Foundations of Finance

Financial Markets

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Partial Review of Last Class

- What are the four main families of financial instrument?
- Rank the claims on a firm from safest to riskiest
- What is the prima de riesgo, and what does it measure?

Financial Markets-Outline

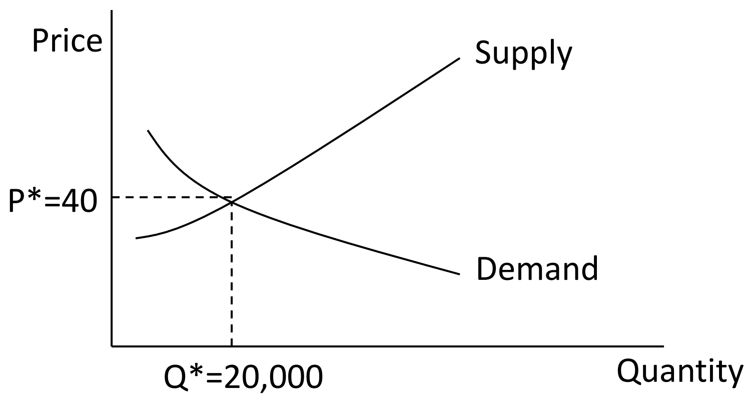
- What determines the price of a security?

- Primary markets: Initial public offerings (IPO)

- Secondary markets: re-trade of securities

Equilibrium Prices

- What determines the price?
  - Time value of money + risk + option value + liquidity/other transaction costs
- What is the mechanism that drives the price?
- Equilibrium price is where demand = supply



Buying and Selling on Margin

- Two types of margin requirement
  - Initial margin: represents the minimum amount an investor must put up to purchase a stock
  - Maintenance margin: represents the minimum amount required to be maintained in the margin account to maintain an open position
- In the US, regulations govern the margin requirement.
  - For a long position, the Federal Reserve Regulation T initial margin requirement is 50% and the maintenance margin requirement is 25%
  - For a short position, the initial margin requirement is 150% and maintenance margin is 130%

Buying on Margin

- Suppose you want to invest in GameStop by borrowing money from your broker ("on margin").
- Suppose it costs $50 today and you have $5,000 to invest. You can borrow at 1% rate.
- Suppose further that the price can end up at $75, $50 and $25.
- Let us first look at the returns from investing $5,000 without margin

Position	Cost Today	Value Next Year	Net Return
100 shares	$5,000	$7,500	7,500/5000-1=50%
100 shares	$5,000	$5,000	0%
100 shares	$5,000	$2,500	-50%

Buying on Margin

- Now suppose in addition to investing your own money, you borrow another $5,000. You can now invest $10,000
- Next year, you need to pay back $5,000 * 1.01=$5,050
- What are your investment returns if you invest entire $10,000 in GameStop?

Position	Cost Today	Value Next Year	Net Return
200 shares	$10,000	$15,000-$5,050=$9,950	9,950/5000-1=99%
200 shares	$10,000	??	??
200 shares	$10,000	??	??

Buying on Margin

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- What are your investment returns if you invest entire $10,000 in GameStop?
- Leverage doubles the gain and more than doubles the loss

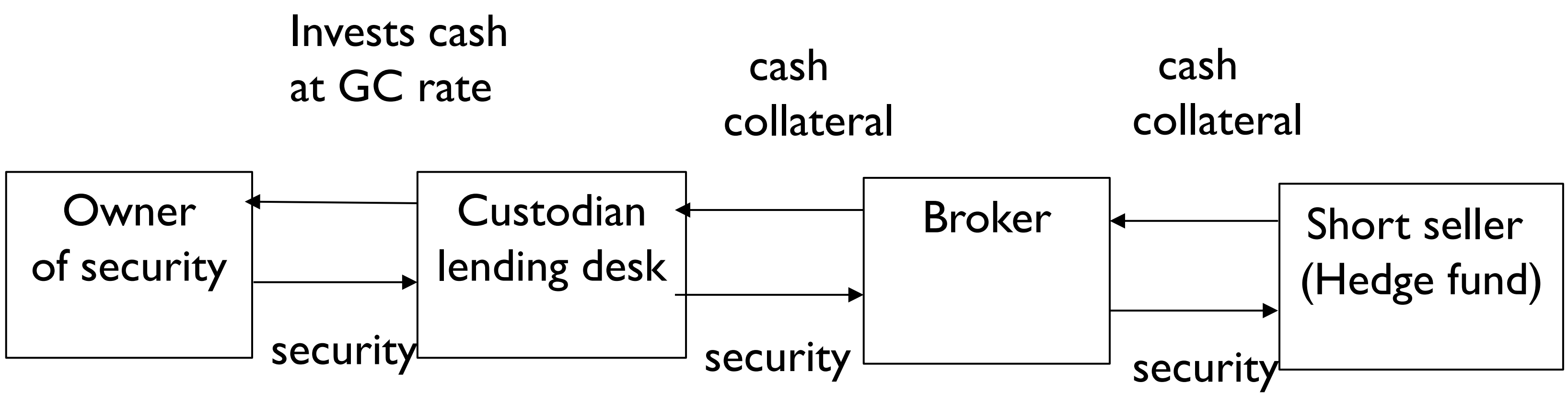
Position	Cost Today	Value Next Year	Net Return
200 shares	$10,000	$15,000-$5,050=$9,950	9,950/5000-1=99%
200 shares	$10,000	$10,000-$5,050=$4,950	4,950/5000-1=-1%
200 shares	$10,000	$5,000-$5,050=-$50	-50/5000-1=-101%

Short Sale

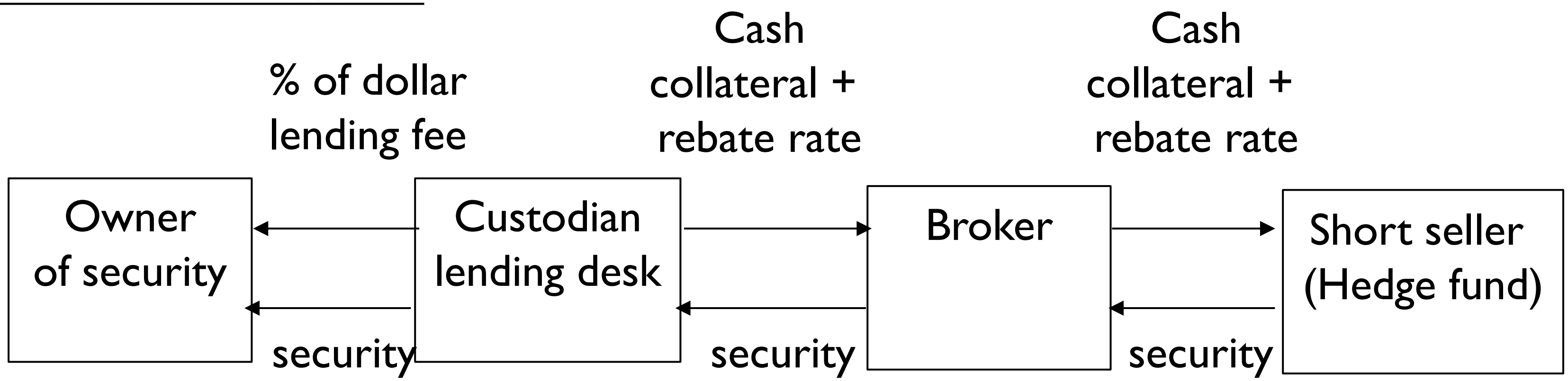
- Short sales-to sell something you don't own
  - Selling shares of a firm not owned by borrowing security, and later replacing it (cover it)
  - A profit is made is the short position is covered at a price lower than the one at which it was established
  - Bearish investment or as a hedge
- Requirements
  - Short sale proceeds must remain with the broker
  - The investor is also required to deposit collateral (to post margin) as a guarantee against default. The margin requirement is 50%
  - Short selling is subject to an uptick rule

Short Sale

<u>At the time of Short</u>



<u>When short is covered</u>



Short Selling

- Suppose now you think GameStop is overvalued.
- You decide to sell 100 shares at $50.
- Your broker charges $1 fee for borrowing the shares
- What would your profit/loss be if the stock goes to $75, $50, $25?

Position	Value Today	Cost Next Year	Profit/(Loss)
100 shares	$5,000	$7,500	$5,000-$7,500-$1=($2,501)
100 shares	$5,000	??	??
100 shares	$5,000	??	??

Short Selling

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- You decide to sell 100 shares at $50.
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- Gain is capped at the short proceeds; the loss is not capped

Position	Value Today	Cost Next Year	Profit/(Loss)
100 shares	$5,000	$7,500	$5,000-$7,500-$1=($2,501)
100 shares	$5,000	$5,000	$5,000-$5,000-$1=($1)
100 shares	$5,000	$2,500	$5,000-$2,500-$1=$2,499

Volkswagen Short-Squeeze

theguardian

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Business › Volkswagen (VW)

VW goes from the Beetle to the world's most valuable company

VW becomes world's most valuable firm

David Gow, European business editor
The Guardian, Wednesday 29 October 2008

Volkswagen Short-Squeeze

GameStop


GME 20.15
yahoo!finance
300.00
250.00
200.00
150.00
100.00
90.79
50.00
23.09M
May
Jul
Sep
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2021
Mar
May
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Sep
Nov
2022
Mar

Buying on Margin-Example

- An investor buys 10,000 shares at $10 each in the margin account. The initial margin is 50% and the maintenance margin is 25%. Calculate the threshold price that would trigger a margin call.

- What if the stock price decreases to $6? How much should the hedge fund deposit for the maintenance margin requirement to be met?

Buying on Margin-Example

- An investor buys 10,000 shares at \$10 in a margin account. Initial margin 50%, maintenance margin 25%. Find the price that triggers a margin call.
- What if the price falls to \$6? How much must be deposited?
- Equity = 10,000P – 50,000; call when equity/value < 25%
- (10,000P – 50,000)/10,000P = 0.25 → P = \$6.67
- At \$6: equity \$10,000 vs required \$15,000 → deposit \$5,000

Selling Short-Example

- A hedge fund deposits $50,000 on a margin account. Suppose that the hedge fund sells short 10,000 shares at $10. Its broker applies a 150% initial margin and a 130% maintenance margin requirement
  - Calculate the threshold stock price that triggers a margin call and calculate the new hedge fund account.
  - What if the stock price increases to $12? How much should be deposited for the maintenance margin requirement to be met?

Selling Short-Example

- A hedge fund deposits $50,000 and shorts 10,000 shares at $10. Initial margin 150%, maintenance 130%.
  - Account = $150,000; position value = 10,000P
  - Call when 150,000/10,000P < 1.30 → P = $11.54
- At $12: required $156,000 → deposit $6,000

Primary Market

- Capital is raised in primary markets

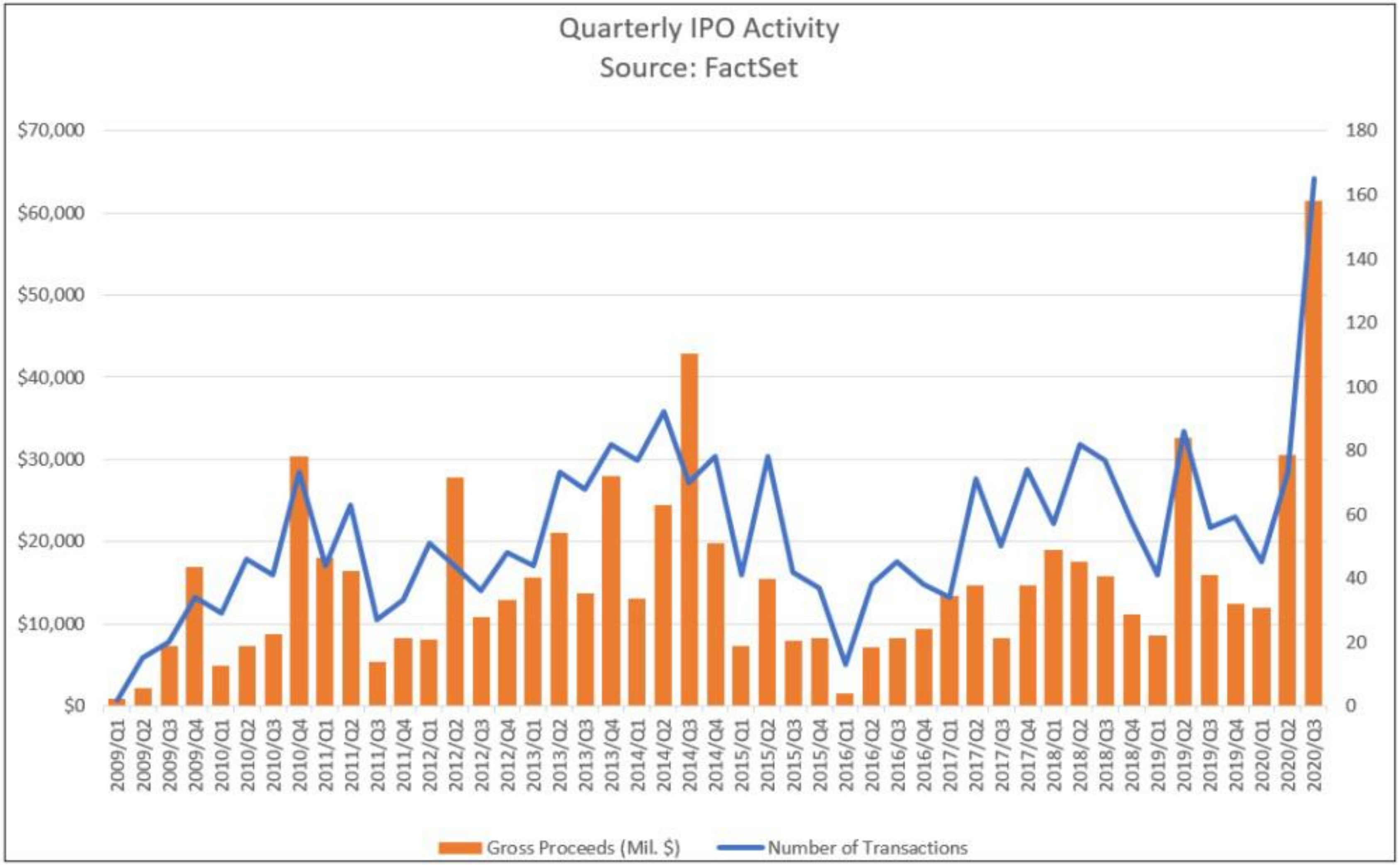
- How are new securities sold (“floated”)
  - Government securities: typically auctioned
  - Corporate securities (stocks and bonds), federal agency debt, municipal bonds, mortgage-backed securities: typically underwritten by investment banks

Primary Markets: Underwriting

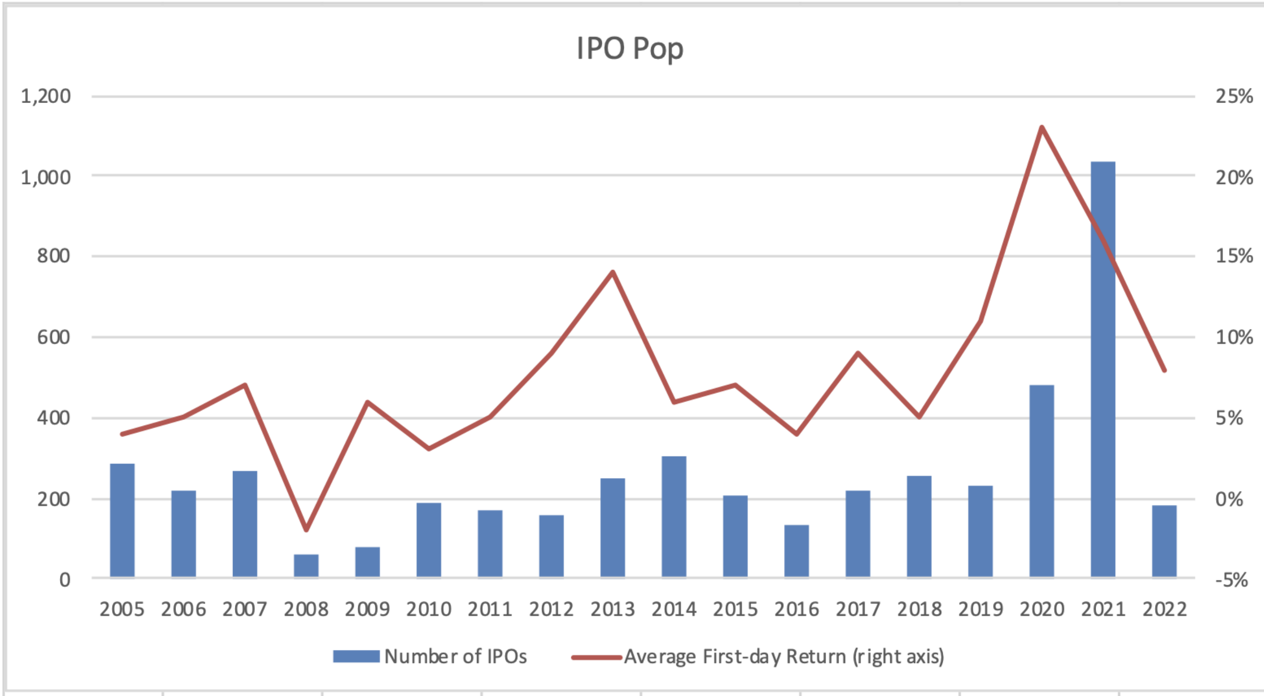
- Underwriters: a syndicate of investment banks.
  - *Firm commitment* : Investment banks buys all the securities and takes the risk that it won't be able to sell all the securities.
  - *Best effort* : Investment bank doesn't purchase the securities but just helps the firm to place as many shares as possible with the public.
  - *Road show and Book-building*: Goal is to trace out an aggregate demand curve. Based on the status of the book, underwriters determine the price and quantity at which they will offer the security to the public.

- Registration through Securities and Exchange Commission (SEC) (Red Herring Prospectus and Form S-1).

The IPO Cycle



The IPO Pop



- Average IPO “pops” on first day of trading (by 18% on average)
- A large cost to issuers on top of underwriting fees
- Has made auctions and direct listings increasingly popular (Google, Slack, Spotify, Palantir, Coinbase)

Secondary Markets

- Different levels of intermediation in markets: Direct search markets, brokered markets, dealer markets, auction markets.

- Brokers help investors trade without taking positions themselves (they don't carry inventory).

- Broker guarantees counterparty that:
  - An investor can pay for a security they are buying.
  - An investor can deliver a security they are selling.

Secondary Markets-How Do Brokers Trade?

- Exchanges: traditional centralized floor trading. NYSE.
- Over the Counter (OTC) Markets: trade with dealers. Bonds mostly traded this way.
- Electronic Communication Networks (ECNs).Direct trade among investors. NASDAQ, BATS, NYSE Arca, Direct Edge.

Where Spanish Shares Trade

- BME — Bolsas y Mercados Españoles, the Spanish exchange
  - Owned by SIX (Switzerland) since 2020
- The IBEX 35: the 35 most liquid Spanish stocks
  - Weighted by free-float market capitalisation, reviewed twice a year
- Continuous trading on SIBE, with opening and closing call auctions
- The building on Plaza de la Lealtad is on the Immersion Portfolio list

Mechanics of Trading: Call Auction

- How does a call auction work?
  - All investors get together at a fixed time.
  - Orders aggregated into demand/supply curves.
  - Equilibrium price chosen.

- Examples include
  - Sotheby's, eBay.
  - London Gold Fixing.
  - Opening of NYSE.

Continuous Auction Trading

- This type of auction happens in most exchanges.
- Why continuous auctions? New information arrives at all times. Investors have random liquidity needs.
- Problem: order flow fragmented.
- Thin markets at times: few buyers or sellers. Prices bounce around the equilibrium price.

The Market Maker

- A market maker holds inventory and quotes bid and ask prices.
  - Ask: price at which market maker is ready to sell.
  - Bid: price at which market maker is ready to buy.

- How does the market maker know where to put the bid and ask prices? Tries to aim them so that doesn't accumulate inventory.

- Market maker provides a service:
  - Immediacy and liquidity to market participants.
- Compensation for these services: the bid-ask spread.

What Determines Bid-Ask Spread?

- The bid-ask spread allows the market-maker to make a profit, on average.

- The bid-ask spread depends on:
  - High Volume of trade.
  - High Volatility of equilibrium price.
  - High Threat of insider information.
  - High Competition between market makers.

Trading Costs

- Suppose you are an arbitrageur seeking to exploit a mis-pricing. What are the various trading costs?
- Explicit cost: broker commission.
- Implicit cost: bid-ask spread.
- Implicit cost for large orders: market impact.
  - Deep market = small market impact.
  - Thin market = big market impact.
  - Solution: do trade in parts to minimize impact

Types of Orders

- Limit order: Set maximum or minimum price at which willing to execute. Most of orders in practice are limit orders.
- Market order: Immediate execution at whatever price is available.
- The trade-off between market and limit orders.
  - Market order is immediately executed, but the execution price is uncertain.
  - Limit order takes time to get executed—and might not get executed at all—but the execution price is known.
- Stop-loss and stop/buy orders.
  - Sell as soon as the price is less than X
  - Buy as soon as the price is more than X (useful for short sellers)
  - Rationale: Protection from losses (What is the rationale for limit orders?)

Example-Type of Orders

- If you want to buy shares of Intel and believe the current price in the market is approximately at the "fair" value

- You are short GoPro shares. You are pessimistic about GoPro as you don't estimate travel industry picking up soon. Now you are hearing rumors that Apple may make an offer to buy GoPro.

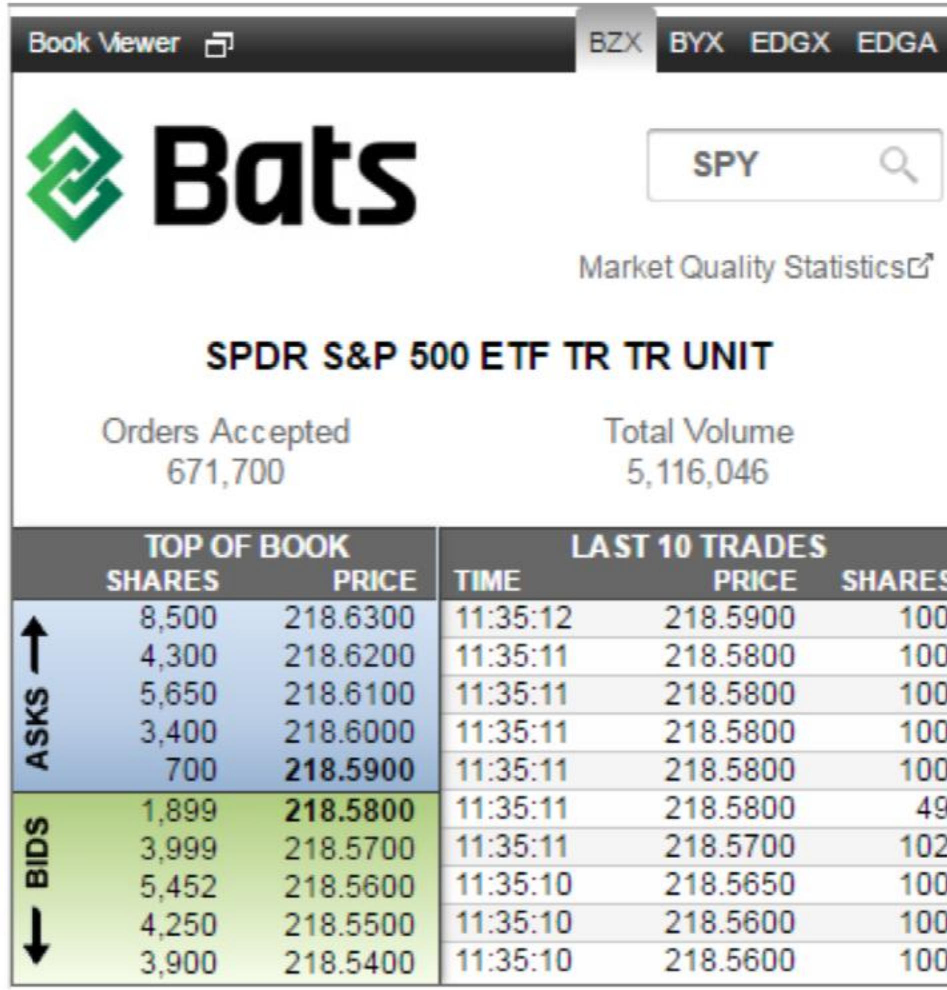
- You are interested in buying shares of Apple but you think the current price is too high. You would be interested if the shares can be obtained at a price 5% lower than the current price

Example-Type of Orders

- Intel, priced fairly → market order: take the current price
- GoPro, short, bid rumoured → stop-buy above market: caps the loss
- Apple, 5% cheaper → limit order: price certain, execution is not

The Limit Order Book

- Placing limit orders is acting like a market maker.
- Popular with high-frequency traders (HFTs.)
- Unlike traditional dealers, can and do withdraw at any time.


Book Viewer

BZX BYX EDGX EDGA

Bats

SPY

Market Quality Statistics

SPDR S&P 500 ETF TR TR UNIT

Orders Accepted 671,700

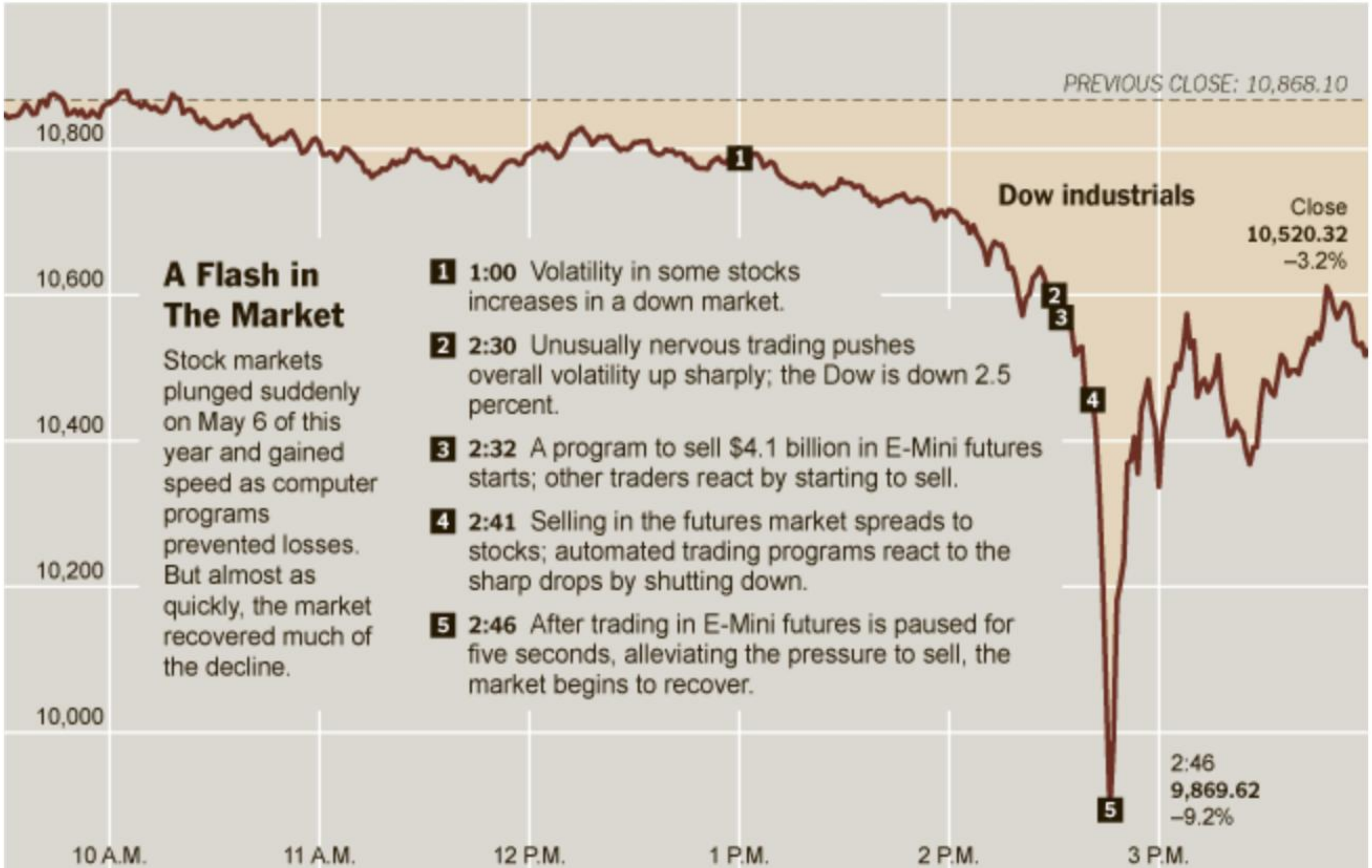
Total Volume 5,116,046

	TOP OF BOOK		LAST 10 TRADES		
	SHARES	PRICE	TIME	PRICE	SHARES
ASKS	8,500	218.6300	11:35:12	218.5900	100
ASKS	4,300	218.6200	11:35:11	218.5800	100
ASKS	5,650	218.6100	11:35:11	218.5800	100
ASKS	3,400	218.6000	11:35:11	218.5800	100
ASKS	700	**218.5900**	11:35:11	218.5800	100
BIDS	1,899	**218.5800**	11:35:11	218.5800	49
BIDS	3,999	218.5700	11:35:11	218.5700	102
BIDS	5,452	218.5600	11:35:10	218.5650	100
BIDS	4,250	218.5500	11:35:10	218.5600	100
BIDS	3,900	218.5400	11:35:10	218.5600	100

New Trading Strategies

- Algorithmic trading: automated trading to profit from short-lived signals or mispricing.
- Popular algorithmic trade: trading on small mispricing between closely related securities. For instance, an index and constituent assets.
- In effect, algorithmic traders may be providing liquidity to other market participants.
- Competing on speed $\Longrightarrow$ high-frequency trading. An arms race to gain a millisecond advantage over competitors. Limit: speed of light is 186 miles in one millisecond.
- Dark Pools.

HFTs and the 2010 Flash Crash



Sources: Bloomberg (Dow industrials); Securities and Exchange Commission

THE NEW YORK TIMES

Summary

- A price is where demand meets supply — everything else is mechanism
- Margin and short selling change the payoff, not the security
- Primary markets raise capital; secondary markets re-trade it
- Liquidity is a service, and the bid-ask spread is what it costs
- Next class: Time Value of Money (BMAE 2.1–2.4)