

The Impact of Financial Education on Medium and Large Enterprises – Evidence from a Randomized Controlled Trial in Mozambique

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Abstract

A randomized controlled trial (RCT) with medium and large companies in Mozambique identifies a positive treatment effect of an executive education programme in finance for top managers on financial policies and firm profitability. Using survey data as well as financial accounting data, we find that managers adjust firm financial policies in response to the treatment. The largest treatment effects are for policies related to working capital. We also find these policy changes to improve firms' efficiency. Our results suggest that relatively small and low-cost interventions such as a short executive education programme in finance improves financial practices and can ultimately affect economic development.

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1 Introduction

Previous research shows that management practices help to explain differences in firm productivity and profitability across countries and firms (e.g., Bloom et al. (2011)). These studies usually focus on lower or middle management of larger corporations or on founders/CEOs of small or micro-enterprises. There is no quasi-experimental evidence on executives of larger companies, even though their potential impact on economic development is large given that they effectively control a large part of the economy.

In this paper, we conduct a randomized controlled trial (RCT) with top executives of medium and large companies in Mozambique, who participate in a free executive education programme in finance. Financial expertise might be an important dimension of CEOs' human capital. While financial decisions are irrelevant in a frictionless world, the ability to make optimal financial decisions may have a positive impact on firm value in contexts where financial frictions are potentially severe, as, for instance, in developing economies. The RCT documents a positive treatment effect of the executive education programme on financial policies and firm profitability. Using survey data as well as financial accounting data from one of the world's largest accounting firms, we find that managers adjust some financial policies, including working capital management, in response to the treatment. These adjustments are also reflected by efficiency gains.

Our findings suggest that individual CEOs matter for corporate policies and, ultimately, for corporate performance. These findings are consistent with Bertrand and Schoar (2003) who argue that individual CEOs help to explain observed heterogeneity in management practices and corporate policies and conclude that CEOs possess different "styles". The origins of those CEO styles might be multifaceted. Indeed, there is substantial research linking CEO styles to preferences and traits (e.g., Malmendier and Tate (2005, 2008), Malmendier, Tate, and Yan (2011), Kaplan, Klebanov, and Sorensen (2012), Graham, Harvey, and Puri (2013), Hirshleifer, Low, and Teoh (2012)), to education (e.g., Bertrand and Schoar (2003) and Malmendier and Tate (2005)), or to industry-specific work experience (e.g., Custódio and Metzger (2013, 2014), Custódio et al. (2012, 2017)). One potentially important dimension of managerial human capital is financial expertise. There is research that shows that managers' financial expertise impacts revenues and survival rates of corporations in the context of small and micro-entrepreneurs in developing countries (Drexler, Fischer, and Schoar, 2014 and Anderson-Macdonald, 2014). Custódio and Metzger (2014) study chief executive officers (CEOs) in the US who have working experience in finance. They document that firms run by these *financial expert CEOs*

hold less cash, more debt, and engage more intensively in share repurchases. With respect to investment policy, they show that financial expert CEOs are more aware of common mistakes firms tend to do when making capital budgeting decisions. Overall, the evidence suggests that the impact of financial expertise of CEOs on economic outcomes is potentially large. However, it remains unclear whether the observed heterogeneity in firm practices and CEO backgrounds is merely a reflection of an optimal matching between underlying firm fundamentals and the types of CEOs that are needed to implement optimal practices, or whether firms or CEOs are constrained in the ability to acquire certain dimensions of human capital.

Financial expertise may be obtained through specialised roles or tasks on-the-job (e.g., in the finance or accounting department of a non-financial corporation) as well as through education (e.g., finance courses, relevant specialisations at undergraduate/graduate programmes, MBA, or through advanced training such as the CFA programme). Depending on type, content or depth of the programme or experience, it might be very costly or time-intense to build up financial expertise. However, learning basic financial concepts or refreshing previously learnt concepts might be also relatively low-cost and could be accomplished by attending short finance Executive education programmes.² As comparison, the intervention by Bloom et al. (2013) on management practices that was carried out in 17 firms operating 28 plants ran for about three years with a total consulting cost of \$1.3 million, approximately \$75,000 per treatment plant, and \$20,000 per control plant.

Our study makes three contributions to the literature. First, we show in a randomized controlled trial (RCT) setting that individual CEOs, and in particular their financial skills, have real effects on financial policies and firm value. Second, we show that relatively low-cost interventions, such as an 18-hours, MBA-style, finance Executive education course, help to build-up finance expertise. Last, we provide detailed evidence on financial practices of large firms and executives' financial education and other demographics from a developing country (Mozambique).

We start by documenting substantial heterogeneity in financial expertise by CEOs in Mozambique. About 43% of the CEOs have a background in finance, either by education or work experience. When analysing financial practices in firms with and without financial expert CEOs, we find large differences in their practices. For example, we find significant differences between these two groups in the way they evaluate investment projects. While a large majority of CEOs with a background in finance is making use of sophisticated valuation techniques such

² Similar courses are sold for 5,000 GBP (6,500 USD) per participant.

as net present value (NPV) (70%), or conducts sensitivity analysis (63%), this is relatively uncommon for CEOs without such a background. Only 25% of CEOs with no financial background use NPV, and only 33% of them perform sensitivity analyses in their capital budgeting calculations. At the same time, they are more likely to use less sophisticated valuation techniques such as hurdle rates (63%). These findings are consistent with US evidence by Bertrand and Schoar (2003) and Custódio and Metzger (2014) who found CEOs with MBAs or financial expertise are much more likely to follow financial theory and textbook rules, and to avoid common mistakes such as using a unique firm cost of capital irrespective of the nature of the project (the WACC fallacy).³

A clean interpretation of these correlations remains difficult though. Researchers have examined whether corporate outcomes are affected by CEO characteristics, but no consensus has been reached (see also Chemmanur and Simonyan (2017) for a survey of the literature). CEOs and firms are not randomly matched, and the concern is that endogenous matching biases the estimates. Indeed, the literature on potential effects of managerial human capital heavily relies on cross-sectional analysis that makes causal inference very challenging. Some studies such as Bertrand and Schoar (2003) use panel regressions and estimate potential CEO effects making use of within-firm variation due to CEOs switching firms. However, Fee, Hadlock and Pierce (2013) cast doubt on this methodology for identifying managerial style effects on policy choices. They argue that CEO turnover events are endogenous and managerial “style changes” are anticipated by corporate boards at the time of the CEO selection decision. In other words, while firm-fixed effects allow to control for unobserved firm heterogeneity that is time-invariant, it cannot be ruled out that firm time-varying characteristics, unobserved by the econometrician such as some strategic decisions, drive both financial policies and the characteristic of the CEO that is appointed. In the context of financial expertise, Custódio and Metzger (2014) show that firms run by managers that have past work experience in finance have better access to external financing and allocate the firms’ financial resources more efficiently. At the same time, however, they also provide evidence that financial expert CEOs are more likely to be appointed by more mature firms.

In order to identify a potential treatment effect of financial expertise on firm policies, one would need to randomize financial expertise across firms. One way of doing so would be an actual random allocation of CEOs to firms. Unfortunately, this type of experiment is not feasible

³ The use of companywide discount rates to evaluate investment projects rather than project-specific ones has been called the weighted average cost of capital (WACC) fallacy (Graham and Harvey, 2001; and Kruger, Landier, and Thesmar, 2011).

in the context of large firms. We propose a different solution, by randomizing financial expertise of top managers, and, at the same time, keeping the match between CEOs and firms constant. We “treat” managers with financial expertise by offering free MBA-style lectures on corporate finance and risk management to top managers of 93 medium and large firms in Mozambique. Similar approaches are commonly employed in the development economics literature and have been used to measure the impact of financial literacy on revenue and survival rates for small and micro-entrepreneurs (Drexler et al., 2014 and Anderson-Macdonald, 2014), but have not been applied to larger companies. An exception is Bloom et al. (2013) who use a controlled randomized experiment to measure the effects of management practices on the productivity of large plants in India.⁴ However, they focus on lower-tier, plant managers rather than on executives and do not study financial education and financial policies. Their experiment was carried out in 17 firms operating 28 plants; this relatively low number of observations reflects the difficulty to obtain big samples in the context of RCTs with large corporations. In this respect, a sample size of 93 firms appears notable.

To address concerns of endogenous selection into the treatment, we randomly staggered the timing of the treatment of firms that expressed their interest in participating in the executive education programme. Firms were randomly allocated into two cohorts: a treatment group and a control group. Randomization was done in a stratified way so that both groups are balanced in terms of industries. The first cohort - the treatment group - received the treatment in May 2017, while the second cohort - the control group - received the same treatment in November 2018. We offered the control group the course in order to provide an incentive to participate in the experiment, and to make detailed financial data available. During the fifteen-month period, both firms were contacted to collect financial data and to conduct a follow-up survey on financial practices.

The main results of the RCT can be summarized as follows: i) treated firms report high intentions to change financial policies after the participation in the course (92% of the firms intend to adjust their working capital management, 85% their risk management, 64% their valuation techniques and 64% their capital structure). The survey also reveals that a sizeable fraction of firms is not able to adjust their capital structure (25%) or risk management practices (20%), mostly because they are subsidiaries and these policies are set somewhere else in the business group. ii) 36.4% of treated firms report that they have implemented changes in working

⁴ Other experiments find mixed evidence of the impact of basic business training to micro and small enterprises in developing countries (Karlan and Valdivia 2011; Bruhn and Zia 2013; Bruhn, Karlan, and Schoar 2013; Karlan, Knight, and Udry 2012).

capital management 15 months after the treatment. Corresponding figures for other financial policies are lower (13.5% respectively). Moreover, firms report that they implemented these changes *because* of the treatment (i.e., the course they participated in, 15 months ago). While these results are suggestive of a treatment effect, we can also make use of the control group to address the concern that we may be capturing a pure time-effect, for instance. Indeed, it might be the case that changes in the economy may have led companies to change their financial policies, irrespective of the treatment. When we compare differences between the means of treatment and control group (using a one-sided t-test), we find a large and significant difference for changes in working capital management (significant at the 1%-level) and changes in capital structure (significant at the 10%-level). We do not find statistically significant differences for changes in risk management or valuation techniques. iii) we make use of accounting data to validate the survey evidence and to analyse potential implications for firms' efficiency. Using a difference-in-difference estimator, we find a significant and large treatment effect for working capital and average collection period. The effects on working capital management are large and significant: working capital decreases by 0.86 standard deviations for the treated firms when compared to the control group. Whether these changes have led to policies that are more efficient or not is not clear though. To test whether firms have indeed moved towards more optimal policies as a response of the treatment, we analyse whether treated firms become more efficient relative to the control group. Given that most firms are private, we do not observe their market values. Hence, we rely on accounting ratios to measure efficiency. Analysing return on assets (ROA), we find that treated firms' ROA increases by 0.37 standard deviations compared to control firms' ROA. Overall, our results show that financial expertise of managers has a large impact on firm performance through the adoption of financial practices that promote value creation. Moreover, our results suggest that relatively small interventions such as financial education improve financial practices and decision-making and may ultimately affect economic development.

The remainder of this paper is structured as follows: in section 2, we present the experimental design. Section 3 describes the executive education programme (intervention). In section 4, we present the results based on survey and accounting data. Finally, section 5 presents conclusions.

2 Financial Education and Financial Policies of Medium and Large Enterprises in Mozambique

This section motivates our decision to conduct the experiment in Mozambique and explains the selection of firms considered for the experiment. It also describes the design and outcome of an explorative stage in which we collected information on the background (including financial education and experience) of CEOs as well as on firms' current financial practices. The results of this explorative stage were helpful for several reasons. First, there is no data on financial expertise and financial policy available for a large set of firms in Mozambique. Understanding the status quo, in terms of CEO backgrounds and current finance practices, as well as learning more about the functioning of the financial markets was important to design a meaningful course for that target audience. Second, it allowed us to compare financial expertise and practices of these firms with evidence of firms of similar size and sectors from the US. In the last part of this section, we motivate the design of the experiment - a staggered treatment - and explain the randomization process in more detail. Figure 1 gives an overview about the timeline of the project.

2.1 Mozambique and the Selection of Firms for the Experiment

We have chosen Mozambique to conduct the RCT for several reasons. First, given a lower presence of executive education providing institutions in Mozambique, we expect to observe more heterogeneity in terms of financial education among executive managers compared to managers of US-American or European firms. This heterogeneity might be helpful when measuring effects of financial education on financial expertise and, ultimately on financial policies and firm performance. Second, survey statistics collected by the World Bank Enterprise Surveys (2018) suggest that Mozambique is representative of other Sub-Saharan economies (henceforth SSA). Some details of this survey are summarized in Section 9.1. in the Appendix. Second, Mozambique has an important advantage for the implementation stage: most large companies' headquarters are located in the capital, Maputo, which helps with the logistics and organization of the training courses, and is expected to increase participation rates. Last, there have been existing links between NOVAFRICA, a knowledge center by the Nova School of Business and Economics, and governmental organisations as well as NGOs in Mozambique that helped to increase visibility and credibility of our project.

We focused the intervention on medium and large firms because they control a large fraction of assets in the economy. Potential efficiency gains of these firms are, therefore, more

likely to be economically relevant. Moreover, some capital allocation inefficiencies previously documented in the literature are mostly relevant for large and multi-divisional firms. For instance, Krüger, Landier and Thesmar (2015) show that firms do not properly adjust for risk in their capital budgeting decisions, and that conglomerates underinvest (overinvest) in relatively safe (risky) divisions. In addition, financial literacy has been mostly studied at for small enterprises (instance.g., Drexler, Fischer, and Schoar, 2014), but little is known at the level of large corporations beyond the fact that there is a correlation between financial expertise and financial policies (Custódio and Metzger 2014; Güner, Malmendier and Tate, 2008).

Our initial sample of companies considered for the experiment comes from the reports “Top-100 Companies in Mozambique” published annually by KPMG Mozambique. These reports contain name and information of many of the largest corporations in Mozambique. These reports are publicly available used by local and foreign investors, public administration and other institutions. Each report lists and ranks the 100 largest companies (according to total revenue) from the pool of companies that fill-in the KPMG annual survey. Although the survey is non-mandatory, companies tend to participate as this is one of the most relevant and visible business storefronts available. For each company, it provides main financial accounting figures such as revenues, net income, assets, liabilities, equity, number of employees and new investments. We also restrict our sample to companies that are headquartered in Maputo. This enabled in-person interactions with participants, which was crucial throughout the project to engage the participants with the programme and facilitate data collection. This requirement also reduced treatment non-compliance as it minimized the participants’ cost of attending the training. We focussed on executives of these companies as those usually take most strategic decisions, including financial decisions. Indeed, there is evidence by Harvey et al. (2015) who show that most capital allocation decisions are taken by CEOs or CFOs.

To the best of our knowledge, our paper is also the first RCT project whose intervention targets executives of relatively large companies. Usually, RCTs target either entrepreneurs of small companies (e.g., Drexler et al. (2014) or managers below the executive board in large firms (e.g., Bloom et al. (2013)).

2.2 Explorative Stage: Financial expertise and Financial Policies

The project was kicked-off by an explorative stage in 2015 where we collected information about managers, including demographics and financial education and experience, as well as firms’ characteristics and financial policies. We then used this information to design the

executive education programme and to compare financial expertise and finance policies of medium and large enterprises in Mozambique with US evidence.

The exploratory project run between June and July 2015 (see Figure 1). During this period, we contacted 218 companies obtained from KPMG “Top-100 companies in Mozambique” reports from 2010-2014, and had 65 meetings. Out of the 65 meetings, we were able to collect 63 questionnaires.⁷ The questionnaires were filled in during a 30-minute face-to-face interview. The interview was conducted at company’s premises by a member of the research team. Although we specifically invited the CEO, sometimes our request was forwarded to the CFO, to a member of the accounting team, or in a few cases, to a non-finance related staff.

These questionnaires surveyed financial practices, manager characteristics and overall business aspects of the companies, following Graham and Harvey (2001, 2002). We also used the survey to assess the interest of managers for a free of charge Executive Programme on Financial Management. We specifically asked which topics they would find more relevant, including capital budgeting, risk management, capital structure, pay-out policy and mergers and acquisitions. Finally, we inquired the executives’ availabilities for such an programme to maximize attendance.

These questionnaires also allowed to have a first look at financial expertise, financial policies, and the interaction between the two in Mozambique. Figure 2 shows financial practices related to capital budgeting and valuation by firms that are run by financial expert CEOs compared to non-financial expert CEOs. We find significant differences between these two groups. While a large majority of CEOs with a background in finance is making use of sophisticated valuation techniques such as NPV (70%) and conducts sensitivity analyses (63%), this is relatively uncommon for CEOs without such a background. Only 25% of CEOs with no financial background use NPV and only 33% of them perform sensitivity analyses in their capital budgeting calculations. At the same time, they are more likely to use less sophisticated valuation techniques such as hurdle rates (63%). This evidence is consistent with the existing literature documenting a relationship between managers’ financial expertise and firm financial policies (e.g. Custodio and Metzger (2014)).

⁷ Two participants were busy at the scheduled time and committed to send us the questionnaire later by e-mail, which did not happen. These 63 pilot questionnaires correspond to 62 business groups (in this case single companies), as we surveyed separately two managers from the same company.

2.3 Experimental Design and Randomization Process

To identify the treatment effect of financial expertise on firm policies, one would like to randomize financial expertise across firms. In non-experimental data, the matching between CEOs and firms is endogenous and there is the concern that (time-varying) unobserved heterogeneity biases the estimates. For instance, depending on the life-cycle of a firm, different types of CEOs could be optimal for a firm (Custodio and Metzger, 2014). We propose a solution of randomizing financial expertise of top managers while keeping the match between CEOs and firms constant. We treat the financial expertise of executives by inviting them to participate in an executive education programme on corporate finance. To address concerns of endogenous selection into the treatment, we randomly allocated firms that expressed their interest in participating into two groups: the treatment group and the control group. The randomization was done within industries to make sure the same industries were represented in both groups.

We offered to the two groups a staggered treatment. The first cohort - the treatment group - received the treatment in May 2017, while the second cohort - the control group - received the same treatment in November 2018.⁸ The reasoning for eventually teaching the control group as well has the following rationale: First, it incentivizes the control group to share their accounting data and participate in the surveys as well. Second, it helps addressing the concern that the formation of expectations is biasing the experiment (Chemla and Hennessey (2019)) because treatment and control group both expect to be treated.

Even though the experimental setup helps to identify a causal effect of financial executive education on firm outcomes, there are still remaining threats to identification. For instance, managers may benefit from networking with managers of other firms while attending the course. If they start doing business together, there can be positive effects on revenues, unrelated to the actual course. In order to alleviate this potential confounding effect of networking, we organized a networking event for the control group as well. This event occurred during the same time when the treatment group was exposed to its intervention.

⁸ While not affecting the internal validity of the experiment, it is still interesting to analyze the characteristics of firms and executives who are interested in attending the course versus who are not. Please see also Section 9.2 in the appendix of the paper.

3 Financial Education for Executives

This section explains the implementation of the intervention. It also describes in detail the different stages of the data collection process (e.g., exit survey, 15-month survey, and financial data).

3.1 Design of the Course

The course was designed as a general course in corporate finance, but emphasized topics identified as weaknesses by the managers at the pilot stage. We also used the survey conducted at the explorative stage and face-to-face interviews to evaluate the trade-off between the executives' willingness to participate and the course content and duration to maximize participation. The course consisted of four modules:

(1) Managing Working Capital: This topic covered the concept of working capital and the impact of efficient working capital management on cash flows and cash holdings. This module also covered cash management, and management of account receivables and account payables. For instance, participants were taught how to calculate the cost of trade credit and compare it to other sources of financing.

(2) Capital Budgeting and Valuation: This module covered standard techniques of firm and project valuation such as discounted cash flows methods, net present value, internal rate of return, payback period. It also covered asset pricing models such as CAPM as a tool to estimate project discount rates. Some common valuation mistakes such as the misuse of the weighted average cost of capital irrespective of the specific risk of the project were also covered in the course.

(3) Capital Structure: This module presented a practical view of assessing the optimal capital structure of the firm, listing the advantages and disadvantages of debt financing such as the tax shield of debt and bankruptcy costs, respectively.

(4) Risk Management: This module covered the identification of risks and associated potential costs, analysis of the causes of risk of financial loss, determination of various hedging strategies, implementation of the risk management strategies, and management and monitoring

of results. The approach to this topic was that an effective risk management programme can reduce losses and improve financial performance.

The intended learning outcomes of these four modules can be summarized as follows:

- (1) Read, understand and process (for instance calculate basic financial ratios) financial information from financial reports.
- (2) Understand the impact of efficient working capital management on firm liquidity and funding needs.
- (3) Understand the appropriate valuation techniques to use when making capital budgeting decisions, and avoid common mistakes in valuation, for instance do not take the time value of money into account.
- (4) Trade-off the costs and benefits of a given financial structure and source of financing.
- (5) Identify sources of risk and risk management practices, for instance hedging using insurance or financial instruments.

The course was organized in four modules taught in 18 hours over four days. While this may appear relatively short, courses in related studies have similar durations (e.g., two days or two half days (Bruhn and Zia (2012) and Field et al. (2010)). Moreover, our course is at the shorter end but in line with sessions on related topics in typical MBA core courses in corporate finance. Given that participants were top executives, our survey results also suggested that many CEOs/CFOs found it difficult to accommodate longer duration courses in their agendas. By keeping the intervention short, we may have increased participation, potentially at the expense of the intensity of the intervention.⁹ At the same time, shorter courses are cheaper and simpler to organize from a logistical point of view, a potentially important criterion from a policy point of view.

The format of the course was a mixture of lectures and case studies. The case studies illustrated the different topics in a relevant setting for larger firms operating in emerging markets. For instance, we made use of the following Harvard Business School case studies: New Earth Mining (evaluating a new investment opportunity in South Africa), Mozal (large investment project in Mozambique), Supply Chain Finance at Procter and Gamble and Fibria (working capital management and its liquidity consequences in US and Brazil). Note that no one-size-fits-all solution was presented. Instead, managers were given a set of tools to apply in

⁹ It might be interesting to experiment with the length of such a course in future extensions of this project.

the context of their own firms. The course was delivered both in Portuguese and English (the group was split according to their language preferences), by the same instructor. Participants who attended a minimum of 80% of the classes received a participation certificate from Imperial College Business School.

3.2 Intervention 1 – Delivery of the Course for Cohort 1 (Treatment Group) and Mingling for Cohort 2 (Control Group)

The intervention consisted of an Executive-level Programme in Finance - “Finance and Strategy – Value Creation in Emerging Markets” - promoted under Imperial College executive education branding. The course was offered in Maputo, free of charge and limited to the companies participating in the research project. Nevertheless, information about the course was openly available at the Imperial College Executive Education webpage, including a market price of £5,000 per participant / free of charge for invited participants.¹⁰

The first edition of the course took place in May 2017. Between February and April 2017, we made a new round of contacts with companies in Mozambique to advertise the programme. We contacted 459 companies, all appearing at least once in any table of the KPMG reports between 2009 and 2015. In the first communication (by email) we explicitly informed about the programme and sent the webpage url. Upon 109 positive response, we conducted 109 face-to-face meetings to present further details about the programme. Managers that were interested in the programme formalized their interest on behalf of the company by submitting an application form. This form collected information on manager characteristics such as demographics, educational background and professional experience, as well as company characteristics. We allowed each company to send up to two attendees imposing that at least one of them was a senior manager (CEO or CFO).¹¹ We received application forms from 111 participants, corresponding to 93 firms.

We performed the randomization procedure described in Section 2.3 two weeks before the intervention for the first cohort. Conditional on the treatment assignment, companies that had formalized their interest were offered a seat either in the course in May 2017 or in the second edition of the same course at a later stage.¹² We had 45 companies on the treatment group and 48 companies on the control group. We made sure companies that were part of the same

¹⁰ While the programme’s webpage was online, the executive education team received a sizeable number of emails from people interested in attending the course.

¹¹ We required one application form per attendee.

¹² The second edition of the course was taught in November 2018.

business group were allocated to the same cohort. 46 managers effectively participated in the programme, representing 41 companies and 31 business groups.

A concern that remains is that there are confounding effects related to the treatment. For instance, by attending the course, attendees may build or intensify relationships to each other. As a result, network effects instead of the content of the course itself may lead to changes in some outcomes of interest. While these potential network effects are less obvious for financial policies, we are more concerned with them affecting profitability, which is an important outcome for us to understand whether potential changes in financial policies lead to outcomes that are more efficient. Networks can affect profitability in several ways. For instance, attendees may form new business relationships or share relevant information or knowledge. To address this concern, we organized an event with speakers from the public and private sector for the control group. The purpose of that event was to give executives of the control group the opportunity to mingle and to network as well to tease out the differential effect of the educational component and the networking one of the intervention.

3.3 Intervention 2 – Delivery of the Course for Cohort 2 (Control Group)

Between September and November 2018, we contacted and invited companies of the control group that applied to the programme. In these meetings, we run the pre-learning questionnaire where we also asked which financial practices had changed since May 2017, and investigated their current financial practices, and expectation with respect to future changes. This survey was intended to provide counterfactuals in terms of implemented changes in financial practices for the treatment group. We conducted 40 interviews in which we also requested financial accounting data.

In a few cases, the manager that had applied to the programme was replaced. For these cases, we briefed the new manager about the programme and invited her or him to participate in the second intervention. The second cohort of the course was taught in November 2018. The course's content and teaching method was replicated from the first edition.

3.4 Data Collection – Pre-learning Survey, Post-learning Exit survey, Follow-up survey, and Financial Reports

We collected data on financial policies as well as accounting data for the treatment group and control group during and after the interventions.

First, the participants were required to fill-in a pre-learning survey. This survey replicated the exploratory project survey and collected baseline information on current financial practices of the company. At the end of the programme, participants filled in a post-learning exit survey. The post-learning exit survey was divided into a confidential part, where participants were asked to evaluate the course, and a non-confidential part, where they described their intentions to change financial practices in future. These surveys were filled in by the treatment group at the end of the first intervention and by the control group at the end of the second intervention.

Second, there was a follow-up survey, approximately 15 months after the first intervention targeted at both treatment and control firms. Between September 2018 and November 2018, we interviewed managers and asked them about implemented changes with respect to financial policies since the first intervention. During these face-to-face interviews, we also requested their financial reports data between 2013 and 2018. We provided companies with a template spreadsheet including balance sheet, income statement and statement of cash flows items to fill in.

Last, we collected financial information for the period between 2008 and 2018 from the report “Top-100 Companies in Mozambique” published annually by KPMG Mozambique. We use this data to add financial information of companies that did not or could not share their financial data, and to check the quality and consistency of the data provided by the companies through the Excel spreadsheets. This information was collected for both treatment and control firms. Financial data was available in dollars and/or Metical depending on the source. We have converted all values in Metical to Dollars using the exchange rate of the reporting date.

Table 2 panel A shows summary statistics for the participating firms (treatment and control groups) and differences between the two groups, in the year before the intervention. The average treated firm has total assets of 55.3 million USD, total revenue of 28.6 million USD, and 307 employees. Only total revenue is statistically significantly different for treatment and control firms, with control firms generating an average revenue of 58.9 million USD.

Panel B of Table 2 shows summary statistics for the managers in the treatment and control groups, as well as the differences across the two groups. About 20% of the managers in the treatment groups are the CEO of the company and 34% the CFO. These managers are in general highly educated, with more than 90% having an undergraduate degree or higher. A large fraction also has a finance or accounting related education, with only 23% of them reporting no education in finance or accounting at any level. About 17% of the executives are female. Differences across the two groups are not statistically significantly different. The only

exception is nationality. About 57% of the managers in the treatment group are Mozambican, compared to 78% in the control group.

4 The Effect of Financial Education on Financial Policies and Efficiency

This section analyses the effect of financial education on financial policies. We measure the intentions of treated firms to implement changes of financial policies after the courses in May 2017 and November 2018, respectively. We make also use of our staggered treatment design that is defining treatment and control firms. We compare implemented changes of financial policies of firms taught in May 2017 (treated firms) and firms yet to be treated in November 2018 (control firms) in September-October 2018, i.e., before the delivery of the second course. We use both survey evidence and accounting data to measure the outcomes of interest.

4.1 Intention to Change Financial Policies (Exit Survey)

We start our analysis by evaluating the intentions of treated firms to change financial policies. We focus on valuation techniques, working capital management, capital structure, and risk management, the main themes of the delivered courses. Table 3 shows evidence of the exit survey by the participants at the end of the courses. We provide evidence on manager level (left) as well as firm level (right).

Panel A of Table 3 shows the results for the first cohort that was treated in May 2017. The survey shows a couple of interesting findings. i) managers / firms aim to implement changes in all financial policies. Among firms that have the discretion to set their own policies, between 64% and 92% intend to implement changes in their policies that were discussed in the course. These numbers drop to 50% and to 85% but are still very sizeable if we treat no answers as “no”. ii) Depending on the policy, there is substantial heterogeneity in the intention intensity. Working capital management and risk management are the policies that managers / firms are most likely to change (92% and 86%). There are fewer intended changes of capital structure and valuation techniques (64% each). iii) Capital structure appears to be the policy where managers have the least discretion over. 33% of the companies (9 out of 27) say that they cannot change the capital structure themselves. This may partly be driven by companies being subsidiaries of larger (international firms) that determine the capital structure as well as by limited access to loans in the capital / banking market of Mozambique.

Panel B shows corresponding results for the second cohort that was treated in November 2018. While there are some differences in the numbers, the overall picture remains robust. Panel C pools the two cohorts. Overall, the exit surveys provide strong evidence that treated firms intend to implement changes in financial policies.

4.2 Implemented Changes of Financial Policies (15-months Survey)

Even though firms seem committed to change corporate policies, there are reasons why they may end up not implementing changes. For example, firms may not have the resources or the personnel to do so, there might be other items on the agenda with higher priorities, external conditions might impose constraints, etc. Moreover, there might be reasons unrelated to the treatment that lead firms to change their policies. To better understand the effect of the treatment itself we explicitly ask firms whether they changed firm policies because of the course. More importantly, we also survey the population of control firms. This allows us to compare changes in financial policies between treatment and control firms as well.

Table 4 shows the results. First, between 13.6% and 36.4% of the firms mention that they have implemented changes of financial policies in the preceding 15 months. Not unexpectedly, implementations rates are much smaller compared to the intentions that were reported in the exit survey but still sizeable. The ordering of the magnitudes of different policies is relatively consistent across surveys with working capital management being most affected and valuation and capital structure the least. One exception is risk management that ranked very high on the list at the exit survey but is at par with valuation and capital structure in the 14 months survey. Second, analyzing the motivation for implementation changes in financial policies, firms seem to respond to the treatment. Almost all firms that reported that they implemented changes in financial policies declared that they did so because of the course (second column of Table 4). While these results are suggestive, we can also make use of the control group to address the concern that we may capture a pure time-effect, for instance. Indeed, it might be the case that changes in the economy may have led companies change their financial policies, irrespective of the treatment.

We conducted the survey for the control group at the same time of the survey for the treatment group, before the second intervention of November 2018 (when the treatment group participated in the course). The middle panel of Table 4 shows the corresponding evidence for the control group. Only a very small fraction of firms reports that they changed financial policies over the preceding 15 months. The policy that has been changed most frequently is risk

management (changed by 9.1% of the firms). In particular, working capital management which was most affected in the treatment group (36.4%) was changed by only one firm in the control sample (3%).

The right panel of Table 4 test for statistical differences between the means of treatment and control group (using a one-sided t-test). We find a large and significant difference of 33.3 percentage points of firms having implemented changes in working capital management. This difference is significant at the 1%-level. The difference in terms of changes in capital structure is significant at the 10%-level. We do not find statistically significant differences for changes in risk management or valuation techniques.

Overall, the comparison of treatment and control group is consistent with the self-reported treatment effect of the course on certain financial policies. Moreover, the 15-months survey results are also in line with the intentions by the treated firms to change financial policies during the exit survey after the treatment. Implementation rates are, however, lower compared to the intentions by the treatment group.

4.3 Implemented Changes of Financial Policies (Financial Accounting Data)

While the last sections make use of survey data by treatment and treatment & control firms, we can also measure potential changes of financial policies in the financial reports. The financial statements contain information that allow us to investigate potential changes in working capital management and capital structure; changes in risk management and valuation techniques are more difficult to measure without survey data. However, the financial data also allows us to measure potential valuation effects of the treatment.

Table 5 reports the estimates of treatment effects on main financial policies using ordinary least squares (OLS) to compare treatment and control firms in the cross section, and firm fixed effects exploiting within firm variation. Column (1) shows the treatment effect on working capital using OLS. We find a point estimate of -0.155 that is significant at 10% level. This corresponds to a negative impact on working capital of 0.5 standard deviations. Specification in column (1) has robust standard errors, clustered at the firm level. Following Bloom et al. (2013) we also estimate our results with alternative standard errors. Specifications in columns (3) and (4) has bootstrapped standard errors. Columns (2)-(4) show firm fixed effect estimates. We find a similar coefficient of 0.19. Estimates are statistically significant at 5% level across firm fixed effects specifications.

Columns (5)-(8) shows the impact of the treatment on working capital investment. The effects is negative. Column (1) shows the OLS estimate with clustered standard errors at firm level. The estimated coefficient is -0.206, which represents a drop of close to one standard deviation. Columns (6)-(8) show firm fixed effects estimates. The magnitude of the coefficient is similar at 0.21, and significant at 5% level.

Columns (9)-(12) show the impact on average collection period. We find a difference between treatment and control group between 70 and 83 days when using firm fixed effects and the OLS estimator, respectively. This effect is statistically significant at 1% level and represents a change between 0.57 and 0.68 standard deviations.

Table 6 reports the impact of the treatment on other firm policies: leverage and total investment in fixed assets (capex). The effects on both leverage and total investment are not statistically significant. Because it is not obvious in which direction firms would adjust their leverage and investment as a response to the treatment, we also run similar regressions using absolute changes in leverage and in total investment, and we do not find any significant effects.

Figure 3 shows average financial policies for firms in the treatment and control groups over the 2014-2018 period. The figures illustrate the negative differences in differences in working capital, working capital investment, and average collection period for the treated firms when compared to control firms after the intervention. These figures also suggest that the parallel trends assumption is not violated. When analysing leverage, capex and total employment, only capex seems to increase after the treatment for the treatment group, however, as reported above, this result is not apparent in the regression analysis.

Whether the implemented changes have led to policies that are more efficient or not is not clear though. To test whether firms have indeed moved towards more optimal policies as a response to the treatment, we analyse whether treated firms become more efficient relative to the control group. Given that most firms are private, we do not observe their market values. Hence, we rely on accounting ratios to measure efficiency. Table 7 shows regression on firm performance measured by ROA, ROIC (return on investment capital) and Sales Growth. Columns (1)-(4) show the treatment effect on ROA using OLS and firm fixed effects. We find a positive impact on firm performance between 0.18 and 0.20 using OLS and firm fixed effects respectively. The effect on ROA is also statistically significant at 10%. The effect is equivalent to up to 0.87 standard deviations of ROA.

Columns (5)-(8) show consistent results using a measure of return to capital invested (ROIC). The estimated coefficient is between 1.3 using OLS and 1.5 using firm fixed effects,

which represents between 1.8 and 1.9 standard deviations of ROIC. This effect is statistically significant at 10% level.

Last, we look at sales growth. We find some evidence that treatment firms improved their growth in revenues. The results are sensitive to the specification employed and are only statistically significant when using firm and year fixed effects, and bootstrapped standard errors. Other fixed effects regressions show point estimates that are similar but not statistically significant. The estimated coefficient is between 0.11 and 0.19, which corresponds to up to 0.75 standard deviations of sales growth.

Figure 4 shows average performance for treatment and control groups before and after the treatment took place. The positive impact of the intervention on ROA, ROIC, ROE, Sales growth and Asset turnover is visible in the graphs. ROE and Assets Turnover differences are not statistically significant once regression analysis is employed. The graphical analysis on accounting performance also suggests that the parallel trends assumption is not violated, as treated and control groups seem to follow similar trends before the intervention across the different measures.

Overall results suggest that relaxing constraints on financial expertise of managers can improve firm performance.

5 Conclusion

This paper evaluates the impact of managers' financial expertise on firm financial policies and performance. A randomized controlled trial with 93 medium-size and large companies in Mozambique shows a positive effect on firm return on assets of an 18-hours executive education programme in finance for top managers. Our results suggest that the deficiency of managerial financial expertise at large firms can be an important constraint to firm growth.

Using survey data and firm financial information, we find that managers changed firm financial policies after a financial education intervention. We find a significant and large treatment effect in working capital, changes in working capital and average collection period. We also find some evidence that managers change their capital structure after the treatment.

The effects on working capital management are large and significant: working capital decreases by 0.86 standard deviations for the treated firms when compared to the control group. This is likely to alleviate, at least in the short run, potential financial constraints. The effects on firm performance are economically relevant: ROA increases up to 0.87 standard deviations for treated group when compared to the control firms.

These results confirm that financial expertise of managers has a large impact on firm performance through the adoption of financial practices that promote value creation and alleviate financial constraints at the firm level. Moreover, our results suggest that relatively low-costs interventions such as an 18-hours executive education course on corporate finance and risk management can improve financial practices and decision-making and may ultimately affect economic development. In comparison, the experiment by Bloom et al. (2013) that was carried out in 28 plants operated by 17 firms ran about three years with a total consulting cost of \$1.3 million, approximately \$75,000 per treatment plant and \$20,000 per control plant.

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7 Figures

Figure 1: Timeline

This timeline illustrates the project's field work carried out between June 2015 and November 2018. For each stage, it explains the work performed and the information collected for managers and respective companies.

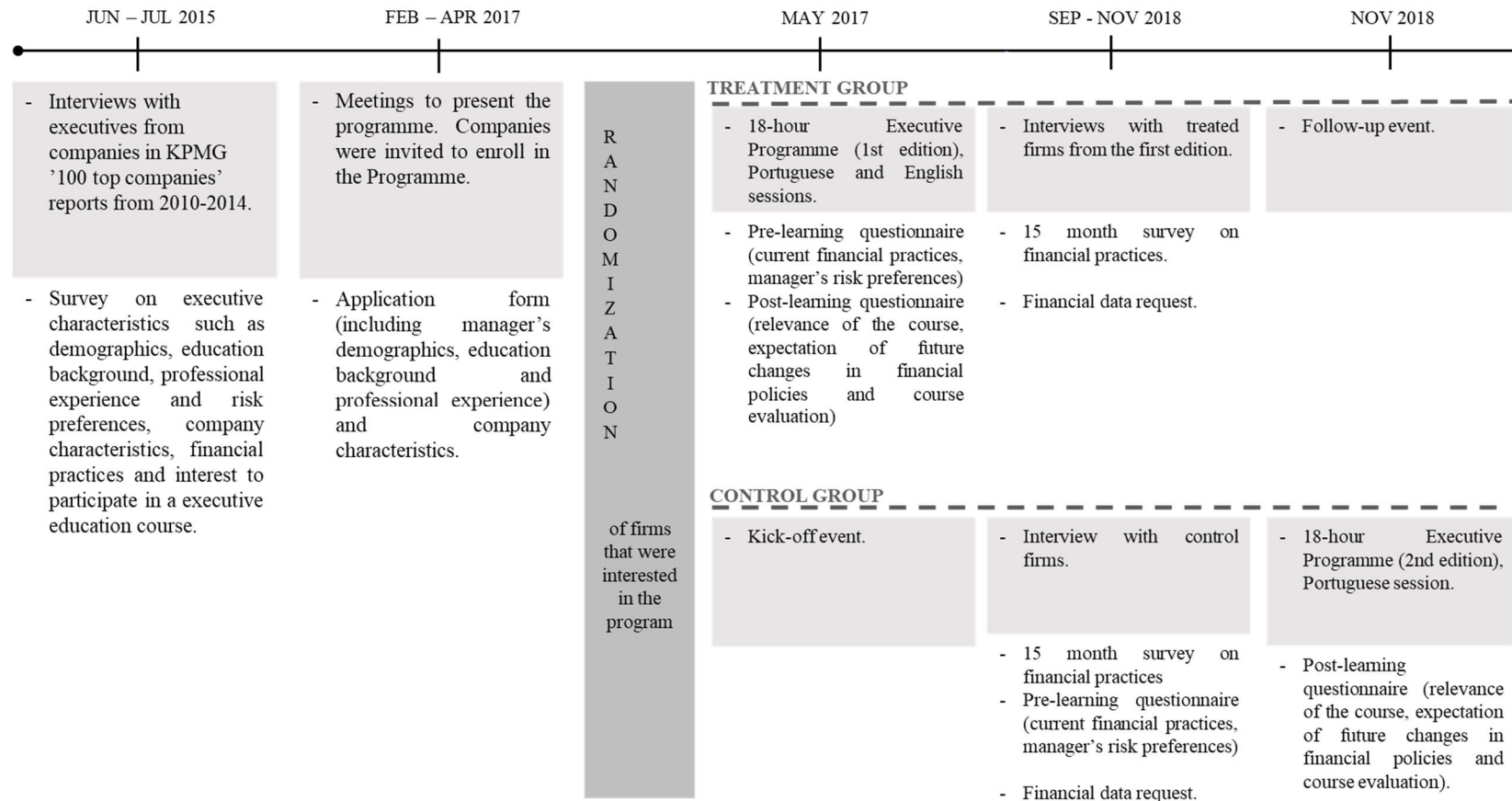


Figure 2: Financial Experience and financial policies

These graphs display the percentage of managers using different valuation techniques. Source: Survey Jun-Jul 2015.

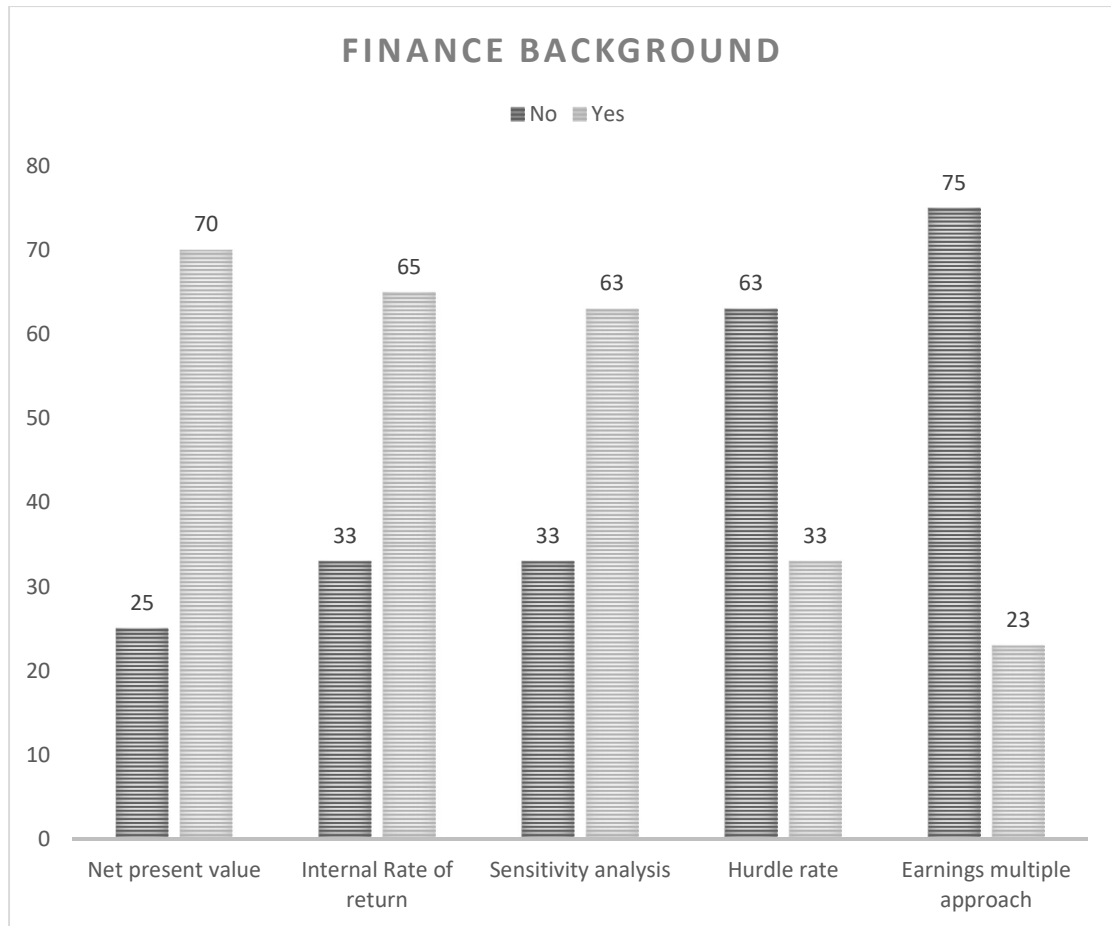


Figure 3: DiD Graphs on Financial Outcomes

The graphs present mean financial outcomes over time for 85 firms included in the treatment and control samples. Financial outcomes are Working capital (lnwc_assets), Changes in working capital (ldeltanwc_assets), Average Collection Period (avgcollectperiod), Leverage (lev), Capital Expenditure (capx_assets) and Number of Employees (logemp). The vertical line corresponds to the date of the treatment

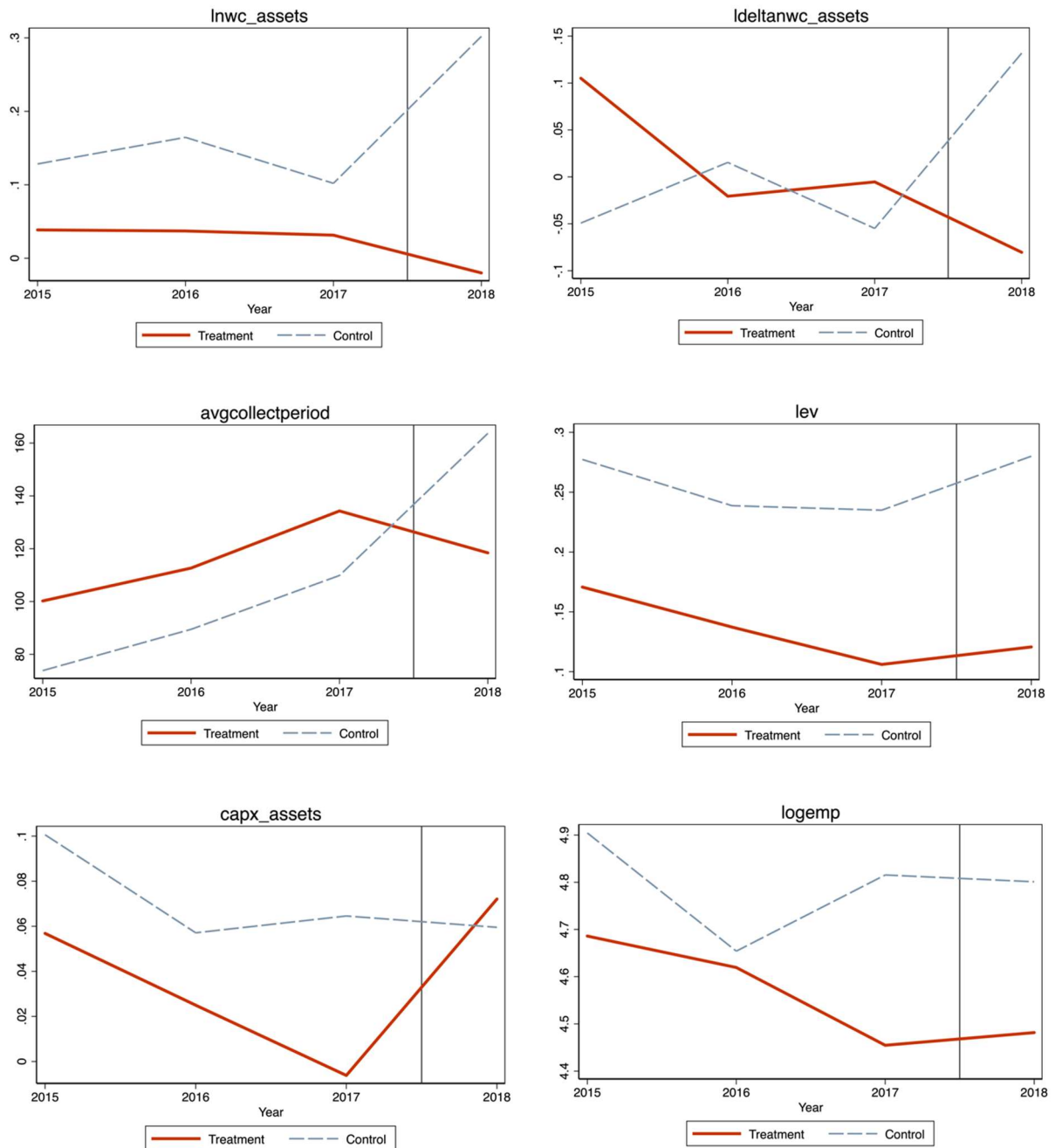
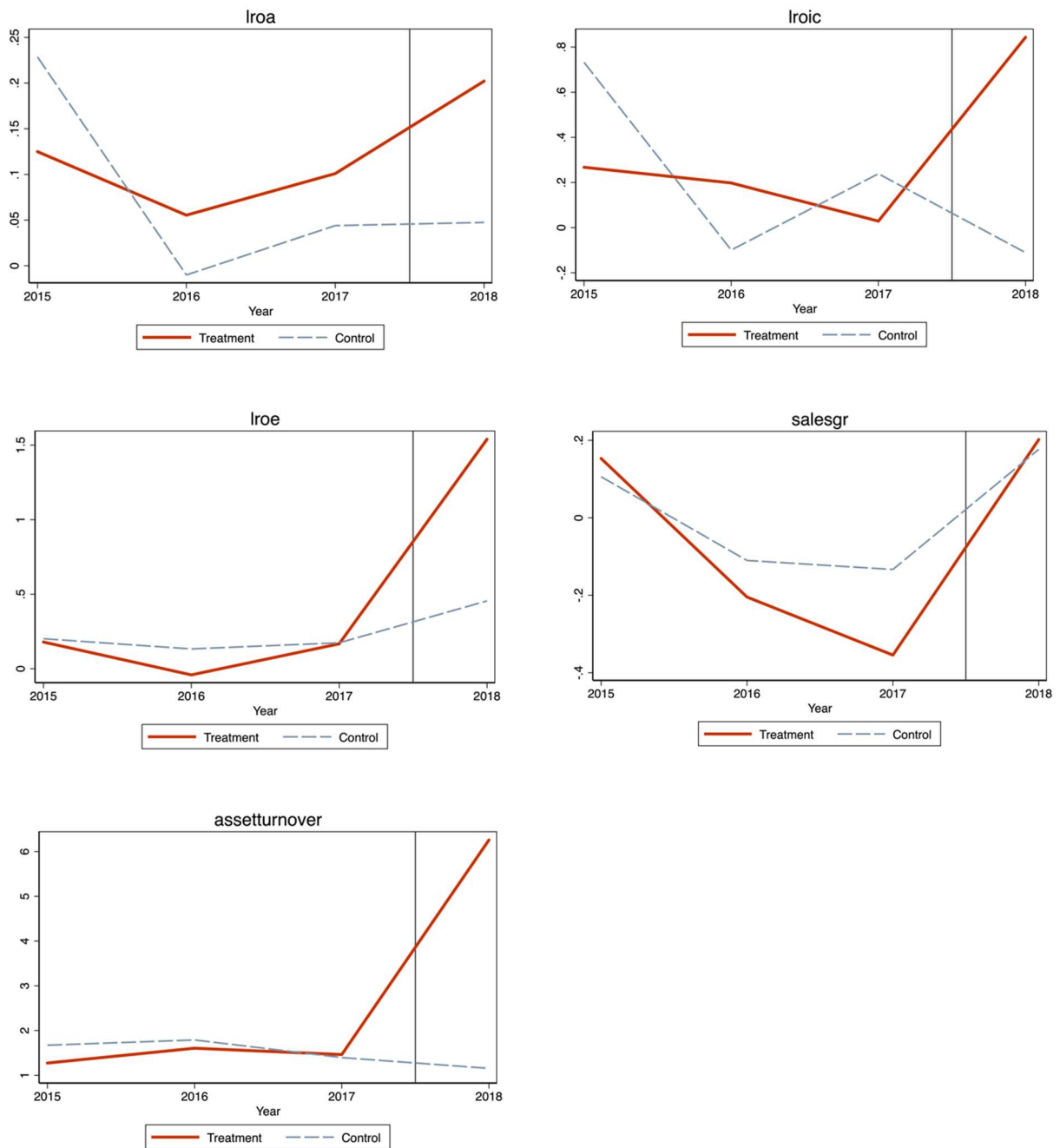


Figure 4: DiD Graphs on Firm performance

The graphs present mean Return on assets (lroa), Return on Invested Capital (lroic), Return on Equity (lroe), Sales growth (salesgr) and Asset turnover (assetturnover) over time for 85 firms included in the treatment and control samples. The vertical line corresponds to the date of the treatment (May 2017).



8 Tables

Table 1: Number of managers and companies participating in the programme

The table displays the number of participating companies at different stages of the project.

Time	What	Firms	Managers
Pre-Treatment	Invitations and applications to the programme; randomization		
	Companies that applied to the programme	93	-
	- Treated companies	45	-
	- Control companies	48	-
	Financial data		
	- Treated companies	36	-
	- Control companies	42	-
Treatment (2017)	Intervention I		
	- Programme attendees	41	46
	- Control event attendees	18	17
Post-Treatment	15month survey		
	- Treated companies	30	22
	- Control companies	39	31
	Financial data		
	- Treated companies	32	-
	- Control companies	35	-

Table 2: Base line summary statistics

Panel A displays summary statistics for the main financial variables of 93 firms participating in the programme (Treated/Control Sample). Financial data is obtained from KPMG ‘Top 100 firms’ Mozambique report, and hand collected. Panel B displays demographic, educational and professional characteristics of managers reported in the application forms for treatment and control firms. Top manager is defined as the most senior participant filling in the application form. The (descending) order of seniority considered is CEO, CFO, accountant or related, other directors or staff and sales manager or related. When more than one manager had a top position due to turnover during the project we considered the manager with the longest reported tenure.

Panel A: Treatment / Control

	Treatment companies			Control companies			Diff. (t-stat.)
	Obs.	Mean	St. Dev.	Obs.	Mean	St. Dev.	
Size (total assets) 000usd	36	55 287	205 410	42	126 334	339 055	71 047.2 (1.10)
Sales 000usd	36	28 638	83 435	42	58 936	132 896	30 298.5 (1.18)
Sales growth	36	-0.33	0.25	38	-0.14	0.76	0.191 (1.44)
Net Working Capital/ Assets	26	0.02	0.31	34	0.12	0.38	0.101 (1.10)
Net Working Capital Change/Assets	25	-0.01	0.21	32	-0.05	0.35	-0.036 (-0.46)
Average Collection period (days)	21	127	122	26	114	104	-13.850 (-0.42)
ROA	35	0.1	0.23	37	0.05	0.22	-0.049 (-0.93)
ROIC	34	0.03	0.72	37	0.25	0.6	0.222 (1.41)
ROE	22	0.15	0.74	30	0.18	2.4	0.031 (0.06)
Leverage	30	0.12	0.26	36	0.23	0.35	0.106 (1.38)
Cash/Assets	21	0.1	0.1	26	-0.02	1.07	-0.119 (-0.51)
# Employees	34	307	679	38	308	541	0.969 (0.01)

Panel B: Treatment / Control (Top Manager)

	Treatment companies		Control companies		Diff. (t-stat.)
	Obs.	Mean	Obs.	Mean	
Male	35	0.83	36	0.75	-0.079 (-0.80)
Age (years)	34	44.35	34	45.26	0.912 (0.40)
Tenure (years)	35	7.76	35	7.60	-0.161 (-0.10)
Nationality					
Mozambican	35	0.57	36	0.78	0.206 (1.88)
Role in the company					
CEO	35	0.20	36	0.14	-0.061 (-0.68)
CFO	35	0.34	36	0.31	-0.037 (-0.33)
Education level					
Higher than Masters	34	0.56	33	0.42	-0.135 (-1.09)
MBA or Ph.D.	34	0.18	33	0.21	0.036 (0.36)
Accounting or Finance Background					
Yes	31	0.77	33	0.73	-0.047 (-0.43)

Table 3: Intention to implement Changes of Corporate Policies (Exit Survey)

The table displays the intentions of managers to change corporate policies. The data was collected in the exit survey at the end of the course. “N/A” means that a corporate policy cannot be changed because firm does not have discretion over that policy (e.g., subsidiary of a foreign firm). “Miss.” refers to a missing answer. Depending on the specification, we disregard this answer in the aggregation or, being conservative, interpret it as a “No”. The left tables show the raw answers of the individual managers. The right tables aggregate answers on firm level. A firm intends to change a policy, if at least one manager intends to do so. Source: Exit survey of cohort 1 (May 2017), Exit survey of cohort 2 (November 2018).

Panel A: Cohort 1 (May 2017)

Managers							Firms								
<i>Intention to implement changes in corporate policies</i>							<i>Intention to implement changes in corporate policies</i>								
	Y	No	N/A	Miss.	#	% Yes	% Yes (incl. missings, excl. N/A)		Yes	No	N/A	Miss.	#	% Yes	% Yes (incl. missings, excl. N/A)
Working capital	27	5	2	6	40	84%	71%	Working capital	22	2	1	2	27	92%	85%
Risk management	22	3	8	7	40	88%	69%	Risk management	18	3	4	2	27	86%	78%
Valuation	15	9	3	13	40	63%	41%	Valuation	14	8	2	3	27	64%	56%
Capital structure	10	6	10	14	40	63%	33%	Capital structure	9	5	9	4	27	64%	50%

Panel B: Cohort 2 (November 2018)

Managers

Intention to implement changes in corporate policies

	Yes	No	N/A	Miss.	#	% Yes	% Yes (incl. missings, excl. N/A)
Working capital	8	3	1	5	17	73%	50%
Risk management	11	3	0	3	17	79%	65%
Valuation	7	4	2	4	17	64%	47%
Capital structure	7	5	2	3	17	58%	47%

Firms

Intention to implement changes in corporate policies

	Yes	No	N/A	Miss.	#	% Yes	% Yes (incl. missings, excl. N/A)
Working capital	7	2	1	3	13	78%	58%
Risk management	9	2	0	2	13	82%	69%
Valuation	5	4	2	2	13	56%	45%
Capital structure	5	4	2	2	13	56%	45%

Panel C: Pooled cohorts 1 & 2

Managers

Intention to implement changes in corporate policies

	Yes	No	N/A	Miss.	#	% Yes	% Yes (incl. missings, excl. N/A)
Working capital	35	8	3	11	57	81%	65%
Risk management	33	6	8	10	57	85%	67%
Valuation	22	13	5	17	57	63%	42%
Capital structure	17	11	12	17	57	61%	38%

Firms

Intention to implement changes in corporate policies

	Yes	No	N/A	Miss.	#	% Yes	% Yes (incl. missings, excl. N/A)
Working capital	28	4	2	5	39	88%	76%
Risk management	27	5	4	3	39	84%	77%
Valuation	18	12	4	5	39	60%	51%
Capital structure	14	9	10	6	39	61%	48%

Table 4: Implemented Changes of Corporate Policies after 15 Months (15M Survey)

The table displays the implemented changes of corporate policies by managers 15 months after the first treatment (May 2017) and before the second treatment in November 2018. The data was collected through a survey in Sep-Oct 2018. “N/A” means that a corporate policy cannot be changed because firm does not have discretion over that policy (subsidiary of a foreign firm). Depending on the specification, we disregard this answer in the aggregation or, being conservative, interpret it as a “No”. The middle of part of the table shows the corresponding answers by control firms (i.e., firms that participated in the experiment but were not taught in the course in May 2017). The right part of the table shows the difference between treatment and control firms and p-values of the corresponding one-sided t-tests. Source: 15M survey (Sep-Oct 2018).

Firms

After 12 months, have you implemented changes in corporate policies?

	<i>Treated</i>					<i>Control</i>					<i>Difference</i>				
	Yes	Yes (b/c of course)	No	N/A	#	% Yes	% Yes (incl. N/A)	Yes	No	#	% Yes	Diff	P(T<t)	Diff (incl. N/A)	P(T<t)
Working capital	8	7	14	4	26	36.4%	30.8%	1	32	33	3.0%	33.3%***	0.00	27.7%***	0.00
Risk management	3	3	19	4	26	13.6%	11.5%	3	30	33	9.1%	4.5%	0.30	2.4%	0.38
Valuation	3	2	19	4	26	13.6%	11.5%	2	31	33	6.1%	7.6%	0.17	5.5%	0.23
Capital structure	3	2	19	4	26	13.6%	11.5%	1	32	33	3.0%	10.6*	0.07	8.5%	0.10

Table 5: Impact on Firm Financial Outcomes (Diff-in-Diff) – Working Capital (Financial Data Regressions)

The table displays the difference in difference estimator for firm financial outcomes. The sample includes treated and control firms that participated in the programme for which financial data is available. Working capital is defined as current assets minus current liabilities divided by total assets of the previous year. Changes in working capital is defined as the difference in working capital in two consecutive years divided by assets of the previous year. Average collection period is defined as account receivables divided by sales and multiplied by 365. The sample period is 2008-2018.

	Working capital				Changes in working capital				Avg. collection period			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment x post	-0.155*	-0.193**	-0.193**	-0.194**	-0.206**	-0.209**	-0.209**	-0.210**	-83.069***	-70.448***	-70.448***	-72.778***
	[-1.767]	[-2.313]	[-2.084]	[-2.322]	[-2.205]	[-2.268]	[-2.314]	[-2.385]	[-3.157]	[-2.811]	[-2.629]	[-2.837]
Treatment	-0.165**				0.013				27.020			
	[-2.206]				[0.598]				[1.005]			
Post	0.138**	0.089	0.089	0.275*	0.128***	0.119***	0.119***	0.027	86.938***	84.770***	84.770***	155.124
	[2.316]	[1.613]	[1.418]	[1.746]	[3.674]	[3.474]	[3.522]	[0.147]	[3.674]	[3.606]	[3.181]	[1.622]
Constant	0.178***				-0.003				85.813***			
	[3.658]				[-0.253]				[5.763]			
Observations	430	430	430	430	406	406	406	406	226	226	226	226
R-squared	0.066	0.016	0.016	0.061	0.021	0.021	0.021	0.045	0.065	0.161	0.161	0.23
Firm fixed effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year dummies	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Bootstrap s.e.	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Clustered s.e. (firm)	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No

Table 6: Impact on Firm Financial Outcomes – Other Financial Polices (Financial Data Regressions)

The table displays the difference in difference estimator for firm financial outcomes. The sample includes 81 treated and control firms that participated in the programme. Leverage is defined as total liabilities divided by assets. Capex is defined as total capital expenditures divided by assets. The sample period is 2008-2018.

	Leverage				Capex			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment x post	-0.044 [-0.661]	-0.019 [-0.386]	-0.019 [-0.427]	-0.021 [-0.456]	-1.687 [-0.671]	-2.444 [-1.158]	-2.444 [-1.294]	-2.303 [-1.213]
Treatment	-0.108* [-1.712]				1.701 [0.676]			
Post	0.051 [0.948]	0.034 [0.977]	0.034 [0.914]	-0.033* [-1.783]	-2.389* [-1.776]	-1.074* [-1.850]	-1.074** [-2.024]	-14.501*** [-2.854]
Constant	0.221*** [4.492]				2.445* [1.818]			
Observations	579	579	579	579	427	427	427	427
R-squared	0.020	0.001	0.001	0.043	0.007	0.004	0.004	0.174
Firm fixed effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year dummies	No	No	No	Yes	No	No	No	Yes
Bootstrap s.e.	No	No	Yes	Yes	No	No	Yes	Yes
Clustered s.e. (firm)	Yes	Yes	No	No	Yes	Yes	No	No

Table 7: Impact on firm performance (Financial Data Regressions)

The table displays the difference in difference estimator for firm financial performance. ROA is defined as operational income (Earnings Before Interest and Taxes) over total assets of the previous year. ROIC is defined as operational income divided by invested capital of the previous year. Invested capital is total assets minus current liabilities. Sales growth is the growth rate in total revenue. The sample includes treated and control firms that participated in the programme for which financial data is available. The sample period is 2008-2018.

	ROA				ROIC				Sales growth			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment x post	0.202*	0.181*	0.181**	0.187*	1.320*	1.467*	1.467**	1.484*	0.113	0.179	0.179	0.188**
	[1.957]	[1.913]	[2.082]	[1.882]	[1.689]	[1.819]	[1.990]	[1.952]	[0.951]	[1.482]	[1.395]	[2.013]
Treatment	-0.056				-0.427				-0.060			
	[-0.658]				[-1.094]				[-1.281]			
Post	-0.178**	-0.192***	-0.192***	-0.123	-0.856**	-0.960**	-0.960**	-1.475	-0.007	-0.081	-0.081	-0.320*
	[-2.482]	[-2.911]	[-3.247]	[-1.245]	[-2.288]	[-2.429]	[-2.389]	[-1.233]	[-0.089]	[-0.977]	[-0.936]	[-1.951]
Constant	0.226***				0.759**				0.128***			
	[2.970]				[2.067]				[4.018]			
Observations	542	542	542	542	527	527	527	527	554	555	556	554
R-squared	0.009	0.016	0.016	0.113	0.011	0.017	0.017	0.043	0.003	0.004	0.005	0.197
Firm fixed effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year dummies	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Bootstrap s.e.	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Clustered s.e. (firm)	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No

9 Appendix

9.1 Mozambique and other Sub-Saharan Economies

Survey statistics collected by the World Bank Enterprise Surveys (2018) suggest that the macroeconomic and investment environment in Mozambique is similar to that of other Sub-Saharan economies (henceforth SSA). In Mozambique, this survey covered 601 large, medium and small firms. In line with the purposes of our study, we have chosen some indicators that allow us to draw such analogy. For instance, regarding general firm characteristics, firms are, on average, 15 years old. In addition, both Mozambique and SSA share similarities in the ownership of firms. About 23% of firms have at least 10% of foreign ownership in Mozambique (16.6% in SSA) and 0.7% are government-owned Mozambique (1.5% in SSA). Lastly, 44.5% of firms have their financial statements reviewed by external auditors in Mozambique, similarly to 48.6% of firms in SSA. Related to human capital, top managers have an average of 15 years of experience in the firms' working sector, both in Mozambique and in SSA. Interestingly, almost 16% of top managers in Mozambique and in SSA are female, a number that is approximates to the one in our sample (about 20%).

Another important comparison is the credit market environment in Mozambique and SSA. Access to credit requires high collateral values (270% of the value of the loan in Mozambique and 220% in SSA). This leaves firms relying mostly on internal funds, 80% in Mozambique and 75% in SSA. Given these constraints in the credit market, 21% of firms in Mozambique use supplier/customer credit to finance working capital similarly to the 25% in SSA.

9.2 Participation in the Treatment

We also analyse the determinants of participation. The information obtained during the exploratory project is useful in this regard, as it allows analysing enrolment rates (second stage) for different manager characteristics (panel A of Table A1). Regarding gender, participation rates is higher among female respondents. Three out of six female participants we interviewed in 2015 ended up enrolling in 2017. The participation rate among male respondents is lower (39%). The participation rate is slightly higher among Mozambican respondents compared to other nationalities. When we analyse the roles, we also observed the enrolment rate is higher if we first met with the CFO (45%) then with general managers/CEO. The breakdown according to the maximum education attainment reveals that the participation rate is not monotonically related to education. Among participants with any higher education degree (excluding PhD), the enrolment rates vary between 37% to 47%. This pattern contrast with participants without

any higher education degree (20%). Finally, we observe whether participation rates vary according to previous attendance of finance or accounting courses. We observe the course seems to be more attractive to the group of respondents that have no previous background in those fields (67%) compared to the ones who do (36%).

In panel B of Table A1, we do a similar exercise now based on firm characteristics. We report the difference in means for several financial variables between companies that enrol and did not enrol in the experiment. All values are from the 2015 KPMG report, the most recent report available at the time of enrolment in the experiment. Companies that enrolled tend to be smaller companies (based on total assets, number of employees or sales growth), even though the difference is not significant comparing total revenue volume. We find that companies with lower net income in 2015 are more likely to participate. In fact, the average net income among the enrolment group is negative. We do not find any significance difference on return on assets (ROA), leverage or investment opportunities (capital expenditures/total assets) across the two groups

Table A1: Base line summary statistics and take up analysis

Panel A displays summary statistics for the main financial variables of 93 firms participating in the programme (Treated/Control Sample), and for firms that did not enrol in the programme. Financial data is obtained from KPMG ‘Top 100 firms’ Mozambique report, and hand collected. Panel B displays demographic, educational and professional characteristics of all managers reported in the application forms.

Panel A: Enrolment in the Programme: Firms

	Companies that enrolled in the Programme			Companies that did not enroll in the Programme			Diff
	Obs.	Mean	St. Dev.	Obs.	Mean	St. Dev.	
Size (total assets) 000usd	81	90 172	280 889	170	81 696	260 364	-8 475.7
Sales 000usd	81	43 367	111 291	169	29 396	85 544	-13 970.8
Sales growth	77	-0.24	0.57	132	-0.14	0.62	0.106
Net Working Capital/ Assets	60	0.07	0.35	69	0.01	0.32	-0.0598
Net Working Capital Change/Assets	57	-0.03	0.29	67	0.02	0.16	0.0539
Average Collection period	47	120	111	-	-	-	-
ROA	75	0.06	0.24	132	0.07	0.33	0.00570
ROIC	74	0.12	0.7	131	0.15	1.39	0.0263
ROE	52	0.17	1.87	68	0.24	1.55	0.0663
Leverage	69	0.17	0.31	167	0.19	0.32	0.0186
Cash/Assets	47	0.03	0.79	-	-	-	-
# Employees	75	300	595	169	446	1 338	145.5

Panel B: Enrolment in the Programme (all managers interviewed in exploration stage)

	Companies that Enrolled in the Programme		Companies that did not enroll in the Programme		Diff.
	Obs.	Mean	Obs.	Mean	
Male	25	0.88	38	0.92	0.0411
Age (years)	25	46.32	38	48.08	1.759
Tenure (years)	25	4.68	38	5.76	1.083
Nationality					
Mozambican	25	0.52	38	0.47	-0.0463
Role in the company					
CEO	25	0.36	38	0.50	0.140
CFO	25	0.6	38	0.47	-0.126
Education level					
Higher than Masters	25	0.68	38	0.68	0.00421
MBA or Ph.D.	25	0.16	38	0.18	0.0242
Accounting or Finance Background					
Yes	25	0.76	37	0.92	0.159

Table A2: Impact on firm policies and performance (2013-2018 period)

The table displays the difference in difference estimator for firm financial outcomes. The sample includes treated and control firms that participated in the programme for which financial data is available. The sample period is 2013-2018.

Panel A: Working capital policies

	Working Capital		Changes in working capital		Avg. collection period	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment x post	-0.184** [-2.274]	-0.184** [-2.081]	-0.224** [-2.282]	-0.224** [-2.286]	-70.448*** [-2.811]	-70.448*** [-3.061]
Observations	290	290	273	273	226	226
R-squared	0.027	0.027	0.031	0.031	0.161	0.161
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No	No	No
Bootstrap s.e.	No	Yes	No	Yes	No	Yes
Clustered s.e. (firm)	Yes	No	Yes	No	Yes	No

Panel B: Firm Performance

	ROA		ROIC		Sales growth	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment x post	0.178** [2.034]	0.178** [2.435]	1.442* [1.901]	1.442* [1.771]	0.198 [1.541]	0.198 [1.602]
Observations	335	335	330	330	345	345
R-squared	0.018	0.018	0.031	0.031	0.02	0.02
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No	No	No
Bootstrap s.e.	No	Yes	No	Yes	No	Yes
Clustered s.e. (firm)	Yes	No	Yes	No	Yes	No

Table A3: Impact on working capital policies and firm performance (KPMG, and non-financial firms only)

The table displays the difference in difference estimator for firm financial outcomes. Panel A The sample includes treated and control firms that participated in the programme for which financial data is available. Panel A shows firms for which KPMG collects annual financial data. Panel B excludes all financial firms. The sample period is 2008-2018.

	ROA		ROIC		Sales growth		Working Capital		Changes in working capital		Avg. collection period	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	<i>Panel A: KPMG sample</i>											
Treatment x post	0.165*	0.165*	1.622*	1.622*	0.182	0.182*	-0.241***	-0.241***	-0.253**	-0.253**	-60.611**	-60.611**
	[1.672]	[1.659]	[1.911]	[1.815]	[1.487]	[1.700]	[-2.967]	[-3.006]	[-2.637]	[-2.419]	[-2.328]	[-2.283]
Observations	531	531	516	516	539	539	415	415	391	391	207	207
R-squared	0.015	0.015	0.019	0.019	0.003	0.003	0.025	0.025	0.029	0.029	0.145	0.145
	<i>Panel B: Excluding all financials</i>											
Treatment x post	0.190*	0.190**	1.580*	1.580**	0.133	0.133	-0.194**	-0.194**	-0.199**	-0.199*	-76.920***	-76.920***
	[1.864]	[1.988]	[1.820]	[2.042]	[1.095]	[1.251]	[-2.137]	[-2.010]	[-2.032]	[-1.839]	[-2.837]	[-2.817]
Observations	504	504	489	489	516	516	393	393	370	370	209	209
R-squared	0.016	0.016	0.019	0.019	0.003	0.003	0.015	0.015	0.019	0.019	0.173	0.173
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No	No	No	No	No	No	No	No	No
Bootstrap s.e.	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Clustered s.e. (firm)	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No

Table A4: Impact on firm policies and performance – alternative variable definitions

The table displays the difference in difference estimator for firm financial outcomes. The sample includes treated and control firms that participated in the programme for which financial data is available. The sample period is 2008-2018. ROA' is defined as EBIT divided by assets in the same period. Working Capital/Sales is defined as Working capital (Current Assets – Current Liabilities) divided by total sales in the same period.

	ROA'		Working Capital/Sales	
	(1)	(2)	(5)	(6)
Treatment x post	0.169*	0.169*	-0.426***	-0.426***
	[1.983]	[1.906]	[-2.777]	[-2.801]
Observations	633	633	489	489
R-squared	0.014	0.014	0.041	0.041
Firm fixed effects	Yes	Yes	Yes	Yes
Year dummies	No	No	No	No
Bootstrap s.e.	No	Yes	No	Yes
Clustered s.e. (firm)	Yes	No	Yes	No
Firm size control	No	No	No	No

Table A5: Impact on firm policies and performance on working capital policies and firm performance controlling for firm size

The table displays the difference in difference estimator for firm financial outcomes. The sample includes treated and control firms that participated in the programme for which financial data is available. The sample period is 2008-2018. All regressions include the log of assets as a control variable.

Panel A: Working capital policies

	Working capital	Changes in working capital	Avg. collection period
	(1)	(2)	(3)
Treatment x post	-0.178** [-2.032]	-0.208** [-2.144]	-70.141** [-2.206]
Observations	415	406	226
R-squared	0.047	0.045	0.231
Firm fixed effects		Yes	
Year dummies		Yes	
Bootstrap s.e.		Yes	
Clustered s.e. (firm)		No	

Panel B: Firm Performance

	ROA	ROIC	Sales growth
	(1)	(2)	(3)
Treatment x post	0.197* [1.926]	1.472** [2.162]	0.216* [1.723]
Observations	542	527	553
R-squared	0.114	0.043	0.197
Firm fixed effects		Yes	
Year dummies		Yes	
Bootstrap s.e.		Yes	
Clustered s.e. (firm)		No	