

IGC Policy Brief Template

Purpose: Policy briefs help research to shape policy.

Dissemination: They will be delivered to policymakers by IGC Country Teams, the website and workshops, conferences and wider media.

General Instructions: This guidance is intended to support the purpose of the policy brief: Please limit your brief to 2 pages of text, excluding visual aids, using a non-technical and straightforward language. Please cover all of the following sections.

Title: **Spillovers in Technology Adoption: Evidence from a Randomized Experiment in Pakistan**

Authors:

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Short summary paragraphs:

- I. **Policy Motivation for Research:** *the policy and research question(s) addressed by this project, and a brief explanation of why they are crucial for policy-making in targeted countries*

Spillovers between firms, and in particular technology spillovers, play a central role in many theories of economic growth. Such spillovers are thought to be a key mechanism generating increasing returns and they also provide the primary economic rationale for industrial policies to increase investment in innovation. In the presence of spillovers, such interventions may be needed to overcome coordination failures among firms and bring investment closer to socially optimal levels. In the absence of spillovers, such interventions are unnecessary and may generate distortions that may slow growth.

Despite the centrality of technology spillovers among industrial firms in theoretical and policy discussions of the growth process, the empirical evidence for their existence is weak. There are two key challenges that researchers confront when analyzing technology spillovers. First, researchers rarely have direct measures of firms' technology use. Second, if one observes two firms adopting similar technologies, it is difficult to know whether the first firm is having an effect on the second, the second firm is having an effect on the first, or both are being affected by some unobserved factor. Teasing apart these effects requires detailed information on the network links between firms as well as, ideally, experimental variation in which firms initially adopt the technology.

Our research resolve both of these issues and provide rigorous, experimental evidence on the presence (or absence) of technology spillovers between manufacturing firms. We have designed a new cutting technology that enables soccer ball manufacturing firms in Sialkot, Pakistan, to reduce the amount of raw materials required to produce a soccer ball. Our estimates suggest that the technology will save about 2% of the unit costs. We have randomly introduced this new technology to a group of treatment firms, and are measuring the extent to which this technology is adopted by non-treated firms that are connected to the treated firms. We will then explore connections through family relationships, supplier relationships, worker flows, and geographical proximity. The project is still ongoing and should be completed this year.

- II. **Policy Impact:** *what decision or policy will be shaped as a result of this work*

We believe that our results will help shape innovation policy in developing countries. Specifically, we anticipate providing insights on the following three policy questions related to technology spillovers. First, does technology spillover in manufacturing clusters? If so, this provides justification for similar types of interventions by governments to subsidize innovation costs. The presence of externalities implies that the social benefit from an investments in technology exceed the private cost. Second, our research will characterize the channels through which spillovers occur. For example, if spillovers primarily occur through shared suppliers, policymakers may want to target policies towards upstream suppliers in order to maximize spillovers through limited resources. Finally, our research will inform policymakers of the characteristics of firms that are particularly influential in generating spillovers. Again, this further helps policymakers achieve optimal targeting of industrial policy interventions when faced with limited resources.

III. Audience: *the audience or key decision makers targeted by this brief*

The findings of this project should be of interest to several stakeholders: 1) Central and State-level Ministries of Commerce and Export Promotion Agencies who are interested in promoting technological upgrading within their manufacturing sectors, 2) Local Chambers of Commerce that specialize in promoting the interests of specific industries and clusters, and 3) Agencies that promote small- and medium-scale enterprises.

Main sections:

IV. Policy Implications: *Identify the key messages on the policy implications of your research in bullet point form. Please use one sentence providing a brief description of each bullet together with one paragraph that accompanies each bullet to substantiate or explain further the bullet.*

Since the project is still ongoing, we cannot yet derive any policy implications, but we intend to have the following messages:

- We find clear evidence of technology spillovers within manufacturing clusters.
- We identify the channels through which technology spillovers occur.
- Governments can potentially encourage innovation and technology upgrading by devising particular policies, such as providing matching innovation grants to particularly firms or subsidizing consulting services to help streamline manufacturing costs.

V. Implementation: *Please provide guidance for policymakers as to how to implement policy measures based on the implications of your research by devising a number of 'action points'. Please discuss constraints that could arise in the implementation of these 'actions points' and suggest ideas on how to confront those. If applicable, please also discuss issues in replication of results, or in scaling up, or any cross-country experience, that arise in thinking about implementing decisions that would be influenced by your research.*

Since the project is still ongoing, we are unable to provide specific guidance on how to implement the policy measures at this time. However, we anticipate being able to discuss the use of government funds to respond to the "Innovator's Dilemma": the reason that private firms under invest in innovation is because their ideas will spill over and they will not be able to appropriate the full returns of their investment. Governments could encourage such investments by providing matching innovation grants or encourage process innovation by subsidizing consulting firms.

VI. Dissemination: *Please suggest individuals or institutions, along with emails and/or postal addresses that you would like the IGC to send soft and hard copies of your final working paper and policy brief. Ideally, we would like to disseminate IGC findings to those in the policymaking community in developing countries in Africa and South Africa.*

We will provide this information once the project is complete.

VII. Further Readings: *a brief (non-technical) list of related writing.*

IGC Policy Brief Evaluation

Title: *Title of Project*

Authors: *List name and main affiliation for each person*

General comments:

[A short blurb as to how we see the policy brief and what the key points of the evaluation are.]

Evaluation and feedback:

Policy Motivation

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Policy Impact

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Audience

-

Policy Implications

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Dissemination

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Implementation

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