Making Entrepreneurs: the Long Term Return to Training Youth in Hard versus Soft Business Skills *

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Abstract

We study the medium- and long-term impacts of the Skills for Effective Entrepreneurship Development (SEED) program, an in-residence 3-week mini-MBA program for high school students modeled after western business school curricula and adapted to the Ugandan context. Two versions of the curriculum were implemented: the hard skills MBA features a mix of approximately 75% hard skills and 25% soft skills; the soft skills curriculum has the reverse mix. Using data on 4,400 youth from a nationally representative sample in a 3-arm field experiment in Uganda, the (medium-term) 4-year follow-up demonstrated that training was effective in improving both hard and soft skills, but only the soft skills curriculum was directly linked to improvements in self-efficacy, persuasion, and negotiation. Four years after the intervention, youth in both groups were more likely to start enterprises and more successful in ensuring the survival of their businesses. Businesses started by the treatment groups were also of higher quality: more likely to be formal, having employees, and being collaborations with other entrepreneurs. With roughly 52% of the sample still enrolled in post-secondary education four years post-intervention, we find suggestive evidence that ventures started by the treatment groups were better performing than those of the control group along several dimensions: monthly revenues (SEED hard: $20.7 or 7%; SEED soft: $16.4 or 5.5%) and profits (SEED hard: $7.9 or 5.4%; SEED soft: $13.8 or 9.5%). Nine years after the intervention, the entrepreneurial efforts of the treatment and control groups increased significantly: 58% of the sample owned an active business, with no statistical differences across treatment arms. However, ventures led by SEED graduates maintained their edge in terms of quality. They were also larger in scale as proxied by revenues (SEED hard: $214.4/month or 20.7%, SEED soft: $195.2/month or 18.7%) and commanded higher profits (SEED hard: $74.6/month or 15.8%, SEED soft: $78.4/month or 16.6%). The program also led to significant improvements in business practices in the form of competition and business management practices as well as more innovation (i.e., reliance on more modern financial and management technologies). We estimate that the indirect effect of improvements in business practices and management account for roughly 50% of the treatment effect on business earnings. Both SEED curricula were highly cost effective. The program's costs were $160.14 (in 2021 USD) per youth, whereas the present discounted value of incremental SEED-induced business earnings alone ranges between $1,119.52 (6.9x) and $1,396.57 (8.7x) under the very conservative assumption of no impacts emerging until year four, nor persisting beyond year nine.

JEL Codes: I20, J01, J02, J23, J24, M13, M53, O15

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1 Introduction

Unlocking the "production function" of high-quality entrepreneurs could be an important catalyst to addressing numerous economic challenges. Entrepreneurship has long been recognized as a powerful engine of economic growth (e.g. Smith (1776)). Entrepreneurs invest in risky ventures in the hope of high returns, introduce new and innovative goods and services, and improve production processes (e.g., Schumpeter, 1911). In fact, governments have invested heavily in programs designed to increase the stocks of entrepreneurial skills (Deming, 2017; OECD, 2015), spending more than US$ 1 billion annually on entrepreneurship training in the developing world (McKenzie et al., 2020).

Small and medium enterprises (SMEs) account for the majority of businesses worldwide and are important contributors to job creation and global economic development. SMEs represent approximately 90% of businesses and account for more than 50% of employment worldwide (World Bank). SMEs form the backbone of the African economy, representing more than 90% of businesses, employing over two-thirds of workers, and create approximately 80% of new jobs – many of which are for women and youth (International Trade Centre, 2018). The World Economic Forum estimates that the African workforce will increase by a staggering 910 million people by 2050, of which 830 million will be in Sub-Saharan Africa, creating enormous pressure for jobs in SMEs. The stakes for producing high quality entrepreneurs are even higher considering that the overwhelming majority of small business owners are entrepreneurs who lack alternative opportunities (Schoar, 2010).

To assess the degree to which successful entrepreneurs can be made or trained, we designed an intervention called Skills for Effective Entrepreneurship Development (SEED) in Uganda. SEED is an innovative full-time, in residence, 3-week mini-MBA program modeled after western business school curricula, adapted to the Ugandan context. SEED was implemented as an at-scale randomized controlled trial (RCT) featuring a nationally representative sample of graduating secondary school students. Study participants were surveyed at baseline, four years (medium run), and nine years (long run) after training to assess program impacts.

SEED was conceived to foster transformational entrepreneurial skills. Recent evidence (Schoar, 2010) suggests that transformational and subsistence entrepreneurs are quite different, not only in terms of their economic objectives, but also with respect to ability, motivation, and personality characteristics. Transformational entrepreneurs tend to have greater ability (de Mel et al., 2013), greater confidence / ambition / motivation, and greater expectations of their own business (i.e., enterprise self-efficacy) (Ardagna and Lusardi, 2010). Several studies have emphasized the role of various intra- and interpersonal skills in transformational entrepreneurial success (Lucas, 1978; Baumol, 1996; Murphy et al., 1991; Gennaioli et al., 2013; Levine and Rubinstein, 2017).[1]

Furthermore, SEED featured extensive material designed to explicitly improve managerial practices and teach tools for business management (e.g., sales, competition, suppliers, inventory, financials, human resources, goal setting, and use of technology). These SEED skills are now supported by and in line with rigorous evidence and are identified as central factors underpinning firms performance (Bloom and Van Reenen, 2007; Bloom et al., 2013, 2020; Iacovone et al., 2022; McKenzie, 2021). As emphasized by Bloom and Reenen (2010), management practices were recognized as a key factor in firm productivity by business schools and policymakers. However, economists were largely skeptical: lack of data and the belief that profit motives combined with low barriers were thought to be sufficient to drive adoption of good management practices.

[1] These same skills have been shown also to be important in the context of more general labor market outcomes. See, for example, Borghans et al. (2014); Deming (2017); Deming and Kahn (2018); Heckman et al. (2006); Bowles et al. (2001); Autor (2015).

Bloom and Reenen (2010) were instrumental in documenting factors that allow suboptimal management practices to persist, including imperfectly competitive markets, family ownership, regulations, and, critical for this work, informational barriers.

Unlike traditional entrepreneurship training programs, SEED does not target existing businesses owners, but rather enrolls potential future entrepreneurs. SEED targets youth at the end of secondary school, which is much earlier in life than traditional entrepreneurial training interventions and before youth begin their working lives, an age group not yet extensively studied for this type of intervention. This phase represents a unique period in youth' lives to be able shape their futures and set them on higher trajectories of lifetime productivity. From adolescence to early- to mid-20s, high-level executive and social processes necessary for emotion regulation, working memory, inhibitory control, abstract thought, decision making, perspective taking, and interpersonal communication undergo substantial development (e.g., Blakemore and Robbins, 2012; Dumontheil, 2014; Sebastian et al., 2010; Andrews et al., 2021; Choudhury et al., 2006).[2]

The study featured two separate treatment arms:(1) a hard skills curriculum that placed a stronger emphasis on hard skills: 75% hard skills (e.g., accounting, finance, economics, marketing) and 25% soft skills (such as negotiation, persuasion, grit, emotional regulation), and (2) a soft skills curriculum that had the reverse mix: 25% hard skills and 75% soft skills. In 2012, a sample of 4,400 high school students was recruited from a random sample of 200 high schools from the universe of full-time high schools in Uganda. Study participants (34% female), stratified by gender and secondary school, were randomly assigned to one of the two treatments or to a control group.

At the end of the training, both curricula yielded a significant differential in the accrual of knowledge of hard and soft skills consistent with their specialized focus. Four years after training, SEED graduates outperformed their counterparts in the control group in terms of hard skills and business knowledge, as well as in terms of socio-emotional skills/traits. Although knowledge of hard skills for the two treatment groups converged, treatment effects on inter- and intrapersonal skills tell a more nuanced story. The differences between the hard and soft skills treatments disappeared for *intrapersonal skills* (stability, plasticity, stress, etc.), while a meaningful difference persisted for negotiation, persuasion, and self-efficacy (defined as the belief in one's ability to effectively perform tasks – including interpersonal tasks – needed to achieve a valued goal), favoring the SEED soft treatment.

Four years after training, SEED was effective not only in fostering youth' human capital accumulation (soft and hard skills), but also in jump-starting self-employment and business creation. Overall, youth in the treatment groups started their economic lives earlier (as proxied by the economic activity and business ownership rates in the 4-year survey). Focusing on entrepreneurship, they were more likely to establish new ventures and own more businesses. At the 4-year survey, SEED graduates were more likely to start businesses (SEED hard: 10.2 percentage points or 21.5%; SEED soft: 10.8 pp) and to own active businesses (SEED hard: 4.1 pp or 14.5%, SEED soft: 6 pp or 21.7%) relative to the control group.

In the long run (nine years after treatment), self-employment grew significantly in our sample, doubling from 27% after 4 years to 58% in the control group and closing the entrepreneurship gap between assignment groups. The intensity of business ownership in the sample speaks to the prominent role that self-employment plays in sub-Saharan African economies. However, important differences persisted in terms of business quality in the medium and long runs: enterprises owned by those in the treatment groups were more likely to be

[2]Development of these cognitive processes appears to be underpinned by structural and functional brain plasticity. During adolescence to young adulthood, the prefrontal cortex undergoes significant structural changes that entail the proliferation of new synapses and the rewiring of existing connections, particularly between the prefrontal and limbic regions (Ahmed et al., 2015; Blakemore, 2012).

formal (that is, either registered or paying taxes), to have employees, and to be established in partnership with other entrepreneurs. Furthermore, treatment enterprises were larger in terms of revenues (SEED hard: \$216.4 or 20.7%, SEED soft: \$195.16 or 18.7%) and more profitable (SEED hard: \$74.57 or 15.8%, SEED soft: \$78.40 or 16%). Moreover, the business-related net benefits of the training continued to grow over the five years following the 4-year follow-up; the annualized growth of profit was 56. 68% and 41. 51% for hard and soft SEED, respectively. The annual growth of the profits in both treatment groups was significantly higher than that of the control group (26.46%).

These patterns are consistent with SEED resulting in an earlier onset of youth's economic lives, allowing for more (business) experimentation, which could in turn have led to better firm outcomes, echoing the view that entrepreneurship is a process of trial-and-error and learning by doing (Schumpeter, 1934; Manso, 2016).[3] More recent work that has pointed to entrepreneurial experience as a key factor in explaining higher returns to credit and firm performance (Banerjee et al., 2021). However, entrepreneurship is a learning process that imparts skills that are valuable in subsequent businesses. Experience per se is not sufficient; the ability to learn and the need to do so efficiently are also paramount (Lafontaine and Shaw, 2016; Thompson, 2010; Rosen, 1972). SEED appears to have endowed youth with better "learning" skills and allowed them to take advantage of their early business starts. Both SEED curricula were highly cost effective and compared favorably with existing training alternatives. Program costs per youth were \$118.7 per participant in 2013 or \$160.14 when expressed in 2021 US dollars, whereas the present discounted value of incremental SEED-induced business earnings alone ranges between \$1,119.43 (6.9x) and \$1,396.57 (8.7x) under the very conservative assumption of no impacts emerging until year four, nor persisting beyond year nine. If instead we assume that no benefits emerge until year four and year nine benefits last until year 15 and disappear thereafter, SEED's additional business earnings would yield a return on investment of 18.0x.

Our paper stands in contrast to the large body of work that has studied the effectiveness of business training courses in improving the performance of managers of existing enterprises. Despite their popularity, reviews of training programs document relatively weak or temporary impacts of training programs in low-income settings (Blattman and Ralston, 2015; McKenzie and Woodruff, 2017; Card et al., 2018). A more recent meta-analysis by McKenzie (2021) concludes that traditional entrepreneurship training has modest, but (across studies) significant effects in terms of improving business practices and business outcomes for microenterprises. The most compelling evidence relates to the training of small-scale subsistence enterprises: successful training interventions may lead to short-lived improvements in profits or sales, without altering the growth paths of enterprises.

Fewer resources have been devoted to assessing whether individuals can be taught a more entrepreneurial personality (Kerr et al., 2017). A small but growing number of attempts have been made to evaluate interventions that teach such attributes to entrepreneurs in developing countries. Programs that foster an entrepreneurial mindset have shown more encouraging results than traditional training. Innovations include personal initiative training (see Campos et al., 2017; Alibhai et al., 2019; Ubfal et al., 2019, in Togo, Ethiopia, and Jamaica, respectively) and psychology-influenced training curricula, including interpersonal skills (Dammert and Nansamba, 2019). Efforts to follow up on Campos et al. (2017)'s success in Togo – where personal initiative training increased firm profits by 30%, compared to a statistically insignificant 11% increase among those who received traditional training– have yielded largely insignificant and therefore less encouraging results in other contexts.

[3] Kerr et al. (2014) argue that entrepreneurship is fundamentally about experimentation because the knowledge required to be successful cannot be known in advance; Arrow (1969) associates innovation with the production of knowledge through experimentation.

Our work also contributes to a broad literature that underscores the importance of youth interventions and their potential to endow them with critical intra- and interpersonal skills. This critical developmental phase has garnered increasing attention (Kautz et al., 2014). Programs aimed at developing youth' socioemotional skills have led to improvements in education outcomes (Yeager et al., 2019; Alan and Ertac, 2018; Alan et al., 2019) and have shown promise as effective prevention strategies against crime and antisocial behavior (Blattman et al., 2017; Heller et al., 2017).

Recent research has also highlighted the role of negotiation and persuasion skills – skills that are at the center of the SEED intervention – in shaping education outcomes and gender attitudes of adolescent girls. In Zambia, Ashraf et al. (2020) finds that negotiation training (which taught girls skills to reconcile different interests by looking for "win-win" solutions) led to improvements in human capital outcomes 3 years after the intervention. In India, Dhar, Jain and Jayachandran (2022) document meaningful impacts on gender attitudes of a school-based *persuasion* intervention for adolescents among a sample of boys and girls two years after training. No labor market outcomes were reported by either study.

This paper also relates to Bandiera et al. (2020) and Alfonsi et al. (2020), who focus on youth and on labor market outcomes, although these studies place less emphasis on socioemotional skills. Bandiera et al. (2020) assess the impact of a program that provides adolescent girls with an opportunity to simultaneously acquire (1) *vocational skills* to enable them to start small-scale income-generating activities and (2) life skills to help them make informed choices about sex, reproduction, and marriage. Four years post intervention, adolescent girls in treated communities were more likely to be self-employed and delay family formation. Alfonsi et al. (2020) design a labor market field experiment to compare demand-side (vocational training, VT) and supply-side policies (offering firms wage subsidies to train workers on-the-job, FT) to tackle youth (approximately 20 years old) unemployment. Their results speak to the importance of portability and transferability of skills. Indeed, both treatments led to skill accumulation, with VT workers learning sector-specific skills and FT workers learning more firm-specific skills, translating into differential gains in employment rates (VT: 21% vs. FT: 14%) and increases in total earnings (VT: 34% vs. FT: 20%).

The paper is organized as follows. Section 2 details the intervention and its implementation. Section 3 describes the research design. Section 4 presents the experimental design, data, and estimation strategy. Section 6 presents the impacts of the hard and soft skill treatments on post-intervention knowledge assessments and on various outcomes in the medium run (four years) and in the long run (nine years). It also performs a cost-benefit analysis 7. Section 8 concludes by highlighting the broader implications of our findings for policy and future research.

2 The Intervention

The study team designed two separate curricula: a mini-MBA with more emphasis on hard skills and a mini-MBA with more emphasis on soft skills. The hard skills content was in part based on the Know About Business curriculum developed by the International Labor Organization for Africa. The soft skills content was in part based on a social entrepreneurship curriculum developed by *Educate!*, an NGO that provides social entrepreneurship training to Ugandan secondary school students.[4] Both soft and hard skills curricula integrated content from the MBA program of the Haas School of Business at UC Berkeley. The curricula were designed to enable highly participatory classroom environments, addressing different learning modalities

[4]Educate! advises national governments (Uganda, Kenya, Rwanda) on curriculum design and teacher training initiatives. Educate! was recognized by the World Bank (S4YE) and the UN, received the 2015 WISE award and the 2018 Klaus J. Jacobs Prize.

through a variety of exercises and teaching methods. The curricula were extensively pilot tested to ground them in the local language and cultural environment, to make them relevant and salient to local business institutions, to ensure that the course content was appropriate and well understood, and that the teaching methods were interesting and engaging. The curricula were delivered in intensive 3-week entrepreneurship courses. An outline of the lesson plans for the two curricula and business plan development component is summarized in Table 1.

Table 1: Lesson Plans for Soft and Hard Curricula

SEED Curricula: Lesson Plans		
HARD SKILLS	**SOFT SKILLS**	**BUSINESS PLAN**
1. Defining Entrepreneurship	1. Defining Entrepreneurship	1. Entrepreneurship in Society
2. Self-Employment	2. Entrepreneurial Identity	2. Thinking about Business
3. Generating Business Ideas	3. Self-Management	3. Evaluating Starting an Enterprise
4. Identifying Business Opportunities	4. Identifying Business Opportunities	4. Business Planning Overview
5. Selecting a Suitable Market	5. Communication	5. Skills/Resources needed
6. Ways of Getting into Business	6. Win-Win Judgment	6. Market Research
7. Legal Forms of Business Ownership	7. Personal Power	7. Coffee Shop Case Study, Part 1
8. Hiring and Managing People	8. Negotiation Simulation	8. Taxes & Legal Responsibilities
9. Knowing the Cost of an Enterprise	9. Leadership and Team Building	9. Coffee Shop Case Study, Part 2
10. Money Needed to Start an Enterprise	10. Goal setting	10. Financial Planning
11. Obtaining Money to Start an Enterprise	11. Decision Making Skills	11. Fundraising
12. Managing Money	12. Group Decision Making	12. Marketing
13. Investment Simulation	13. Risk-Taking	13. Confidence & Executive Summary
14. Using Financial Statements	14. Social Networking	14. Persuasion & Business Plan Pitch
15. Managing Sales	15. Public Speaking	15. Pitching your Business Plan
16. Selecting Suppliers	16. Formal Presentations of Business Plan	
17. Using Technology in Small Business	17. Using Technology in Small Business	

Students in the **hard skills program** differentially focus on (1) accounting, covering financial statements (income statements and balance sheets), and the cost structure of an enterprise; (2) business creation, covering generating business ideas, selecting a suitable market, resources needed to start an enterprise, and legal forms of business ownership; (3) management, covering sales, keeping track of business operations, hiring and managing people, and selecting suppliers; and (4) finance, covering managing money, investments, and obtaining financing to start a business. This hard-skills curriculum provides foundational skills to teach students how to generate a business idea, how to secure capital, how to get the business off the ground, and how to manage it.

Students in the **soft skills program** differentially focus on inter- and intrapersonal skills. Specific topics include (1) learning to control one's self through self-management, goal setting, risk taking, decision making and personal power;[5] (2) persuasion through communication strategies, leadership and team building, group decision making strategies, social networking and public speaking; and (3) negotiation through win-win strategies and personal power. This soft skills curriculum teaches foundational skills so that students have more self-awareness, improved ability to regulate emotions, delay gratification, and make sound decisions.

The **business plan curriculum**, available to both treatment groups, outlined fundamental principles that students could use as a guide to develop successful business plans, such goals, structure, and other aspects of a business development. The classes covered key topics in depth, including market research,

[5]Personal power is the ability to ignore the influence of others, to control one's own outcomes, and to be personally independent (see van Dijke and Poppe, 2006; Galinsky et al., 2008).

human resources, legal and tax issues, financial planning, fundraising, and marketing. Two classes were devoted to pitching the business plan and two others to case studies. The business plan curriculum was developed to guide students in writing their own original business plan, and the authors of the winning plan at each host school were awarded a cash prize of 1 million Ugandan Shillings, UGX (approximately $400). One student per site won, for a total of 10 winners.

The curricula were designed to enable highly participatory classroom environments, addressing different modalities of learning through a variety of exercises and teaching methods.[6]

Each of the curricula was organized into 17 sessions and detailed lesson plans were developed for each session (see Table 1). Lesson plans included detailed steps for the teacher to follow, framed by objectives and rationales to encourage a sense of ownership by the teacher. The plans covered learning objectives, key concepts, case applications, presentation materials, and a series of interactive exercises. The lesson plans were designed for use in an intense Western-Socratic-based course in which the learning process encourages sharing, discovery, and reflection while maintaining a similar classroom environment between curricula and across all training sites.[7]

The training took place between May 6th and May 24th, 2013 – for a total of 17 instruction days – at 20 host school training sites, during the break between Term 1 and 2 of the academic year, when dormitories at host schools would be available. Students slept and boarded at the schools, attending two lessons each day: one hard or soft skills lesson in the morning and one business plan lesson in the afternoon. Each student also had two "prep" periods per day – one in the morning and one in the afternoon. Students were expected to work on their homework or business plans during these periods, which were supervised by SEED camp directors and teachers. Study's and data collection's milestones are summarized in Figure 1

The study used a number of different types of monitoring and supervision to assess both operational and academic aspects of the training and to ensure that the training was implemented as designed. Monitoring was used to identify deviations from the curriculum and weak instructional pedagogy by specific teachers and to correct problems in real time.

3 Experimental Design

The study was designed to be nationally representative, with both students and teachers being randomly assigned to one of three arms (hard skills, soft skills, and control) and to one of 20 training sites. The design of the field experiment is summarized in Figure 2.

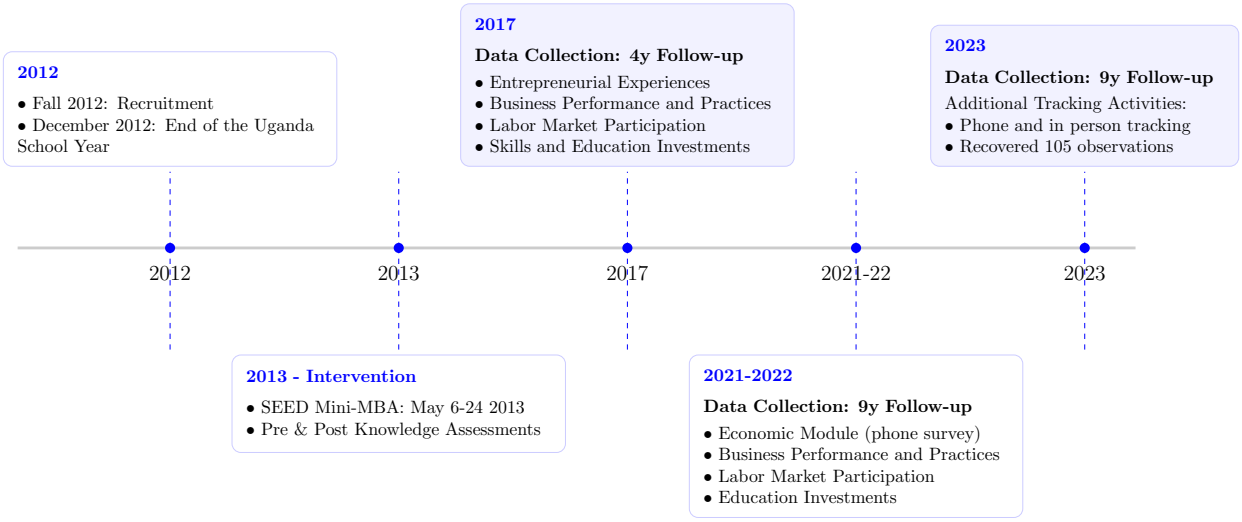
3.1 Student Recruitment

To ensure representativeness at the national level, students were recruited from 200 full-time secondary schools randomly selected from the universe of approximately 700 full-time secondary schools in Uganda.

[6] In the context of the 2016 education reform in Rwanda, Blimpo and Pugatch (2021) experimentally study the extent to which comprehensive teacher training can improve the implementation of the entrepreneurial curriculum for upper secondary grades. The 2016 reform mandated that all secondary students enroll in the revised entrepreneurship course, which, in turn, prevents a direct test of the entrepreneurship curriculum. More participatory pedagogical style led to increased entrepreneurial activity among students and suggest as substitution between entrepreneurship and wage employment may be at play among students in treated schools.

[7] There was also a series of planned social activities that were implemented consistently across all training sites. These took place almost every evening and included debates, a cultural night (in which students representing different cultures rehearsed and performed dances), movie nights, a spelling bee, a lip-syncing competition ("miming"), stand-up comedy, quiz nights, and a social dance. In addition, sports activities were held each afternoon before dinner. Basic sports equipment (e.g., volleyballs, netballs, and soccer balls) was purchased for each school.

Figure 1: Timeline, Study and Data Collection Milestones



In October 2012, promoters visited each of the 200 schools to recruit students in their sixth (last) year of secondary school. Each recruitment visit consisted of an oral presentation and promotional posters. The promotion informed the students of a 3-week in-residence program designed to train students in entrepreneurship skills. SEED would be free, including lectures, room and board, and transport, and students would have the opportunity to write business plans and enter a competition for a large cash prize. The promoters explained that there was limited space in the program, such that not all applicants would be admitted, but that they all had an equal chance of admission through a fair lottery.

Students interested in the program were asked to complete a simple application form and a baseline survey.[8] Response to the SEED program opportunity was overwhelmingly positive. In almost all schools, the majority of the S6 class expressed interest in the program, resulting in 8,080 student applications. However, 313 students (3.9%) were dropped due to problems with their student ID, 113 (1.3%) were excluded because they did not indicate their gender, and another 223 were dropped because they were already participating in another entrepreneurship training program. The remaining 7,431 served as the population universe for the study.

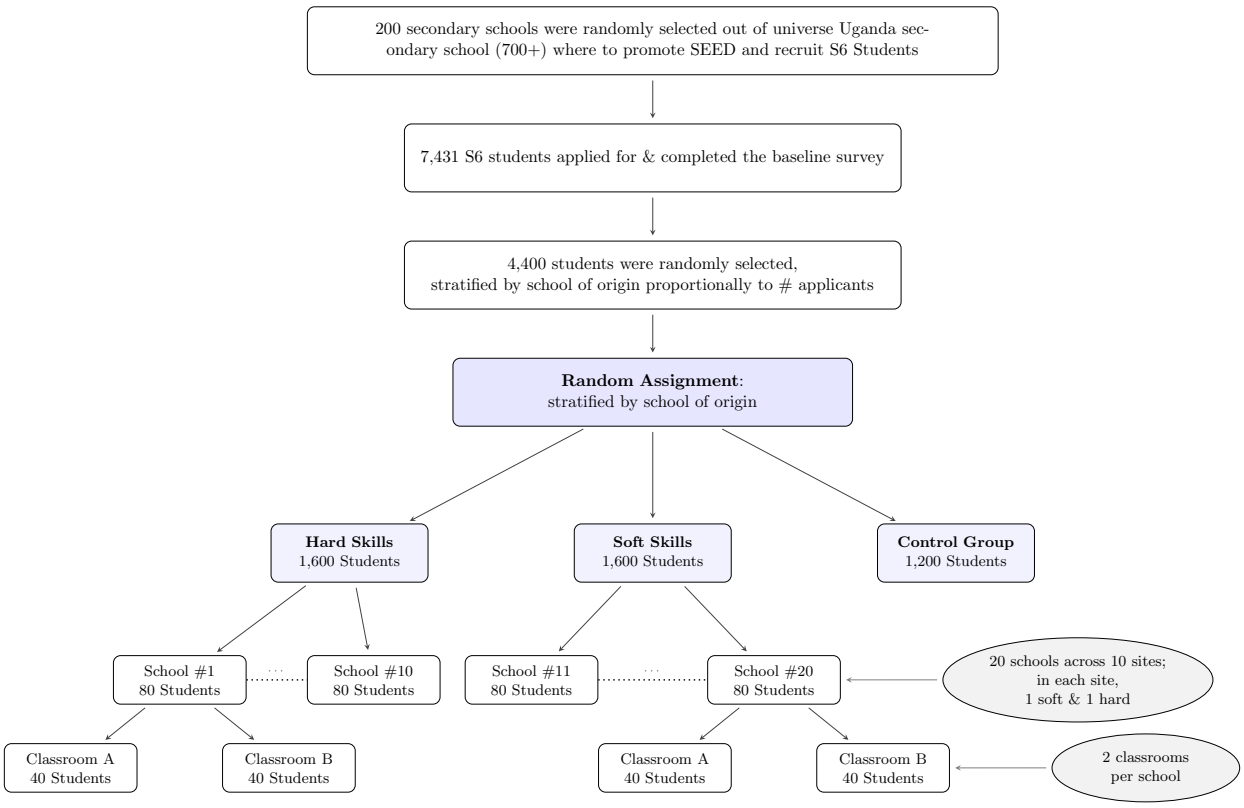
3.2 Student Assignment to Treatment Arms and Training Sites

Power calculations indicated that we needed 1,200 students in each arm (hard skills treatment, soft skills treatment, and control group), or 30 students in each of the 80 classes. Taking into account estimates of attrition rates from similar programs and the long period of time between recruitment and program implementation, the evaluation team over-enrolled each treatment arm by one third, accepting approximately 1,600 students in each arm, or 40 students per class. The control group remained at about 1,200 students. Therefore, we randomly sampled 4,400 students from the 7,431 eligible applicant pool to participate in the study, randomly assigning 1,600 to each treatment group and 1,200 to the control group, stratified by school and gender.

To minimize travel time, recruitment schools were clustered into four geographic regions, with students

[8]The application form asked students to provide detailed contact information. It also included the question: 'If you participated in the SEED training, what business would you start and how would you start and run it?' This question was included to indicate to students that SEED would accept serious applicants who have considered starting their own businesses.

Figure 2: Experimental Design



participating in the study being sent to a randomly selected school in their region. Of the 200 schools visited during data collection and recruitment, 20 eventually served as training sites. The distribution of training sites was chosen based on the number of individuals in the sample surveyed in each region to achieve fairly even numbers across regions. Approximately 40% of the sample attended schools in the West, 40% from the East (including 20% in the Jinja area and 20% in the Mbale area), and 20% from the North. As a result, eight sites were located in the West, eight in the East, and four in the North for a total of 20 training sites.

The 20 schools were divided into 10 sites that included one hard skills only school and one soft skills only school. Each school had two classrooms for a total of 40 classrooms, 20 in each arm of the study. Students assigned to the hard skills arm were randomly assigned to one of the hard skills classrooms within their region, stratified by feeder school and gender. Similarly, students assigned to the soft skills arm were randomly assigned to one of the soft skills sites within their region, stratified by feeder school and gender. Approximately 160 students were assigned to each site, 80 per school, and divided into two classes of 40 each.

3.3 Teacher Training and Assignment

Each school was staffed with three teachers: two regular curriculum instructors (hard or soft skills), who taught regular curricula, and one instructor who focused exclusively on teaching the business plan curriculum. Teachers were randomly assigned to one of the training sites and to a classroom stratified by language ability.

The research team worked with *Educate!* to recruit, hire, and train instructors in general teaching methods. Trainees were required to pay a fee of (approximately) $134 to enroll in the training (or $180.78

in 2021 USD) and, upon completion, a formal certificate was issued, which is highly valued in Uganda as it is perceived as a strong signal of quality.

Potential instructors were first trained in general (western) teaching methods. Instructions took place five mornings per week for four weeks. Recruits who met the training requirements were then randomly assigned to one of three groups: (1) hard skills, (2) soft skills, and (3) business plan. The second training phase, lasting three weeks, focused exclusively on the assigned topic (hard, soft, or business plan). The training was designed to establish three levels of learning – the "what", the "how", and the "why" of each lesson – including insights into the rationale for the content, thereby endowing teachers with deep understanding and a sense of ownership of the material. Teachers received hands-on practice with their assigned lessons via read-through assemblies, mock lessons, presentations, and role playing. After the specialized training, the curriculum development consultants provided an additional day of coaching to several teachers who were identified as relatively weak based on consensus among trainers. All teachers had to pass a knowledge test satisfactorily (the same as that administered to students) to become SEED instructors.

4 Data, Attrition, and Compliance

A **baseline survey** was administered to all study participants at the time of recruitment and prior to assignment to the study arm. The survey was framed as purely research-oriented and had no bearing on the chances that a student would be accepted. The 45 minute survey collected a rich set of baseline information: demographic and family background characteristics as well as participants' education, proxies of ability and intelligence, job experience, personality traits, and soft skills. Table D.1 reports summary statistics for study participants, as well as the results of balance tests between intervention groups.

At baseline, youth were on average 20 years old, 34% female, with 73% attending a boarding school and 70% planning to attend university. Study participants became active in the labor market at an early age (14.5 years old, on average) and, by the time they reached their last year of secondary school, approximately 40% owned a small business. Most of the parents of the youth had not completed secondary education (60% of fathers and 73% of mothers) and tended to be employed primarily in low-skill manual jobs. As alluded to in the introduction, in low income countries nearly half of the labor force runs an enterprise, consistent with our sample (51% of households owned a business).

Randomization achieved good balance across groups, with p-values associated to joint tests of whether the 30 covariates predict treatment statuses relative to the control exceeding 0.16. We test for balance across 30 outcomes, such that some individual coefficients are expected to be significant, at conventional levels, by chance. Few systematic differences were observed (only 5 out of 90 comparisons) and were quantitatively small.

Skills knowledge assessments were performed before and at the end of the training. These include an extensive array of concepts at the core of the two curricula.[9] The skill assessment was administered to establish whether the two treatment arms endowed youth with different sets of skills that reflect the intensity of the assigned treatment arm. As discussed later, both treatments did improve knowledge of hard and soft

[9]Topics covered by the *hard skills test* include general business knowledge (e.g., meaning of an enterprise, definition of legal ownership, challenges and advantages of self-employment); concepts related to industry sectors, market competition and its implications; best business practices surrounding sales, marketing, and employee management; elements of profit/loss statements, utility of record keeping, and classification of costs; financing strategies to support capital and business investments; elements of successful business plans; and strategies to identify and develop good business ideas. *The soft skills assessment* instead focused on qualities and traits of successful entrepreneurs; communication, the importance of listening, elements of successful public speaking; negotiation strategies and desirable outcomes; attributes of win-win judgment; personal power (self-mastery, competence, vision, confidence); decision making skills; and the importance of teams and social networking.

skills, with youth in the hard skills arm accruing larger gains in hard skills knowledge relative to those in the soft skills arm, gains in terms of soft skills being reversed.

In the context of the **4-year follow-up**, we collected data on an extensive set of outcomes that can be organized into four groups: (1) SES and demographic outcomes (e.g., education, self-assessed present and future social and wealth standings, time use); (2) labor market indicators (e.g., labor force participation, entrepreneurial success, wage and self-employment earnings, business investment, access to lending); (3) business knowledge and business/management practices; (4) self-reported and task-based measures of soft skills (e.g., negotiation, persuasion, patience, self-efficacy, stress, grit, and Big Five). Details on outcome definitions and variable construction are presented in Appendix.

Four years after the intervention, 88.4% of the original sample was successfully tracked. However, attrition was slightly higher for the control group than for the two treatment groups. Recontact rates were 85.3%, 89.7% and 89.3% for the control, hard and soft skills groups, respectively (see Table D.3, Column (1)). Females and older youth tend to attrit at higher rates, while youth planning to attend university attrit less. However, covariates do not appear to explain attrition rates across assignment groups (see Table D.3, Column (2)), with the coefficients on the two treatment dummies being virtually unchanged (as are their standard errors) from Column (1) to Column (2). That is, differential attrition across groups is not explained by our rich set of observables, including proxies for abilities, personality traits, and socioemotional characteristics.

To assess whether differential attrition leads to bias, we retest the balance across our 30 outcomes for the estimation sample used in our 4-year follow-up analysis (Table D.4): only 8 out of 90 comparisons are significantly different from zero at the 10% level; the p-values for joint tests of whether the 30 covariates predict treatment statuses are greater than 0.46, consistent with the notion that the samples remain well balanced on various youth characteristics four years post intervention.

Tables D.5 and D.6 document imperfect compliance with assignment among the two treatment groups, but no contamination of the control group (no defiers). 69% of those assigned to treatment (SEED hard: 67.8%; SEED soft: 69.8%) participated in SEED. Conditional on taking up treatment, the majority (over 75%) attended 28 or more of the 30 sessions. These take-up rates are consistent with other entrepreneurship training programs, such as Groh et al. (2015), de Mel et al. (2013), and Calderon et al. (2020), and far exceed the 21% take-up rate in Bandiera et al. (2020).

Between October 2021 and April 2022, **nine years after implementation**, we resurveyed study participants. An additional 105 observations were collected in the summer and fall of 2023.[10] Data collection was carried out by phone survey due to the health environment in Uganda related to Covid-19 at the time of the survey. Consistent with the 4-year data collection, nine years after the intervention, we successfully tracked 3,686 (over 84%) of the baseline sample of 4,400, and completed 3,396 surveys (77.2%). Attrition was slightly higher in the control group (72.6% survey completion) compared to the treatment groups (80.3% and 77.3% survey completion for the hard and soft treatment groups, respectively). 34% of the surveyed sample are women.[11]

To assess whether differential attrition leads to bias, we retest the balance across all 30 baseline covariates for the estimation sample used in the 9-year follow-up analysis (Table D.7, in Appendix D.1). Only seven of

[10] The survey instrument is largely unchanged in 2023, but certain financials modules were simplified. In our analysis, we express all financial amounts in 2021 US dollars and include a dummy variable for the observations collected in 2023.

[11] Overall, our effective response rate is relatively high and performs well compared to many other long-term studies reviewed by Bouguen et al. (2019). The recontact and completion rates in this study are remarkably higher than in other phone surveys. During approximately the same period, IPA's average response rate for phone surveys was 56% based on an existing sample of 41 studies covering 20 countries–see IPA report. Our low attrition rate is especially significant considering that ours is a long-term follow-up study.

90 comparisons are significantly different from zero at the 10% level, with a p-value for joint tests of whether the 30 covariates predict treatment assignment of 0.13, such that the samples remain well balanced along various characteristics nine years after intervention.

5 Estimation

The identification of program impacts relies on random assignment of applicants to SEED curricula and control groups. For parsimony and for a cleaner interpretation of the results, we present intent-to-treat (ITT) estimates, which capture the impact of offering SEED training regardless of actual take-up.[12]

Our main estimating equation for the ITTs is given by

$$y_i = g(T_i^h, T_i^s, X_i) + \varepsilon_i \tag{1}$$

where y_i denotes outcome y for youth i; T_i^h and T_i^s correspond to hard skills and soft skills treatment indicators, respectively; X_i is a vector of baseline characteristics; and $g(\cdot)$ is an unknown function, which is a nuisance parameter. Therefore,

$$ITT_j = \beta_j = E[g(T^j = 1, X) - g(T^j = 0, X)], \quad \textit{where } j = \textit{hard, soft} \tag{2}$$

We report here *Double/Debiased machine learning (DML)* estimates (Chernozhukov et al., 2018), which rely on Neyman-orthogonal scores and yield valid estimation and inference for parameters of interest in the presence of a high-dimensional and potentially nonlinear nuisance parameter.[13] DML ITTs and standard errors are estimated using an interactive model in which treatment dummies are not additively separable.[14]

Recent work has drawn attention to the pitfalls of transformed regressions with a mass at zero and has highlighted the sensitivity of estimated treatment effects to the unit of measure of the outcomes and their transformation (e.g., $log(Y+1)$ or $arcsinh(Y)$; see Mullahy and Norton (2024); Chen and Roth (2024); Aihounton and Henningsen (2021)).[15] In our analyses, financial outcomes (e.g., earnings, revenues, and capital) are measured in levels winsorized at the the 97th percentile. In the online appendix, we also include results for Poisson with double selection (Lasso), as in Belloni et al. (2016), which requires weakly positive outcomes and additional winsorization. The results are robust and very similar across specifications.

[12] Local Average Treatment Effect (LATE) estimates of the effect of treatment on the treated using initial random assignment as an instrument are proportional to ITT estimates under a monotonicity assumption (no defiers). That is, $LATE = ITT/\pi_c$, where π_c is the fraction of compliers.

[13] The main results and overall conclusions are preserved when omitting baseline controls, X_i; DML improves precision.

[14] DML estimates rely on K-fold cross-fitting (in our case $K = 5$) to minimize overfitting. In finite samples, the dependence of the estimator on the particular split creates an additional source of variation. Following Chernozhukov et al. (2018), to incorporate a measure of this additional source of variation in the estimates and their standard errors, the estimation step is repeated $S = 100$ times. Sample medians of the estimates and median standard errors obtained across the S replications/splits are reported.

[15] Chen and Roth (2024) derive formal results showing that scale dependence is a necessary feature of any identified treatment effect on outcomes with a mass at zero (revenues, earnings, capital, etc.). The authors show that when the treatment has an effect on the extensive margin –as in our study– estimates using the $log(Y+1)$ or $arcsinh(Y)$ transformation cannot be interpreted as percentage effects since they depend on the outcome's unit and treatment effects are arbitrarily sensitive to scaling. Chen and Roth (2024) offer elegant intuition for their results: the arbitrary unit dependence arises because an individual-level percentage effect is not well-defined for individuals whose outcomes change from zero to a nonzero amount when receiving treatment, and the units of the outcome implicitly determine how much weight the treatment effect for a log-like transformation places on the extensive margin.

6 Results

This section organizes the results into categories related to their distance from the training. We first discuss the effects of the program on knowledge of hard and soft skills immediately after training and then four years after the intervention. During our 4-year follow-up, we added lab-in-the-field task-based measures for persuasion and negotiation and self-reported personality traits and soft skills. It is important to note that skills such as negotiation and persuasion were explicitly taught in the context of the soft SEED curriculum but not in the hard curriculum. More traditional personality traits (e.g., Big Five, Stress, Self-Efficacy, etc.) are thought to be important to entrepreneurial success and could have been influenced by the program either directly (during lessons covering topics such as self-management, personal power, goal setting) or indirectly. The impacts of the program on business creation and their performance in the medium and long runs are discussed next. We conclude by reviewing whether and to what extent improvements in entrepreneurial mindset and skills altered educational investments and/or were rewarded in the labor market.

6.1 Knowledge Assessments Post-Treatment

Students who attended SEED completed tests of hard and soft skills knowledge at the beginning and at the end of the mini-MBA. The pre- and post-training knowledge assessment tests were identical except that the order of questions differs between the two tests. Figure 3 illustrates the pre-to-post shift in the test score distributions for hard and soft skills knowledge, by treatment arm. Aggregate test scores were calculated as standardized weighted averages following Anderson (2008).[16] After three weeks of training, both curricula were associated with significant improvements in test scores for hard and soft skills relative to the pre-program levels.

More importantly, the two curricula led to significant differential knowledge accrual in hard and soft skills relative to pre-training (see Table 3). Focusing on **hard skills knowledge**, youth in the hard and soft skills trainings experienced large knowledge gains, 0.76 sd and 0.36 sd, respectively. Equivalently, the hard skills knowledge gap grew by 0.4 sd favoring the hard SEED group relative to the soft SEED. This learning gap remains largely unchanged when we control for pre-SEED test performance and additional controls. In terms of **soft skills knowledge**, the post-training test scores for both treatment groups improved significantly, with a 0.28 sd score differential between treatment groups, consistent with the soft skills intensity of the assigned curricula. Soft skills assessment test scores increased by 0.74 sd and 0.47 sd for those in the soft skills and hard skills groups, respectively.

6.2 Hard and Soft Skills: 4 Years Post Intervention

Four years after the intervention, meaningful differences in hard skills knowledge, soft skills, and personality traits persist relative to the control group in both treatment groups. In particular, both treatment groups scored higher on the hard skills knowledge assessments compared to the control group four years after training (see Table 4). The soft SEED group displayed better mastery of persuasion and negotiation skills, which were explicitly part of the soft curriculum but not the hard skills one. The patterns of impacts on soft skills and personality traits are more nuanced. Below, we discuss these results in detail.

[16] Test scores for each assessment are standardized with respect to the mean and standard deviation of pre-treatment test performances.

6.2.1 Task-Based Measures: Negotiation and Persuasion

When establishing and growing a business venture, entrepreneurs constantly need to negotiate with various stakeholders, making negotiation skills essential for entrepreneurial success (Artinger et al., 2015). To assess whether participants' newly acquired skills provided them with better tools to broker more favorable prices, to persuade, and to convincingly present their business plans and points of view, we turn our attention to negotiation and persuasion, which were taught only in the soft curriculum (e.g., see sessions on negotiation, communication, public speaking, etc.). We rely on task-based measures to quantify participants' ability to successfully deploy *negotiation* and *persuasion* skills and strategies in a simulated professional situation.

The defining characteristic of **negotiation** is the existence of two parties who share an important goal, but have conflicting interests (Bazerman and Neale, 1994). Negotiation is the process of interpersonal communication by which interested parties resolve disputes, agree upon courses of action, bargain for individual or collective advantage, and/or attempt to craft outcomes that serve their mutual interests. Effective negotiation involves skills such as communication, persuasion, planning, strategic thinking, and cooperation (Thompson, 1990; Bazerman et al., 2000). To assess study participants' negotiation abilities, we conducted a lab field experiment with real payoffs for both players (Bontempo and Iyengar, 2008).

Table 2: Negotiation: Payoff Tables

Buyer (Enumerator): Musumba Payoff Table				**Seller (Subject)**: Butagira Payoff Table			
Financing		**Project Start**		**Financing**		**Project Start**	
Paid Down Payment (UGX millions)	**Points**	**Start Date**	**Points**	**Received Down Payment (UGX millions)**	**Points**	**Start Date**	**Points**
100	**500**	**2 months**	**1000**	100	0	2 months	0
150	450	3 months	900	150	100	3 months	50
200	400	4 months	800	200	200	4 months	100
250	350	5 months	700	250	300	5 months	150
300	300	6 months	600	300	400	6 months	200
350	250	7 months	500	350	500	7 months	250
400	200	8 months	400	400	600	8 months	300
450	150	9 months	300	450	700	9 months	350
500	100	10 months	200	500	800	10 months	400
550	50	11 months	100	550	900	11 months	450
600	0	12 months	0	**600**	**1000**	**12 months**	**500**

Note: Buyer's and Seller's strategies: the Seller, the respondent, prefers a full payment, UGX 600 million,, up front and a delayed project start date; the Seller places relatively more weight on the financing arrangement than on the start date. The Buyer prefers a small down payment but an early start date, and assigns a higher weight to the start date than to the financing arrangements.

The *Buyer* plays the role of the Commissioner of the Ministry of Lands, who is tasked with purchasing Butagira Farms to construct a rail line. The *Seller* plays the role of the owner of Butagira Farms. The Buyer (the enumerator) and the Seller (the respondent) have already agreed that the land is worth UGX 600 million (approximately $573,295.75, PPP adjusted), but the two will need to agree (i) on financing terms, that is, how much is paid upfront, with the remainder paid in equal installments over a 12-month period (Table 5, Column (3)) and (ii) on project start date between two and 12 months (Table 5, Column (4)).

Both Buyer and Seller were informed that they will be entered into a lottery carrying a $400 prize, with the probability of winning being a function of the number of points obtained in the final deal based on

the payoffs in Table 2.[17] The Seller and Buyer have five minutes to reach an agreement. If they reach an agreement, both of them are entered in the lottery. If they do not reach an agreement, the are ineligible for the lottery.

Table 5 summarizes the negotiation payoffs. Participants in the soft skills-focused SEED negotiated better outcomes not only relative to the control group but also relative to those in the hard skills-focused SEED. The Seller's (respondent) best outcome corresponds to full payment upfront (down payments equal to UGX 600 million) and a project start date in 12 months.[18] A high percentage (81.3%) of study participants in the control groups achieve agreement. Negotiation strategies employed by those in the soft SEED group did not appear to influence the likelihood of agreement; however, the strategies adopted by the hard SEED treatment group led to fewer agreements (SEED hard: 2.8 pp or 3.3%).

Only youth in the soft-skill SEED struck better/more advantageous deals for themselves, with later starting dates (26.2%, approximately 1.2 months) and higher down payments (30.2%, or approximately $28,892 which is roughly 5% of the value of the land), relative to the control group. There are no statistically significant impacts for youth who attended the hard skills treatment.

At the core of negotiation skills is **persuasion**; that is, the process of changing (without duress) a person's opinion, feelings, behaviors, or general evaluations (attitudes) toward an object, issue, or person (Cialdini, 2001). Communication, emotional intelligence, active listening, logic, and reasoning are some of the key skills for persuasion (Cialdini, 2018).[19]

During the persuasion task, the participant was asked to convince a group of hypothetical government officials who intend to distribute more land to farmers that they (i.e., the participant) should be granted more land, which, in turn, will make their business more profitable. Youth in the study were allocated one minute to make a persuasive pitch and their conversations were audio recorded. To assess the quality of the case they made, MBA students and business professionals recruited in Uganda were asked to score youth's performance during the *persuasion task*.

Youth in the soft skills treatment were more persuasive than those in the control group (see Table 5). In particular, they were more likely to be identified as convincing (1.5 pp or equivalent to 68% more convincing) and more likely to be someone whom the evaluators would hire (1.6 pp more likely to be hired, or 61%). Consistent with the results of the negotiation task, there are no significant impacts for the hard skill treatment group compared to the control group. However, we cannot reject the null of equal impacts for the two treatment groups.

6.2.2 Personality Traits and Skills: 4-year Follow-up

SEED graduates exhibited a greater ability to maintain stability and avoid disruption in emotional and social domains (*Stability*) and to engage flexibly with novelty, in both behavior and cognition (*Plasticity*),

[17] Table 2 also summarizes the Buyer's and Seller's ideal outcomes and strategies. The Buyer prefers as small a down payment as possible and for the project to start in two months. The Buyer assigns relatively higher weight to the starting date (more points) than to the financing arrangement (fewer points). The Seller prefers to a full payment of UGX 600 million up front, and a project start date in 12 months. The Seller places more weight (more points) on the financing arrangement than the starting date (fewer points).

[18] In a separate paper, we study the negotiation strategies in detail: youth in the soft treatment arm engage in lengthier conversations and provide longer arguments (as proxied by the number of words used by both Sellers and Buyers), and engage in more rounds of offers and counter-offers.

[19] Cialdini (2018) describes six principles related to persuasion: (1) Liking – people like those who like them (uncover real similarities and offer genuine praise); (2) Reciprocity – people repay in kind (give what you want to receive); (3) Social proof – people follow the lead similar to that of others (use peer power whenever it is available); (4) Consistency – people align with their clear commitments (make their commitments active, public, and voluntary); (5) Authority – people defer to experts (expose your expertise; don't assume it is self-evident); and (6) Scarcity – people want more of what they can have less of (highlight unique benefits and exclusive information).

see Table 6.[20]

SEED graduates display better *Plasticity* (0.114 sd for SEED hard; 0.138 sd for SEED soft, both significant at conventional levels, see Table A) as well as *Stability* (SEED hard: 0.142 sd; SEED soft: 0.095 sd). For both outcomes, the effects for the hard and soft curricula are not statistically distinguishable from each other. The gains in psycho-social skills extended to their ability to better handle stress, with estimated effects of 0.23 sd and 0.19 sd for hard and soft curricula, respectively.

Although the gaps in *intrapersonal skills* (as proxied by Plasticity, Stability, and Stress management skills) between the two treatments closed four years post-intervention, some important differences remained. These favored the soft skills treatment group and emerged for *self-efficacy*[21] (the belief in one's ability to perform tasks effectively, including interpersonal tasks, needed to achieve a valued goal) and *interpersonal soft skills* in the context of *task-based measures of negotiation and persuasion skills.*

6.3 Entrepreneurship: Medium and Long Run Impacts

At the 4-year follow-up, youth in our sample were in their mid-20s and a large share (63.4% of the control group) were economically active (that is, either working for someone else or self-employed). Almost half (47.3 %) of the control group ever started a business; only 27.6% owned at least one active business at the time of the survey, while 43.1% were working for someone else. In addition, approximately 52% of the sample was enrolled in post-secondary education at the time of the 4-year follow-up survey such that they juggled education and economic activities; as such, they were not active full-time in the labor market.

Against this backdrop, we first focus on business creation and performance to understand whether SEED-acquired skills and business knowledge shape entrepreneurship and business success.[22] Below, we begin by reviewing medium run impacts, followed by those after nine years, highlighting the temporal evolution of the effects.

6.3.1 Entrepreneurial History, Experience, and Performance at 4-year Follow-up

Since the end of the training, SEED graduates have engaged in entrepreneurship at higher rates and have accrued more business experience than the control group, whether proxied by number of business starts or the time they spent in entrepreneurial endeavors. They were not only more likely to ever start a business (10.2 and 10.8 pp for hard and soft treatments, respectively) relative to youth in the control group, 47.4% of whom ever started a business, but also started more businesses (SEED hard: 0.109 or 25.08% ; SEED soft: 0.136 or 31.2 %) and, were more successful in ensuring their survival (see Table7, Columns (1) and (2), and Table 8a, Column (1)). Another dimension of business experience is the length of time during which youth were running active enterprises: those in the treatment groups spent an additional 25% more (approximately

[20]The Big Five taxonomy of personality traits (Goldberg, 1993; John et al., 1991) was initially conceptualized as containing orthogonal dimensions. Recent work has revealed the presence of two higher-order personality traits: (1) *Stability, Self-Control, or Alpha* is composed of the shared variance of Emotional Stability (Neuroticism reversed), Conscientiousness, and Agreeableness; (2) *Plasticity, Engagement, or Beta* is composed of the shared variance of Extraversion and Openness/Intellect. For a review of these constructs, see De Young (2006), Hirsh et al. (2009) and the citations therein. In Appendix A, Table D.9, we report results for the individual dimensions of the Big Five.

[21]Self-efficacy beliefs determine how people feel, think, motivate themselves and behave (Bandura, 2010). Self-efficacy does not refer to one's abilities, but to how strongly one believes that one can use their own abilities to work toward goals (Latham and Locke (2007) and Bandura (2010)). Self-efficacy is not a unitary construct or trait.

[22]As a reminder, business and labor market outcomes are defined as the joint outcome of owning a business (working for someone else) and the outcome under consideration. Estimates for outcomes that are conditional on employment status (e.g., defined only for entrepreneurs and/or wage workers) would be biased and inconsistent, since they would result from conditioning on an outcome that is endogenous to treatment.

2.5 months) managing a business venture (see Table 7 Column (3)).[23]

27.6% of the control group owned one or more businesses that were active at the time of the 4-year. Youth in both treatment groups were more likely to own active enterprises (SEED hard: 4.1 pp or 16%; SEED soft: 6 pp or 22%), with no statistically significant differences between them (see Table 8a).

The nature and profiles of the firms owned by the treatment groups indicate that the intervention contributed to the formation of higher-quality entrepreneurial endeavors. Active businesses owned by youth enrolled in SEED were also more likely to have employees (SEED hard: 4.2 pp or 15.2%; SEED soft: 6 pp or 21.9%) and to be ventures with partners (SEED hard: 1.9 pp or 28.35%; SEED soft: 3.2 pp or 47.8%) relative to the control group. Most businesses at the 4-year mark tended to be informal (neither registered nor paying taxes): only 12.2% of the control group met at least one of the formality criteria, yet the program was successful in increasing formality, especially for those enrolled in the SEED soft curriculum (SEED soft: 2.3 pp or 18.7%, significant at the 5% level).

We find suggestive evidence that ventures started by the treatment groups might be better performing than those of the control group along several dimensions: revenues (SEED hard: $20.7 or 7%; SEED soft: $16.4 or 5.5%) and profits (SEED hard: $7.9 or 5.5%; SEED soft: $13.8 or 9.47%), though the estimates are not statistically significant at conventional levels (see Table 10a). It is worth noting that these estimates are a combination of intensive and extensive margins (only a third of study participants are involved in active businesses) and may as such be pulled towards zero. Moreover, many of them are part-time businesses run by full-time students. Another issues is that the measurement of business profits and sales in small firms is characterized by substantial noise (de Mel et al., 2009; Anderson et al., 2021), and precision may not be achieved even in large samples such as ours (point discussed in detail in McKenzie, 2021; McKenzie and Woodruff, 2014). McKenzie (2021)'s meta-analysis concluded that optimistic impacts of training programs on profits and revenues would range between 5 and 10% increases, a magnitude that is in line with our point estimates at the 4-year data collections. Encouragingly, we fail to reject the null that the 4-year effect sizes are statistically different from 10%.

Indirect evidence of program effectiveness can also be gleaned from improved profit margins, measured by business earnings over business revenues, for SEED participants (SEED hard: 2.0 pp or 14%; SEED soft: 3.6 pp 25.2%). Further indirect evidence as to the promise of this intervention comes from the adoption of managerial practices (see Table 11a). SEED graduates not only created higher quality businesses but also adopted better practices regarding competition (negotiating prices, visiting their competitors, or promoting their business) and business management practices (e.g., maintained business records, took financial as well as hiring/firing decisions). Overall, the program led to more frequent adoption of best practices (effect size around 0.175 sd), with similar effects when focusing on sub-indices for competition (SEED hard: 0.175 sd; SEED soft: 0.126 sd) and for management (SEED hard: 0.13 sd; SEED soft: 0.181 sd) practices.

6.3.2 Business Characteristics and Performance, 9-year Follow-up

Shifting focus to the long run, we first draw attention to some features of economic engagement among the more mature Ugandan population, in their late twenties / early thirties. At the time of the long term follow-up, nearly 80.5% of the study sample had completed post-secondary education, either university or professional certificates. Ninety percent of the control group reported participating in economic activities (against the 63.9% five years earlier), either as business owners (58.3%, nearly double the 4-year rate) or

[23] In the 9-year follow-up, we did not ask about retrospective business starts; the decision was largely driven by the need for parsimony since the data collection was implemented as a phone survey in response to the Covid pandemic.

as wage workers (55.6%, 12.4 pp higher than at the 4-year mark). According to the 2019/2020 Uganda Household Survey, the employment rates (across all age groups) in the Ugandan population are 72.3% and 54.9% for males and females, respectively. Therefore, it is not surprising that a relatively younger and higher education segment of the population would actively engage in the economy at higher rates.

The participation rates in self-employment for the treatment and control groups are very similar, around 58.3% (see Table 8b, Column (1)), with no significant differences between the treatment and control groups. Comparing these results with those of the 4-year follow-up, treatment and control groups all increased their entrepreneurship efforts, with the control group doubling its likelihood of owning at least one active business (4-year: 27.6%, 9-year: 58.3%). The expansion in self-employment is in line with the sector's prominence in Africa, including Uganda.[24]

Although the ownership gap in active businesses across treatment arms disappeared nine years after intervention, there are still important differences in terms of business quality, size, and performance. SEED participants still own higher quality enterprises: they are more likely to have (paid) employees (SEED pooled: 3.1 pp or 9.2%), and be in partnership with other entrepreneurs (SEED pooled: 2.1 pp or 21%); they also appear to be more formal, but these estimates are noisier with a p-value of 0.143 (SEED pooled: 2 pp or 6%).

The magnitudes of these 9-year effects is remarkably similar to those of the 4-year follow-up, despite the improvements in the control group between surveys. Over time, the control group was not only more likely to manage active businesses relative to the 4-year measurement (4-year: 27.6%; 9-year: 58.3%), but was also more likely to start formal businesses (4-year: 12.2%; 9-year: 33.8%), marginally more likely to have partners (4-year: 6.7%; 9-year: 10.1%), and have employees[25] (4-year: 27.4%; 9y: 33.3%). In summary, the quality of the enterprises established by the control group increased over time, yet both treatment groups preserve their quality advantage.

Nine years post intervention, given that treatment and control groups converged in terms of their extensive margin in self-employment, an even more pressing question relates to the performance, size, and profitability of SEED enterprises relative to those in the control group (intensive margin). Table 10b presents the results for business performance, as proxied by monthly revenues, profits, capital, as well as profit margin and return to capital.[26]

The business ventures of the *control group* grew significantly relative to the 4-year measurement: business revenues (4-year: \$295.78; 9-year: \$1,044.57) and profits (4-year: \$145.96; 9-year: \$472.00) nearly tripled, yet ventures in the two treatment groups outpaced this growth, expanding their edge in terms of performance (see Table 10b). First, SEED graduates reported significantly higher monthly sales volumes (SEED hard \$216.45 or 20.72%; SEED soft \$195.16 or 18.28%; Pooled \$205.26 or 19.65%)) and higher profits (SEED hard: 15.77%; SEED soft: 16.61%; Pooled: 15.97%). The program translates into \$74.46 and \$78.40 additional business earnings per month for the hard and soft skills treatment groups, respectively. We still fail to reject the null that the two curricula delivered identical treatment effects. Compared to the medium run (four years), pooling across SEED hard and SEED soft treatment arms, the program impacts on business profits increased more than seven-fold: \$10.08 at the 4-year mark vs. \$75.40 five years later.

[24] In the 9-year survey, we did not ask about retrospective business starts; the decision was largely driven by the need for parsimony since the 9-year survey was implemented as a phone survey in response to the Covid pandemic.

[25] The 4-year survey did not distinguish between paid and non-paid employees. The 9-year survey asked solely about paid employees.

[26] All financial and monetary amounts are expressed in 2021 PPP adjusted US dollars in order to ensure comparability across surveys.

While no significant impacts on profit margins and capital,[27] SEED led to higher returns to capital investments (SEED hard: 13.8%, SEED soft: 13.8%; SEED Pooled: 13.5%).[28]

It is important to note that the financial and quality edge associated with the SEED intervention is not explained by a differential maturity/age of the businesses owned by the treatment group. Although those in the treatment group did start more businesses and owned more active businesses at the 4-year mark, their active businesses after 9 years are relatively new enterprises, with a median age (across firms owned by the same individual) of 21 months for all assignment groups (see Table 8b).[29] This fact renders the comparison of business performance and quality even more meaningful and corroborates the theory that entrepreneurship is a process of trial and error / learning-by-doing, which imparts skills and learning that are valuable in subsequent endeavors (Manso, 2016; Thompson, 2010).

In the context of these relatively young businesses, the treatment groups continue to adopt better business practices (relative to the control group) along all dimensions considered – competition and business management (see Table 11a). They also seem more open to innovation and rely on more modern technologies, as proxied by fintech adoption (i.e., use of mobile money as a form of payment or to pay employees) and other use of technology (i.e., digital records and reliance on IT solutions to run their businesses). Effect sizes are around 0.1 sd for all management practices and are statistically identical across treatment groups.

Taken together, these findings demonstrate that SEED training was successful in jump-starting youth's human capital (soft and hard skills) to set them on higher earnings trajectories and expanded income opportunities. Moreover, the program contributed to the creation of vibrant ventures employing better practices and adopting technology solutions at higher rates, with SEED graduates behaving like *transformational/opportunity entrepreneurs* (as in Schoar, 2010; Ardagna and Lusardi, 2010): that is, they were more successful in creating dynamic firms that expanded beyond the scope of an individual's subsistence needs.

6.4 Spillovers: Education Investment and Labor Market Outcomes

Labor Market. So far, we have shown how, four years post intervention, SEED graduates demonstrated better hard skills knowledge, soft skills, and personality traits to succeed as entrepreneurs. They are also more likely to start businesses that survive over time and higher-quality ventures. A complementary set of outcomes pertains to the extent to which upgrades in entrepreneurial mindset and skills are rewarded in the traditional job (wage) market, which employs 43.2% and 55.6% of the control group at the 4 and 9 year follow-ups, respectively (see Tables 12a and 12b).

At the time of the *4-year survey*, not only were the hard and soft treatment groups more likely to own an active business, but they were also economically active at higher rates, with hard and soft skill treatment groups participating at 4.9 pp (7.6%) and 3.8 pp (5.9%) higher rates than the control group, respectively. Furthermore, SEED graduates were more likely to be contemporaneously self-employed and work for someone else (SEED hard: 2.4 pp; SEED soft: 2.5 pp), but just as likely to be wage workers than their counterparts in the control group . The attenuated impacts on the extensive margin of labor market participation were accompanied by insignificant wage earnings effects for the soft skill curriculum and roughly 10% higher wage

[27] Although those in the treatment group are more likely to own capital–not reported here.

[28] Survey questions regarding business capital were modified between the 4-year and 9-year follow-ups. The 4-year survey question was: *What is the approximate total cash value of all machines, equipment, supplies, land, and tools that you own for your business? In other words, if you were to sell everything that helps you run your business right now, how much would you get for it? You can provide an estimate.* The 9-year survey question was: *What is the resale value of equipment, land, and building (used in the operation of the business)?.*

[29] We fail to detect any differences in the minimum/youngest (18.6 months) and maximum/oldest (23.2 months) age of active businesses owned by a given individual.

earnings for those in the hard curriculum.

Five years later (*9-year survey*), participation in the wage sector expanded to 55.6% for the control group (a 12 pp increase), a more modest growth compared to the growth in self-employment (4-year: 27.6%; 9-year: 58.3%). Despite this growth and in line with the medium run results, the two SEED curricula did not lead to gains in terms of participation in the labor market, nor in wage earnings (see Tables 12b). The effects on the extensive margin of labor market participation are statistically insignificant, but there is a significant impact on wage earnings for the hard SEED treatment (SEED hard: $42.96 or 9.4%, SEED soft: $27.01 or 6%). Treatment and control groups are also equally likely to work for someone else, as well as to jointly be self-employed and work for someone else.

Education. As noted earlier, expressions of interest in the SEED program took place in October 2012, the month prior to their final examinations of upper secondary (S6), as did the baseline survey, and the mini MBAs were delivered in May 2013, when most of the students had already made decisions about tertiary education. Approximately 70% of study participants at baseline stated that they had plans to attend university. As such, we should not expect the intervention to shape investments in higher education. This expectation is corroborated by Table D.10, in the Appendix. SEED participants and their control group counterparts were equally likely to be enrolled in post-secondary school at the 4-year follow-up (52% of the study sample was enrolled in post-secondary); they were also equally likely to have attended some post-secondary (78.8%) or completed post-secondary education (72.6%) at the time of the 9-year follow-up.[30] These null effects serve to dispel concerns that the program may have adversely affected investments in human capital by drawing youth away from post-secondary education.

7 Costs and Benefits

Cost analysis falls into two broad categories: Cost-Benefit Analysis and Cost Effectiveness. CE captures the amount of "effect" a program achieves on a given outcome for a given cost, while cost-benefit analysis combines all the different costs and benefits of a program into a single scale (usually a monetary metric) and reports the ratio of combined benefits to combined costs (Dhaliwal et al., 2012).

The conservative measure of benefits that we consider in this section is monthly business earnings four and nine years after intervention. This is a conservative measure, since it abstracts from other benefits, including any impacts on mental well-being or those resulting from job creation or from possible social spillovers, all of which are difficult to monetize. However, the non-monetary benefits of such skills training programs – and of SEED training, in particular – can be quite sizable.[31] A medium run evaluation of another secondary school social leadership intervention carried out by Educate!, our implementing partner for SEED, suggests even greater nonmonetary impacts.[32]

The research and evaluation team was directly involved in the implementation and supervision of the SEED program; as such, we have access to detailed information on intervention costs. Total intervention costs were estimated at $160.14 per student (expressed in 2021 USD, in order to be comparable to the earnings figures).[33] To put this figure into perspective, based on McKenzie (2021)'s random effects meta-analysis,

[30] At the 4-year survey, 63.9% of control group participants were engaged in an economic activity. 80% of inactive youth in the control group were in school, and 7.32% were looking for a job.

[31] SEED graduates report being more satisfied with their quality of life (0.16 sd and 0.17 sd for hard- and soft-skills treatments, respectively); as documented earlier, they also report less stress.

[32] The Educate! program generated substantial social spillovers along several dimensions: delayed family formation, lower incidence of risky behaviors, shifts in gender-related social norms, and reductions in intimate partner violence.

[33] Total costs included salaries and benefits for trained teachers (10%), curriculum development and testing (2%), teacher

traditional (hard skills only) training programs yield positive average effects on both profits (10.1%) and sales (4.6%). The costs of these programs range from $400 to $12,242 for a class of 20, with an average of $3,537, or $177 per participant. For a firm earning $100 a month, a 10% increase in profits would recover the $177 cost of a training within 18 months (McKenzie et al., 2020).

Campos et al. (2017)'s personal initiative training, which is more directly comparable to the SEED curricula, cost $756 per invited participant and yielded a $60-per-month increase in monthly profits during the first two years. At the 9-year follow-up, SEED graduates earn an additional $74.457 (hard) and $78.402 (soft) per month relative to the control group. Between the 4- and 9-year follow-ups, the implied annual growth rates of effect sizes are 56.68% and 41.51% for the hard and soft skills groups, respectively (see Table: 16). Nine years after the intervention, the control group would need to work 2 additional months annually to match the yearly earnings of the treatment groups. For both the 4-year and the 9-year results, we fail to reject the null that the two curricula yielded the same business earnings impacts.

To further quantify the added profits generated by SEED beneficiaries, we calculate the *present discounted value, (PDV)* of the extra business earnings associated to the two SEED curricula. Consistent with similar calculations, we adopt a 10% discount rate.[34] In order to compute the PDV, we need to also make assumptions about the temporal evolution of SEED's effects on profits, our proxy of benefits for those periods during which we do not measure program impacts; i.e., before the 4-year and after the 9-year follow-ups, and between the two follow-ups.

Duflo et al. (2024), studying the impact of secondary school subsidies in Ghana, model the first-generation labor market benefits as a stream of income starting at age 31 and persisting for the remainder of study participants' working lives (34 years). Here, we consider two scenarios that are much more conservative with respect to the period over which benefits accrue.

In the first scenario, we assume that the program benefits (i) did not emerge until year four (the medium run follow-up), and (ii) will not continue beyond year nine. We further assume that effect sizes between years four and nine grow at a constant annual rate calculated in Table: 16. Under this set of assumptions, the present discounted values of the hard, soft, and pooled SEEDs are $PDV_{hard} = \$1,119.52$, $PDV_{soft} = \$1,396.57$ and $PDV_{pooled} = \$1,221.43$, respectively. That is, the program delivered a return on investment between 6.9x and 8.7x. To put these figures into perspective, the median annual income in Uganda is around $800. Taking into account only the returns between years 4 and 9, the program delivered nearly 1.52 extra years of (median) income in a 5 year span. If instead we assume that no benefits emerge until year four and year nine benefits last until year 15 and disappear thereafter, SEED's additional business earnings would yield a return on investment of 18.0x and a present discount value of $PDV_{pooled} = \$2,892.67$, in 2021 USD.

8 Concluding Remarks

In this paper, we study the medium-term impacts of SEED, which was implemented at-scale in Uganda. SEED is an innovative in-residence 3-week mini-MBA modeled after western business school curricula. The program featured two separate treatments, with the hard skills MBA featuring a mix of approximately 75% hard skills and 25% soft skills and the soft skills curriculum having the reverse mix.

recruitment and training (4%), site management staff costs (4%), venue, transport, meal, staff plus other students costs (67%), training materials and supplies (5%), supervision and support to teachers (2%), and administration country office (5%).

[34] An annual discount rate of 10% is consistent with the median interest rate in Uganda during the 2013-2021 period. A comparable interest rate was also employed by Hamory et al. (2021) during 1998–2018 in Kenya for a similar calculation. The authors deemed 10% a conservative rate since other potential funders (e.g., international donors) would face lower rates.

SEED training was successful not only in jump-starting youth' human capital accumulation (both soft and hard skills), but also in setting them on higher earnings trajectories and expanding their economic opportunities. In particular, without sacrificing their educational investment, youth in the treatment groups started their economic lives (as proxied by the economic activity rate in the 4-year survey) earlier and engaged in both the wage and self-employment sectors at higher rates. In terms of entrepreneurial endeavors, they are more likely to establish new ventures and own more businesses. In the long run (9-year follow-up), treatment and control groups converge on the extensive margin of economic participation in either the wage sector or self-employment; however, SEED graduates continue to run higher quality firms (i.e., formality, number of employees, business partners), that are larger in scale and more profitable (intensive margin). These patterns suggest that the earlier onset of entrepreneurship allowed SEED youth to experiment more, which in turn led to better long term business performance. These results are consistent with the idea that entrepreneurship is a process of trial-and-error and learning-by-doing.[35] More recent work suggests entrepreneurial experience as a key factor explaining higher returns on credit and firm performance (Banerjee et al., 2021). However, entrepreneurship is a learning process that imparts skills that are valuable in subsequent businesses. Experience per se is not sufficient; the ability to learn and do so efficiently are also paramount (Lafontaine and Shaw, 2016; Thompson, 2010; Rosen, 1972). SEED may have endowed youth with better "learning" skills and allowed them to take advantage of their early business starts.

Our results indicate that SEED graduates behave like *transformational / opportunity entrepreneurs* (as in Schoar, 2010). The intervention was highly cost-effective and compares favorably with existing training alternatives that tend to be more expensive and often yield lower benefits.

Two critical program features support SEED's effectiveness. First, SEED was designed and implemented as a high quality intervention. The curricula were informed by rigorous evidence from the economic and psychology literatures, which have been able to identify which skills/personality traits matter in shaping top performing entrepreneurs. Furthermore, instructors received extensive and premium training on teaching methods, as well as on soft and hard skills knowledge. Implicitly, our results corroborate the proposition that first-rate teacher and youth trainings can be delivered at relatively low costs.

Second, SEED targeted youth at the end of secondary school, which is earlier in life than traditional training interventions. This critical age and developmental stage has garnered increasing attention. The period of adolescence through the mid-20s represents a critical stage of brain development, featuring significant degrees of plasticity in those areas of the brain that are responsible for the regulation of automatic or instinctive reactions, risk-taking behavior, self-control, reflective reasoning, communication, among others. In fact, research increasingly points to youth as the key phase during which those skills that are at the core of transformational entrepreneurship can be shaped.

It is also worth highlighting that youth in our study are positively selected: not only were they in their last year of secondary school, but the majority also planned to attend university, both of which correlate with higher ability. Furthermore, our population is self-selected for high interest and motivation in learning entrepreneurship.

The larger effects for individuals with higher potential are consistent with the calls for better targeting emerging from recent work. The lack of significant effects for business training or workforce programs has

[35] Manso (2016) documents patterns that are consistent with entrepreneurship as experimentation: entrepreneurship spells are short; the probability of abandoning entrepreneurship is higher after poor performance. Kerr et al. (2014) argue that entrepreneurship is fundamentally about experimentation because the knowledge required to be successful cannot be known in advance. These ideas can be traced back to Arrow (1969) and Schumpeter (1911). Arrow associates innovation with the production of knowledge through experimentation. Experimentation by new firms underlies Schumpeter's notion of creative destruction.

led some authors to examine impact heterogeneity and conclude that more careful targeting of businesses and/or youth could improve the impacts of these programs and mitigate unintended consequences (e.g., Blimpo and Pugatch, 2023; Bertrand et al., 2021, and citations therein). The efficacy of SEED for youth with lower levels of education/ability remains untested and is an avenue that we plan to explore in future work.

Several important questions remain, especially regarding the temporal evolution of SEED's impacts. As McKenzie and Woodruff (2017) points out, most of the existing literature on business training does not examine the effects of training at different points in time. The few exceptions indicate that some effects disappear in the longer term (e.g., Blattman, Fiala and Martinez, 2020; Blattman, Dercon and Franklin, 2019), however, in some instances, impacts may reemerge over the life cycle (Fiala et al., 2023). Furthermore, while SEED explicitly features soft skills (with two distinct intensities) as one of the centerpieces of its curriculum, we only observe differences between the two treatment arms for interpersonal skills and self-efficacy, but no overall statistical differences for economic outcomes. Will these patterns persist, or are returns to interpersonal skills just slower to emerge?

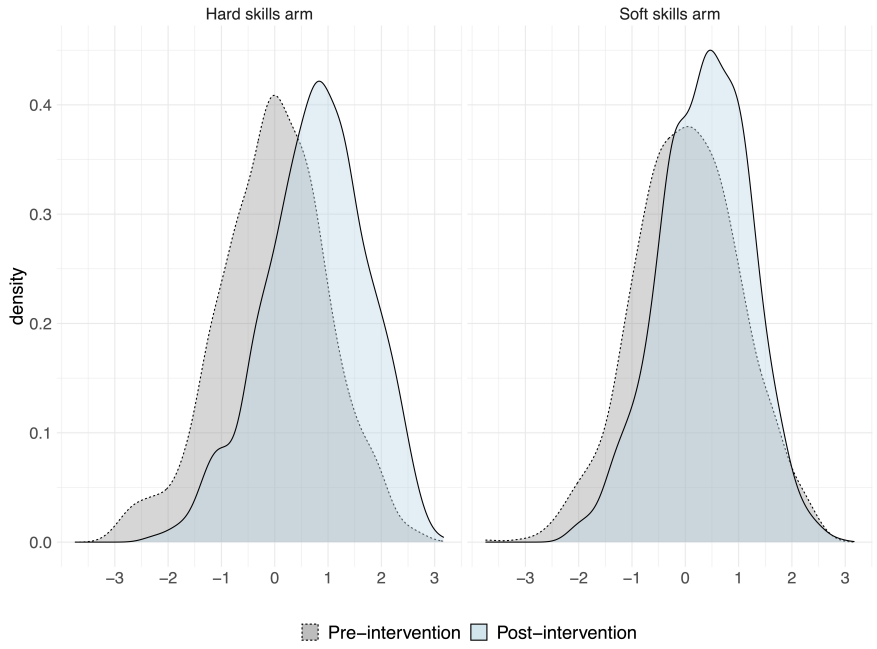
SEED-like interventions call for future research to gain insight into their optimal timing (how late or how early can these skills be taught?), into their complementarities with other initiatives (e.g., start-up capital, digital skills), and into potential social spillovers of these skills on noneconomic outcomes (e.g., gender empowerment).

Between 2010 and 2030, global labor markets will need to generate roughly three quarters of a billion new jobs (Bloom et al., 2018), an especially daunting task in light of growing young populations and often underperforming education systems – themselves under additional stress during the recent pandemic. As noted by Blimpo and Pugatch (2023) and Sumberg et al. (2021), entrepreneurship is becoming a necessity in developing countries and is called upon to play a dual role: promoting growth and absorbing a persistently high share of employment. As a result, training programs designed to "make" transformational entrepreneurs capable of generating positive ripple effects for the economy are critical investments to face this development challenge.

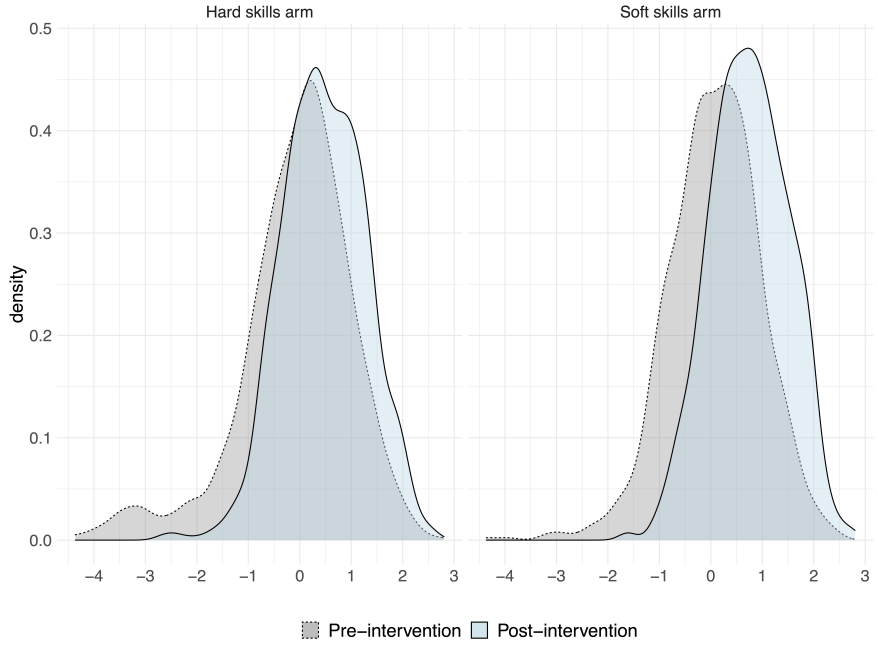
A Tables: Skills and Personality Traits - 4y Follow-up

Figure 3: Pre- and Post-Training Knowledge Assessments, by Treatment Arm

(a) Hard Skills Knowledge Test Scores (z-score)



(b) Soft Skills Knowledge Test Scores (z-score)



Note: Test scores on hard and soft skills assessments for the two treatment groups are standardized with respect to each treatment arm's mean and standard deviation of pre-training test scores.

Table 3: Post-Training Knowledge Test Scores

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Hard Skills Assessment (sd)				Soft Skills Assessment (sd)			
Soft Skills Treatment								
β	**-0.40*** **	**-0.43*** **	**-0.42*** **	**-0.41*** **	**0.28*** **	**0.25*** **	**0.26*** **	**0.28*** **
se	0.041	0.035	0.033	0.024	0.035	0.034	0.032	0.023
Mean of Hard Skills Group	**0.761**				**0.465**			
Observations	1959	1959	1959	1959	1959	1959	1959	1959
Pre-training Knowledge score	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Student characteristics	No	No	Yes	Yes	No	No	Yes	Yes
DML	No	No	No	Yes	No	No	No	Yes

Note: The sample is restricted only to SEED participants. The table reports estimates from regressions of test scores of hard (soft) skills knowledge on a dummy variable for the soft SEED group and a constant. Test scores for the hard and soft skills assessments post intervention are standardized with respect to knowledge assessment test scores performed prior to training. The mean of the hard skills group corresponds to the average post-training test score for youth in the hard skill treatment. All specifications are OLS regressions, with the exception of columns (4) and (8) report DML (Chernozhukov et al., 2018) estimates.

A.1 Hard and Soft Skills: 4y follow-up

Table 4: Knowledge Hard Skills, 4y Follow-up

		(1)	(2)	(3)	(4)	(5)	(6)
		Hard Skills Knowledge Index	Generating Business Ideas	Effects of Competition	Cost Categorization	Utility of Record Keeping	Profit/Loss Statement
Hard skills	β	**0.116*** **	**0.117*** **	**0.061***	**0.129*** **	**0.029**	**-0.015**
	se	[0.040]	[0.041]	[0.041]	[0.041]	[0.041]	[0.041]
	p-value	0.002	0.002	0.066	0.001	0.237	0.643
Soft skills	β	**0.103*** **	**0.130*** **	**0.138*** **	**0.064***	**-0.009**	**0.012**
	se	[0.041]	[0.041]	[0.041]	[0.041]	[0.041]	[0.041]
	p-value	0.006	0.001	0.000	0.059	0.587	0.386
Mean control group		0.000	0.000	0.000	0.000	0.000	0.000
p-value Hard skills = Soft skills		0.817	0.830	0.181	0.256	0.507	0.643
Observations		3890	3890	3890	3890	3890	3890

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors across splits are calculated with the median method as in Chernozhukov et al. (2018).

Table 5: Task-Based Measures: Negotiation and Persuasion, 4y Follow-up

		(1)	(2)	(3)	(4)	(5)	(6)
		Negotiation			**Persuasion**		
		Agreement Final Offer	Agreement down payment (million)	Agreement start date (months)	How convincing	Would like to hire	Negotiation & Persuasion Index
Hard skills	β	**-0.028***	**0.021**	**0.036**	**0.007**	**0.003**	**0.012**
	se	[0.017]	[0.019]	[0.033]	[0.006]	[0.007]	[0.043]
	p-value	0.095	0.275	0.282	0.127	0.317	0.392
Soft skills	β	**-0.024**	**0.043****	**0.078****	**0.015****	**0.016****	**0.079****
	se	[0.017]	[0.018]	[0.032]	[0.007]	[0.008]	[0.043]
	p-value	0.163	0.019	0.016	0.017	0.019	0.033
Mean control group		0.813	375	4.674	0.022	0.026	0.000
p-value Hard skills = Soft skills		0.849	0.225	0.203	0.453	0.224	0.267
Observations		3,701	3,701	3,701	3,716	3,716	3,560

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors across splits are calculated with the median method across splits as in Chernozhukov et al. (2018). Outcomes in columns (1), (4) and (5) are dichotomous variables. Negotiation outcome, in Column(3) and (4), are weekly positive and were estimated with Poisson with double selection (Lasso) as in Belloni et al. (2016), the DoubleML package to generalized linear models.

Table 6: Soft Skills / Personality Traits, 4y Follow-up

		(1)	(2)	(3)	(4)	(5)
		Plasticity	Stability	Self-efficacy	Stress	Soft Skills Index
Hard skills	β	**0.114*****	**0.142*****	**0.040**	**-0.226*****	**0.222*****
	se	[0.039]	[0.039]	[0.040]	[0.039]	[0.039]
	p-value	0.002	0.000	0.157	0.000	0.000
Soft skills	β	**0.138*****	**0.095*****	**0.079****	**-0.191*****	**0.205*****
	se	[0.039]	[0.040]	[0.040]	[0.040]	[0.039]
	p-value	0.000	0.008	0.023	0.000	0.000
Mean control group		0.000	0.000	0.000	0.000	0.000
p-value Hard skills = Soft skills		0.666	0.398	0.484	0.525	0.752
Observations		3890	3890	3890	3890	3890

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors across splits are calculated with the median method, as in Chernozhukov et al. (2018). Plasticity and Stability correspond to the Big Five meta-traits: Stability combines Emotional Stability, Agreeableness, and Conscientiousness; Plasticity combines Extraversion and Openness. All Dependent variables are normalized with respect to the mean and standard deviation of the control group. Column (5) is an Anderson (2008)-style index, whose components are columns (1)-(4).

B Tables: Economic Outcomes 4- and 9-year Follow-ups

Table 7: Entrepreneurial History and Experience, 4y Follow-up

		(1)	(2)	(3)
		Ever Started a Business	Number of Business Starts	Cumulative Number of Months Running a Business
Hard skills	β	**0.102*** **	**0.109*** **	**2.561*** **
	se	[0.020]	[0.035]	[0.628]
	p-value	0.000	0.001	0.000
Soft skills	β	**0.108*** **	**0.136*** **	**2.544*** **
	se	[0.020]	[0.035]	[0.616]
	p-value	0.000	0.000	0.000
Pooled	β	**0.104*** **	**0.121*** **	**2.546*** **
	se	[0.018]	[0.031]	[0.552]
	p-value	0.000	0.000	0.000
Mean control group		0.474	0.434	9.790
p-value Hard skills = Soft skills		0.815	0.598	0.985
Observations		3,890	3,890	3,890

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors are calculated with the median method across splits as in Chernozhukov et al. (2018). In the 9-year survey, the questions about retrospective business starts and experience were not asked out of a need for parsimony, since it was implemented as a phone survey in response to the Covid pandemic.

Table 8: Active Businesses and their Characteristics

(a) Active Business: Characteristics, 4y Follow-up

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Active Business	Number of Active Businesses	Median Age (months)	Formal Business	Have Partners	Have Employees	Business Quality Index
Hard skills	β	**0.041****	**0.056*****	**1.590*****	**0.007**	**0.019****	**0.042****	**0.055**
	se	[0.019]	[0.021]	[0433]	[0.014]	[0.011]	[0.018]	[0.043]
	p-value	0.013	0.005	0.000	0.312	0.040	0.012	0.101
Soft skills	β	**0.060*****	**0.071*****	**1.533*****	**0.023****	**0.032*****	**0.060*****	**0.116*****
	se	[0.019]	[0.021]	[0.428]	[0.014]	[0.011]	[0.019]	[0.044]
	p-value	0.001	0.000	0.000	0.048	0.002	0.001	0.004
Pooled	β	**0.050*****	**0.063*****	**1.552*****	**0.015**	**0.025*****	**0.050*****	**0.084****
	se	[0.016]	[0.019]	[0.382]	[0.012]	[0.010]	[0.016]	[0.038]
	p-value	0.001	0.000	0.000	0.113	0.004	0.001	0.013
Mean control group		0.276	0.298	6.733	0.122	0.067	0.274	0.000
p-value Hard skills = Soft skills		0.479	0.604	0.925	0.396	0.413	0.498	0.320
Observations		3,890	3,890	3,890	3,890	3,890	3,890	3,890

(b) Active Business: Characteristics, 9y Follow-up

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Active Business	Number of Active Businesses	Median Age (months)	Formal Business	Have Partners	Have Paid Employees	Business Quality Index
Hard skills	β	**0.019**	**0.049***	**0.077**	**0.025**	**0.017**	**0.040****	**0.090****
	se	[0.022]	[0.032]	[1.229]	[0.021]	[0.014]	[0.021]	[0.045]
	p-value	0.193	0.062	0.475	0.120	0.106	0.028	0.023
Soft skills	β	**-0.002**	**0.031**	**-0.109**	**0.016**	**0.024****	**0.024**	**0.077****
	se	[0.022]	[0.032]	[1.278]	[0.021]	[0.014]	[0.021]	[0.045]
	p-value	0.535	0.165	0.534	0.229	0.044	0.122	0.046
Pooled	β	**0.008**	**0.039***	**-0.015**	**0.020**	**0.021****	**0.031****	**0.083****
	se	[0.019]	[0.028]	[1.120]	[0.019]	[0.012]	[0.018]	[0.040]
	p-value	0.334	0.086	0.506	0.143	0.047	0.045	0.019
Mean control group		0.583	0.720	21.116	0.338	0.101	0.333	0.000
p-value Hard skills = Soft skills		0.501	0.699	0.916	0.762	0.740	0.599	0.8319
Observations		3,396	3,396	3,396	3,396	3,396	3,396	3,396

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors are calculated with the median method across splits as in Chernozhukov et al. (2018). p-values are one-sided. The dependent variable in column (1) is an indicator for whether subject i owns an active business, those in columns (4)-(6) are dichotomous. Outcomes in columns (2)-(6) are not conditional on employment status; they are defined as the joint outcome of owning a business and the relevant dichotomous variable. A formal business is one that is either registered or paying taxes; an employee in the 9y follow-up survey was defined as a salaried employee, while in the 4y survey, we cannot distinguish between salaried and and non-salaried employees.

Table 9: Business Sector, an Overview

(a) Business Sector, 4y Follow-up

Own (Active) Business, Sector Distribution (%)	Full Sample	Control	Hard Skills	Soft Skills
Retail and Food Services (Baking, Cooking, Catering, Waiting)	52.9	54.8	51.6	53.1
Food Production (Crops, Livestock, Fishing, Bee-keeping)	27.5	27.9	28.3	26.4
General Services (Security, Barbering/Cosmetology, Transportation, Janitorial)	6.8	5.2	6.8	7.7
Skilled Services (Administration/Financial, and Art/Science/Education)	5.3	3.9	4.9	6.5
Manufacturing, Construction, Repair Services	5.4	6.6	6.1	4.0
Other, Specify	2.2	1.6	2.3	2.3
Number of Businesses	1,339	305	512	522

(b) Business Sectors, 9y Follow-up

Own Business, Sector Distribution (%)	Full Sample	Control	Hard Skills	Soft Skills
Retail and Food Services (Baking, Cooking, Catering, Waiting)	44.65	42.58	44.64	46.05
Food Production (Crops, Livestock, Fishing, Bee-keeping)	34.27	34.03	35.57	33.08
General Services (Security, Barbering/Cosmetology, Transportation, Janitorial)	7.20	8.87	6.39	6.92
Skilled Services ((Administration/Financial, and Art/Science/Education)	9.18	8.87	9.07	9.51
Manufacturing, Construction, Repair Services	3.74	4.52	3.61	3.35
Other, Specify	0.95	1.13	0.72	1.08
Number of Businesses	2,515	620	970	925

Table 10: Business Performance and Business (Monthly) Earnings

(a) Business Performance and Earnings, 4y Follow-up

		(1)	(2)	(3)	(4)	(5)
		Business Revenue	Business Profits	Profit Margin	Capital	Return to Capital
Hard skills	β	**20.682**	**7.885**	**0.020*** **	**-128.548**	**-2.172**
	se	[39.076]	[19.297]	[0.011]	[125.668]	[1.509]
	p-value	0.298	0.341	0.000	0.847	0.925
Soft skills	β	**16.388**	**13.816**	**0.036*** **	**-76.730**	**-1.075**
	se	[38.473]	[19.329]	[0.012]	[124.959]	[1.717]
	p-value	0.335	0.237	0.000	0.730	0.734
Pooled	β	**16.950**	**10.085**	**0.027*** **	**-102.175**	**-1.467**
	se	[34.810]	[17.242]	[0.010]	[113.863]	[1.482]
	p-value	0.313	0.279	0.000	0.815	0.839
Mean control group		295.781	145.959	0.143	760.729	4.449
p-value Hard skills = Soft skills		0.938	0.828	0.318	0.770	0.631
Observations		3,890	3,890	3,890	3,890	3,890

(b) Business Performance and Earnings, 9y Follow-up

		(1)	(2)	(3)	(4)	(5)
		Business Revenue	Business Profits	Profit Margin	Capital	Return to Capital
Hard skills	β	**216.446****	**74.457***	**-0.002**	**457.653**	**0.138****
	se	[111.916]	[50.566]	[0.021]	[482.653]	[0.079]
	p-value	0.027	0.070	0.539	0.172	0.040
Soft skills	β	**195.164****	**78.402***	**-0.017**	**160.197**	**0.138****
	se	[113.365]	[52.140]	[0.0228]	[478.298]	[0.070]
	p-value	0.043	0.066	0.768	0.369	0.024
Pooled	β	**205.264****	**75.401****	**-0.011**	**309.189**	**0.135*****
	se	[98.953]	[45.348]	[0.020]	[423.235]	[0.056]
	p-value	0.019	0.048	0.714	0.2325	0.008
Mean control group		1,044.574	472.003	0.295	3,231.389	0.154
p-value Hard skills = Soft skills		0.894	0.957	0.636	0.662	1.000
Observations		3,396	3,396	3,396	3,396	3,396

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors are calculated with the median method across splits as in Chernozhukov et al. (2018). p-values are one-sided. All variables except Return to Capital, column (5), are expressed in 2021 PPP adjusted US dollars. Outcomes in all columns are not conditional on employment status; they are defined as the joint outcome of owning a business and the relevant variables. Variables are winsorized at the 97th percentile with respect to their distribution conditional on employment status. Survey questions to capture business capital were modified between the 4y and 9y follow-ups. The 4-year survey question was: *What is the approximate total cash value of all machines, equipment, supplies, land, and tools that you own for your business?*. The 9-year survey question was: *What is the resale value of equipment, land, and building (used in the operation of the business)?*.

Table 11: Management Practices

(a) Management Practices, 4y

		(1)	(2)	(3)	(4)	(5)
		Aggregate Management Index	Competition Practices	Business Management	Fintech Adoption	Technology Adoption
Hard skills	β	**0.175*** **	**0.175*** **	**0.130*** **		
	se	[0.042]	[0.043]	[0.040]		
	p-value	0.000	0.000	0.001		
Soft skills	β	**0.179*** **	**0.126*** **	**0.181*** **		
	se	[0.041]	[0.042]	[0.040]		
	p-value	0.000	0.001	0.000		
Pooled	β	**0.175*** **	**0.149*** **	**0.155*** **		
	se	[0.037]	[0.037]	[0.036]		
	p-value	0.000	0.000	0.000		
Mean control group		0.000	0.000	0.000		
p-value Hard skills = Soft skills		0.948	0.410	0.369		
Observations		3,890	3,890	3,890		

(b) Management Practices, 9y

		(1)	(2)	(3)	(4)	(5)
		Aggregate Management Index	Competition Practices	Business Management	Fintech Adoption	Technology Adoption
Hard skills	β	**0.127*** **	**0.105*** **	**0.102*** **	**0.099** **	**0.099** **
	se	[0.044]	[0.043]	[0.043]	[0.044]	[0.045]
	p-value	0.002	0.008	0.009	0.012	0.014
Soft skills	β	**0.085** **	**0.080** **	**0.060***	**0.073** **	**0.080** **
	se	[0.044]	[0.044]	[0.043]	[0.044]	[0.045]
	p-value	0.027	0.035	0.082	0.050	0.037
Pooled	β	**0.106*** **	**0.093*** **	**0.082** **	**0.088** **	**0.089** **
	se	[0.039]	[0.039]	[0.039]	[0.039]	[0.040]
	p-value	0.003	0.009	0.018	0.013	0.013
Mean control group		0.000	0.000	0.000	0.000	0.000
p-value Hard skills = Soft skills		0.500	0.681	0.501	0.672	0.775
Observations		3,396	3,396	3,396	3,396	3,396

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors are calculated with the median method across splits as in Chernozhukov et al. (2018). Outcomes in columns (1)-(5) are Anderson (2008)-style indexes. The *Aggregate Management Index* combines yes/no answers for managerial practices spanning the following dimensions: competition, business management, fintech, and technology adoption. Competition practices capture whether respondents visit competitors, advertise their businesses, negotiate with suppliers, compare quality and prices of goods/services across suppliers; *Business management* combines answers relating to whether respondents keep business records, are in charge of businesses' financial and HR decisions (hiring/firing); *Fintech Adoption* captures the reliance for business purposes on digital payments and mobile money in conjunction with business technology to handle business transactions (receive payments, paying employees, suppliers, loans, taxes); *Technology Adoption* includes responses as to whether respondents used any IT solutions to manage the business and whether they kept digital financial records. Fintech and tech Adoption questions were asked only in the 9-year survey.

Table 12: Labor Market and Wage (Monthly) Earnings

(a) Economic Participation: Employment Status and Wage Earnings, 4y Follow-up

		(1)	(2)	(3)	(4)
		Economically Active	Wage Worker	Wage worker and Self-employed	Wage Earnings (wins. p97)
Hard skills	β	**0.049*** **	**0.031***	**0.024****	**10.993***
	se	[0.019]	[0.020]	[0.011]	[8.242]
	p-value	0.006	0.066	0.015	0.09
Soft skills	β	**0.038****	**0.004**	**0.025****	**-6.414**
	se	[0.019]	[0.020]	[0.011]	[7.863]
	p-value	0.024	0.426	0.014	0.793
Pooled	β	**0.043*** **	**0.017**	**0.024*** **	**2.356**
	se	[0.017]	[0.018]	[0.010]	[7.124]
	p-value	0.006	0.170	0.007	0.370
Mean control group		0.639	0.432	0.069	108.585
p-value Hard skills = Soft skills		0.702	0.353	0.967	0.1265
Observations		3,890	3,890	3,890	3,890

(b) Economic Participation: Employment Status and Wage Earnings, 9y Follow-up

		(1)	(2)	(3)	(4)
		Economically Active	Wage Worker	Wage worker and Self-employed	Wage Earnings (wins. p97)
Hard skills	β	**0.003**	**0.002**	**0.018**	**42.964***
	se	[0.013]	[0.022]	[0.019]	[33.074]
	p-value	0.420	0.469	0.170	0.097
Soft skills	β	**-0.008**	**0.012**	**0.018**	**27.013**
	se	[0.013]	[0.022]	[0.019]	[32.764]
	p-value	0.732	0.296	0.164	0.205
Pooled	β	**-0.002**	**0.008**	**0.018**	**35.471**
	se	[0.012]	[0.020]	[0.016]	[29.060]
	p-value	0.584	0.347	0.137	0.111
Mean control group		0.904	0.556	0.235	456.258
p-value Hard skills = Soft skills		0.559	0.744	0.984	0.732
Observations		3,396	3,396	3,396	3,396

Note: Results in columns (1) to (4) are based on DML (K-fold=5, Splits=100); point estimates and standard errors are calculated with the median method across splits as in Chernozhukov et al. (2018). Results in column (5) are estimated using cross-fitting partialling out as described in Chernozhukov et al. (2018). p-values are one-sided. All variables are in levels. Wage earnings are expressed in 2021 PPP-adjusted US dollars. The outcome in column (4) is not conditional on employment status and is defined as the joint outcome of working for someone else and wage earnings.

Table 13: Summary (Monthly) Earnings: Medium and Long Run

(a) Earnings, 4y Follow-up

		(1)	(2)	(3)
		Total Earnings (wins. p97)	Business Profits (wins. p97)	Wage Earnings (wins. p97)
Hard skills	β	**23.278**	**7.885**	**10.993***
	se	[29.806]	[19.297]	[8.242]
	p-value	0.217	0.341	0.091
Soft skills	β	**-14.428**	**13.816**	**-6.414**
	se	[29.358]	[19.329]	[7.863]
	p-value	0.312	0.237	0.793
Pooled	β	**3.963**	**10.085**	**2.356**
	se	[26.404]	[17.242]	[7.124]
	p-value	0.440	0.279	0.370
Mean control group (USD PPP adjusted)		482.135	145.959	108.585
p-value Hard skills = Soft skills		0.367	0.828	0.127
Observations		3,890	3,890	3,890

(b) Earnings, 9y Follow-up

		(1)	(2)	(3)
		Total Earnings (wins. p97)	Business Profits (wins. p97)	Wage Earnings (wins. p97)
Hard skills	β	**120.811****	**74.457***	**43.349***
	se	[59.879]	[50.566]	[33.079]
	p-value	0.022	0.070	0.095
Soft skills	β	**112.081****	**78.402***	**26.538**
	se	[61.289]	[52.140]	[32.735]
	p-value	0.034	0.066	0.209
Pooled	β	**116.369****	**75.401****	**35.635**
	se	[53.550]	[45.348]	[29.057]
	p-value	0.015	0.048	0.110
Mean control group (USD PPP adjusted)		919.366	472.003	456.258
p-value Hard skills = Soft skills		0.919	0.957	0.718
Observations		3,396	3,396	3,396

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors are calculated with the median method across splits as in Chernozhukov et al. (2018). Variables are expressed in 2021 USD PPP adjusted. One-side p-values are reported. Outcomes in columns (2) and (3) are not conditional on employment status: weekly business profits (wage earnings) are defined as the joint outcome of owning a business (wage work) and profits (wage earnings).

C Tables: Cost and Benefit Analysis

Table 14: Business Earnings: Medium vs. Long Run Returns (4y vs. 9y)

Business Profits	Implied Semi-Elasticity	E(Business Earnings) Monthly, Control	Effect Size Monthly	Effect Size Yearly
Hard skills - 9y	0.158	$ 472.003	$ 74.457	$ 893.480
Soft skills - 9y	0.166	$ 472.003	$ 78.402	$ 940.820
Pooled - 9y	0.160	$ 472.003	$ 75.401	$ 904.812
Hard skills - 4y	0.054	$ 145.959	$ 7.885	$ 94.620
Soft skills - 4y	0.095	$ 145.959	$ 13.816	$ 165.752
Pooled - 4y	0.069	$ 145.959	$ 10.085	$ 121.020

Note: The table summarizes the medium and long run earnings results featured in Tables 13a and 13b. All variables are expressed in 2021 PPP adjusted US dollars.

Table 15: Total Earnings: Monthly Earnings, 9y Follow-up

Total Earnings 9y	Implied Semi-Elasticity	E(Tot. Earnings) Monthly, Control	Effect Size Monthly	Effect Size Yearly
Hard skills	0.131	$ 919.366	$ 120.811	$ 1,449.73
Soft skills	0.122	$ 919.366	$ 112.081	$ 1,344.97
Pooled	0.127	$ 919.366	$ 116.369	$ 1,396.43

Note: The table summarizes the 9-year earnings results featured in Table 13b. All variables are expressed in 2021 PPP adjusted US dollars.

Table 16: Business Earnings: Annualized Growth Rates: from 4y to 9y follow-up

Business Earnings, Growth Rates	Effect Size	Total
Control group		26.46%
Hard skills	56.68%	83.14%
Soft skills	41.51%	67.97%
Pooled	49.53%	75.99%

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D Online Appendix

D.1 Balance and Attrition 4y and 9y Follow-ups

Table D.1: Balance Table at Baseline: Baseline Sample

	Control (n=1,198)	**Hard Skills (n=1,613)**	**Soft Skills (n=1,591)**	***p*-values**		
	Mean	Mean	Mean	Hard vs Control	Soft vs Control	Hard vs Soft
Demographics and Expectations						
Age at baseline	20.04	20	20	0.423	0.429	0.994
Female	0.34	0.36	0.36	0.204	0.219	0.968
Boarding student	0.74	0.73	0.73	0.69	0.619	0.914
Business work experience index (Anderson)	0.02	-0.01	-0.01	0.107	0.184	0.761
Future subjective personal wealth (z-score)	-0.02	0.02	0.00	0.304	0.524	0.676
Plans to attend university (indicator)	0.71	0.7	0.71	0.498	0.885	0.566
Family background						
Parental SES index (Anderson)	0.00	-0.01	0.00	0.675	0.994	0.646
Housing index (Anderson)	-0.01	0.01	0.00	0.51	0.683	0.787
Subjective family wealth (z-score)	-0.02	0.00	0.01	0.592	0.379	0.709
Big 5 (z-score)						
Extroversion	2.73	2.75	2.7	0.545	0.405	0.12
Openness	4.15	4.13	4.13	0.494	0.361	0.801
Emotional stability	3.86	3.88	3.85	0.473	0.891	0.356
Agreeableness	3.63	3.63	3.61	0.908	0.588	0.477
Conscientiousness	3.88	3.9	3.88	0.612	0.892	0.488
Skills (z-score)						
Memory (# digits recited backwards)	0.04	-0.01	-0.02	0.152	0.138	0.953
Intelligence (# Raven's matrices correct)	-0.01	0.02	-0.01	0.326	0.841	0.399
UACE O-levels score	-0.04	0.03	0.00	0.061	0.223	0.479
Math and business knowledge index	0.01	0.01	-0.02	0.99	0.339	0.307
Leadership index	-0.03	0.00	0.04	0.345	0.071	0.349
Perceived control index	0.00	0.01	0.01	0.938	0.789	0.836
Self-confidence index	0.05	-0.04	0.01	0.016	0.249	0.176
Prosocial index	-0.05	0.00	0.05	0.169	0.013	0.226
Patience index	-0.02	0.02	0.01	0.277	0.385	0.815
Willingness to take risks	0.00	0.00	0.00	0.959	0.914	0.864
Teacher and peer acceptance index	-0.03	0.01	0.03	0.248	0.111	0.633
Anxiety and depression index	-0.05	0.00	0.04	0.166	0.017	0.279
Travel time (hours)						
School to hard skills host school	1.49	1.51	1.50	0.583	0.791	0.759
School to hard skills meeting point	1.31	1.33	1.32	0.502	0.667	0.795
School to soft skills host school	1.21	1.24	1.23	0.434	0.603	0.779
School to soft skills meeting point	1.14	1.17	1.16	0.503	0.661	0.804
F-test of joint significance (F-stat)				1.27	1.20	0.59
p-value				0.167	0.221	0.951

Table D.2: Balance Table at Baseline: Take-up Sample and Control Group

	Control (n=1,198)	**Hard skills (n=1,089)**	**Soft skills (n=1,105)**	***p*-values**		
	Mean	Mean	Mean	Hard vs Control	Soft vs Control	Hard vs Soft
Demographics and Expectations						
Age at baseline	20.04	20.07	20.06	0.692	0.77	0.917
Female	0.34	0.32	0.33	0.446	0.588	0.827
Boarding student	0.74	0.70	0.71	0.035	0.139	0.532
Business work experience index (Anderson)	0.02	-0.01	0.00	0.159	0.358	0.629
Future subjective personal wealth (z-score)	-0.02	-0.01	0.00	0.669	0.561	0.882
Plans to attend university (indicator)	0.71	0.66	0.71	0.016	0.806	0.034
Family background						
Parental SES index (Anderson)	0.00	-0.02	-0.02	0.352	0.336	0.978
Housing index (Anderson)	-0.01	-0.06	-0.05	0.158	0.26	0.776
Subjective family wealth (z-score)	-0.02	-0.04	-0.04	0.636	0.685	0.947
Big 5 (z-score)						
Extroversion	2.73	2.76	2.72	0.382	0.822	0.282
Openness	4.15	4.11	4.14	0.228	0.751	0.383
Emotional stability	3.86	3.87	3.86	0.694	0.881	0.811
Agreeableness	3.63	3.6	3.59	0.303	0.245	0.901
Conscientiousness	3.88	3.87	3.88	0.634	0.771	0.855
Skills (z-score)						
Memory (# digits recited backwards)	0.04	-0.06	-0.06	0.014	0.017	0.934
Intelligence (# Raven's matrices correct)	-0.01	0.02	-0.02	0.368	0.973	0.36
UACE O-levels score	-0.04	0.05	0.02	0.03	0.129	0.516
Math and business knowledge index	0.01	0.01	-0.02	0.887	0.354	0.444
Leadership index	-0.03	0.02	0.03	0.225	0.149	0.826
Perceived control index	0.00	0.01	0.01	0.872	0.929	0.944
Self-confidence index	0.05	-0.03	0.02	0.041	0.39	0.244
Prosocial index	-0.05	0.00	0.05	0.296	0.022	0.225
Patience index	-0.02	0.04	0.02	0.16	0.339	0.657
Willingness to take risks	0.00	0.00	0.02	0.92	0.616	0.556
Teacher and peer acceptance index	-0.03	0.02	0.02	0.164	0.205	0.901
Anxiety and depression index	-1.17	-1.19	-1.18	0.041	0.39	0.244
F-test of joint significance (F-stat)				1.73	1.18	1.22
p-value				0.013	0.247	0.200

Table D.3: Attrition, 4-Year Follow-up

	(1)		(2)	
	β	se	β	se
Hard Skills Treatment	-0.044***	(0.012)	-0.044***	(0.012)
Soft Skills Treatment	-0.040***	(0.012)	-0.038***	(0.012)
Demographics and Expectations				
Age at baseline			0.009**	(0.004)
Female			0.025**	(0.011)
Boarding student			-0.016	(0.012)
Business work experience index (Anderson)			-0.005	(0.011)
Future subjective wealth (z-score)			-0.010**	(0.005)
Plans to attend university (indicator)			-0.028**	(0.011)
Family background				
Parental SES index (Anderson)			0.020**	(0.010)
Housing index (Anderson)			-0.021***	(0.007)
Subjective family wealth (z-score)			0.000	(0.005)
Big 5 (z-score)				
Extroversion			-0.010*	(0.006)
Openness			-0.01	(0.007)
Emotional stability			0.005	(0.007)
Agreeableness			0.008	(0.008)
Conscientiousness			0.006	(0.008)
Skills (z-score)				
Memory (# digits recited backwards)			-0.012**	(0.005)
Intelligence (# Raven's matrices correct)			-0.002	(0.005)
UACE O-levels score			0.003	(0.005)
Math and business knowledge index			-0.007	(0.005)
Leadership index			-0.010*	(0.006)
Perceived control index			0.000	(0.005)
Self-confidence index			-0.002	(0.006)
Prosocial index			-0.004	(0.006)
Patience index			0.005	(0.005)
Willingness to take risks			0.002	(0.005)
Teacher and peer acceptance index			-0.003	(0.006)
Anxiety and depression index			-0.007	(0.006)
Travel time				
School to hard skills host school			0.024*	(0.013)
School to hard skills meeting point			0.009	(0.015)
School to soft skills host school			-0.003	(0.020)
School to soft skills meeting point			-0.009	(0.024)
Observations	4,402		4,402	

Table D.4: Balance Table: Estimation Sample, 4-Year Follow-up

	Control (n=1,022)	Hard skills (n=1,447)	Soft skills (n=1,421)	*p*-values		
	Mean	Mean	Mean	Soft vs Hard	Soft vs Control	Hard vs Control
Demographics and Expectations						
Age at baseline	20.00	19.98	20.00	0.735	0.981	0.692
Female	0.32	0.36	0.35	0.036	0.094	0.647
Boarding student (indicator)	0.75	0.73	0.74	0.390	0.483	0.865
Business work experience index (Anderson)	0.02	-0.01	0.00	0.229	0.311	0.839
Future subjective wealth (z-score)	0.01	0.03	0.01	0.548	0.998	0.509
Plans to attend university (indicator)	0.72	0.70	0.72	0.501	0.811	0.318
Family background						
Parental SES index (Anderson)	0.00	-0.01	0.00	0.730	0.749	0.466
Housing index (Anderson)	0.01	0.02	0.01	0.834	0.929	0.896
Subjective family wealth (z-score)	0.00	0.00	0.02	0.966	0.629	0.629
Big 5 (z-score)						
Extroversion	2.74	2.76	2.71	0.750	0.358	0.174
Openness	4.15	4.15	4.14	0.843	0.547	0.657
Emotional stability	3.86	3.87	3.86	0.543	0.974	0.528
Agreeable	3.62	3.62	3.62	0.997	0.964	0.964
Conscientious	3.89	3.90	3.88	0.686	0.809	0.478
Skills (z-score)						
Memory (# digits recited backwards)	0.05	0.00	-0.02	0.183	0.085	0.663
Intelligence (# Raven's matrices correct)	-0.01	0.04	-0.01	0.298	0.925	0.214
UACE O-levels score	-0.07	0.02	-0.01	0.037	0.149	0.484
Math and business knowledge index	0.01	0.02	0.00	0.804	0.677	0.466
Leadership index	-0.01	0.02	0.05	0.497	0.119	0.334
Perceived control index	0.00	0.00	0.02	0.874	0.669	0.520
Self-confidence index	0.07	-0.02	0.01	0.013	0.098	0.371
Prosocial index	-0.03	0.02	0.05	0.285	0.046	0.308
Patience index	-0.03	0.01	0.01	0.282	0.359	0.866
Willingness to take risks	-0.01	0.01	0.01	0.510	0.584	0.905
Teacher and peer acceptance index	0.00	0.02	0.03	0.639	0.449	0.750
Anxiety and depression index	-0.05	0.00	0.04	0.232	0.046	0.378
Travel time (hours)						
School to hard skills host school	1.43	1.47	1.46	0.304	0.440	0.782
School to hard skills meeting point	1.25	1.30	1.30	0.222	0.263	0.915
School to soft skills host school	1.18	1.22	1.24	0.354	0.192	0.677
School to soft skills meeting point	1.11	1.15	1.17	0.359	0.185	0.650
F-test of joint significance (F-stat)				1.07	1.01	0.46
p-value				0.368	0.444	0.995

Table D.5: Program Take-up Rates, 4-Year Follow-Up Sample

	(1)		(2)	
	Hard skills		Soft skills	
	β	se	β	se
Demographics, Experience, Expecations				
Age at baseline	0.003	(0.009)	0.003	(0.009)
Female	-0.079***	(0.028)	-0.077***	(0.027)
Boarding student	-0.107***	(0.028)	-0.038	(0.028)
Business work experience index (Anderson)	-0.020	(0.028)	0.008	(0.029)
Future subjective personal wealth (z-score)	-0.004	(0.012)	0.014	(0.013)
Plans to attend university (indicator)	-0.092***	(0.027)	0.013	(0.027)
Family background				
Parental SES index (Anderson)	0.038	(0.025)	-0.018	(0.025)
Housing index (Anderson)	-0.063***	(0.016)	-0.027*	(0.016)
Subjective family wealth (z-score)	-0.003	(0.013)	-0.028**	(0.013)
Big 5 (z-score)				
Extroversion	0.013	(0.013)	0.015	(0.014)
Openness	-0.026	(0.018)	0.025	(0.017)
Emotional stability	-0.003	(0.018)	0.008	(0.018)
Agreeableness	-0.031	(0.020)	-0.012	(0.019)
Conscientiousness	-0.039**	(0.018)	-0.010	(0.019)
Skills (z-score)				
Memory (# digits recited backwards)	-0.038***	(0.012)	-0.036***	(0.012)
Intelligence (# Raven's matrices correct)	0.016	(0.013)	-0.005	(0.013)
UACE O-levels score	0.007	(0.013)	0.011	(0.013)
Math and business knowledge index	0.003	(0.012)	-0.002	(0.012)
Leadership index	0.026*	(0.014)	-0.012	(0.014)
Perceived control index	0.000	(0.013)	-0.006	(0.012)
Self-confidence index	0.017	(0.013)	0.006	(0.014)
Prosocial index	0.001	(0.014)	0.009	(0.015)
Patience index	0.002	(0.013)	0.004	(0.013)
Willingness to take risks	0.008	(0.012)	0.011	(0.013)
Teacher and peer acceptance index	0.010	(0.014)	-0.011	(0.014)
Anxiety and depression index	0.015	(0.014)	-0.011	(0.013)
Constant	1.122***	(0.236)	0.561**	(0.239)
Treatment group take-up rate	0.678		0.698	
Observations	1,613		1,591	
R-squared	0.096		0.069	

Table D.6: Compliers and Defiers, 4-Year Follow-Up Sample

	No Attendance	**Attendance**	**Total**
Control group	1,022	0	1,022
T1: Hard skills	442	1,005	1,447
T2: Soft skills	405	1,016	1,421
Total	1,869	2,021	3,890

Table D.7: Balance Table: Estimation Sample, 9y Follow-up

	Control (n=872)	**Hard Skills (n=1286)**	**Soft Skills (n=1238)**	***p*-values**		
	Mean	Mean	Mean	Hard vs Control	Soft vs Control	Hard vs Soft
Demographics and Expectations						
Age (years)	20.04	20.01	19.99	0.535	0.718	0.777
Female	0.32	0.34	0.36	0.100	0.346	0.443
Boarding student	0.76	0.73	0.75	0.564	0.159	0.354
Business work experience index (Anderson)	0.02	0.00	0.01	0.228	0.495	0.569
Future subjective personal wealth (z-score)	-0.02	0.00	0.02	0.446	0.796	0.581
Plans to attend university (indicator)	0.72	0.72	0.71	0.476	0.867	0.332
Family Background						
Parental SES index (Anderson)	0.00	0.02	-0.02	0.331	0.600	0.098
Housing index (Anderson)	0.00	0.00	-0.01	0.778	0.997	0.759
Subjective family wealth (z-score)	-0.02	0.00	-0.02	0.920	0.556	0.587
Big 5 (z-score)						
Extroversion (Anderson)	0.02	-0.01	0.02	0.963	0.481	0.464
Openness (Anderson)	0.01	-0.02	0.00	0.927	0.628	0.662
Emotional stability (Anderson)	0.02	-0.03	0.03	0.202	0.831	0.101
Agreeableness (Anderson)	-0.02	-0.03	-0.01	0.807	0.720	0.504
Conscientiousness (Anderson)	-0.01	-0.01	0.02	0.492	0.967	0.477
Skills (z-score)						
Memory (# digits recited backwards)	0.05	0.00	0.00	0.254	0.249	0.982
Intelligence (# Raven's matrices correct)	0.00	-0.01	0.03	0.519	0.854	0.361
UACE O-levels score	-0.07	-0.01	0.00	0.095	0.156	0.789
Math and business knowledge index	-0.01	0.00	0.02	0.509	0.854	0.601
Leadership index	-0.04	0.03	0.02	0.217	0.138	0.774
Perceived control index	0.01	0.02	0.00	0.861	0.863	0.701
Self-confidence index	0.08	0.00	-0.02	0.019	0.084	0.508
Prosocial index	-0.06	0.04	0.01	0.114	0.030	0.506
Patience index	-0.03	0.01	0.01	0.379	0.368	0.976
Willingness to take risks	0.02	0.00	0.02	0.977	0.719	0.713
Teacher and peer acceptance index	-0.02	0.02	0.02	0.415	0.458	0.940
Anxiety and depression index	-0.06	0.04	0.00	0.124	0.022	0.396
Travel Time						
School to hard skills host school	1.42	1.46	1.47	0.277	0.406	0.784
School to hard skills meeting point	1.23	1.29	1.30	0.097	0.178	0.740
School to soft skills host school	1.16	1.24	1.22	0.196	0.125	0.779
School to soft skills meeting point	1.10	1.17	1.16	0.148	0.120	0.895
F-test of joint significance (F-stat)				0.733	0.565	1.296
p-value				0.853	0.973	0.130

Table D.8: Attrition, 9-Year Follow-up

	(1)		(2)	
	β	se	β	se
Hard Skills Treatment	0.069***	(0.016)	0.075***	(0.016)
Soft Skills Treatment	0.050***	(0.016)	0.055***	(0.016)
Demographics and Expectations				
Age (years)			-0.003	(0.005)
Female			-0.043***	(0.015)
Boarding student			0.032**	(0.016)
Business work experience index (Anderson)			0.004	(0.013)
Future subjective personal wealth (z-score)			0.001	(0.007)
Plans to attend university (indicator)			0.038***	(0.014)
Family Background				
Parental SES index (Anderson)			0.003	(0.013)
Housing index (Anderson)			-0.006	(0.009)
Subjective family wealth (z-score)			-0.011	(0.007)
Big 5 (z-score)				
Extroversion (Anderson)			0.002	(0.007)
Openness (Anderson)			-0.007	(0.007)
Emotional stability (Anderson)			-0.008	(0.007)
Agreeableness (Anderson)			-0.011	(0.007)
Conscientiousness (Anderson)			0.002	(0.007)
Skills (z-score)				
Memory (# digits recited backwards)			0.012*	(0.007)
Intelligence (# Raven's matrices correct)			0.000	(0.007)
UACE O-levels score			-0.008	(0.007)
Math and business knowledge index			0.000	(0.007)
Leadership index			-0.004	(0.007)
Perceived control index			0.000	(0.007)
Self-confidence index			0.012*	(0.007)
Prosocial index			-0.003	(0.008)
Patience index			-0.002	(0.007)
Willingness to take risks			0.008	(0.007)
Teacher and peer acceptance index			0.003	(0.008)
Anxiety and depression index			-0.006	(0.007)
Travel time				
School to hard skills host school			-0.013	(0.016)
School to hard skills meeting point			-0.026	(0.019)
School to soft skills host school			-0.019	(0.026)
School to soft skills meeting point			0.037	(0.031)
Observations	4,403		4,403	

D.2 Additional Results

Table D.9: Big Five, Individual Dimensions, 4y Follow-up

		(1)	(2)	(3)	(4)	(5)
		Agreeable	Conscientious	Extrovert	Emotional Stability	Openness
Hard skills	β	**0.088****	**0.120*****	**0.129*****	**0.119*****	**0.114*****
	se	[0.039]	[0.040]	[0.040]	[0.040]	[0.039]
	p-value	0.012	0.001	0.001	0.001	0.002
Soft skills	β	**0.067****	**0.057***	**0.147*****	**0.045**	**0.138*****
	se	[0.039]	[0.040]	[0.040]	[0.040]	[0.039]
	p-value	0.043	0.078	0.000	0.130	0.000
Mean control group		0.000	0.000	0.000	0.000	0.000
p-value Hard skills = Soft skills		0.706	0.265	0.745	0.194	0.666
Observations		3890	3890	3890	3890	3890

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors across splits are calculated with the median method as in Chernozhukov et al. (2018).

Table D.10: Education Investments at 4y and 9y Follow-ups

		(1)	(2)	(3)
		Enrolled in Post-secondary (4y)	Any post-secondary (9y)	Complete post-secondary (9y)
Hard skills Treatment	β	**-0.019**	**-0.008**	**0.003**
	se	0.020	0.018	0.019
	p-value	0.337	0.677	0.429
Soft skills Treatment	β	**0.004**	**0.013**	**0.012**
	se	0.020	0.017	0.019
	p-value	0.843	0.233	0.265
Mean control group		0.523	0.788	0.726
p-value Hard skills = Soft skills		0.413	0.402	0.751
Observations		3,890	3,396	3,396

Note: Results are based on DML (K-fold=5, Splits=100); point estimates and standard errors are calculated with the median method across splits as in Chernozhukov et al. (2018). p-values are two-sided. All dependent variables are dichotomous. *Any (Completed) post-secondary* corresponds to a dummy variable equal to one if the study participant attended any (completed) post-secondary education at the time of the 9-year survey.