Transparency in Financial Markets

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August 2009

Background

- Common perception: agency relationships should be as transparent as possible

- Basic idea: transparency improves accountability; leads to better aligned incentives

- Reality: systematic departures from full transparency (information that could be made available, remains hidden)

- Question: is this necessarily a bad thing (from a social perspective)?

- In general, no (e.g., Hirschleifer 1971, agency literature...)

Applications to Money, Banking, and Financial Markets

- Eff Mkts Hypothesis: financial markets are “informationally efficient”

- Appears to be viewed by some as a *normative* prescription; i.e., that financial markets *should be* informationally efficient wherever possible

- E.g., FASB Rule 157 (mark-to-market) motivated by the idea that “informationally efficient” market prices are the best measure of value for assets, and that these values should be updated frequently and made transparent as possible on B/S statements

- Is this necessarily a good idea?

A Wicksellian Model

- Economy consists of N agents and N time periods; with $3 \leq N < \infty$

- *Ex ante*, all agents are identical; *ex post*, they are divided into N types, with each agent having an equal probability of realizing type $j \in \{1, 2, ..., N\}$

- A type $j \neq N$ agent is endowed with $0 < y < \infty$ units of nonstorable output at date j

- The type N agent is endowed with a stochastic endowment; it is equal to $\alpha^{-1}y$ with probability $0 < \alpha < 1$ and is otherwise equal to zero

- The type N agent receives a private signal at the beginning of date 1 that perfectly reveals the future realization of his endowment

- A type j agent has preferences given by

$$U_j = \theta c_j + c_{j+1}$$

for $j = 1, 2, ..., N$ (modulo N)

- Assume that $0 < \theta < 1$; that is, the agent values the output of his neighbor more than he does his own (a Wicksellian circle–a complete lack of double coincidence)

The (Ex Ante) First-Best Allocation

- Each agent j is required to transfer his endowment to agent $j-1$ (modulo N)

- All agents receive an *ex ante* utility payoff equal to y (autarky yields $\theta y < y$)

- *Ex post*, all type $j \neq N-1$ agents receive y; and the type $N-1$ receives either $\alpha^{-1}y$ (with probability α) or zero

Private Information and Full Commitment

- At date 1, the type N agent receives a private signal (news) concerning the value of his future endowment

- If the news is bad, only agent $N-1$ will suffer (ex post)

- While this agent may regret his participation decision, he is bound to make good on his promise (to deliver y to agent $N-2$, rather than consume it himself)

- As agent N is not affected by the news one way or the other, he makes it publicly available. That is, the first-best allocation is incentive-compatible

Private Information and Limited Commitment

- Assume that the type N agent can commit; but that all other types cannot

- Revelation principle still holds; easy to check that type N agent will reveal private signal truthfully to mediator

- Should be equally apparent that efficiency dictates that the mediator keep this information private!

- Making private information public when it becomes available causes an economic collapse

Money and Banking

- Interpret the mechanism as a bank; issues money loan to type N agent in exchange for collateral (a stochastic claim against date N output)

- As in Kiyotaki and Moore, this banknote will circulate as a medium of exchange throughout the trading chain

- To ensure that efficient exchanges are realized, it will be imperative that the bank keep the true state of its balance sheet hidden from society

- Revealing bad news in the interest of "transparency" will (in this environment) render its notes worthless (the underlying collateral is worth zero) and hence illiquid ($\Rightarrow$ economic collapse)

A Lagos-Wright Model

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

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

- Coconut tree delivers dividend z_t at beginning of each day

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

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

- Define $z(\eta) \equiv \int z^+ dF(z^+ \mid \eta)$ 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

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

Anonymity

- Agents are anonymous and no societal penalties
- 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 (later, I consider fiat notes as well)
- Restrict attention to linear mechanism (competitive spot markets)

An Inside-Money 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 (ϕ_1, ϕ_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

$$x = (z + \phi_1)s_j - \phi_1 s$$

- Choice problem in day is

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

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

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

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

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

if $s_c^+ > 0$ and otherwise

$$c(\eta) = \phi_2(\eta) s$$

- Choice problem for producer at night is

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

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

$$\phi_2(\eta) h'(y(\eta)) = \beta \left[z(\eta) + \phi_1\right]$$

- 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

$$0.5 s_c^+(\eta) + 0.5 s_p^+(\eta) = 1$$

Properties of the Inside-Money Economy: No-News

- By a *no-news economy*, I 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 Inside-Money Economy: News

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

Lemma 3 *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

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

as one would expect (asset prices rapidly capitalize news events)

Proposition 1 *Assume that* $z^e = z_0$ *and* $z(b) < z(g)$*. Then the inside-money equilibrium is informationally efficient and allocatively inefficient. Moreover, the inside-money equilibrium where news is suppressed is informationally inefficient and allocatively efficient.*

- 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

An Economy with Inside and Outside Money

- Assume that nondisclosure is infeasible

- If lump-sum taxation possible, state-contingent tax/transfer policy can implement FB

- Even absent lump-sum taxation, how about asset purchase and using dividend to contract MS?

- Anyway, in what follows, I consider fiat money

Proposition 2 *Assume that* $z^e = z_0$ *and* $z(b) < z(g)$. *Then in an economy where fiat money coexists with inside money,* $y(b)$ *is monotonically decreasing in* μ *with* $y(b) \nearrow y^*$ *as* $\mu \searrow \beta$.

- Deflating at Friedman rule implements first-best allocation (not feasible if LST necessary to contract MS)

Proposition 3 *Assume that* $z^e = z_0$ *and* $z(b) < z(g)$. *Then fiat money is valued for any inflation in the range* $\mu \in (\beta, \overline{\mu})$.

- Note: if $\overline{\mu} > 1$, then fiat money will improve ex ante welfare even if lump-sum taxation is infeasible

Proposition 4 *Assume that* $z^e = z_0$ *and* $z(b) < z(g)$. *Then for any* $\mu \in (\beta, \overline{\mu})$, *the equity premium satisfies*

$$\left[\frac{z_0 + \phi_1}{\phi_1} - \frac{1}{\mu}\right] = \pi \left[\frac{1}{\mu} - \frac{z(b) + \phi_1}{\phi_1}\right] [A(y(b)) - 1] > 0$$

- Note: equity premium vanishes at the Friedman rule

Proposition 5 *Assume that* $z^e = z_0$ *and* $z(b) < z(g)$. *Then for any* $\mu \in (\beta, \overline{\mu})$,

$$\frac{\phi_2(b)}{\phi_1} < \frac{v_2(b)}{v_1} \leq \frac{v_2(g)}{v_1} < \frac{\phi_2(g)}{\phi_1}$$

- Fiat money offers a relatively stable "short-term" (from day-to-night) rate of return

Conclusion

- Good monetary instruments should be insensitive to certain types of information
- For private money systems (banking), this may imply that nondisclosure of some information is desirable
- Societal benefits of private information can be understood as an application of the theory of the second best