Insider Trading Regulation and Market Quality Tradeoffs

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Calibrated for a 45 minute presentation

Insider Trading and Disclosure

Main form of insider trading regulation in the U.S.

- Ex post disclosure requirements (Section 16(a) of the Securities Exchange Act of 1934 + Sarbanes-Oxley Act of August 2002)

> *"Section 16(a) is likely to provide significant benefits by making information concerning insiders' transactions in issuer equity securities publicly available substantially sooner than it was before. Making this information available to all investors on a more timely basis should increase market transparency, which will likely enhance* market efficiency *and* liquidity*."*
>
> —— U.S. Securities and Exchange Commission, File No. S7-31-02.

Purposes of this paper

- Provides foundations to statements such as the previous one in markets with endogenous information acquisition
- Builds up a framework to gauge how **alternative forms** of insider trading regulation affect information efficiency and other attributes of market quality
  - study information efficiency and market liquidity across such alternative regulatory regimes
- Assess modern and alternative regulatory models available in light of existing regulation in the U.S., the E.U., and in other legislations such as that in the U.K. or Switzerland

Main conclusions

- Insider trading should **not** be left unregulated
- **How** to regulate depends on both uncertainty around market fundamentals and the efficiency of information technology and the market quality attribute that regulation tries to target at
  - (For example, in times of elevated uncertainty, ex post disclosure requirements—the U.S. model—may be irrelevant to market efficiency)
- General messages:
  - in markets with high uncertainty and/or more efficient information technologies, stricter regulatory regimes ensure the informationally most efficient markets
  - liquidity $always$ improves with a straight ban on insider trading

Example: market quality in the information age

- Insider trading regulation may seem to be irrelevant to market efficiency or liquidity in the current information age
  - if information has become easier to process, wouldn't insiders' informational advantage be so reduced to render regulation practically irrelevant?

- No. Market efficiency and liquidity both improve while properly regulating insider trading in markets with more parsimonious and efficient information search and computational costs.

Mechanisms: information crowding-out

Consider the following stylized examples

1. Investors cannot bear the costs of collecting information in markets with low uncertainty—not profitable enough

2. Assume an information technology "shock" occurs (e.g., new web crawling or parallel computing technique)

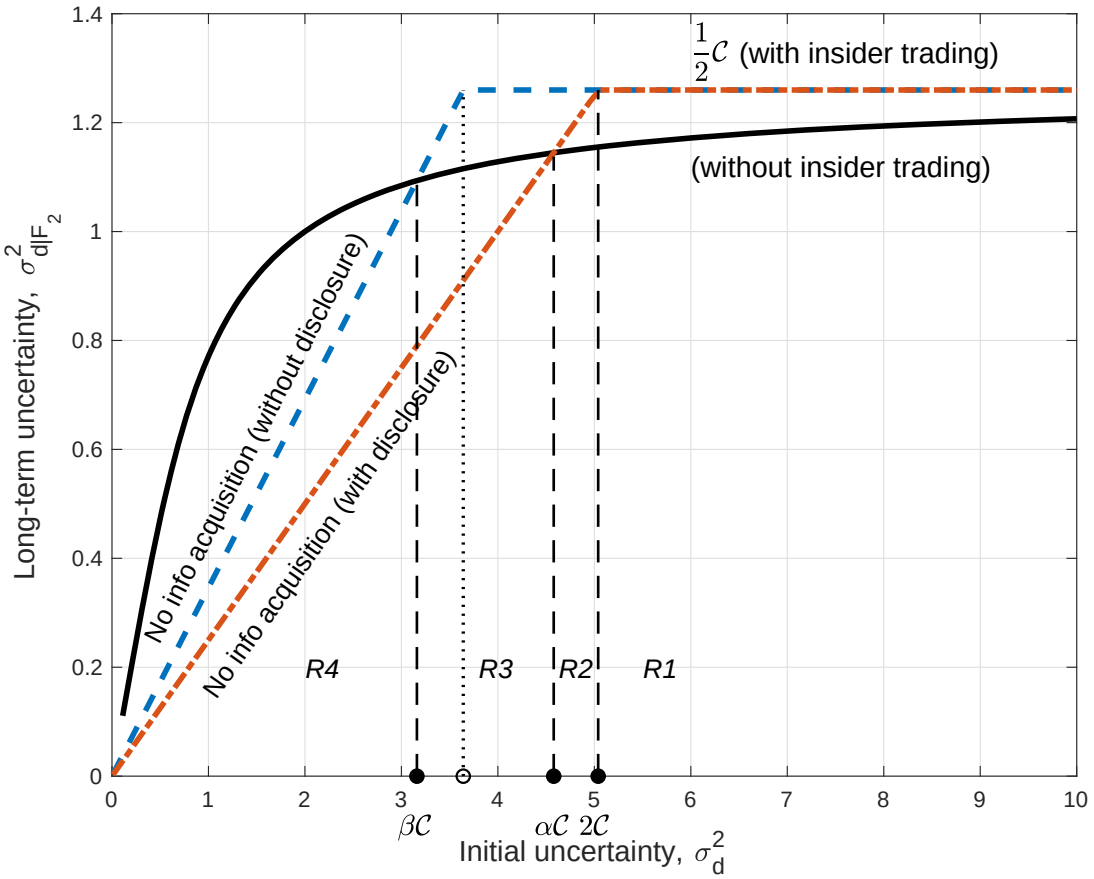
3. Investors may now afford collecting information to the entire benefit of market efficiency

Information crowding-out: insider trading (with or without disclosure) discourages 3

Mechanisms: forces

- Insider trading (with or without disclosure) ...
  - ... improves price efficiency—for fixed levels of information
  - ... crowds-out investors
- Second effect is very strong and often dominates in our model

Preview: efficiency and regulatory regimes



What's new

(Paper contains complete literature review)

- Provide a much stronger case for regulation than in the previous literature
  - insider trading should *always* be regulated, independent of parameter values
- Suggest *how* it should be regulated
  - detailed analysis of the most appropriate regulatory regime based on insider's info advantage and outsiders' info technology
- Assess alternative regulatory models adopted in the U.S., the E.U. and other legislations such as the U.K or Switzerland
  - ... propose policy mix, e.g., justify the adoption of complementary policy measures based on ex ante corporate disclosure

- Finally, info acquisition arguably operates in an opaque way—hedge funds and family offices alike typically maintain their research activities quite secret.
  - calls for new ways to model information acquisition in these markets
  - model solved as in the very recent strand of the literature in which information choices by strategic agents are not observed (but correctly anticipated in equilibrium)

Outline

1. Model
2. Market quality tradeoffs
3. Discussion

1. Model

Market

- Asset pays off $\tilde{d} \sim N\left(\bar{d}, \sigma_d^2\right)$ at time $t = 3$ and is traded at $t = 1$ and $t = 2$
- Kyle's trading protocol
- Price at-t is $p_t = E(\tilde{d}\,|\mathbb{F}_t)$ and insider knows $\tilde{d}$, and trades, when possible, at time $t = 1, 2$
- **Three regulation regimes**
  - Insider is not allowed to trade
  - Insider is allowed to trade, but is required to disclose his trade at $t = 1$
  - Insider is allowed to trade but without disclosure requirements
- Noise trading is $z_t \sim N\left(0, \sigma_z^2\right)$ in each trading period $t = 1, 2$

- At time-2, $\bar{N}$ "speculators" may trade in Cournot competition based on
  - Info reported by the insider (if any)
  - Signal $s_i = \tilde{d} + \varepsilon_i$, where ε_i is N.I.D.$\left(0, \tau_i^{-1}\right)$
    - cost function $c(\tau_i)$
    - $c(\tau_i)$ increasing, weakly convex, and satisfies $c(0) = 0$

- *Perfect Bayesian Equilibrium*
  - A speculator's information acquisition decision **is not observed** by others

Endogenous information acquisition

- Identify conditions under which no active speculator finds it optimal to deviate to a different signal precision

- Let $\bar{\Pi}\left(N, \tau_\varepsilon, \tau_i; h\right)$ be the net expected profits of an active speculator who chooses precision τ_i, provided all other traders choose τ_ε and expect others to choose the same precision — h is the info set in a given regulatory framework

- $\bar{\Pi}\left(N, \tau_\varepsilon, \tau_i; h\right)$ are concave in τ_i
  - Best response $\tau_i = \mathcal{T}\left(\tau_\varepsilon\right) : \frac{\partial}{\partial \tau_i} \bar{\Pi}\left(N, \tau_\varepsilon, \mathcal{T}\left(\tau_\varepsilon\right); h\right) = 0$
  - Equilibrium precision satisfies the fixed point, $\tau_\varepsilon = \mathcal{T}\left(\tau_\varepsilon\right)$

- Active speculators acquire information in equilibrium ($\tau_\varepsilon > 0$) iff the marginal cost of the first bit of information (in noise units, κ) is low enough:

$$\sigma^2_{d|h} > \mathcal{C} \equiv 4\kappa^{2/3}, \quad \kappa \equiv \frac{c'(0)}{\sigma_z}. \tag{1}$$

- Secret info acquisition by $inactive$ traders
  - Let $\bar{\Pi}'(N, \tau_\varepsilon, \tau_i; h)$ be their expected profits while they deviate and purchase info with precision τ_i
  - We have $\max_{\tau_i} \bar{\Pi}'(N, \tau_\varepsilon, \tau_i; h) > 0$ if (1) holds
    - Always optimal to deviate and $N = \bar{N}$

- If (1) does not hold, no speculators would purchase information

- Speculators always enter the market when insiders are not allowed to trade

2. Market quality tradeoffs

Informational efficiency

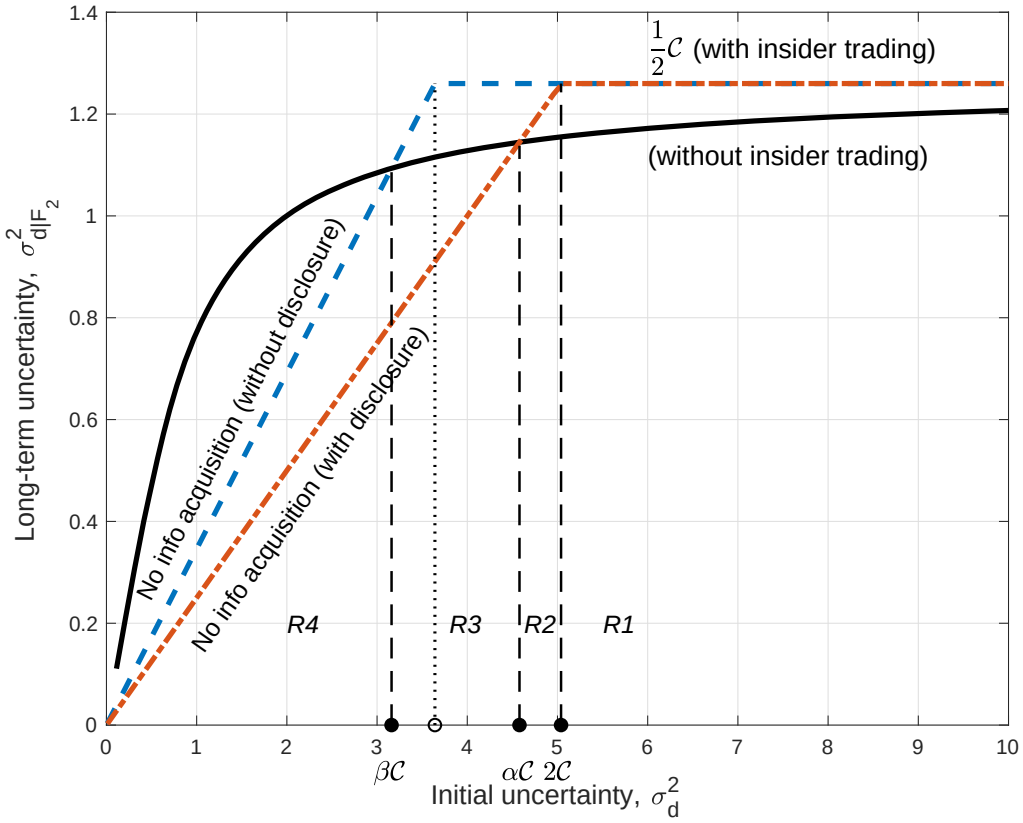
Theorem 1. (Price informativeness.) *For given σ_z and $c'(0)$, we can partition the values of σ_d^2 in the following four regions:*

R1. $\sigma_d^2 \geq 2\mathcal{C}$ *(Highly uncertain markets). Prices are the most informative with insider trading bans. In a market with insider trading, price informativeness is the same with and without mandatory disclosure of insider trades.*

R2. $\sigma_d^2 \in [\alpha\mathcal{C}, 2\mathcal{C})$, $\alpha \approx 1.817120$ *(High/moderate uncertainty). Prices are still the most informative with insider trading bans. In markets with insider trading, prices are more informative with than without mandatory disclosure.*

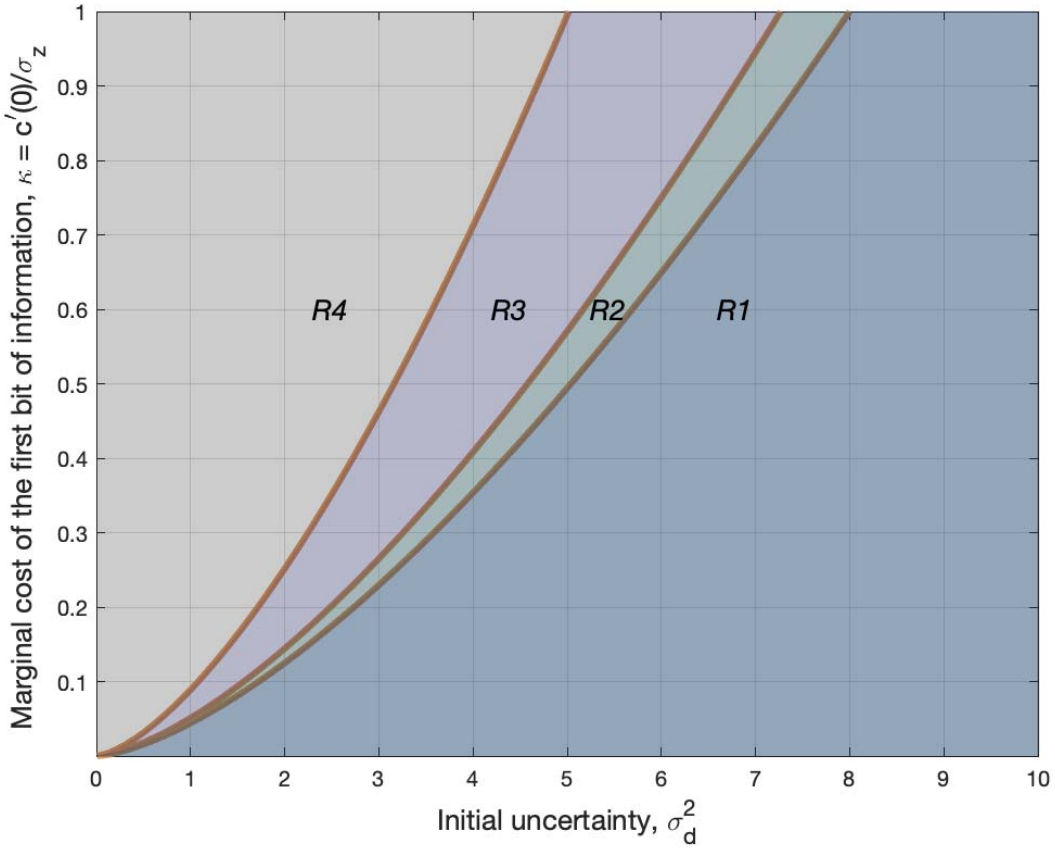
R3. $\sigma_d^2 \in [\beta\mathcal{C}, \alpha\mathcal{C})$, $\beta \approx 1.254308$ *(Low/moderate uncertainty). Prices are the most informative when insider trading is regulated with mandatory disclosure. Prices are more informative in markets with insider trading bans than in unregulated markets.*

R4. $\sigma_d^2 \in (0, \beta\mathcal{C})$ *(Low uncertainty). Markets with insider trading bans result in the less informative prices. Prices are the most informative with mandatory disclosure of insider trading.*



... As uncertainty increases, more stringent regulatory requirements ensure the most informationally efficient markets

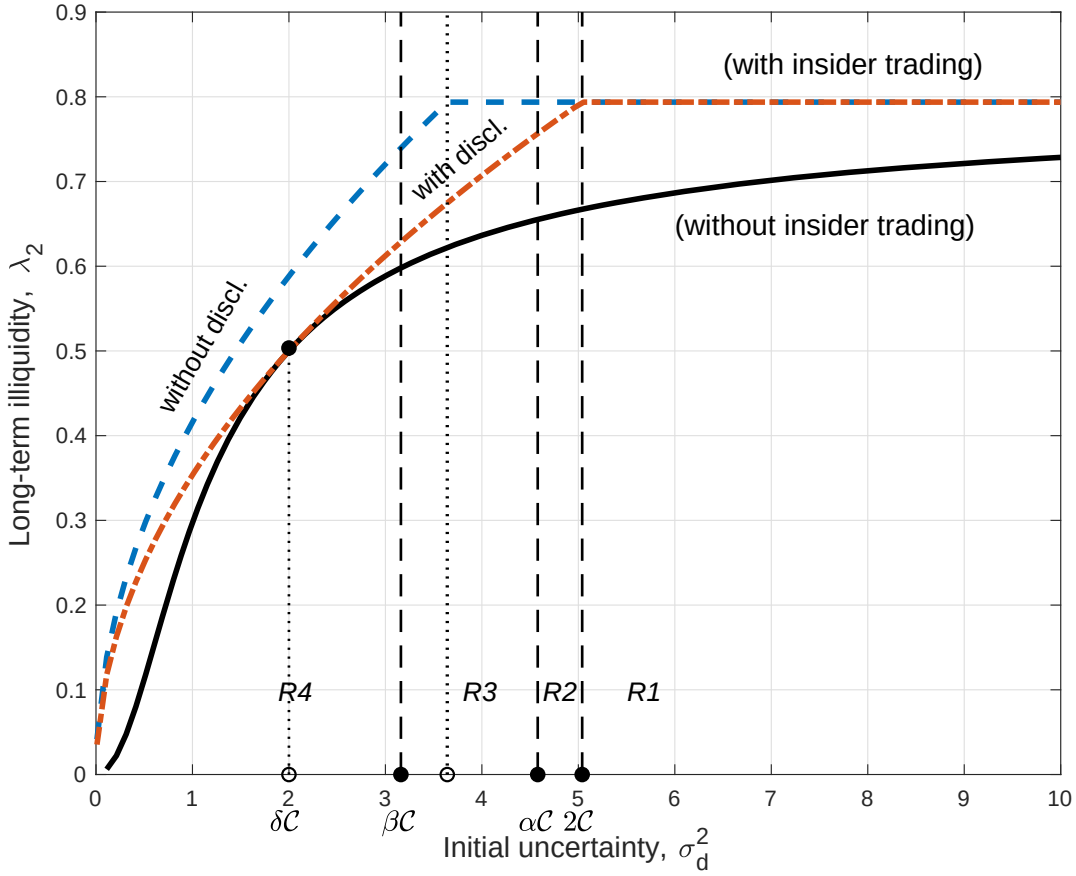
Information technology



Liquidity

Theorem 2. (Liquidity.) *Let* λ_2^p, λ_2^m *and* λ_2^u *be as in Proposition 1. We have* $\lambda_2^p \leq \lambda_2^m < \lambda_2^u$. *Moreover, there exists only one value of initial uncertainty,* $\sigma_d^2 = \delta \mathcal{C}$, $\delta \approx 0.793701$, *for which the market with mandatory disclosure is as liquid as the market without insider trading,* $\lambda_2^p = \lambda_2^m$.

A market without insider trading is always the most liquid


(with insider trading)
with discl.
(without insider trading)
without discl.
R4
R3
R2
R1
Long-term illiquidity, λ_2
Initial uncertainty, σ_d^2
$\delta\mathcal{C}$
$\beta\mathcal{C}$
$\alpha\mathcal{C}$
$2\mathcal{C}$
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
3
4
5
6
7
8
9
10

3. Discussion

Old and still quite active topic of debate

- For example, insider trading is simply prohibited in Switzerland, where it has long been debated
  - currently treated both as a criminal offence and a violation of public administrative law (Arts. 154 and 142 of Financial Market Infrastructure Act)
- Does not uniquely involve insiders of a firm
  - May also regard outside investors, brokers or individuals, who might gain access to MNPI of corporations and governments
  - Only in December 2019, the House of Representatives passed a bill (the "Insider Trading Prohibition Act") that would have reinforced rules on insider trading based on MNPI
    - The bill, however, was never passed by the Senate

- Likewise, in the wake of the global financial crisis of the 2007-2009, it became known that Congressmen were trading on MNPI on risks of the global financial system, which they had garnered through confidential meetings
  - In 2012, U.S. legislation incorporated the STOCK (Stop Trading on Congressional Knowledge) Act, which was designed to prohibit members and employees of the Congress to trade on information gathered by means of their business
  - Yet, in 2013, the STOCK Act was partially lifted by loosening some of the financial disclosure requirements regarding some officials

Regulatory models

- Therefore, insider trading regulation is very fluid, and subject to new legislative initiatives, amendments and vivid policy discussions

- Our analysis is suggestive of a clear message
  - When uncertainty around asset markets is very high, as during periods of financial distress, insider trading should be **banned**
    - in these markets, information acquisition is particularly strong, but it could be discouraged by the presence of insider traders
  - Regulation through **ex post mandatory disclosure** should help improve price discovery in markets with lower uncertainty
    - information acquisition and crowding-out effects should now be very limited

"Policy-mix" initiatives

- Insider trading can be regulated throughout other models
- E.U.: insiders may be required to disclose all price-sensitive info (= MNPI) acquired within their corporation
  - Art. 17 of the Market Abuse Regulation (also "onshored" into U.K. law on December 31, 2020) requires listed corporations to inform the public ASAP of "inside information" (as per Art. 7)
- U.S. legislation focusses on mandatory disclosure of insider trades
  - However, many stock exchanges include timely disclosure of material information (see, e.g., Section 202.05 of NYSE Listed Company Manual: "Timely Disclosure of Material News Developments").

- In terms of our model, it is $as\ if$ the insider were required to provide the market with a signal on his private info: reduction of σ_d^2
  - Ex ante corporate transparency has strong (weak) effects on price efficiency when uncertainty is low (high)
    - info acquisition is already strong when uncertainty is high!

- "Policy-mix" initiatives may lead to improvements
  - When uncertainty is elevated, and markets fall in Region R1 (say), trading bans lead to the most informative markets
  - Now, requiring the insider to ex ante disclosure of his information may cause markets to fall in Region R3, where the most efficient regime is achieved throughout mandatory disclosure
  - Therefore, ex ante disclosure of information and mandatory disclosure of insider trades may well be **complementary policy actions**