E self-reported in the follow-up survey while for panel F it is independently verified from local regulatory agencies. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.17. Reduced form results on dichotomous measures of firm performance (EDC sub-sample)

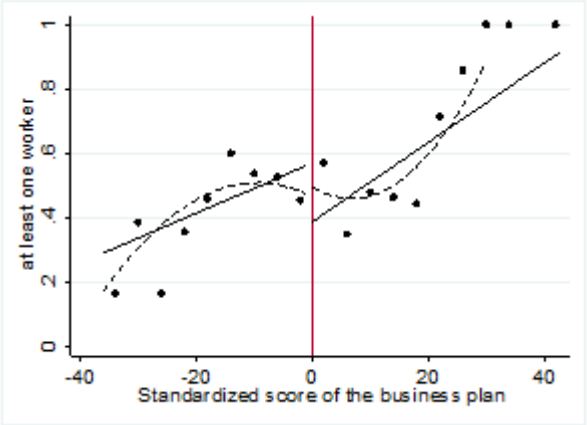
Panel A: Reporting Monthly sales



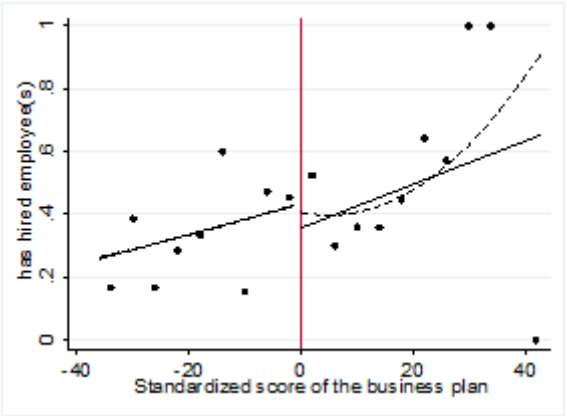
Panel B: Reporting Monthly profit



Panel C: Having at least one worker



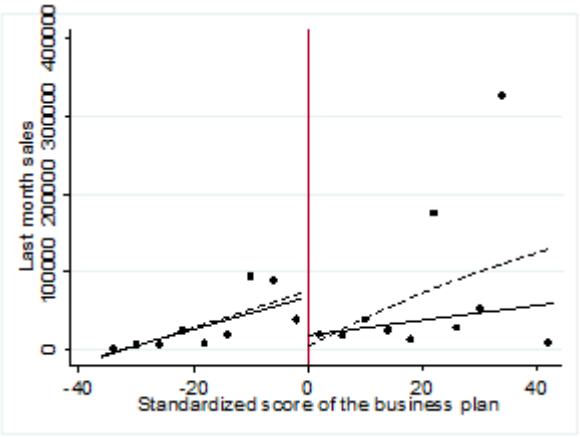
Panel D: Having hired employee



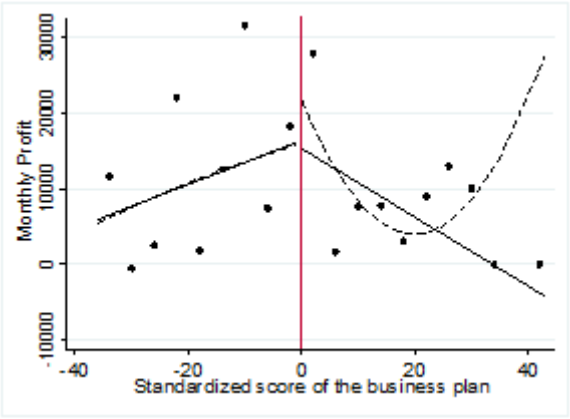
Notes: These graphs show results for EDC sub-sample. Dependent variable for each panel is dummy for reporting any sales, profit, worker, and salaried worker (hired employee) for panel A, B, C, and D, respectively, one year after the application to the business plan competitions. The results are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Data about these outcomes are self-reported in the follow-up survey. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.

Figure 4.A.18. Reduced form results on continuous measures of firm performance (EDC sub-sample)

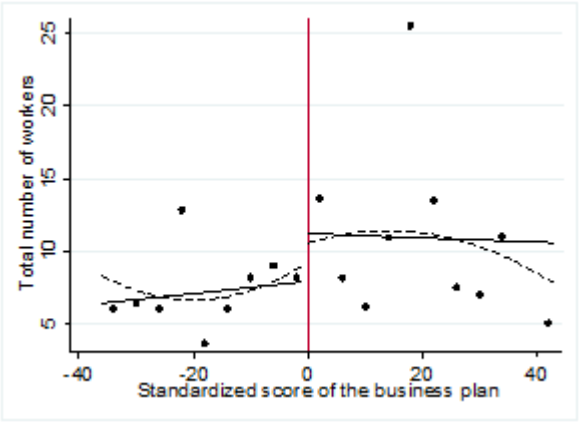
Panel A: Monthly sales



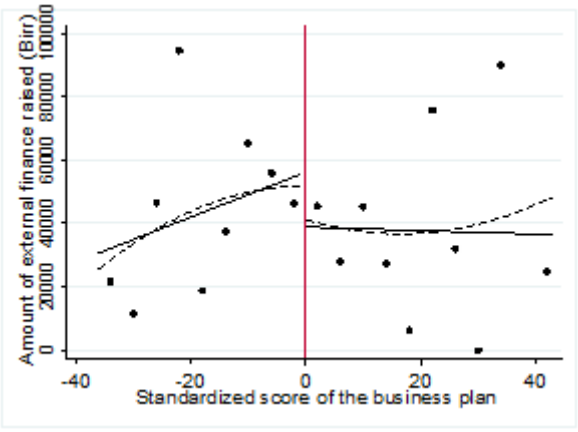
Panel B: Monthly profit



Panel C: Employment level



Panel D: Amount of external finance raised



Notes: These graphs show results for Bruh sub-sample. Dependent variable for each panel the level of last month's sales (panel A) and profit (panel B) in Ethiopian Birr, total numbers of worker (panel C), and amount of external finance raised over a year in Ethiopian Birr (panel D), all as reported by the respondents a year after the application to program. The results are not conditional on operating a business and outcomes of those who did not operate business were coded to zero. Zero is the cutoff for the running variable (the standardized score). The graphs were drawn for the entire support with a bin width of 4. The scattered black dots or circles are the bin means whereas the sold and dashed lines are linear and quadratic fits of the regressions.