

## Conditional and complex orders

Securities Trading: Principles and Procedures  
Chapter 12

### Algorithms (Algos)

Less complex



More complex

- ❑ Qualified orders
  - IOC, FOK, etc.
- ❑ Conditional orders
  - Stop, pegged, discretionary, reserve
- ❑ Multi-trade algorithms
  - VWAP, TWAP, Order splitting

## Stop order

- ❑ “Sell 100 sh MSFT, stop 25, limit 24”
- ❑ If MSFT trades at 25 or lower, enter an order to sell 100, limit 24.
- ❑ Some exchanges permit stop *market* orders.
  - “Sell 100 sh MSFT, stop 25” → If there’s a trade at 25 or lower, enter an order to sell 100 *at the market*.
- ❑ On the sell side, also called stop-loss orders.
- ❑ Like AON, a stop order does not reside in the book until it is activated.

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## Uses

- ❑ Used to protect accumulated gains.
  - “I bought ABC at 15; it’s now at 30. If it drops below 25 I want to sell.”
- ❑ Used as a safety measure for margined positions.
  - “I bought XYZ at 32 on margin [with borrowed money]. If it drops to 31 or more, I want out.”
- ❑ Stop-buy orders are used as safety measures on short margined positions.
  - “I sold DEF short at 49. If the price rises above 53, I want to cover [buy the stock back] to prevent any further losses.”

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## Stop orders and price dynamics

*Sell 10 limit 50.10*

Bids	Shares	Price	Stop-loss orders	Shares	Stop price
	300	50.10		300	50.10
	200	50.05		200	50.05
	400	50.00		1,100	50.00
	200	49.80			
	300	49.50			
	100	49.00			
	200	48.00			

- An order arrives: "Sell 10 shares, limit 50.10" What happens?

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## Recent experience in FX markets

- FCA fines five banks £1.1 billion for FX failings and announces industry-wide remediation programme
  - Press release from UK Financial Conduct Authority (12/11/2014)
- Traders at different Banks formed tight knit groups in which information was shared about client activity These groups were described as, for example, "the players", "the 3 musketeers", "1 team, 1 dream", "a co-operative" and "the A-team".
- Traders shared the information obtained through these groups to help them work out their trading strategies. They then attempted to manipulate fix rates and *trigger client "stop loss" orders* (which are designed to limit the losses a client could face if exposed to adverse currency rate movements). This involved traders attempting to manipulate the relevant currency rate in the market, for example, to ensure that the rate at which the bank had agreed to sell a particular currency to its clients was higher than the average rate it had bought that currency for in the market. If successful, the bank would profit.

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## Stop order modifications: the trailing stop

- The stop price adjusts (in one direction) to the market price.
- “Sell 100 sh XYZ, stop price trailing by \$4”
  - If the last sale price is \$80 when the order is entered, the stop price is \$76.
  - Whenever the last sale price moves up (from the previous sale), the stop price is reset.
    - If 80 is followed by 81, the stop price is reset to 77.
  - If the last sale price drops, the stop price is not reset.
    - A sequence 80, 82, 79 leaves the stop price at 78.

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## Pegged orders

- Limit orders that are automatically priced and repriced relative to same-side NBBO, opposite side NBBO, or NBBO midpoint.
- Most pegged orders are hidden.
- A *primary peg* refers to the same side of the market.
  - “Buy 1,000 MSFT pegged to the NBB”
    - The initial price of the order is the NBB. If the NBB changes, the price of the order changes with it.
  - “Sell 1,000 MSFT pegged to the NBO”
    - The initial price of the order is the NBO.

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- A pegged order may include an offset.
  - “Buy 1,000 MSFT pegged to the bid with a \$0.02 offset”
    - This sets the price of the order to the NBB *minus* \$0.02.
    - The offset can be negative. This is an aggressive peg: the order is priced above the bid.
  - Sell 1,000 MSFT pegged to the offer with a \$0.01 offset.
    - The price is \$0.01 above the NBO.
- A *market peg* refers to the opposite side of the market.
  - “Buy 1,000 MSFT pegged to the offer with a \$0.02 offset.”
    - Sets the price to \$0.02 below the NBO.
  - “Sell 1,000 MSFT pegged to the bid with a \$0.01 offset.”
    - Sets the price to \$0.01 above the NBB
- Background and examples
  - On the BATS web page, follow the links to: (<http://batstrading.com> → Features → BATS Order Type Guide, or go directly to <http://www.brainshark.hcom/DCS/vu?pi=zHTzdnPSpz3QRKz0>)
  - On the Interactive Brokers web page, follow the links to: (<http://www.interactivebrokers.com> → Trading → Order Types and Algos)

*non-aggressive*

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## Why are (almost all) pegged orders hidden?

- A visible order pegged to the same-side quote could be unstable.
- “Buy 1,000 MSFT, pegged to the NBB plus \$0.01.”
  - If (upon arrival) the NBB is 30.10, the order is priced at 30.11.
  - 30.11 becomes the new NBB → the order is repriced at 30.12.
  - 30.12 becomes the new NBB → the order is repriced at 30.13
  - ...
  - “The dog chasing its tail”

## “Buy 1,000 MSFT, pegged to the midpoint” arrives at market A

- ❑ Suppose the NBBO is 29.50 bid, offered at 29.80
  - Both sides are from market B, which is alone.
  - The pegged order is originally priced at 29.65.
  - If the NBBO midpoint changes, the order is repriced.
- ❑ If a seller knows about the order he might:
  - Enter a bid on market B to raise the NBB to 29.70
  - Send the intended sell order to market A.
    - ❑ It executes at 29.75 (against the repriced pegged order)
  - Cancel the bid on market B
  - Note: The seller’s bid is “spoofing”.  
Spoofing is manipulative, illegal, and difficult to detect.

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## Discretionary orders

- ❑ When the opposite side NBBO gets within the discretionary range, execute against it.
- ❑ A discretionary order starts passive, but might go active.
- ❑ Example:
  - The NBBO in MSFT is 29.80 bid, offered at 29.90.
  - “Buy 100 MSFT limit 29.79 with an aggressive discretionary offset of 0.05”
  - If the NBO drops to  $29.79 + 0.05 = 29.84$  or below, the order is repriced to 29.84, and executes against the NBO.
  - The execution price is the NBO (not the limit price of the order).
- ❑ If you suspect that the opposite side might be using discretionary orders, move your quote incrementally.

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## Reserve (“iceberg”) orders

- ❑ Only a part of the size is visible.
  - The rest is hidden reserve.
  - When the visible portion executes, it is replenished from the reserve.
- ❑ This avoids showing the full size of the order all at once.
- ❑ If the refresh is instantaneous, the order is easy to detect.
- ❑ Randomization (of time or refresh quantity) will help to conceal the order.

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## Implementation

- ❑ Where is the “logic” (hardware/software) for the order implemented?
- ❑ Possibilities:
  - Customer/trader
  - Broker
  - Exchange

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## The life cycle

- ❑ Advanced algos are usually developed by proprietary (“prop”) traders and implemented on traders’ systems.
- ❑ Next, they’re offered by technologically sophisticated institutional brokers
  - ... then retail brokers
- ❑ Finally they become standard order types on exchanges.

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- ❑ The advantages of implementation on exchanges.
  - The algo doesn’t have to be coded as many times (once per exchange)
  - The hardware is at each exchange (less subject to delays).
  - The algo is more stable.
- ❑ But some algos are best implemented by the broker.
  - An all-or-nothing order is handled by scanning the sizes available at all exchanges, and then (if the requested amount is available) routing separate orders to each exchange.

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## Current trends

- ❑ Traditionally, exchanges have competed to offer complex order types.
- ❑ NYSE Arca (owned by ICE) has eliminated some order types (in an attempt to compete on simplicity)