Exchange and Specialization as a Discovery Process

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Motivation

“As it is the power of exchanging which gives occasion to the division of labour, so the extent of this division will always be in proportion to the extent of that power.”

--Adam Smith, *Lectures on Jurisprudence* (Appendix)

- What are the dynamics of the discovery process for specialization and exchange?

- In an unstructured, decentralized economy, how do people spontaneously order their production, exchange, and consumption decisions?
Left click to select/deselect. Right click and drag to move.
Efficiency: Unknown2

The diagram shows the efficiency results for different sessions across various blocks. Each session is represented by a distinct color, and the efficiency is measured on a scale ranging from -40% to 100%. 

- Session 1: Blue bars indicate a high efficiency in the early blocks, declining in later blocks.
- Session 2: Red bars show a consistent low efficiency across all blocks.
- Session 3: Yellow and purple bars depict variations in efficiency with a peak in the middle blocks.
- Session 4: Green bars display a steady increase in efficiency, peaking in the last block.
- Session 5: Pink bars reflect a steady decline in efficiency throughout the blocks.
- Session 6: Red bars with slight variations show a general decrease in efficiency.

The efficiency overall ranges from 20% to 60%, with some sessions showing significant fluctuations between blocks.
Efficiency: Unknown4

Blocks

Efficiency

Session 1
Session 2
Session 3
Session 4
Session 5
Session 6
Efficiency: Unknown8
Observations

- There seem to be three discovery steps:
  - Arriving at the idea to trade
  - Finding a suitably endowed trading partner with whom one can exploit the power of exchanging through specialization
  - Building the relationship by increased specialization over time

- The tone in the transcripts clearly indicates that the emergence of (a natural propensity to) exchange is indeed personal and social.

- Exchange in this setting is increasingly bilateral over time.
***** Period 16-B *****
1: i want more money
2: so do i
1: i wish i knew what i was doing
2: i wish i knew how to make more
1: me too
1: i hope we have time to figure it out

***** Period 17-A *****
2: yea, but i doubt it

***** Period 17-B *****
2: can i put them things in your house?
1: i dont think so
1: oh thats ur house

***** Period 18-B *****
2: you can put them in each others house
1: oh ok
2: do you know which one you make faster

***** Period 19-B *****
2: im trying to think how maybe we could help each other
Instances of Specific Words

Give

Trade

Share, Help, Team, Split, Partner, Together
Conclusions

- Finding a suitable trading partner is key to exploiting specialization.

- We do not observe **impersonal and multilateral trading** emerge spontaneously.

- It is clear that whatever tradeoffs spawn impersonal markets, such institutions must emerge from highly personal exchange.
Building a Market:
From Personal to Impersonal Exchange

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George Mason University
Informal norms based on reciprocity are adequate for small-scale exchange within villages and hunter and gatherer societies.

As exchange expands across a larger area, these informal norms are offloaded onto what are generally more formal, centralized rule systems.

But what is this process of institutional evolution?

What spawns transitions from the explicit reciprocity of personal exchange to the implicit cooperation of impersonal exchange?

How and to what extent do yesterday’s institutions constrain future trajectories?
Potential Earnings

**RedBlue Earnings**: 90

*Pink Multiplier*: 1.7

**Potential Profit**: 153

Need 3 Red for each 1 Blue to earn 3 cents.

0 Red needed or 0 Blue wasted.

Chat Room:

***** Period 1-4 *****
***** Period 1-3 *****
***** Period 2-4 *****
***** Period 2-3 *****

<Person 4>: anyone need pinks
***** Period 3-4 *****
***** Period 3-3 *****

[You received 5 Pink from person 4]
[Person 2 received 5 Pink from person 4]
[Person 3 received 4 Pink from person 4]
[You received 30 Blue from person 2]
[Person 4 received 10 Blue from person 2]
[Person 2 received 35 Red from you]
[Person 4 received 5 Red from you]
***** Period 1-1 *****
***** Period 1-B *****
<You>: 14 blues for 14 pinks

***** Period 1-B *****
***** Period 1-1 *****
Red-Blue Village: Day 14

Person 1: ok
4: 55 blues
1: i can make 130 reds
4: usually
1: which is what i've been doing
2: correction, 110 blues
1: ah, right
1: wait
2: ok, what about 3 and 4?
3: what r these pinks for?
1: i can actually make 130 red
4: pinks are a multiplier
2: ok so 110 + 55 = 165 blues
1: the pinks multiply profits
4: yea
2: 3, how many reds can you make?
3: 70
3: how can i increase it
2: ok so 70 + 130 = 200 red

1: the production scroller on the top
2: me and 4 need more blues than red
4: right
2: 1 and 3 need more red than blue
3: two of us can make more reds and 2 can amke more blues
4: we need extra blues to trade for pinks also
1: what should we change for next round?
3: then we can excahnge if required
2: 1 and 3 maximize reds
1: i'm already at red producing max
2: me and 4 will max blues
1: okay
2: ok
1: #3 you got it?
3: ok
Pink-Red Village: Day 14

9: lemme get re
9: man
11: 10 where you at
10: yo
11: who you know is the business man
10: 10
11: nah i get those great deals
11: those meal deals
10: if i had that bucket i wouldve
    bankrupted every other chat room
11: produce something
11: doing all that typing
11: produce something
11: do something
10: naw
10: im chillin
9: yeah i wish i had that bucket
11: you wouldnt know what to do
    with it
9: i would do better then y'all 2
11: yall probably just wear it on
    your head
10: i come back with at least 1
    million blue
11: and get no deals
11: im helping everyone come up
11: when i eat everyone eat
11: you know who said
10: oh for real
[Person 4 receives 20 Red from person 1.]
2: ok so lets to 25 reds and 50 blues for me and 4

[Person 2 received 20 Red from person 1.]
3: i made only 61 this time on 100% reds
2: and 25 blues and 75 red for 1 and 3
1: oh, ok
2: does that work out?
3: ok
1: right, but we now only need to decide, of those red to you and 4, how many i give
1: and how many #3 gives
2: extra blues?
4: 2 i need the extras
2: how about 20 blues and 40 reds for me and 4

[Person 4 received 40 Blue from person 2.]
1: work your bucket magic
1: are you talking to me?
1: #2
2: just throwing out some ideas
2: actually 20 reds and 40 blues for me and 4
1: oh ok, i was just wondering
1: right
2: 20 blues and 60 red for 1 and 3

[Person 1 received 5 Pink from person 4.]
[Person 4 received 5 Pink from person 4.]
[Person 2 received 5 Pink from person 4.]
Merchant Area: Day 15

3: any pinks for reds
8: yea i got it
3: how many
7: I need 5 reds
8: i have 12. u want em all
7: ok
7: yes
3: pinks please
7: person 8 what do you want
3: can i get some pinks
8: red
12: 7 pinks for 7 blues?
8: 3..ill give u 12 pink for 12 red
4: got pinks for blues
11: 20 20
3: person 11 can i get some pinks for 10 reds
11: yo 4
7: who has reds
11: 20/20
12: 7 pinks for 7 blues 4?
8: person 3.. i can give u 12 pinks
Merchant Discussion

- Clearly lack idle chitchat
- Filled with price quotes
  - “20/20”
  - “7 pinks for 7 blues”
- The merchants arrive at the area, make their “deals”, and return to their village community.
- The cooperation in the merchant area is implicit—when I give 20 pinks, you will give 20 blues, and you and I will each be better off.
- There is no discussion of how the consumption of the goods generates earnings, nor is it visible just exactly how we will be better off from the transaction.
Merchants may take their cut, but the role they play in their villages is closer to that of a fellow villager returning from a successful hunt than that of a broker fulfilling orders for clients at the Chicago Mercantile Exchange.
% of Gains from Exchange Realized

Day

Percentage

Complete Village Specialization

Red-Blue Village

Blue-Pink Village

Pink-Red Village
Historical Property Rights, Sociality, and the Emergence of Impersonal Exchange in Long-distance Trade

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Economic History in the Laboratory

- North (2006) argues that belief systems and the stock of local knowledge are intimately intertwined with the institutions that humans build.

- Two History-Induced Treatments
  - Property rights are perfectly enforced for all of the participants, though they must rely on trust and repeat interactions to enforce exchange agreements \((PRH)\).
  - No property rights of any kind are enforced \((NPRH)\).
Historical Rates of Specialization: \textit{PRH}
Rates of Specialization

![Graph showing rates of specialization for different sessions with property rights history and no property rights history.]

- **PRH1** to **PRH4** represent sessions with property rights history.
- **NPRH1** to **NPRH4** represent sessions with no property rights history.

The graph visualizes the specialization rates across different sessions, with color-coded sections indicating the contribution of Pink-Red Village, Blue-Pink Village, and Red-Blue Village.
Impact of History on Wealth

Week 5: Days 29-34

Village Competitive Equilibrium with no Intervillage Trade

Autarky

Property Rights History

No Property Rights History
Sociality: Usage of “we”

### Property Rights History

<table>
<thead>
<tr>
<th>Session</th>
<th>PRH1</th>
<th>PRH2</th>
<th>PRH3</th>
<th>PRH4</th>
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<td>Meeting Area</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
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<tr>
<td>Pink-Red Village</td>
<td>70</td>
<td>120</td>
<td>170</td>
<td>220</td>
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<td>Blue-Pink Village</td>
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<tr>
<td>Red-Blue Village</td>
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### No Property Rights History

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<th>Session</th>
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<td>Red-Blue Village</td>
<td>10</td>
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</tbody>
</table>
No Property Rights History 1

Day Percentage

Red-Blue Village
Blue-Pink Village
Pink-Red Village

Complete Village Specialization

Day 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39
**Impersonal and Personal Exchange**

**Blue-Pink Village - Day 33**
5: is the other room cooler than this one?
6: i wanna travel...
8: not really
8: you just make deals
8: it has a chat board
8: and buckets
8: thats it
7: yea
7: pretty much

**Merchant Area - Day 33**
12: Why does it feel like we're selling illegal drugs behind Denny's when we're doing this?
4: cause we are
“Path dependence is a fact of history and one of the most enduring and significant lessons to be derived from studying the past...the learning process by which we arrive at today’s institutions constrains future choices.”

“No economic model can capture the intricacies of economic growth in a particular society. The process of economic growth is going to vary with every society, reflecting the diverse cultural heritages and the equally diverse geographic, physical, and economic settings...

You must have an intimate understanding of the individual characteristics of that society before you are ready to try to change it.”

--Douglass North, *Understanding the Process of Economic Change*

(Even if you believe you have an intimate understanding of a society, it remains to be seen that trying to change it will be successful.)