Vulnerability and Cooperation: Social Policy and Trade Promotion

Chris Bidner - University of New South Wales
Ken Jackson - Wilfrid Laurier University

21 January 2011
Trade, Trust and Uncertainty

Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence. (Arrow, 1972, p.357)

Trust and trustworthiness (and choice and rationality) are at issue just because we are in the murky in-between land that is neither deterministic nor fully indeterminate. (Hardin, 2002, p.12)

Throughout history, institutions have been devised by human beings to create order and reduce uncertainty in exchange. (North, 1991, p.97)
The Role of Institutions

- Institutions fill different roles (Dixit, 2009)
  1. Security of property rights: Provides the incentives to save and invest.
  2. Enforcement of contracts: Provides incentives to behave honestly in the face of moral hazard.

- Is an effective social safety net necessary for trade?
## The Correlates of Trust

<table>
<thead>
<tr>
<th></th>
<th>Base</th>
<th>Inequality</th>
<th>LowIncomeShare</th>
<th>OldAge</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP/Capita(Log)</td>
<td>.004</td>
<td>.012</td>
<td>.018</td>
<td>-.037*</td>
</tr>
<tr>
<td></td>
<td>(.025)</td>
<td>(.025)</td>
<td>(.025)</td>
<td>(.022)</td>
</tr>
<tr>
<td>Pop.Size(Log)</td>
<td>.024**</td>
<td>.031***</td>
<td>.028***</td>
<td>.025**</td>
</tr>
<tr>
<td></td>
<td>(.009)</td>
<td>(.009)</td>
<td>(.009)</td>
<td>(.011)</td>
</tr>
<tr>
<td>Ethnic Div.</td>
<td>-.094</td>
<td>-.026</td>
<td>-.027</td>
<td>- .056</td>
</tr>
<tr>
<td></td>
<td>(.078)</td>
<td>(.078)</td>
<td>(.079)</td>
<td>(.077)</td>
</tr>
<tr>
<td>Rule of Law</td>
<td>.071**</td>
<td>.052*</td>
<td>.056**</td>
<td>.084***</td>
</tr>
<tr>
<td></td>
<td>(.028)</td>
<td>(.028)</td>
<td>(.028)</td>
<td>(.023)</td>
</tr>
<tr>
<td>Gini Index</td>
<td></td>
<td>-.005***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inc.Share-Bottom Decile</td>
<td></td>
<td></td>
<td>.047***</td>
<td>.041***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.015)</td>
<td>(.015)</td>
</tr>
<tr>
<td>Old Age/Disab.Benefits</td>
<td></td>
<td></td>
<td></td>
<td>.437***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(.134)</td>
</tr>
<tr>
<td>Obs.</td>
<td>80</td>
<td>79</td>
<td>79</td>
<td>66</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.319</td>
<td>.381</td>
<td>.379</td>
<td>.526</td>
</tr>
</tbody>
</table>

**Notes:** Dependent variable in all regressions is generated from World Values Survey data and corresponds to the fraction of respondents agreeing with the statement that most people can be trusted, as opposed to the statement that you can’t be too careful with people.
A Summary

- Benchmark model of cooperation independent of social safety net
- Add uncertainty in two forms
  1. A fraction “above the law”
  2. Uncertain legal environment
- Uncertainty adds a role for social policy
- Even when noise is small - social policy may be critical
A Simple Game

- Agents are randomly matched in a one-shot game
- Imperfect legal institutions impose fines, $F$ on defectors, with probability $\theta$

<table>
<thead>
<tr>
<th>$A_{-i} = C$</th>
<th>$A_{-i} = D$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A_i = C$</td>
<td>$u(r)$</td>
</tr>
<tr>
<td>$A_i = D$</td>
<td>$\theta \cdot u(t - F) + (1 - \theta) \cdot u(t)$</td>
</tr>
</tbody>
</table>

- Interested in two comparative statics
  1. Cooperation and vulnerability - loosely $u(s)$, all else equal
  2. Cooperation and social policy - provision of basic services
A Benchmark

- When is there a cooperative equilibrium?

**Proposition 1**

The strategy profile \((D, D)\) is always a Nash equilibrium. The strategy profile \((C, C)\) is a Nash equilibrium if and only if institutions are sufficiently strong:

\[
\theta \geq \theta^{**} \equiv \frac{u(t) - u(r)}{u(t) - u(t - F)}
\]

- Vulnerability has no effect on cooperation - no uncertainty
People Above the Law

- Benchmark model includes no uncertainty

- One form of uncertainty - a fraction $\varepsilon$ of the population immune from prosecution

- This group always defects

- When will the others cooperate?
Proposition 2

There is an equilibrium in which the agents subject to the law cooperate if:

\[ \theta \geq \theta^{**}(\varepsilon) \equiv \frac{u(t) - u(r) + \left[ \frac{\varepsilon}{1 - \varepsilon} \right] \cdot (u(1) - u(s))}{u(t) - u(t - F)} \]

- Cut-off equilibrium depends on the level of corruption
- Vulnerability (lower \( u(s) \)) reduces cooperation
- In the limit where corruption approaches zero

\[ \lim_{\varepsilon \to 0} \theta^{**}(\varepsilon) = \theta^{**} \quad (1) \]

\[ \lim_{\varepsilon \to 0} \frac{d\theta^{**}(\varepsilon)}{ds} = 0. \quad (2) \]
A Global Games Approach

- What if the effectiveness of the legal system is in question?
- All agents are subject to legal institutions
- Each person receives a noisy signal of \( \theta \) (Carlsson and van Damme (1993))
- Cooperative equilibrium takes a cut-off form - cooperate if my signal was sufficiently large
Equilibrium as Uncertainty Approaches Zero

Proposition 3

In the limit, as the noise in the signal approaches zero, there is an equilibrium in which all agents cooperate if they receive a signal:

\[ \theta \geq \theta^* = \frac{u(t) - u(r) + u(1) - u(s)}{u(t) - u(t - F)} \]

- Vulnerability matters - as \( u(s) \) falls, necessary legal institutions increase
- Remains true even when uncertainty is minimal
- At the cut-off - high level of uncertainty
Illustrating A Simple Safety Net

- The government provides a level of basic services, $b_0$
- Player can augment this from income, receives utility $v(b_0 + b) + y - b$
- $v(z)$ is sufficiently concave - basic services provide more value to low-income individuals
- How does cooperation change with basic services?
The Effect of Basic Services

- Uncertainty reduces possibility of cooperation
- Cooperation increases with social safety net if some uncertainty
Conclusion

- Social policy has a role to play in trade promotion
- Supporting victims allows people to take chances
- Simply improving the legal system may not be enough
- One extension - tradeoff between social policy and legal improvements