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The Impact of Consulting Services on Small and Medium Enterprises: Evidence from a Randomized Trial in Mexico

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The Impact of Consulting Services on Small and Medium Enterprises: Evidence from a Randomized Trial in Mexico [1]

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Abstract

We test whether managerial human capital has a first order effect on the performance and growth of small enterprises in emerging markets. In a randomized control trial in Puebla, Mexico, we randomly assigned 150 out of 432 small and medium size enterprises to receive subsidized consulting services, while the remaining 267 enterprises served as a control group that did not receive any subsidized training. Treatment enterprises were matched with one of nine local consulting firms and met with their consultants once a week for four hours over a one year period. Results from a follow-up survey, conducted after the intervention, show that the consulting services had a large impact on the performance of the enterprises in the treatment group: monthly sales went up by about 80 percent; similarly, profits and productivity increased by 120 percent compared to the control group. We also see a significant increase in the entrepreneurial spirit index for the treatment group, a set of questions designed to illicit the SME owners' confidence in their ability to manage their business and deal with any future difficulties. However, we do not find any significant increase in the number of workers employed in the treatment group.

Keywords: Enterprise growth; entrepreneurship; managerial capital

JEL Codes: D21, D24, L20, M13, O12

1. Introduction

A large literature in development economics and entrepreneurship aims to understand the impediments to firm growth, especially for small and medium size enterprises. Financial constraints are often put forward as a central obstacle to firm growth. The empirical literature has documented these constraints at the micro level (see Banerjee et al 2010, de Mel et al 2008, and Karlan and Zinman 2011) as well as at the macro level (see for example King and Levine 1993 or Rajan and Zingales 1998).

However, capital alone cannot generate growth; one must also know how to use it. Bruhn, Karlan and Schoar (2010) discusses at more length the role of "managerial capital" as a key component for enterprise development, distinct from human capital. We argue that managerial capital can directly affect the firm by improving the strategic and operational decisions, but it also affects the productivity of other factors such as physical capital and labor by helping to use them more efficiently. Recent work by Bertrand and Schoar (2003), Bloom and Van Reenen (2007 and 2010), and Bennedson et al (2007) shows enormous heterogeneity in management practices and CEO styles across firms. But a central question remains: is this observed heterogeneity a reflection of an optimal match between the underlying fundamentals of different firms and the adequate level of management given the firm's state of development? Or are differences in management style and lack of managerial capital a first order impediment to firm growth and profitability? Managers in developing countries might be constrained in the acquisition of these skills, if such skills require either formal training or experience in other well-run enterprises, or both (see for example Gompers, Lerner, and Scharfstein 2005 or Caselli and Gennaioli 2005).

We test if lack of managerial capital has a first order effect on the performance and growth of small enterprises in emerging markets. We focus on small businesses since in this setting the owner/manager can easily be determined as the main decision maker, and in addition these enterprises are often seen as having the most potential for scale up if bottlenecks to their growth can be removed. In order to test this idea more systematically we set up a randomized control trial in Puebla, Mexico, where 432 small and medium size

enterprises applied to receive subsidized consulting services, and 150 out of the 432 were randomly chosen to receive the treatment. The remaining 267 enterprises served as a control group that did not receive any subsidized consulting services. Treatment enterprises were matched with one of nine local consulting firms based on the specialized services they needed. On average, enterprises met with their consultants once a week for four hours over a one year period. The enterprise owner and consulting firm decided jointly on the focus and scope of the consulting services.

This intervention is a joint test of two closely related dimensions: On the one hand we aim to establish if managerial capital is a limiting factor in the growth of enterprises. But the test at the same time depends on whether this knowledge can be conveyed via a consulting intervention in the first place. We cannot test separately the above two questions. For example, it could be that managerial capital is indeed a hindrance to growth, but it might not be possible to transfer this knowledge by simply providing consulting services. Therefore, failure to find a result here would not prove that managerial capital does not matter, since failure to find a result may simply mean that this program was not effective in the transmission of managerial skills (or that managerial skills are innate skills and simply not teachable). Our results can only be interpreted as a reduced form of the effects of managerial capital as provided through a consulting intervention.

We find that our consulting intervention had a large impact on the performance of the enterprises in the treatment group: monthly sales went up by about 80 percent; similarly, profits and productivity increased by 120 percent and one fifth of a standard deviation, respectively, compared to the control group. However, we do not find any significant increase in the number of workers employed in treatment enterprises. The results of the intervention are quite large but we believe that they are reasonable given the context of the intervention: The enterprises in our sample were started by people who are not professional managers and many of them had not received any formal management training at all prior to our intervention.

When looking at the process by which these changes are brought about we find that enterprises in the treatment group show a significant increase in their likelihood to engage in marketing efforts and are more likely

to keep formal accounts about their firms. But we also test for several other changes in business processes and do not find any consistent pattern. We do however find a pronounced impact on an index of what we call "entrepreneurial spirit". This index is a combined measure of answers to a set of questions on the enterprise owner's beliefs about their ability to control the success of their business (or whether they are merely subject to external forces outside of their control) and on the owner's drive for success[2]. The increase in this index might reflect the fact that enterprise owners set new goals as part of the program and that consultants helped to provide motivation and strategy for how to achieve these goals. In addition, enterprise owners' increased confidence in their ability to control the success of their business could be driven by having better command of management tools such as marketing and bookkeeping. Additional support for this interpretation might be derived from the fact that businesses in the treatment group report no significant drop in sales but proactively adjust to the 2008 economic crisis by cutting costs.

Research and practice have recently seen a flurry of programs focused on developing managerial capital for microenterprises (i.e. enterprises typically with zero employees, or under five at the most). The interventions vary widely in the scope of the management skills that are transmitted and the type of enterprises that are targeted. The training is typically provided as in-class training, often linked with a microcredit program. For example, Karlan and Valdivia (2010) and Drexler, Fischer and Schoar (2010) evaluate in-class programs. These papers show that traditional microenterprise training seems to affect the command of accounting practices for microenterprises, but haslimited to no effects on actual firm outcomes and performance. Drexler, Fischer and Schoar finds that a rule of thumb based training program that focuses strictly on separating business from household money appears to have a more significant impact on firm sales and savings. More recently, Bruhn and Zia (2011) and Gine and Mansuri (2011) also find that in-class training for microentrepreneurs leads to improvements in business practices but has only limited effects on business performance and sales.

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[2] See Appendix 1 for the list of questions used to construct the entrepreneurial spirit index.

Bloom et al (2010) is more closely rated to our study in that they evaluate the impact of intensive consulting services from an international management consulting firm on the business practices of large Indian textile firms. The average firm in their sample has about 270 employees, whereas the average number of employees in our study is 14. Bloom et al find that even these larger firms were unaware of many modern management practices, and treated plants improved their management practices during the intervention. The approaches of Bloom et al and this study are complementary in nature: Bloom et al focuses on a small set of large firms in one industry, textile manufacturing, with a tightly defined intervention by a major international consulting firm. The current study includes a larger set of firms and industries (close to 400 firms compared to 20 experimental plants in Bloom et al and employs a heterogeneous set of local consulting firms.

The remainder of this paper is structured as follows: In Section 2, we describe the subsidized consulting program. Section 3 discusses the experimental setup, data collection, and characteristics of our sample. Section 4 gives the results, examining both business outcomes and business process variables. Section 5 asks why more enterprises do not use consulting services, i.e., given these results, what are the possible market failures in the consulting services industry? Section 6 concludes.

2. Consulting Program

We conducted a randomized control trial in collaboration with the Puebla Institute for Competitive Productivity (known as IPPC, after its Spanish acronym), a training institute set up by the Ministry of Labor of the Mexican State of Puebla. IPPC implemented a business development program to provide participating enterprises with subsidized consulting services from one of a number of local consulting firms. The program, which started in March 2008 and ended in February 2009, aimed to include 100 micro, 40 small, and 10 medium-sized enterprises[3] and actually included 108 micro enterprises, 34 small enterprises and 8 medium-size

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[3] As defined by the Mexican Ministry of the Economy, micro enterprises have up to 10 full-time employees. Small enterprises have between 11 and 50 full-time employees in the manufacturing and services sectors and between 11 and 30

enterprises. The primary goal was to help enterprises reach the next size category by the end of the program and thus contribute to job creation and economic growth of the region.

Consultants were asked to (1) diagnose the problems that prevented the enterprises from growing, (2) suggest solutions that would help to solve the problems and (3) assist enterprises in implementing the solutions. The consultants dedicated four hours per week to each enterprise on average. The program was originally intended to last two years but ended prematurely after one year due to government funding issues. Thus the implementation phase was shortened.

The consulting services were highly subsidized by the State of Puebla. Micro enterprises paid only 10 percent of the market cost of the consulting services, small enterprises 20 percent, and medium sized enterprises about 30 percent. The unsubsidized cost of the consulting services varied by firm size but was equivalent to about US$57[4] per hour on average, amounting to US$11,856 per firm for one year (4 hours for 52 weeks).

Consulting firms were selected through a competitive bidding process. In response to a call for proposals put out by IPPC, eleven consulting firms submitted proposals to participate in the program. Two firms were eliminated based on inadequate references from former clients. The majority of the participating firms were private local consulting firms that usually work with micro, small, and medium size enterprises.

At the beginning of the program, principal decision makers, as well as most employees, from all program enterprises completed a computerized test that determined their individual strengths and talents. This test was based on Gallup's StrengthFinder method and IPPC was licensed to conduct this test in Puebla. IPPC encouraged enterprises to use the results of this test to help assign employees to responsibilities based on their strengths as identified by the StrengthFinder method. The consultants were trained in helping the enterprises interpret and apply the results to their labor decisions. For example, one talent was "communication" whereas another was

full-time employees in the commerce sector. Medium size enterprises have up to 100 full-time employees in the service and commerce sectors and up to 250 full-time employees in the manufacturing sector.
[4] 700 Mexican Pesos (MXP)

"operations". Employees with the communication talent were particularly suited to interacting with clients, while employees with the operations talent would do well at record keeping and accounting.

Apart from the employee talent diagnostic, the content of the consulting varied across enterprises depending on their needs. In order to gain an understanding of the issues that enterprises worked on with their mentors, we conducted in-depth case studies of eight treatment enterprises. Table 1 lists the areas that these eight enterprises covered with their consultants, along with the number of enterprises that worked on each topic. Almost all enterprises started by establishing mission and vision statements with their consultants, setting specific goals for what they wanted to achieve in the future and throughout the program. Most enterprises also worked on improving accounting and record keeping (through training and/or use of new software), clearly assigning staff responsibilities, and sales strategy and advertising. Apart from these common topics, the remaining topics covered are diverse, including optimizing the number and location of points of sale, quality control, access to credit or alternative financing solutions, pricing strategy, team work and leadership training. This reflects the fact that the consultants tailored their advice to each enterprise's individual challenges, leading them to work on different areas with each enterprise.

3. Experimental Setup and Data

For the implementation of the program, IPPC advertised the program throughout the State of Puebla via various media outlets in order to attract an initial sample of interested micro, small, and medium enterprises. In response to the advertising, 432 enterprises expressed interest in the program and signed a letter of interest. A baseline survey of these interested enterprises was conducted between October and December 2007. This survey collected information on enterprise characteristics and performance, as well as on business practices and characteristics of the enterprise's principal decision maker (typically the owner or manager).

Using data from the baseline survey, 150 enterprises were randomly selected to participate in the program[5]. The randomization was stratified by sector (manufacturing, services, and commerce) and enterprise size (micro, small, and medium-sized)[6], conducted through a Stata program that was run on the premises of IPPC in the presence of government officials and a public notary, who certified that the assignment to the treatment group was random, i.e., not re-run depending on any particular assignments.

Out of the 150 enterprises in the treatment group, 80 chose to take up the consulting services[7]. The remaining treatment group enterprises declined to participate in the program although they had initially signed a letter of interest saying that they would participate if offered a spot. Most enterprises that chose not to participate said their financial situation had changed since they signed the letter of interest and they no longer had sufficient funds to pay the fee (albeit subsidized) for the consulting services. IPPC paired the 80 treatment

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[5] We originally had 434 observations in the randomization and assigned 150 of them to treatment, but we later discovered that two firms had expressed interest in the program twice under separate names. For this reason, we had to drop two observations, giving us 432 unique firms. In one of the cases, both separate names were in the control group, and we dropped one of these. In the other case, one name was assigned to the treatment group and the other to the control group. Here, we had to keep the firm in the treatment group since they had already been notified that they had been randomly selected to participate in the program.

[6] Within strata, we re-randomized until the maximum t-statistic on the differences in averages across the treatment and control groups of the following variables was above 1.25 and the average t-statistic was above 0.35: Within Puebla City dummy, business age, total asset value, profit margin, measured risk aversion, entrepreneurial spirit index, currently has a loan from a financial institution dummy, principal decision maker's hours worked, principal decision maker's age, principal decision maker's gender, principal decision maker's years of schooling, principal decision maker is of indigenous background dummy, as well as two dummies indicating whether the firm has participated in other IPPC programs.

[7] Due to an administrative error, there was also one control group firm that was invited to participate, and did, in the program. For analysis purposes, we adhere to the random assignment and this enterprise is included in the control group.

group enterprises that took-up the program with consulting firms according to the consultants' sector and enterprise-size expertise, as well as geographic restrictions.

Table 2 provides summary statistics of baseline characteristics for enterprises and their principal decision makers in the treatment and control groups. About 30 percent of enterprises in each group operated in the manufacturing sector, 25 percent in the commerce sector, and 45 percent in the services sector. On average, the enterprises in the study had about 14 full-time paid employees and were slightly over 10 years old. The enterprises' principal decision makers were on average 43 years old, 72 percent of them were men, and they had completed 16 years of schooling.

Panel C of Table 2 displays our main measures of business performance, starting with last month's sales. This variable varies widely in our sample. At baseline, average last month's sales in the treatment group was US$76,343 with a standard deviation of 283,025, and US$50,844 in the control group, with a standard deviation of 119,987. To reduce the noise in this variable, we drop the top one percent of outliers, after controlling for enterprise size group (micro, small, and medium size, as defined above). This reduces the standard deviation by a factor of about three in the treatment group and by 1.3 in the control group. The averages of the trimmed variables are more similar across the treatment and control groups (US$40,479 and US$46,113, respectively) than for the untrimmed variable.

We use two different measures of profits in this paper. The first one is calculated as last month's sales minus costs. The second one is calculated based on last month's sales and reported profit margin, where the profit margin was obtained by asking "For every 100 pesos of sales/revenue, how many pesos of costs does the business have?"[8] De Mel, McKenzie, and Woodruff (2009) use a similar question when measuring profits to adjust for differences in the timing of inputs and sales of outputs[9]. One important difference between our two measures of profits is that profits calculated from profit margin and sales do not have negative values since the

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[8] The formula used to calculate these profits is: Profits=Sales*(1-"Pesos of costs per 100 pesos in sales"/100).
[9] De Mel, McKenzie and Woodruff (2009) also suggest asking business owners directly what their profits are as an alternative to calculating profits based on underlying variables. We tried this approach but had a very high non-response rate to this question.

respondents did not report costs higher than 100 pesos in the profit margin question. Profits calculated as sales minus costs, on the other hand, do have negative values. Thus we also report treatment effects for the log of the second method, but not the first.

We calculate two separate measures of enterprise productivity. The first is the residual from a regression of log sales on log employees and log business assets. The second is return on assets (ROA), defined as profits (calculated as sales minus costs) divided by business assets.

Similarly to sales, the variances of profits, assets, productivity and ROA are large. For this reason, we include the averages of the one percent trimmed variables in Table 2, dropping the top and bottom one percent of outliers for profits calculated as sales minus costs, productivity and ROA. For assets and for profits calculated based on profit margin and sales, we only drop the top one percent of outliers since these variables are bounded below by zero. Overall, the averages of the one percent trimmed variables are very similar across the treatment and control groups.

In Table 3, we examine whether the baseline characteristics summarized above predict which enterprises in the treatment group decided to participate in the consulting program. Column 1 includes only enterprise and principal decision maker background characteristics. In Column 2, we add business performance variables to the estimation. The results reveal three strong predictors of take-up. First, enterprises with a male principal decision maker were about 20 percentage points more likely to participate in the program than enterprises with a female principal decision maker. Second, enterprises with higher sales, as well as enterprises with higher productivity, have higher take-up rates. We also find weak evidence that older principal decision makers were less likely to take-up the program.

We conducted a follow-up survey between March and May 2009 (i.e., one to three months after the intervention ended, which is 12-15 months after the intervention began), re-interviewing 378 enterprises or 88 percent of the 432 enterprises interviewed at baseline, to measure the impact of the consulting services on business outcomes. Out of the 54 enterprises that could not be re-interviewed, eleven enterprises were

confirmed closed[10], 31 declined to participate in the interview[11] and seven enterprises could not be tracked down despite repeated contact attempts. The remaining five enterprises had merged with another enterprise – one of them with an enterprise outside our sample and two with two other enterprises in the sample. For these five enterprises, we were not able to obtain separate data for the unit corresponding to the original enterprise, and thus they are not included in the analysis. We provide an analysis of attrition rates and correlates with baseline information in the appendix. We show that there are no differential attrition rates across treatment and control groups; neither do we see compositional shifts.

4. Results and Discussion

Our main specification uses OLS regressions for the various outcome measures on an indicator variable for whether the enterprise was assigned to the treatment rather than the control group. The coefficients on this indicator variable are displayed in Tables 4 through 6 and represent the intention-to-treat effect of the consulting program. In all regressions, we control for strata dummies and re-randomization variables[12], as suggested in Bruhn and McKenzie (2009). We also include the baseline outcome variable as an additional control variable and show the results with and without this control. For observations where the baseline value of the outcome is missing, we replace this value with zero and include a dummy variable indicating that the value is missing, in order to keep the observation in the sample.

4.1 Business Performance

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[10] We verified with the former principal decision maker and/or neighbors that these enterprises had indeed closed. In the empirical analysis, we replaced employees, sales, costs, and assets for these enterprises with zero. The percentage of closed enterprises was lower in the treatment group (1.4 percent) than in the control group (3.3 percent). However, the difference is not statistically significant.
[11] The percentage of enterprises that refused the interview was slightly higher in the control group (8.7 percent) than in the treatment group (5.6 percent), but the difference between these two numbers is not statistically significant.
[12] Due to baseline data entry typos that were discovered and corrected after the randomization took place, a few values of the variables included in the randomization procedure do not correspond to the true baseline values. The strata dummies and re-randomization controls included in the regressions, contain the values originally used in the randomization procedure. All other baseline data used in the summary statistics and regressions, , contains the true baseline values.

The results in Columns 1 and 2 of Table 4 suggest that the consulting program increased monthly profits, calculated based on sales and profit margin, by about 120 percent. Profits, calculated as sales minus costs, are also higher in the treatment group than in the control group by about US$5,400. This effect is, however, not statistically significant, possibly due to the noise in this measure. Unlike profits calculated based on sales and profit margin, we cannot use the log of sales minus costs to reduce the influence of outliers since this variable has negative values. In order to check whether results are robust to outliers, we estimate the results for one percent trimmed variables (Columns 3 and 4) and for two percent trimmed variables (Columns 5 and 6). The effect of the consulting program on profits calculated as sales minus costs is positive in all three samples but is only statistically significant in the one percent trimmed sample, and the magnitude of the effect varies from US$4,300 to US$7,750. The effect on log profits calculated based on sales and profit margin, on the other hand, is robust in size and is statistically significant at the five percent level in all three samples.

Table 1 also shows a positive impact of the consulting on sales, of about 80 percent, but the effect is only marginally statistically significant in the full sample, at the 12.1 percent level without controlling for the baseline sales, and at the 10.3 percent level, after controlling for baseline sales.

The results in Table 1 further suggest that the consulting improved enterprise productivity as measured by the residual from a productivity regression and also as measured by ROA, by about one fifth of a standard deviation. In contrast, Table 1 does not show any statistically significant effect on employment. This could be due to the fact that the consulting ended after one year instead of two as initially planned. A one-year follow-up period may also be too short to expect an effect on slow moving variables, such as employment; having said that, it makes it clear that the consulting was not directly attending to labor market failures, i.e., in helping enterprises learn how to hire and train workers.

Overall, the results suggest that the consulting did improve business outcomes for the enterprises in the treatment group. However, the effects on sales and productivity are only statistically significant at the 10

percent level, likely because the data are quite noisy and the sample size is relatively small. Many enterprises in treatment and control group do not report sales, costs, and assets, further reducing the sample size.

Our estimated effects of the consulting on sales and profits of 80 and 120 percent, respectively, are large compared to the estimated impacts of improved access to capital and of business training for small businesses found in the literature. De Mel, McKenzie, and Woodruff (2008) estimate a return to capital of five percent for Sri Lankan microenterprises, McKenzie and Woodruff (2008) find 20-33 percent return to capital in Mexico, and Udry and Anagol (2006) find 60 percent for Ghana. Banerjee and Duflo (2004) estimate an elasticity of sales with respect to bank credit of 0.75 for large Indian enterprises. Bruhn and Zia (2011) detect an increase in profits of 53 percent for entrepreneurs with ex-ante high levels of financial literacy who participated in a classroom-based business training program. One concern could be that there might be potential demand effects in the survey response if treatment enterprises overstate their outcomes to justify receiving subsidized consulting services. This could possibly inflate the effects on the outcomes for the treatment group. While we tried to provide positive incentives to answer the surveys even for the firms in the control group by promising them preferential access to future consulting programs, there still might have been a differential bias between treatment and control groups.

4.2 Process Variables

In order to investigate the channels that drive the observed effects on sales, productivity, and profits, we now study how the consulting program changed processes within the enterprise. We measure these processes as follows. First, the surveys asked enterprise owners whether or not they implemented certain changes during the past year, such as developing new products, attracting new investors, and launching a new marketing campaign. Note that if treatment enterprises believed they should please the program by reporting process changes that did not actually occur, these estimates will be upwardly biased.

Second, we constructed an entrepreneurial spirit index, developed in collaboration with IPPC. This index is based on the answers to the eight questions listed in Appendix 1, which intend to capture entrepreneurial

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attitudes of the principal decision maker, and is generated using Principal Components Analysis (PCA). Third, we use a PCA human resources management index based on the six questions listed in Appendix 1. Fourth, we asked enterprise owners how they keep their accounts and classify accounting practices as formal if they use either an accountant or a computerized system as opposed to keeping handwritten or no notes at all.

Table 5 displays the treatment effects on business process variables. We only find statistically significant improvements in three processes: made a new marketing effort (13 percentage points increase), entrepreneurial spirit index (17 percent of a standard deviation increase), and the percent of enterprises that keep formal accounts (7 percentage points increase). Other processes examined in Table 5, such as registering a patent, developing new products or attracting new investors, do not appear to be changed significantly. These could be more difficult to detect since they are more heterogeneous across enterprises, or require a longer time to change than is observable in the treatment period. In addition, since the content of the consulting was tailored to each firm's needs it is perhaps not surprising that we do not see improvements in some of the processes in Table 5, on average. But it is puzzling that treatment enterprises do not report acquiring new clients at a higher rate than enterprises in the control group. Either the estimated increase in sales and profits is entirely driven by sales to existing clients, or the data on new clients are misreported or too noisy to detect an effect.

The finding that the program increased marketing efforts and the use of formal accounting practices is consistent with the case study evidence mentioned in Section 2, which suggests that many enterprises worked on accounting and record keeping, as well as sales strategy and adverting, with their mentors. Similarly, the increase in the entrepreneurial spirit index might reflect the fact that enterprise owners set new goals as part of the program and that consultants helped to provide motivation and strategy for how to achieve these goals. A potential limitation to interpreting the entrepreneurial spirit index as a process variable is that it might improve as a result of better enterprise performance instead of the other way around. Two of the questions used to construct the index are particularly subject to this criticism (Questions d and e in Appendix 1). As a robustness

check, we construct the index without these two questions. As shown in Table 5, the results for this modified entrepreneurial spirit index are basically unchanged.

4.3 Response to Economic Shocks

The program could have also improved enterprise performance by helping enterprises cope better with the 2008 economic crisis. In the follow-up survey, about 89 percent of enterprises – both in the treatment and control group – reported that they had been affected by the crisis. We asked these enterprises what changes they made in response to the crisis. Table 6 displays the answers to these questions and examines whether the responses differed across the treatment and control groups. The results show that treatment enterprises are eight percentage points (standard error of four percentage points) less likely than control enterprises to report that they had to cut production in response to the crisis. The ability to weather shocks more effectively could be a result of being able to more proactively engage in marketing activities and better control finances, as shown in the previous section. Enterprises that are less well trained in these skills might experience economic shocks more passively and do not have tools to counteract a shortfall in demand.

Other changes in response to the crisis were not statistically significant across the treatment and control groups, but one of magnitude (but not statistical significance) to note is a positive impact on seeking government assistance (a 5.6 percentage points increase, standard error of 4.4 percentage points, relative to an average of 12.8 percent in the control group). For enterprises that reported seeking government assistance, we asked which program or agency they contacted and most answers indicate state or federal programs that provide funding or subsidies to micro, small, and medium-sized enterprises.

5. Cost-Effectiveness: Why Don't More Enterprises Use Consulting Services?

Given the large increases in sales and profits observed in Section 4.2, we ask why more firms do not use consulting services. In particular, a cost-effectiveness calculation suggests that the returns to hiring a consultant

are well worth the cost. The average increase in *monthly* profits lies between US$7,600, and US$11,000 (depending on the measure of profits), compared to an *annual* cost of the consulting services of US$11,856. Since the program was highly subsidized, participating enterprises only had to pay between 10 and 30 percent of this cost (depending on firm size). Yet among the enterprises in the treatment group, only 53 percent chose to participate in the subsidized consulting program once offered a spot.

Several issues may hinder the market in consulting services. First, there may be no failure at all: those who opt-in may be the ones who can benefit, and those who do not opt-in would not benefit. Naturally we do not observe what the impact would have been on those who do not opt-in, but given the excessive gap between the average increase in profits and the cost of the service, there seems to remain a failure for those who did opt-in, in that they had not taken up the services before, even at the unsubsidized rate. It is important to emphasize that all enterprises in our study had initially expressed interest in the subsidized consulting program, and that their views are thus not representative of enterprises that do not have a pre-existing interest in consulting services. It could be that firms expressed an interest, learned more about the service, and then decided that this was unlikely to yield profitable results for them, and thus failure to take-up remains a rational and correct decision.

Second, there may be a credit market failure. In fact, most of the enterprises in the treatment group that declined participation in the program once offered a spot gave liquidity constraints as the reason. This is consistent with the finding in Section 3 that treatment group enterprises with higher sales and higher ROA were more likely to take up the program. However, it still begs the question: why do we not observe consulting firms accepting delayed payment, or working with financial services firms to provide credit to cover their services? Either way, it suggests a credit market failure is the source of the problem for some enterprises.

Third, entrepreneurs may be risk- or ambiguity-averse with respect to the potential returns from hiring a consultant. This could be perpetuated by lack of information in the market on the returns to consulting advice (and which consulting firms have difficulty credibly signaling).

To examine this issue, in the follow-up survey we included some qualitative questions for the control group on whether they were using any consulting or mentoring services, and if not why not. About 21 percent of control group enterprises said that they were indeed using some services, and provided the name of the consulting firm they were using. Examining these names reveals that only about half of these firms offer management consulting services similar to the consulting firms that worked with the treatment group enterprises. The other firms mentioned by the control group provide specialized services, such as accounting or technical assistance. Overall, the incidence of using management consulting services in the control group appears to be around 10 percent. Table 7 lists the self-reported reasons why control group enterprises do not use consulting services. By far the most frequently mentioned reason is lack of funds (46.3 percent of enterprises mention this reason), followed by uncertainty about the benefits of consulting services (22.2 percent) and simply not having considered hiring a consultant (18.5 percent).

Our findings indicate that management consulting services can have high returns for micro, small, and medium enterprises, and we consider funding constraints to be the most likely explanation for the lack of market transactions in consulting services.

6. Conclusion

Our results suggest that lack of managerial skills constitutes a significant constraint to firm growth and the ability of micro, small, and medium enterprises to withstand economic shocks. The effects of the study are large. On average we find an increase in sales and profits of 80 and 120 percent, respectively, for the treatment group compared to the control group. However, we believe that the magnitude of the impact is not unreasonable given that many enterprises in the sample had not received any formal management training prior to our intervention. The sales and productivity improvements seem to be brought about primarily by improvements in marketing and financial controls. Consultants also appear to have helped enterprises to set clear goals and define a strategy for how to achieve these goals.

In contrast, we do not see any significant impact on employment generation or the number of employees. One can only speculate whether the scope of the intervention was not long or significant enough to affect employment, or whether the decision to hire additional workers would have to be preceded by even larger or more sustained increases in output. Alternatively, some recent studies suggest that there is large heterogeneity in the willingness of small businesses to expand which may be due to variation in the owners' objective function (see for example Hurst and Pugsley 2011).

Overall our results suggest that managerial inputs have a large and important impact on firm performance. However, there is still much to learn about the way this information affects firm performance as a whole and more specifically how it interacts with the marginal productivity of inputs such as labor and capital. In addition, while there may be a lot of heterogeneity in effects our sample is not large enough to allow us to look at all the firm level interactions that might be of interest, such as competitive nature of the industry, age and gender of the owner, owner's ambition level, risk taking ability, or general skill levels. We believe this is a critical area for further research.

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Survey Questions for Entrepreneurial Spirit Index

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a.	I have professional goals.	1	2	3	4	5
b.	I revise my goals periodically.	1	2	3	4	5
c.	If I don't reach a goal in the way I wanted to I try again.	1	2	3	4	5
d.	I can't motivate my business partners.*	1	2	3	4	5
e.	Everything I need for success lies in myself.	1	2	3	4	5
f.	I prefer talking about solutions, not problems.*	1	2	3	4	5
g.	I think the government should give me opportunities.*	1	2	3	4	5
h.	I have to reach some goals every day to feel satisfied.	1	2	3	4	5

*Reverse coded

Survey Questions for Human Resources Management Index

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a.	The employees identify with the objectives of the company.	1	2	3	4	5
b.	The firm lets its employees know if they have done something wrong.	1	2	3	4	5
c.	All responsibilities are clearly assigned for each of the members of the firm.	1	2	3	4	5
d.	All decisions are made by the same person.	1	2	3	4	5
e.	The firm gives positive recognition to its employees.	1	2	3	4	5
f.	There is low turnover of employees in the firm.	1	2	3	4	5

Table 1: Topics that Firms Worked on with Their Consultant

Based on Eight Case Studies

Topic	# of firms that covered this topic
Define mission and vision statements	6
Accounting and record keeping (training and/or new software)	5
Clarify organizational structure, clearly assign responsibilities	5
Sales strategy and advertising (marketing)	4
Strategically select location and number of sales points	2
Quality control	2
Access to credit or alternative financing solutions	2
Human resources management and hiring practices	2
Mediate family problems in family firms	1
Pricing strategy	1
Reduce costs (negotiate with suppliers, find alternative suppliers)	1
Figure out which products are most profitable and focus on these	1
Team work and communications training for employees	1
Leadership training for firm owners	1

	Treatment Mean (Std Dev)	Control Mean (Std Dev)	Orthogonality Verification (1)-(2) t-stat (p-value)
Panel A: Stratification variables	(1)	(2)	(3)
Manufacturing sector dummy	0.300	0.323	-0.023
	(0.460)	(0.468)	(0.630)
Commerce sector dummy	0.253	0.230	0.023
	(0.436)	(0.422)	(0.597)
Services sector dummy	0.447	0.447	0.000
	(0.499)	(0.498)	(0.998)
Full-time paid employees	14.400	13.684	0.716
	(30.887)	(31.479)	(0.821)
Panel B: Re-randomization variables			
Age of principal decision maker (years)	42.561	42.876	-0.315
	(10.212)	(9.878)	(0.756)
Male principal decision maker dummy	0.727	0.720	0.007
	(0.447)	(0.450)	(0.881)
Years of schooling of principal decision maker	15.630	15.932	-0.302
	(4.919)	(5.196)	(0.559)
Business age (years)	11.053	13.652	-2.599
	(10.330)	(28.120)	(0.275)
N	150	282	432

Note: Columns 1, 2, 4 and 5 display means and standard deviations (in parentheses). Columns 3 and 6 show the difference in means across the treatment and control group with the corresponding p-value in parentheses. Column 7 shows the difference-in-difference in means with the corresponding p-value in parentheses. For the 1% trimmed variables, last month's sales, assets, as well as profits calculated based on profit margin and sales, are only trimmed at the top 1% since they are bounded below by zero. All other variables are trimmed at the top and bottom 1%. Significance levels: *10 percent, **5 percent, ***1 percent.

Table 2: Baseline Summary Statistics (continued)

	Treatment Mean (Std Dev)	Control Mean (Std Dev)	Orthogonality Verification (1)-(2) t-stat (p-value)
Panel C: Other variables - business outcomes	(1)	(2)	(3)
Last month's sales (1000s USD)	76.343	50.844	25.499
	(283.025)	(119.987)	(0.222)
Last month's sales (1000s USD), 1% trimmed	40.479	46.113	-5.634
	(97.605)	(94.238)	(0.591)
Profits (sales minus costs, 1000s USD)	12.498	-3.713	16.211
	(111.446)	(202.489)	(0.426)
Profits (sales minus costs, 1000s USD), 1% trimmed	9.251	9.590	-0.339
	(58.564)	(48.851)	(0.955)
Profits (profit margin and sales, 1000s USD)	13.659	12.253	1.407
	(42.718)	(36.997)	(0.753)
Profits (profit margin and sales, 1000s USD), 1% trimmed	8.797	9.522	-0.725
	(22.443)	(20.361)	(0.766)
Business assets (1000s USD)	296.963	945.842	-648.879
	(767.969)	(7822.005)	(0.376)
Business assets (1000s USD), 1% trimmed	251.358	259.471	-8.113
	(594.726)	(503.203)	(0.898)
Productivity residual	0.028	-0.016	0.045
	(1.349)	(1.253)	(0.787)
Productivity residual 1% trimmed	0.003	0.009	-0.006
	(1.189)	(1.155)	(0.968)
Return on assets (ROA)	-0.026	0.151	-0.177
	(0.956)	(0.808)	(0.119)
Return on assets (ROA) 1% trimmed	0.110	0.095	0.015
	(0.318)	(0.487)	(0.802)
N	150	282	432

Note: Columns 1, 2, 4 and 5 display means and standard deviations (in parentheses). Columns 3 and 6 show the difference in means across the treatment and control group with the corresponding p-value in parentheses. Column 7 shows the difference-in-difference in means with the corresponding p-value in parentheses. For the 1% trimmed variables, last month's sales, assets, as well as profits calculated based on profit margin and sales, are only trimmed at the top 1% since they are bounded below by zero. All other variables are trimmed at the top and bottom 1%. Significance levels: *10 percent, **5 percent, ***1 percent.

Table 3: Predictors of Program Take-Up

OLS

	Dependent variable:	
	Binary = 1 if treatment group firm took up the program	
	(1)	(2)
Commerce sector dummy	-0.106	-0.132
	(0.109)	(0.110)
Services sector dummy	-0.035	-0.031
	(0.097)	(0.097)
Log (full-time paid employees + 1)	0.099**	0.046
	(0.040)	(0.047)
Age of principal decision maker (years)	-0.006	-0.008*
	(0.004)	(0.004)
Male principal decision maker dummy	0.189**	0.212**
	(0.090)	(0.090)
Business age (years)	0.005	0.005
	(0.004)	(0.004)
Log (last month's sales + 1)		0.047**
		(0.023)
Log (profits + 1):		-0.021
Profits calculated by multiplying profit margin by sales		(0.019)
Return on assets (ROA)		0.088***
		(0.021)
Constant	0.429**	0.334
	(0.216)	(0.251)
R-squared	0.122	0.172
N	148	148
Average of dependent variable	0.533	0.533

Note: All explanatory variables are measured at baseline. Binary control variables included for when covariate is missing, and then missing covariate coded as zero. Significance levels: *10 percent, **5 percent, ***1 percent.

OLS

Outcome variable	Full sample	Full sample	1% trimmed	1% trimmed	2% trimmed	2% trimmed	Full sample control group mean (std. dev.)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log (full-time paid employees + 1)	0.079	0.096	0.063	0.092	0.077	0.111	1.835
	(0.090)	(0.080)	(0.091)	(0.081)	(0.091)	(0.080)	(1.189)
	389	389	385	385	381	381	
Log (last month's sales + 1)	0.562	0.563*	0.573	0.585*	0.625*	0.623*	7.994
	(0.365)	(0.335)	(0.369)	(0.340)	(0.369)	(0.342)	(3.640)
	323	323	319	319	315	315	
Profits:	5.921	5.426	7.609*	7.751*	4.362	4.335	9.707
Calculated as sales minus costs	(5.178)	(5.071)	(4.247)	(4.179)	(3.283)	(3.202)	(93.057)
	288	288	282	282	276	276	
Profits:	0.687	0.544	-0.415	-0.202	-0.128	0.017	8.733
Calculated by multiplying profit margin by sales	(2.728)	(2.435)	(1.560)	(1.396)	(1.250)	(1.142)	(23.170)
	309	309	306	306	303	303	
Log (profits + 1):	0.802**	0.820**	0.761**	0.794**	0.797**	0.828**	6.261
Profits calculated by multiplying profit margin by sales	(0.352)	(0.336)	(0.349)	(0.334)	(0.349)	(0.335)	(3.451)
	309	309	306	306	303	303	
Log (business assets)	-0.052	-0.107	-0.098	-0.129	-0.107	-0.168	11.215
	(0.176)	(0.156)	(0.172)	(0.156)	(0.174)	(0.156)	(1.699)
	319	319	315	315	312	312	
Productivity residual	0.266*	0.249*	0.199	0.193*	0.242**	0.232**	-0.095
Residual from regression of log profits on log employees and log business assets	(0.140)	(0.129)	(0.122)	(0.116)	(0.116)	(0.111)	(1.272)
	250	250	244	244	240	240	
Return on assets (ROA)	0.120*	0.114*	0.061	0.057	0.061*	0.064*	-0.015
	(0.061)	(0.065)	(0.040)	(0.045)	(0.034)	(0.036)	(0.541)
	247	247	241	241	237	237	
Controls for baseline value of outcome	No	Yes	No	Yes	No	Yes	-

Note: Each cell contains the treatment effect point estimate, robust standard error, and number of observations, for a separate OLS estimation. For the regressions that control for the outcome variable measured at baseline (Columns 2, 4, and 6), when the baseline outcome variable is missing, the missing value is filled-in with zero and a dummy variable indicating that the baseline observation is missing is added to the model. All regressions include controls for strata dummies and re-randomization variables. In the x% trimmed samples, full-time paid employees, last month's sales, assets, as well as profits calculated based on profit margin and sales, are only trimmed at the top x% since they are bounded below by zero. All other variables are trimmed at the top and bottom x%. We use log(profits + 1) instead of log(profits) for profits calculated by multiplying profit margin by sales since some principal decision makers reported zero sales for the last month. Significance levels: *10 percent, **5 percent, ***1 percent.

Table 5: Treatment Effect Estimates, Business Processes

OLS

Outcome variable	Full sample	Full sample	Observations	Control group mean (std. dev.)
	(1)	(2)	(3)	(4)
Developed new products during last year dummy	-0.039	-0.038	378	0.531
	(0.056)	(0.054)		(0.500)
Attracted new clients during last year dummy	-0.017	-0.030	376	0.789
	(0.046)	(0.045)		(0.409)
Implemented new process during last year dummy	-0.056	-0.066	378	0.617
	(0.053)	(0.052)		(0.487)
Attracted new investors during last year dummy	0.026	0.024	378	0.074
	(0.032)	(0.031)		(0.262)
Began process to register a patent during last year dummy	0.054		376	0.079
	(0.034)			(0.270)
Began certification process for an international standard (e.g. ISO)	-0.022		378	0.156
	(0.035)			(0.364)
Made new marketing effort during last year dummy	0.132**		378	0.440
	(0.055)			(0.497)
Expanded installations during last year dummy	-0.024		377	0.240
	(0.045)			(0.428)
Remodeled installations during last year dummy	0.025		377	0.459
	(0.054)			(0.499)
Entrepreneurial spirit index	0.242*	0.227	373	-0.094
	(0.140)	(0.139)		(1.371)
Entrepreneurial spirit index w/o questions d and e (see Appendix 1)	0.245*	0.210	373	-0.095
	(0.140)	(0.138)		(1.343)
Human resources management index	-0.053	-0.050	363	0.022
	(0.152)	(0.147)		(1.450)
Keeps formal accounts dummy	0.072**	0.065**	378	0.852
	(0.030)	(0.028)		(0.356)
Controls for baseline value of outcome	No	Yes		-

Note: Columns 1 and 2 contain the treatment effect point estimates, robust standard errors, and number of observations, for separate OLS estimations. All regressions include controls for strata dummies and re-randomization variables. Some variables are not available at baseline, which is why the corresponding cells in Colum 2 are empty. Column 4 includes the control group mean and standard deviation of each variable at follow-up. Significance levels: *10 percent, **5 percent, ***1 percent.

Table 6: Treatment Effect Estimates, Changes in Response to Crisis

| Outcome variable | OLS | |
	Full sample	Control group mean & std. dev.
	(1)	(2)
Laid off staff or cut down on hiring	0.036	0.257
	(0.053)	(0.438)
Lowered employee salaries	-0.023	0.092
	(0.032)	(0.289)
Cut production	-0.080**	0.206
	(0.040)	(0.406)
Diversified business activities	-0.015	0.431
	(0.057)	(0.496)
Sought government assistance	0.056	0.128
	(0.044)	(0.335)
None	-0.005	0.115
	(0.037)	(0.319)
Other	0.045	0.216
	(0.050)	(0.412)
Number of changes made	0.020	1.330
	(0.093)	(0.810)
N	340	218

Note: Column 1 contains the treatment effect point estimates and robust standard errors for separate OLS estimations. All outcome variables, except for "number of changes made", are binary variables for the responses to the question "Which changes has your firm made in response to the current economic situation?" (multiple answers were allowed). This question was asked at follow-up in reference to the recent economic crisis. "Number of changes made" is a count of the number of changes reported in response to the question above. All regressions include controls for strata dummies and re-randomization variables. Column 2 includes the control group mean and standard deviation of each variable. Significance levels: *10 percent, **5 percent, ***1 percent.

Table 7: Self-Reported Reasons for Not Using Consulting Services

Reasons for not using consulting services	% of enterprises mentioning this reason (multiple mention)
Would be a good investment, but don't have funds	46.3
Don't know what the benefits would be	22.2
Simply hadn't considered it	18.5
Didn't need the services	13.9
Other	11.1
Didn't know these services existed	7.4
Not worth the cost	5.6