Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data

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Agenda: Connection between financial and productive sectors

1. How do shocks to banks affect the real economy?
   ▶ How does credit supply affect firms’ outcomes?

2. Do banks provide services apart from credit intermediation?
   ▶ Can healthy banks or government credit lines freely replace distressed financial institutions?

3. How do firms use external credit?
   ▶ Expand to new markets, increase physical capital, finance working capital?

→ We need detailed data, not only to answer these questions but to quantify them
This Project: Effect of shocks to banks on real economy

- When do shocks to banks affect real activity?
  - Banks cannot offset shock with other sources of funding
    - Negative shock to banks’ balance sheet implies drop in lending
  - Firms cannot substitute banks in the short term
    - Drop in overall credit supply to the firm
  - Firms need external finance in the short term
    - Firms lower investment and production in downturns; they may need less credit

  Shocks to banks affect real activity only if these frictions exist

- Why focus on trade?
  - 2008 crisis opened this debate in international trade
    - World exports fell 23% in 2009 (WTO)
  - Data allow to control for changes in demand
    - Detailed information on product and destination
Setting: Peru during 2008 financial crisis

- Banking sector
  - Peruvian banks not directly affected by U.S. real estate value
  - Banks with foreign liabilities adversely affected by capital flow reversals
- Exports
  - Drop in international demand for Peruvian products
  - Drop in commodity prices
- Data: customs data matched with credit registry at the firm level
Data

- Bank Balance Sheets
- Credit Registry
  - Firm-bank-month panel
  - Outstanding debt every firm with every domestic bank
- Customs Data (SUNAT)
  - Product (11 digits), destination, volume, value, price, shipment
  - US$ 20,252 Millions FOB in 2009 (57% manufactures)

<table>
<thead>
<tr>
<th>Main Sectors</th>
<th>Value (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining and derivatives</td>
<td>61.0</td>
</tr>
<tr>
<td>Oil and derivatives</td>
<td>10.8</td>
</tr>
<tr>
<td>Agriculture</td>
<td>9.2</td>
</tr>
<tr>
<td>Fishing and derivatives</td>
<td>8.3</td>
</tr>
<tr>
<td>Textile</td>
<td>5.7</td>
</tr>
<tr>
<td>Metallurgy</td>
<td>3.2</td>
</tr>
<tr>
<td>Other</td>
<td>5.0</td>
</tr>
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<table>
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<tr>
<th>Main Destinations</th>
<th>Value (%)</th>
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<tr>
<td>United States</td>
<td>17.0</td>
</tr>
<tr>
<td>China</td>
<td>15.3</td>
</tr>
<tr>
<td>Switzerland</td>
<td>14.8</td>
</tr>
<tr>
<td>Canada</td>
<td>8.6</td>
</tr>
<tr>
<td>Japan</td>
<td>5.2</td>
</tr>
<tr>
<td>Germany</td>
<td>3.9</td>
</tr>
<tr>
<td>Other</td>
<td>35.3</td>
</tr>
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</table>

(c) Main Sectors (%)  
(d) Main Destinations (%)
Role of banks in the international transmission of crises

- International capital flow reversal affected banks with high share of foreign liabilities

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<td>HSBC</td>
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- Prudential Regulation in Peru:
  - Higher reserve requirements on foreign-currency denominated domestic liabilities
  - Higher reserve requirements for short-term foreign debt

→ Objective: Serve as LOLR and inject liquidity
General injection of liquidity partially solved the problem

- Injection of liquidity worked in reducing domestic interest rate
- But could not solve the heterogeneous impact across banks
  - Banks with high foreign liabilities reduced credit supply relative to other banks
    (loans by banks with high foreign liabilities were growing faster prior to crisis)

![Graph showing loan growth rate](image)
Why do shocks to individual banks have real effects?

- **Banks develop expertise:**

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  31% of exports by related firms goes to U.S.

  3% of exports by related firms goes to U.S.

- **Knowledge on clients**
  - firms cannot substitute banks in the short term

- **Specialization on markets**
  - heterogenous impact on products/destinations
Quantitative Results

- Credit supply by banks with above average foreign liabilities drops 17%
  - Banks play a role in the international transmission of financial crises
  - In this crisis multinational banks were equally vulnerable

- Export elasticity to credit
  (% change in 1 year exports for every 1% change in credit stock)
  - Quantities exported for continuing export lines: 0.23
  - Number of continuing export lines: 0.36
  - Number of new export lines: inconclusive

- Why is the Central Bank interested in these elasticities?
  - Simulate different scenarios of credit shortages
How much of drop in Peruvian exports was due to credit shortage?

- Compare $t = \{Pre, Post\}$: 12 months before and after July 2008
  - Computed credit supply shock on banks with high liabilities (30%): 17%
  - Computed sensitivity of exports to credit supply

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<th>Volume (kg)</th>
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<tr>
<td></td>
<td>$t=Pre$</td>
<td>$t=Post$</td>
</tr>
<tr>
<td>Total</td>
<td>10.9%</td>
<td>-22.4%</td>
</tr>
<tr>
<td>Quantity</td>
<td>10.6%</td>
<td>-15.7%</td>
</tr>
<tr>
<td># Firms-Markets</td>
<td>0.3%</td>
<td>-6.6%</td>
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- Credit shock had first order effect on exports, but most of the drop was due to reduction in international demand and prices
Heterogeneous effects of credit shocks

• How do credit shocks affect exports across firms’ characteristics?
  ▶ Size, age, number of banking relationships
  → Small firms are not more sensitive to credit, but small firms suffer larger shocks
  → Affiliates of foreign multinationals were not affected by the credit shock

• How do credit shocks affect exports across flows’ characteristics?
  ▶ Size, frequency and size of shipments, distance to destination
  → Exporters to neighboring countries are typically smaller and suffer larger credit shocks
  → Small export flows are more likely to be abandoned after a negative credit shock

• How do credit shocks affect exports across sectors?
  ▶ We can compute the response to credit of exports by industry
  → Some evidence that differentiated products are more sensitive to credit shocks
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3. How do firms use external credit?
1. How do shocks to banks affect the real economy?

- Banks are global players
  - role in international transmission of crises
- Credit shocks affect quantities exported for continuing lines and increase exit for small lines
- Quantification of the elasticities to simulate different scenarios

★ Design of prudential bank regulation:
   (Peru’s experience)
   - Reserve requirements for external short-term liabilities
     → Reduce magnitude of shocks to banks
     → Construct countercyclical fund to inject international liquidity

Reduced domestic spreads ... but did not solve heterogeneous impact across bank
2. Do banks provide services apart from credit intermediation?

- Banks have knowledge on clients
  - Firms cannot easily substitute banks in the short term
- Banks specialize in certain export markets
  - Expertise in product/destinations make substitution harder

⭐ Design policy for distressed banks:
  - We still need to identify the sources of expertise

Examples:
- Products are geographically concentrated within the country
- Banks have connections with foreign counterparts
  (IDB program on letters of credit)
3. How do firms use external credit?

- Firms use external credit to finance working capital
  - Strong reaction of quantities to short-term credit shocks
  - No evidence that short-term credit shocks affects entry of firms or new markets

- Still need to understand usage of credit in long-term exports dynamics

★ Access to credit as industrial/export promotion

Dynamics of Exports and Credit

(e) Dynamics of Exports

(f) Dynamics of Credit