Private Enterprise Development in Low-Income Countries

Organizational Learning: Experimental Evidence from Bangladeshi Garment Factories

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A randomized controlled trial shows that inducing knowledge sharing among garment workers in Bangladeshi factories increases firm level productivity. This provides novel experimental evidence for the long held hypothesis that organizational learning drives firm productivity growth, for which we lacked so far clear evidence.

Summary

The finding that a large proportion of firms in developing countries operate with very low productivity has prompted researchers to study the determinants of firm-level productivity growth, which can range from technological innovations to better management practices.

Organizational learning, the generation and exchange of knowledge among members of an organization, has long been assumed to be one of the key drivers of productivity growth within firms. However, due to the inherent difficulty of observing knowledge exchange among workers, rigorous evidence on organizational learning has remained scarce.

Previous studies on organizational learning have taken the approach of inferring the productivity effects of knowledge exchange by showing how the productivity of some workers producing a specific product depends on whether that same product was previously produced by other workers in the firm. If workers are more productive on items on which others have experience compared to items no one has worked on, then it may suggest that the experienced workers have shared insights about producing this particular item. However, such productivity spillovers across workers could be caused by other mechanisms than knowledge exchange. For instance, the mere fact that an item is being produced by other workers in the firms could increase productivity of workers by inducing competitive behaviour, or by providing a benchmark against which the factory management can better monitor and enforce productivity.

To rigorously identify whether knowledge exchange is indeed a driver of productivity spillovers, I conduct a randomized intervention at three Bangladeshi garment factories, varying the amount of knowledge exchanged between random pairs of workers that produce the same garment style. I show that this intervention increases the productivity of the workers in a very similar way as the general productivity spillovers one can observe at the factories when other workers have already produced the same garment before. This provides novel experimental evidence that knowledge exchange indeed drives productivity spillovers.

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Background – Sewing lines and learning

In order to study this question, I gathered detailed production data from three Bangladeshi factories which produce garments ordered by international retail companies, and which constitute an ideal setting for studying organizational learning. The factories are organized into parallel sewing lines of 20-80 workers, which are independent production units on which the whole sewing process of a garment style can be completed. When switching to a new garment style, the productivity of sewing lines drops on average by 30 percent, and only after three to four days of production does line productivity reach its previous levels again (Figure 1). This indicates that garment styles are technically differentiated, and suggests that there is a learning curve involved in becoming able to productively produce a new style.

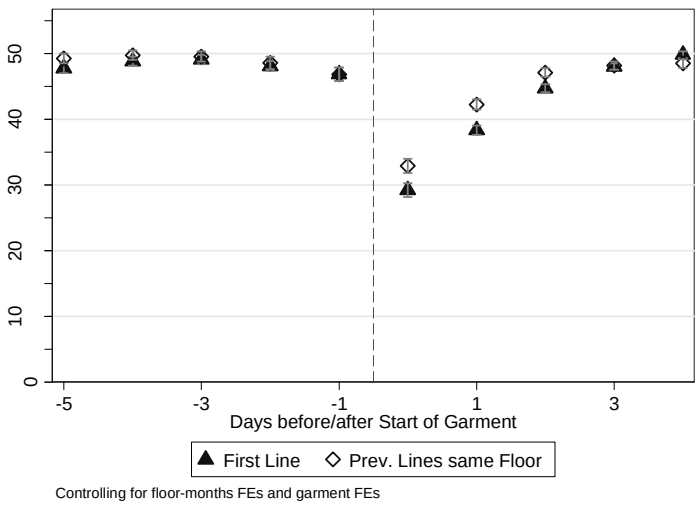

FIGURE 1: Average drop of productivity and subsequent learning curves of lines starting new styles, if no other line produced the style before ("First Line"), and if some line on the same floor has previously produced the same style. Dashed vertical line represents switch to new garment. Lines through the symbols represent 95% confidence intervals.

Due to large order volumes, most styles are produced on more than one sewing line, and if several lines produces a certain style, they typically start producing it on different days, depending on when they finish previously allocated jobs. Thus, when a line starts producing a new style, it is often the case that another line has already gained experience with producing the style, and this experience could be valuable for the later lines producing the same style.

And if another line on the same floor has already produced the style, productivity of the later lines producing the style is increased during the first days they produce the new garment, as illustrated in Figure 1. Given that lines switch to new garment with relatively high frequency, on average every ten days, the size of these productivity spillovers has large and direct implications on the overall productivity of these factories.

Knowledge Sharing Intervention

To better understand the mechanisms behind the productivity increases of later lines producing the same style, and see whether knowledge exchanges are indeed driving the effect, we implemented a management intervention which induced enhanced knowledge sharing on randomly selected sewing floors. For a period of four months, on the selected sewing floors, supervisors of lines that had already produced a given style were sent by their superiors to brief fellow line supervisors once they start to produce the same style. The briefings lasted 15-30 minutes, during which the supervisors were meant to share information on the most important production problems which have to be overcome when starting to produce the style on the earlier lines.

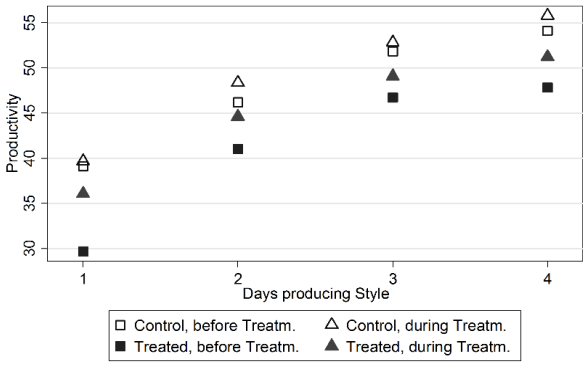

FIGURE 2: Average Learning Curves of sewing lines on floors on which intervention was implemented ("Treated"), and on which it was not ("Control"), during the five month before the implementation and during the four months of the implementation.

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Using a difference in difference framework, in order to account for potential prior differences in productivity between floors, I show that this communication intervention increased productivity of the lines of supervisors which received such a briefing by around 0.3 standard deviations on the first one to two days they started producing the new garment, before the line productivity reached its long-run levels again (Figure 2). No such effect can be seen on control floors at that time, where the intervention was not implemented. A simple back-of-the envelope calculation shows that the returns on the intervention were likely in excess of 500 percent, given its low costs. In sum, our intervention shows that the often observed productivity spill-overs are indeed driven by knowledge exchange, as assumed already for a long time in the literature.

Why was intervention not implemented earlier?

Given the positive productivity effects of this simple and cheap management intervention, one important outstanding question is why this measure was not been implemented earlier at the factories. This question relates to the rapidly growing literature on why many firms in developing countries do not implement simple management techniques which should be universally beneficial.

The study of the experimental logbooks, in which the factory management should document all instances in which they sent one line supervisor to brief another during the time the intervention was implemented, provides some insight into possible reasons. The logbooks reveal that factories were more likely to comply with the intervention and systematically organize briefings the *younger* the supervisors at the receiving end of the briefings were.

This pattern holds when taking into account the experience, education, and the average productivity of the supervisors, and their productivity on the day they should have received the briefing. This suggests that status concerns among line chiefs might have played a role, in the sense that older and more senior supervisors might dislike receiving help from their peers that they did not request themselves, especially from supervisors which are younger or less senior than them. Anticipating such resistance, factory managements might refrain from the implementation of such communication measures, despite their high estimated returns.

Moving Forward…

This project yields two contributions. First it provides novel experimental evidence that knowledge exchange within firms has a positive effect on firm productivity, a mechanism which has already long been discussed in the literature. Second, it uncovers a new aspect which could explain why many firms, especially in developing countries, do not implement seemingly simple and effective management techniques; many of these techniques require employees to cooperate proactively to be effective, but status concerns among employees could prevent such effective cooperation.

The evidence on the status mechanism is still largely suggestive. Future work could directly measure the importance that employees attach to status, and study directly the extent to which status concerns interfere with cooperation on the shop-floor, and how this affects the ability of the factories to manage their operations effectively. Furthermore, many of the Bangladeshi factories involved in the study organize social events such as picnics and excursions among their employees. It would be of great interest to study whether such activities increase the amount of cooperation among workers and productivity spill-overs within firms.