Trading with Expert Dealers

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Setting the stage

- On January 28, 2005 a 5-year corporate bond, issued by Goldman Sachs Group Inc, matured.

- Alamance Insurance Co., a P&C insurance company was holding $250K of that bond.
  - Alamance is below median in size among P&C companies; Burlington, NC.

- Alamance needs to re-invest the money to keep a balanced portfolio.
  - Buy a bond!

Question: which counter-party?

- In 2005 Alamance traded corporate bonds with 10+ counter-parties, including:
  - Goldman Sachs;
  - First Tennessee capital markets, Jefferies Co.
- Bond to buy: a 10 year bond from Metlife Inc, maturing on Dec 1, 2011 (about 5 years of remaining life).

Where terms of trade are better?

- Why Goldman?
  - more liquidity
    top tier US bank in Credit Trading by 2019 revenue

- Why not Goldman?
  - adverse selection
    "Goldman Pays Up for Talent: Wall Street giant's compensation expenses soared 33% in 2021" WSJ.

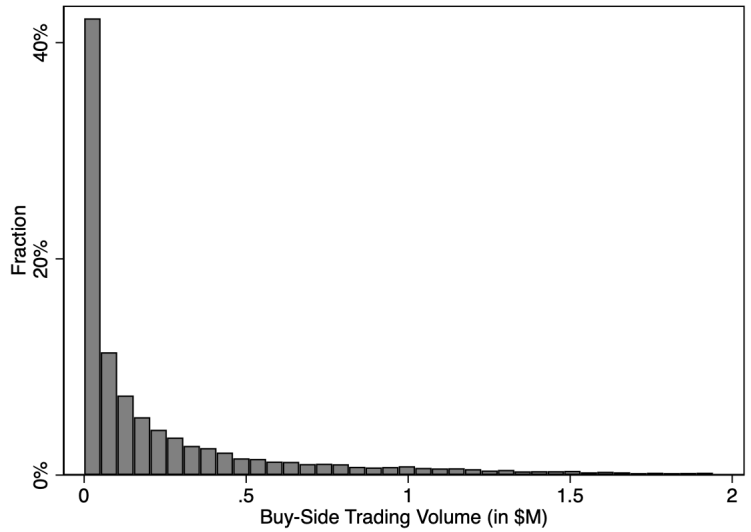
Research Question

- How can a central dealer attract order flow from investors while having superior information?
  - **endogenous** order flow
    (dealer selection by uninformed investors);
  - endogenous expertise acquisition by dealers.

Different Perspective on Expertise

- Limits to expertise in corporate bond markets
  - Differences in covenants limit information spillovers between bonds of the same issuer.
  - Many bonds trade fewer than once per 6 months.

Figure 6: Liquidity of Corporate Bonds
This graph shows liquidity of corporate bonds, as measured on August 11, 2005 (two weeks before Hurricane Katrina) using a trading volume of the bond in the last 180 days. To be present in the sample, the bond must appear in a portfolio of a P&C insurance company at least once in the sample. The mass of observations on the y-axis represents bonds that did not have any transactions in the last 6 months of the measurement day. On the x-axis are the measures of trading volume in $M, truncated at the 95-th percentile. The most distinctive feature of this distribution is its extreme skew to the right. There are a few very liquid bonds, and a lot of very illiquid bonds in the portfolios.



Chaderina et al 2022.

- Dealers can not get private information about all corporate bonds in circulation.

Central dealers seem to have superior information

Allocation of order flow in OTC markets Green (2007), Chacko et al. (2008), Chaderina and Green (2014), Sambalaibat (2018), Green et al. (2007), Li and Schürhoff (2019), Hendershott et al. (2020).

Information acquisition by dealers Glode et al. (2012), Glode and Opp (2018).

- Endogenous order flow and information acquisition:
  - "police work": Babus and Hu (2017);
  - "information broker": Song and Li (2022);
  - "private valuations": Bethune, Sultanum, and Trachter (2022).
- When information is socially-valuable, pooling around central informed dealer is optimal.

But adverse selection?

- However, most information that dealers are trying to acquire is about common value: cash flows, discount rates, etc.
  - Asymmetric information about common values generates adverse selection.
  - Impedes efficient trade, socially-destructive.
- Concern: while socially-valuable information creates incentives for pooling around a central dealer, socially-destructive information deters centralization?
- Our key question: is it still optimal to pool around central informed dealer?

Model

- Assets:
  - Unique. No information spillovers.
  - Each asset: v_l or v_h.

- Investors:
  - b - exogenous benefits to trade;
  - Loyal (always trade with the same dealer) and independent (look for the best dealer);
  - Make take-it-or-leave-it offer.

- Dealers:
  - Private signal about the asset s;
  - e_i - quality of the dealer's private signal. The signal is correct with probability $\frac{1}{2} + e_i$.

Trading Game

WLOG, consider dealer selling an asset. Investor can bid:

$$P_h = E(v|s = v_h, e) \qquad P_l = E(v|s = v_l, e)$$

(+) Always get the asset;
(-) sometimes over-pay;

(-) Only trade if $s = v_l$;
(+) fairly priced.

Optimal bidding strategy:

If $e_i \leq \frac{b/2}{v_h - v_l}$, then bid P_h;

- trade always happens;
- investor earns $b - e_i(v_h - v_l)$;
- dealer earns $e_i(v_h - v_l)$.

If $e_i > \frac{b/2}{v_h - v_l}$, then bid P_l.

- trade only if signal is low;
- investor earns $b/2$;
- dealer earns 0.

Important features:

- Investors prefer dealers with smaller e_i.
- Dealers prefer larger e_i as long as $e_i \leq \frac{b/2}{v_h - v_l}$.

Market

$Dealer_i$

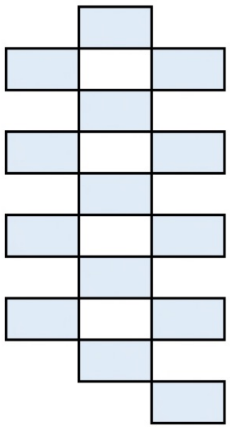
$$e_i = \min\left(\frac{1}{2}\frac{k_i}{n_i}, \frac{1}{2}\right) = \min\left(\frac{1}{2}\frac{\underline{k}}{\underline{n}}, \frac{1}{2}\right)$$

Expertise: $\underline{k}$

Investors:

Loyal $\underline{n}$

Independent Investors



$Dealer_j$

$$e_j = \min\left(\frac{1}{2}\frac{k_j}{n_j}, \frac{1}{2}\right) = \min\left(\frac{1}{2}\frac{\underline{k}}{n_j}, \frac{1}{2}\right) < e_i$$

Expertise: $\underline{k}$

Investors: $\underline{n}$ n_j

$Dealer_{ij}$

$$e_{ij} = \min\left(\frac{1}{2}\frac{k_{ij}}{n_{ij}}, \frac{1}{2}\right)$$

Expertise: $\underline{k}$ k_{ij}

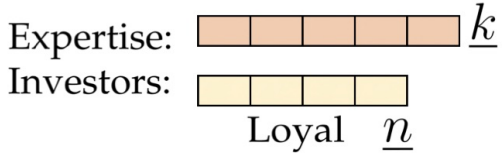
Investors: $\underline{n}$ n_{ij}

$$\Delta\left(k_{ij}, n_{ij}\right) = \begin{cases} -c \cdot (k_{ij} - \underline{k}) & \text{if } e_{ij} > \frac{b/2}{v_h - v_l}, \\ n_{ij} e_{ij} (v_h - v_l) - c \cdot (k_{ij} - \underline{k}) & \text{if } e_{ij} \le \frac{b/2}{v_h - v_l}. \end{cases}$$

Liquidity Pool & Expertise

$Dealer_i$

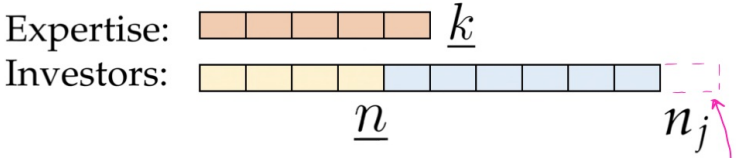
$$e_i = \min\left(\frac{1}{2}\frac{k_i}{n_i}, \frac{1}{2}\right) = \min\left(\frac{1}{2}\frac{\underline{k}}{\underline{n}}, \frac{1}{2}\right)$$



$$e_j > e'_j = \frac{1}{2}\frac{\underline{k}}{n_j+1}$$

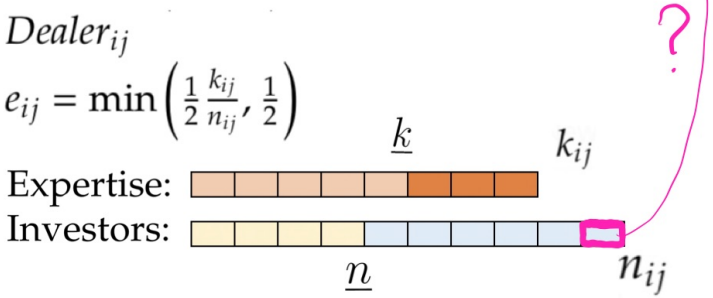
$Dealer_j$

$$e_j = \min\left(\frac{1}{2}\frac{k_j}{n_j}, \frac{1}{2}\right) = \min\left(\frac{1}{2}\frac{\underline{k}}{n_j}, \frac{1}{2}\right) < e_i$$



$Dealer_{ij}$

$$e_{ij} = \min\left(\frac{1}{2}\frac{k_{ij}}{n_{ij}}, \frac{1}{2}\right)$$



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Liquidity Pool & Expertise

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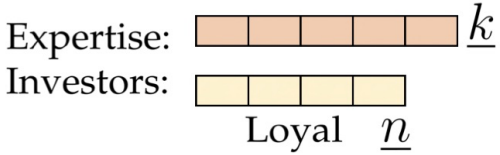

$$e_j > e'_j = \frac{1}{2}\frac{\underline{k}}{n_j+1}$$

$k_j \uparrow$

$Dealer_j$

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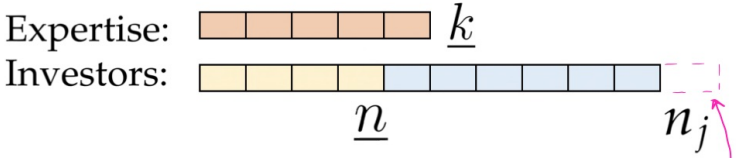

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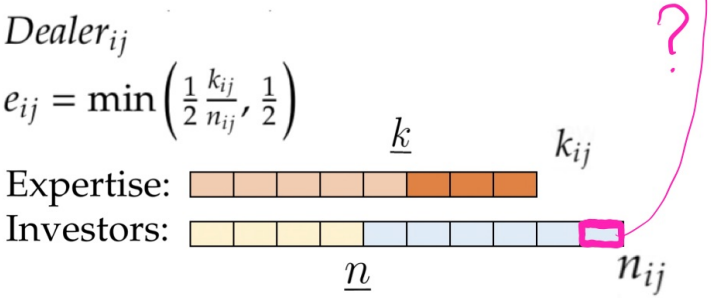

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Equilibrium

An equilibrium of the expertise acquisition and order-flow allocation **simultaneous-move** game is defined by dealers' expertise choices $k_j^* \geq \underline{k}$ and investors' dealer choices $Dealer_i$ such that:

- for any investor i that chooses to rout its trade to dealer j, i.e., $Dealer_i = j$, we have:

$$\Pi\left(\frac{1}{2}+\frac{1}{2}\min\left(\frac{k_j^*}{n_j},1\right),b,P_j^*\right) \geq \Pi\left(\frac{1}{2}+\frac{1}{2}\min\left(\frac{k_{j'}^*}{n_{j'}+1},1\right),b,P_{j'}^*\right) \tag{1}$$

  where P_j^* and $P_{j'}^*$ respectively denote the optimal price offers from investors when trading with dealer j and with dealer $j^{'}$,

- for any dealer j that chooses k_j^* and expects to receive order flow n_j as a result of investors' dealer choices $Dealer_i$, we have:

$$\Delta\left(k_j^*,n_j\right) \geq \Delta\left(k_j',n_j\right) \qquad \forall k_j' \neq k_j^*. \tag{2}$$

Result: Concentration

Assumption:

- if all independent investors allocate evenly between all dealers, then each dealer's $e_i < \frac{b/2}{v_h - v_l}$.

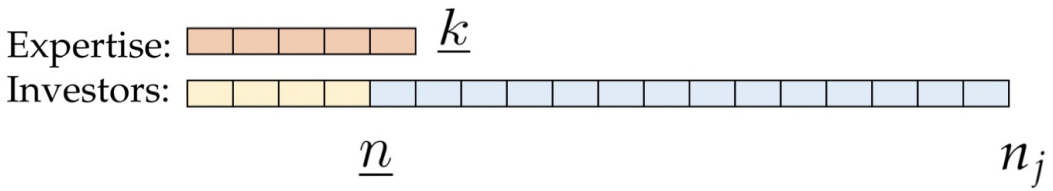
Proposition
With ex-ante identical dealers, trading flow optimally concentrates at a single (central) dealer. All other (peripheral) dealers intermediate only transactions of their loyal clients.

If costs of expertise acquisition are sufficiently high, investors benefit from **the liquidity pool**.

Equilibrium: $c > \frac{1}{2}(v_h - v_l)$

$Dealer_j$

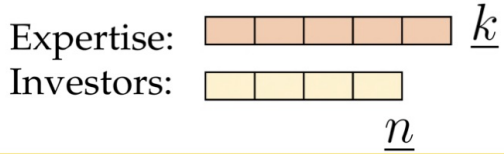
$e_j = \min\left(\frac{1}{2}\frac{k_j}{n_j}, \frac{1}{2}\right) = \min\left(\frac{1}{2}\frac{\underline{k}}{\underline{n}+N}, \frac{1}{2}\right)$



Trade: always
Dealer's $\Delta > 0$
Investors' $\Pi > \frac{b}{2}$

$Dealer_i$

$e_i = \min\left(\frac{1}{2}\frac{k_i}{n_i}, \frac{1}{2}\right) = \min\left(\frac{1}{2}\frac{\underline{k}}{\underline{n}}, \frac{1}{2}\right)$



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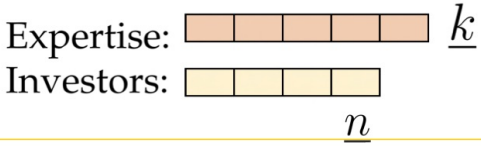
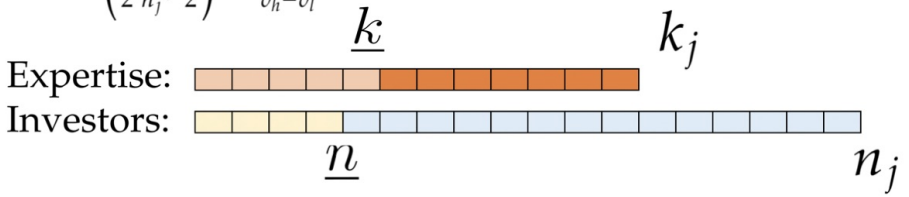


Trade: only if $s = v_l$
Dealer's $\Delta = 0$
Investors' $\Pi = \frac{b}{2}$

Equilibrium: $c \leq \frac{1}{2}(v_h - v_l)$

$Dealer_j$

$e_j = \min\left(\frac{1}{2}\frac{k_j}{n_j}, \frac{1}{2}\right) = \frac{b/2}{v_h - v_l}$



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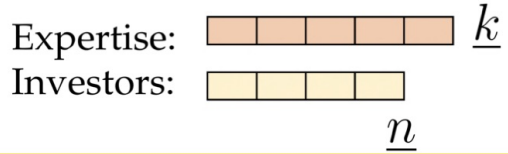

$Dealer_{ij}$

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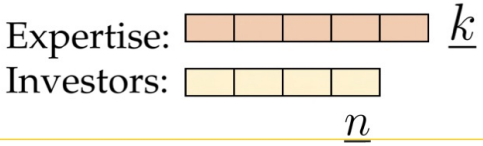


Trade: only if $s = v_l$
Dealer's $\Delta = 0$
Investors' $\Pi = \frac{b}{2}$

Take-away message

Concentration of trades protects against adverse selection

(despite central dealer acquiring the most expertise).

Implications: Democratization of the OTC

Different assumption: few independent investors.

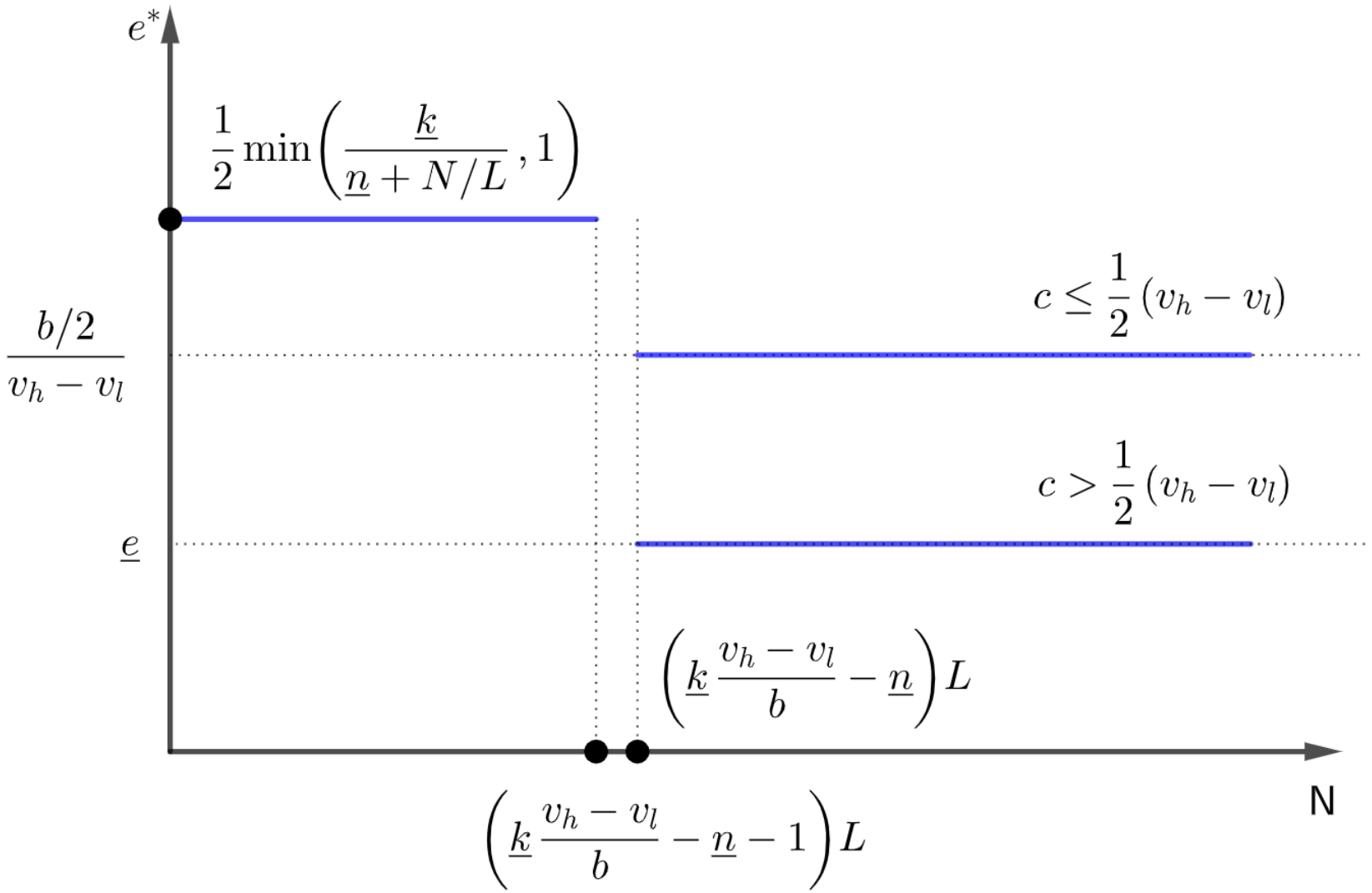
- New equilibrium: All independent investors allocating their trades evenly among dealers, while dealers do not acquire any additional expertise.

Democratisation: Consider an increase in the number of independent investors.

- Equilibrium switches from disperced to concentrated.

- Investors benefit iff c are high.

Information advantage of the central dealer



Payment For Order Flow

- Dealers compete for the order flow with terms of trade (execution equality) and PFOF (think Citadel vs Virtu);

- PFOF reinforces centralisation
  - peripheral dealers have zero capacity to pay for order flow;
  - central dealer has the largest capacity to pay for the order flow, but already receives orders from all indepndent investors.

Conclusions

- Investors prefer to pool liquidity around an expert dealer because they anticipate that trading with peripheral dealers will expose them to even more adverse selection.

- This is because the central dealer faces limits to information spillovers from different assets.

- Peripheral dealers have fewer transactions to spread their attention over, so they are more informed and investors face higher adverse selection.

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