# Model

"value or absolute"

$N$ investors $I_1 \ldots I_N$

given a number $e_i$ between 0 and 10 (can be decimals) which represents their ~~vale~~ economist/analysts valuation of a stock

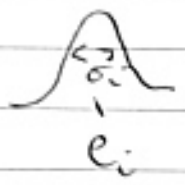
~~each~~ .

$e_1 \ldots e_N$

Each investor has a standard deviation of the valuation

$\sigma_1 \ldots \sigma_N$

i.e each investor has a distribution of their value in mind.




Each investor has a total of $N$ units of risk to buy or sell. Once an inventory gone that investor stops trading.

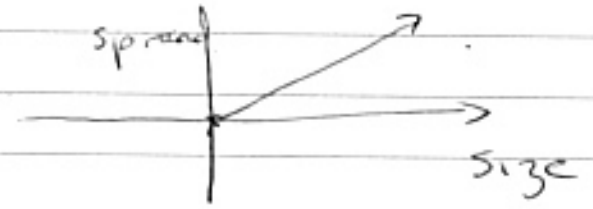
There are $M$ market makers

$m_1 \ldots\ldots m_M$

Market makers make a 2 way price around a "mid" (to be elaborated on later)

The spread ~~s~~ $= f(\text{size})$ and is the same for all market makers.

e.g.




market makers can hold max Inv inventory after which they need to "unload" and have a stop loss $-S_L$ after which they need to "stop" out"

unload = sell out my Inventory > Inv

stop = sell out all Inv.

"stop" means the offer (bid) aggressively increment/increment a until they have reduced or totally unwound inventory)

u

The game starts with the M market makers making prices in "market size" with a spread defined by f(size) around 5. I would introduce small $\varepsilon$ random variation around this to make market makers slightly different.

Round-1: Go to Investor $I_1$. He looks at the prices and ~~Z~~ to using $e_1$ and $\sigma_1$, Z scores the current price. He then to buys/sells an amount A where A = g(Z score) to the market maker with the best price. If ~~he~~ (or not trade).

If he trade the price $p_1$ is "published"

Round 2 - ~~Market makers~~ with zero inventor make price beyond $p_1$ except the Market maker with inventory shorts bid there

Market makers with zero inv make prices around $p_1$. longs ~~offer~~ $ more short inv. bid $ more ($ to be defined).

This is the "new market" for $I_2$

repeat

If a market maker exceeds Inv then he joins the investor group and gets a "go" at next round. - he just hits the best bid in 1 unit ~~until~~ until he is back in Inv limits

If a market maker hits P+L stop loss $S_L$ the he joins investor group and also gets first go on next round. Hitting the best bid in his whole Inv size

The market maker then rejoins the market making group in making prices. In the first case with Inventory = Inv in the second Inv = $\phi$.

As an expansion you can have stop losses for the investors. (But, in real world most Real Money Investors do not have stops; only hedge funds ... so can maybe mix it up)

- Also you might want to introduce another set of investors who are momentum driven rather than "value" to see what happens.

# Model

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i.e each investor has a distribution of their value in mind.


Each investor has, a total of $N$ units of risk to buy or sell. Once an inventory gone that investor stops trading.

There are M market makers

$M_1 \ldots\ldots M_M$

Market makers make a 2 way price around a "mid" (to be elaborated on later)

The spread size = f(size) and is the same for all market makers.

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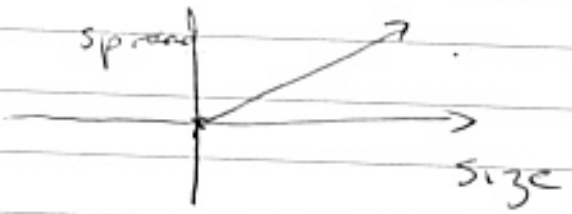


Market makers can hold max Inv inventory after which they need to "unload" and have a stop loss $-S_L$ (P+L) after which they need to "stop" out"

unload = sell out my Inventory > Inv

stop = sell out all Inv.

"stop" means the offer (bid) aggressively until they have reduced or fully unwound inventory

The game starts with the M market makers making prices in "market size" with a spread defined by f(size) around 5.

As an inital seed I would introduce small $\varepsilon$ random variation around this to make market makers slightly different.

Round-1: Go to Investor $I_1$, He looks at the prices and ~~Z~~ to using $\mu_1$ and $\sigma_1$, Z scores the current price. He then buys/sells an amount A where A = g(Z score) to the market maker with the best price.

If trades (or not trade): A determines the spread (ff

If he trade the price $p_1$ is "published"

Round 2 - ~~Market makers make price around~~ $p_1$ ~~except the Market maker with inventory~~ with zero inventor shorts bid there

Market makers with zero inv make prices around $p_1^*$. longs ~~offer~~ $ more short inv. bid $ more (f to be defined).

This is the "new market" for $I_2$ (investor 2)

repeat

* Maybe with small $\varepsilon$ variations

If a market maker exceeds Inv then he joins the investor group and gets a "go" at next round. - he just hits the best bid ~~[illegible]~~ until he is back ~~to Inv limits~~ to holding Inv. in inventory

If a market maker hits P+L stop loss $S_L$ the he joins investor group and also gets first go on next round. Hitting the best bid in his whole Inv size

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