Information Disclosure and Exchange Media

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Background

- Common sense: more information should be preferred to less

- Since at least Hirschleifer (1971), we know this is not necessarily the case
  - some information has private value and no social value
  - zero social value can become negative social value in 2nd-best world

- Many papers on the subject, primarily in the agency literature

- We examine the implications for disclosure practices in financial markets that rely on exchange media
Exchange media

- Generally, assets that are used to support intertemporal trade
  - includes monetary assets (since money represents claims to future resources)
  - also includes collateral objects used in (e.g.) repo transactions

- Our theory does not distinguish between the two
  - in our set-up, either interpretation is possible
Nondisclosure practices (examples)

- Private banks and MMMF prefer to report book value over market value
- Bank regulators do not disclose assessments of bank risk (CAMELS ratings)
- Lender-of-last-resort operations frequently cloaked in secrecy (Fed discount window, Treasury TARP)
- Many historical examples (National Banking Era 1863-1913 clearinghouses)
- What Dang, Gorton and Holmström label “purposeful opacity” (securitization design, coarse debt ratings, etc.)
Related literature

- The Nature of Liquidity Provision: When Ignorance is Bliss
  - Dang, Gorton and Holmström (2012)

- In their story, symmetric information about payoffs increases liquidity
  - and symmetric information may be easier to achieve through shared ignorance

- In our story, even symmetric information may reduce liquidity
  - and in extension, the threat of private information may do the same
A Lagos-Wright Model

- Ex ante identical agents $i \in [0, 1]$ with quasi-linear preferences (day/night)

$$E_0 \sum_{t=0}^{\infty} \beta^t [x_t(i) + 0.5u(c_t(i)) - 0.5h(y_t(i))]$$

- Coconut tree delivers dividend $z_t$ at beginning of each day; and i.i.d. process from day to day, but at night

$$F(z^+ | \eta) \equiv \Pr [z_{t+1} \leq z^+ | \eta_t = \eta]$$

where $\eta_t \in \{b, g\}$ denotes “news” received at date $t$ at beginning of night

- Define $z(\eta) \equiv \int z^+ dF(z^+ | \eta)$ and assume $z(b) \leq z(g)$
• Let $\pi \equiv \Pr [\eta_t = b]$ and define $z^e \equiv \pi z(b) + (1 - \pi) z(g)$

• As all output is nonstorable, there are two resource constraints

$$z_t \geq \int x_t(i)di \text{ and } \int y_t(i)di \geq \int c_t(i)di$$

• First best allocation satisfies

$$u'(y^*) = h'(y^*)$$

and generates ex ante utility

$$W^* = (1 - \beta)^{-1} [z^e + 0.5u(y^*) - 0.5h(y^*)]$$

• Note: first-best is again independent of news (news has no social value)
Anonymity

- Agents are anonymous and no lump-sum taxes
- Tangible medium of exchange is necessary
- Following literature, assume that society can issue durable, divisible, non-counterfeitable bearer notes
- Assume that these notes are used to denote shares in the coconut tree, which is controlled by society
- Restrict attention to linear mechanism (competitive spot markets)
A Monetary Economy

- Eqm distribution of money (shares) at beginning of day will lie on two point set \( \{s_c, s_p\} \)

- Total number of shares normalized to unity

- Let \((\phi_1, \phi_2)\) denote price of shares in day and night, resp.

- Let \(s \geq 0\) denote shares taken into the night; then day budget constraint is

  \[ x = (z + \phi_1)s_j - \phi_1s \]
• Choice problem in day is

\[ D(s_j, z) \equiv \max_{s \geq 0} \{(z + \phi_1)s_j - \phi_1 s + E_\eta N(s, \eta)\} \]

and FOC is

\[ \phi_1 = E_\eta N_1(s, \eta) \]

• Envelope theorem: \( D_1(s_j, z) = z + \phi_1 \)

• Conjecture that \( \phi_1 = \phi_1^+ \) so that

\[
\int D_1(s_j^+, z^+)dF(z^+ \mid \eta) = z(\eta) + \phi_1
\]
• Choice problem for consumer at night is

\[ C(s, \eta) \equiv \max \left\{ u(c) + \beta \int D(s_c^+, z^+) dF(z^+ | \eta) \right\} \]

where \( c \equiv \phi_2(s - s_c^+) \) and \( s_c^+ \geq 0 \) (debt constraint)

\[ \phi_2(\eta)u'(c(\eta)) = \beta [z(\eta) + \phi_1] \]

if \( s_c^+ > 0 \) and otherwise

\[ c(\eta) = \phi_2(\eta)s \]

• Choice problem for producer at night is

\[ P(s, \eta) \equiv \max \left\{ -h(y) + \beta \int D(s_p^+, z^+) dF(z^+ | \eta) \right\} \]

where \( y \equiv \phi_2(s_p^+ - s) \) and FOC is

\[ \phi_2(\eta)h'(y(\eta)) = \beta [z(\eta) + \phi_1] \]
• Notice: \( u' = h' \) if \( s_c^+ > 0 \) (equilibrium allocation will be first-best if debt constraint does not bind tightly)

• Market-clearing conditions

\[
s = 1 \text{ and } c(\eta) = y(\eta)
\]

• This implies

\[
0.5s_c^+(\eta) + 0.5s_p^+(\eta) = 1
\]
Properties of the Money Economy: No-News

- By a no-news economy, we mean $z(b) = z(g) = z^e$

- This obviously implies $y(\eta) = y$ and $\phi_2(\eta) = \phi_2$

- Assume that debt-constraint is slack; then $y = y^*$ and $\phi_2 = \beta \left[ \frac{z^e + \phi_1}{h'(y^*)} \right]$ with

$$\phi_1 = \left( \frac{\beta}{1 - \beta} \right) z^e$$

- Now, need to confirm conjecture that $\phi_2(1) > y^*$ (shares are sufficient to purchase first-best level of output)
• This requires
\[
\left( \frac{\beta}{1 - \beta} \right) z^e > h'(y^*)y^*
\]

• Whether this holds or not depends on parameters; define \( z^e = z_0 \) that satisfies
\[
\left( \frac{\beta}{1 - \beta} \right) z_0 \equiv h'(y^*)y^*
\]

• Debt-constraint is slack for \( z^e > z_0 \) and binds tightly for \( z^e < z_0 \); in this latter case, \( \phi_2 = y < y^* \) and
\[
1 < \left[ \frac{z^e + \phi_1}{\phi_1} \right] < \frac{1}{\beta}
\]
Properties of the Money Economy: News

- By a *news economy*, we mean $z(b) < z^e < z(g)$

**Proposition 1** If $z^e = z_0$ and $z(b) < z(g)$, then the consumer debt constraint will bind tightly in the bad news state and remain slack in the good news state.

- Asset prices at night satisfy

  $$\phi_2(b) = \frac{\beta [z(b) + \phi_1]}{h'(y(b))} < \frac{\beta [z(g) + \phi_1]}{h'(y^*)} = \phi_2(g)$$

- Asset market is “informationally efficient” (asset prices rapidly capitalize all pertinent information); nevertheless, there is “excess volatility”
Proposition 2 Assume that \( z^e = z_0 \) and \( z(b) < z(g) \). Then the competitive monetary equilibrium is implementable only under a nondisclosure policy where news is suppressed.

- Note: suppressing news means \( z(b) = z(g) = z_0 \); which corresponds to no-news equilibrium studied earlier (implements first-best allocation)

- A nondisclosure policy implies that \( \phi_2(b) = \phi_2(g) \); “excess volatility” in asset prices is eliminated

- This is important for a monetary asset because now consumers are never caught short of money by surprise news events that temporarily depress the purchasing power of their money holdings
Is nondisclosure a time-consistent policy?

- If the debt-constraint binds under some states of world under a nondisclosure policy, then there is an incentive for the information manager to release good news when it occurs
  
  – such a policy is infeasible

- There is a short-run gain and long-run pain associated with revealing good news in a constrained state

- Easy to show (and simple to understand) that nondisclosure is time-consistent only for sufficiently patient economies
What if nondisclosure is infeasible?

- Tranching asset here is possible, but there is just not enough of it to help

- Corrective fiscal policy is possible, if enough instruments are available

- Introducing fiat money (or government debt) and deflating at the Friedman rule (paying interest on debt) can restore efficiency—if lump-sum taxes are available

- Introduction of constant stock of fiat money can be welfare-improving—but only if cash-in-advance constraint is imposed
  
  – CIA needed to make the short-run return to money insensitive to news
Extension: Andolfatto, Berentsen and Waller

- Suppose that agents possess a technology that allows them to discover, on their own, at some utility cost $\gamma$, the information that society wishes to remain hidden (disclosed with a lag)?

- We use mechanism design approach to characterize the set of incentive-feasible allocations under the threat of private information acquisition.

- First-best remains implementable for high $z^e$ and high $\gamma$; for moderate ranges of $z^e$ and $\gamma$, constrained-efficient allocation has lower output and nondisclosure.

- But for low enough $\gamma$, constrained-efficiency requires full disclosure.
Conclusion

- We show that “full transparency” is not necessarily desirable when commitment is limited and not all information possesses social value.

- Good monetary instruments should be insensitive to certain types of information.

- For private money systems (banking), this may imply that nondisclosure of B/S information may be desirable.

- But possible benefits need to be weighed against potential costs...