Competition in Sierra Leone’s Cocoa Markets

Tristan Reed, Ph.D.
Trade and International Integration Research Group
How to upgrade the quality of exports?

Setting: Sierra Leone, West Africa

Product:
- Cocoa, the largest non-mineral export by value
- 8.6% of export value
- But quality is poor; Sierra Leone’s cocoa price in international markets is low relative to neighboring countries

Two classes of explanations for poor quality:
- **Demand side:** No price premium for quality, so farmers have no incentive to invest
- **Supply side:** Price premium exists, but farmers lack infrastructure/capital required to upgrade quality
An experiment to test for demand-side constraints

Design:
• **Treatment:** Pay a bonus (per kilogram) to randomly selected set of traders who bring “grade A” cocoa
• **Control:** Measure quantity of “grade A” cocoa, but don’t pay bonus
• **Outcomes:** Quantity delivered by quality grade (A, B, C); prices paid to farmers; credit given to farmers

**Unique Challenge:** How to interpret treatment and control differences when traders operate in the *same market*?

- Stable unit treatment variable assumption (SUTVA) is violated due to competition between treatment and control
- Need a model to interpret treatment/control differences
Farmers

Traders

Wholesalers

Exporters

Grinders

Trader price, $p$

Wholesaler price, $v$

SOURCE: Casaburi and Reed (2019)
Cocoa Purchases (Lbs.)

- **Treatment + Control Traders**
- **Control Traders**
- **Treatment Traders**

**SOURCE:** Casaburi and Reed (2019)
Table 3: Treatment-Control Differences in Advance Payments

<table>
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<th>(1)</th>
<th>(2)</th>
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<tbody>
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<td>Treatment Trader</td>
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<td></td>
<td>(0.03)</td>
<td>(0.02)</td>
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<td>Control Group Mean</td>
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<td>Village Controls</td>
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<td>Observations</td>
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</tr>
</tbody>
</table>

SOURCE: Casaburi and Reed (2019)
T-C Differences by Chiefdom: Prices vs. Advances

SOURCE: Casaburi and Reed (2019)
Using theory of industrial organization to interpret results

• Treatment and control interact in one market
  ➢ Treatment traders “steal” quantity from control by offering credit or higher prices

• Treatment and control price differences imply traders are differentiated, in that one is able to charge a lower price while others charge higher prices (weak competition)

\[ P_{Treatment} - P_{Control} = \frac{Bonus \times D}{(1 + D)} \]

• If D = 1, traders are perfectly differentiated
• If D = 0, they are homogenous; the “law of one price” holds

• Combining price and credit differences \( \Rightarrow D = 0.18 \)
Conclusions

• Farm-gate market appears to work well
  ➢ Traders deliver high quality cocoa in response to bonus
  ➢ Traders are a source of credit for farmers; some of quality premium is paid in credit, rather than price
  ➢ Low differentiation implies traders are not able to charge substantially different prices from one another

• Demand-side constraints (at the farm gate) likely not the problem
  ➢ Gov’t should focus on supply-side interventions

• Caveat: Potential demand side issues in international market
  ➢ Cocoa processing oligopoly (Barry Callebaut, Olam, Cargill)