

# Can Electronic Procurement Improve Infrastructure Provision?

## Evidence from a Large Rural Road Program in India



### In brief

- Governments spend billions of dollars annually on public procurement. Many governments have sought to reduce costs by e-procurement, theoretically providing greater transparency and thus, reducing the potential for corruption through the collusion of contractors and government officials. It may also lower the costs of obtaining information about a tender process and automating admin processes.
- This study examines the impact of e-procurement on the construction of Indian roads, specifically the price, quality and schedule of road construction.
- The quality of public works increased after e-procurement was introduced, thereby providing evidence that e-procurement is associated with better quality outcomes.
- The mechanism for quality improvement appears to be a change in the composition of winning contractors, rather than a change in performance conditional on winning a contract. This provides evidence e-procurement can increase the quality of contractor selected.
- E-procurement led to no changes in project cost or project completion time. This suggests the primary impact of e-procurement comes through selecting higher quality contractors. E-procurement is associated with an overall increase in procurement works completed and a reduction in the size of individual procurement packages.
- Policymakers should consider e-procurement as a potential means to increase the quality of public works and the efficiency of the procurement system. However, caution should be exercised regarding whether these results are applicable in other countries given that, in this case, there may have been an existing need to increase tendering activity.

## Policy Motivation

*“This study examines the impact of e-procurement on the construction of roads in India”*

Governments across the world spend billions of dollars annually on public procurement. In recent years, many governments have sought to cut costs and improve infrastructure provision by utilizing systems of electronic procurement, commonly known as e-procurement. Theoretically, e-procurement provides greater transparency thereby reducing collusion among contractors and corruption among public officials. It also may increase efficiency through lowering the costs of obtaining information about a tender process and automating administrative processes. Despite the widespread enthusiasm for e-procurement, to date there is little rigorous evidence of its impact. This study examines the impact of e-procurement on the construction of roads in India, specifically examining the effect on price, quality and schedule of road construction.

## Policy Impact

E-procurement is one of the most commonly advocated reforms to procurement systems today, with the governments of many low-income countries pursuing such programs. The results of this research will help governments evaluate the benefits of switching to an e-procurement system, in addition to potentially informing governments on how to design such a system to realize such benefits. Switching to a system of e-procurement may help governments to better select the most qualified provider in addition to making better use of existing resources to increasing quality of public infrastructure.

## Audience and Dissemination

The key decision-makers targeted by this brief are government officials engaged in the development and utilization of procurement and e-procurement systems. A more specific audience will be identified for dissemination once this research agenda is complete and a full set of policy recommendations can be made.

## Implications

### **After e-procurement was introduced, the quality of public works increased**

*“E-procurement is associated with a decrease in the likelihood that a road construction project was rated as unsatisfactory”*

The analysis provides evidence that e-procurement is associated with a decrease in the likelihood that a road construction project was rated as unsatisfactory, measured through randomly assigned quality checks.

### **The mechanism for quality improvement appears to be a change in the composition of winning contractors, rather than a change in performance conditional on winning a contract**

A two-stage regression analysis revealed that the changes in quality in procurement projects was largely due to changes in which contractor is chosen rather than changes in a contractor’s activities once they are chosen. The evidence suggests that

e-procurement resulted in the selection of higher quality contractors.

### **E-procurement led to no changes in project cost or project completion time**

The analysis suggested that there were no changes in the two other dimensions of projects that the government may care about: prices or completion time. This suggests that the primary impact of electronic procurement came through selecting higher quality contractors.

*“The study revealed that e-procurement is associated with a substantial increase in the total number of kilometers of roads tendered in each state in each year”*

### **E-procurement is associated with an overall increase in procurement works completed and a reduction in the size of individual procurement packages**

The study revealed that e-procurement is associated with a substantial increase in the total number of kilometers of roads tendered in each state in each year. After e-procurement took effect, the size of the average procurement package decreased by about 25%. Together, this suggests that e-procurement lowers the cost to the government of conducting procurement tenders. However, it also suggests that caution must be used in interpreting the results presented here to ensure that they were not due to the shifting composition of projects.

## **Brief Summary of Research**

E-procurement in India has not been adopted nationally all at once but gradually rolled out at the state level. Because of this time variation across different Indian states, this study is able to separate out the impact of e-procurement from other changes occurring in the country at the same time through using a difference-in-difference estimation strategy. The study focuses on a particular rural road project known as *Pradhan Mantri Gram Sarak Yojana* (PMGSY) that began in 2000, funded by the federal government with specific uniform criteria but executed by each state. Data was collected from PMGSY websites from 2000 to 2009 to construct a dataset covering 21 states, which includes information from over 35,000 procurement contracts.

The paper evaluates bidding, costs, and quality for procurement in states/provinces before and after adoption of e-procurement, as well as those continuing under traditional procurement practices. The paper provides evidence that e-procurement is associated with an increase in tendering activity, entry of higher quality contractors, and increase in road quality. However, our analysis cannot currently distinguish between the impacts of greater tendering activity versus e-procurement on improving road quality. Ongoing work will use bidding data to attempt to distinguish the two.

*“Our analysis cannot currently distinguish between the impacts of greater tendering activity versus e-procurement on improving road quality”*

## **Implementation**

Based on this preliminary work, policymakers should consider e-procurement as a potential means to increase the quality of public works and the efficiency of the public procurement system. Given that this evaluation occurred in a country which

may have had an existing need to increase tendering activity, caution should be used in assuming that the results here will be replicated in other contexts. The research team is continuing to work to provide additional evidence on the casual impact of e-procurement. This ongoing research will provide greater insight to governments and countries considering implementation of e-procurement programs.

## Further Readings

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