University of Richmond
Robins School of Business

§2. Markets and Indices

FIN 366: Investments

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PRIMARY MARKETS AND GOING PUBLIC

Private firms are owned by individuals and families, generally with up to 2000 shareholders.

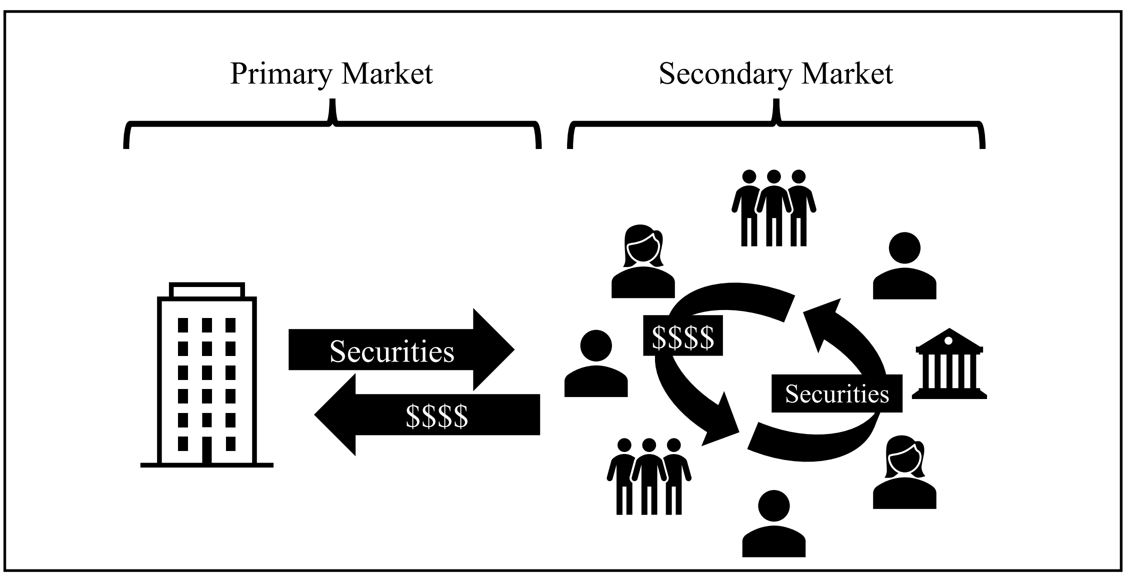
- Owners may be wealthy individual investors, funds, or institutions.
- **Illiquid** ownership.
- Range in size from the 33 million small businesses in the US[1] (fewer than 500 employees each, with average revenue <$100,000) to firms like Cargill (grain, agriculture, food service, $165 billion in revenue and 155,000 employees).

Public firms are formerly private firms that have sold ownership shares to raise money on the *primary market*.

- May have millions of shareholders who, as owners, vote for the **board of directors** to monitor managers.
- Small individual investors to large institutional investors.
- **Liquid** ownership.
- Includes firms like Disney, Apple, and Microsoft.

A firm raises money for projects by issuing shares of stock (units of ownership) or by selling bonds (promissory notes, borrowing) on the **primary market**. Once these instruments are issued, shareholders or debtholders may wish to exchange their ownership interests or bonds with others in the **secondary market**.

Figure 1: Primary and Secondary Markets



GOING PUBLIC AND THE PRIMARY MARKET

The process of a private firm issuing new shares in the primary market is known as **going public** in an **initial public offering (IPO).**

Traditional IPO

In the **traditional IPO** process, firms issuing shares to the public for the first time register with the SEC and hire **underwriters – investment banks** like J.P. Morgan, Credit Suisse, Morgan Stanley who form an **underwriting syndicate** – to advise the firm on how to price the shares being made available to the public. The **prospectus** is the document that describes the details of the IPO as well as the prospects of the company that the firm must make publicly available.

- **Roadshow**: series of presentations by underwriters and firm management to generate interest and establish IPO price (also known as *bookbuilding*).

- **Firm commitment:** underwriters purchase the securities from the issuer, then resell to investors in the market.

Figure 2: A Sample Prospectus

PROSPECTUS

14,444,444 Shares

CAVA

CAVA GROUP, INC.

Common Stock

This is CAVA Group, Inc.'s initial public offering of our common stock ("common stock"). We are offering 14,444,444 shares of common stock. Prior to this offering, there has been no public market for our common stock. The initial public offering price of our common stock is $22.00 per share. Our common stock has been approved for listing on the New York Stock Exchange (the "NYSE") under the symbol "CAVA."

See "Risk Factors" beginning on page 23 to read about factors you should consider before buying shares of our common stock.

We are an "emerging growth company" as defined in Section 2(a)(19) of the Securities Act of 1933, as amended (the "Securities Act"), and, as such, we have elected to comply with certain reduced public company reporting requirements for this prospectus and may elect to do so in future filings.

Neither the Securities and Exchange Commission (the "SEC") nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

	Per share	Total
Initial public offering price	$ 22.000	$ 317,777,768
Underwriting discounts and commissions[1]	$ 1.375	$ 19,861,111
Proceeds, before expenses, to us	$ 20.625	$ 297,916,658

J.P. Morgan	**Jefferies**	**Citigroup**
Morgan Stanley		**Piper Sandler**
Baird	**Stifel**	**William Blair**
Capital One Securities	**Blaylock Van, LLC**	**Drexel Hamilton**

Once a firm has gone public, they can raise additional capital by issuing new shares they create through a **seasoned equity offering**, which may be **dilutive** to existing owners.

> Keep in mind that the firm doesn't sell *all* its ownership interest. Cava raised about $300 million in its IPO by selling shares, but the value of all shares, newly created and existing shares with previous owners, valued the company at $2.5 billion. **Lock up provisions** prevent previous owners from selling their stock within about 180 days of the IPO.

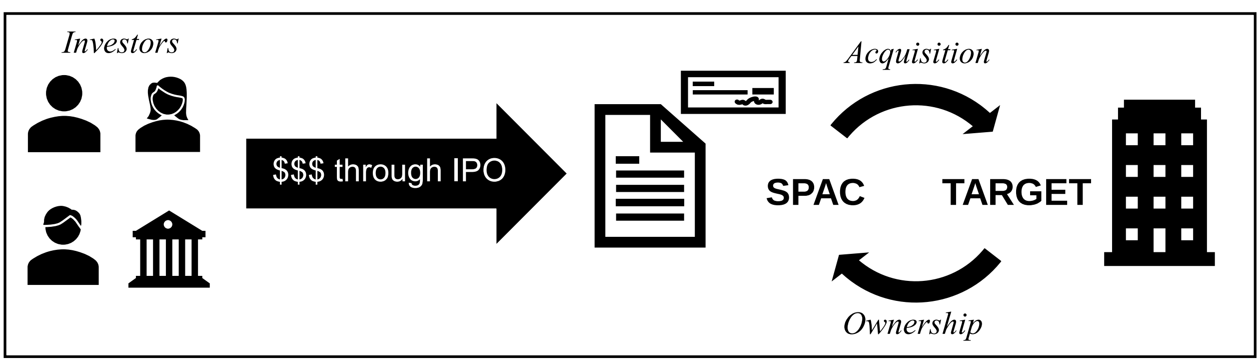
SPACs

IPOs by a **Special Purpose Acquisition Company (SPAC)** occur when a "blank check" company goes public to raise money for the purpose of finding a target firm to purchase. Blank check companies:

(1) *cannot* have a pre-identified target, and
(2) usually liquidate if they cannot find a private firm to acquire within 18-24 months.

The SPAC "reverse merges" with the acquired private company and assumes the identity of the acquired firm. This can be a quicker and less costly way for a firm to go public since the blank check company has no operations when it itself goes public. However, with no roadshow, the merger between the SPAC and the target are negotiated behind closed doors.

Figure 3: Special Purpose Acquisition Company



EXAMPLE: Diamond Eagle Acquisition Corp. was a publicly traded company that had no operations. It had $400,000,000 in cash it raised through its own IPO. It acquired the privately held DraftKings in 2020, at which point DraftKings replaced Diamond Eagle on the stock exchange. Diamond Eagle shareholders became shareholders of DraftKings.[2]

Direct Listing

Direct listings occur when owners of a privately held firm begin to sell their ownership shares. The firm itself doesn't raise money in this type of transaction, but the shareholders can cash out, and the liquidity of the firm's shares improves. Generally, this process is cheaper than a traditional IPO.

EXAMPLE: Spotify (streaming music) and Warby Parker (eyewear).[3] These companies didn't raise any capital in these IPOs, but existing shareholders were able to sell their shares, and the companies began filing documents publicly with the SEC.

What are the advantages and disadvantages of SPACs and Direct Listings relative to traditional IPOs?

Why Do Firms Go Public?

Firms may decide to go public for several reasons:

- To raise capital and have an opportunity to raise capital in the future.
- To increase liquidity for the firm's stock, allowing owners to transact shares (and cash out) easily.
- To create publicity, brand awareness, and prestige.
- To attract and compensate employees with ownership interest.

However, going public has costs:

- The act of going public costs money, and the SEC requires several filings each year that can be costly to prepare.
- Management may lose flexibility: must answer to shareholders and the board of directors.
- Information the firm discloses on public filings becomes available to competitors.
- **Agency problems** arise. These are conflicts between owners (shareholders) and the "agents" (managers). To address the agency problems, shareholders may choose to align manager incentives with their own by compensating managers with stock options or shares of the firm.

THE SECONDARY MARKET: EXCHANGES AND EXECUTING TRADES

After going public, a firm's shares may transact among investors and traders in various markets. Trading shares results in ownership changes among investors and does not represent a source of income for the firm.

Why does a firm and its management care about its stock price given it does not recognize any stock price movement as revenue?

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Markets and Exchanges

Financial markets match buyers and sellers and facilitate low-cost investment. Well-known markets in the United States include the **New York Stock Exchange (NYSE)**, **NASDAQ**, and **Cboe**.

Traditionally, the NYSE uses the **specialist** or **designated market maker (DMM)** model:

- **Floor brokers** receive an order from their client to buy or sell shares.
- The broker then seeks out the specialist or DMM, a representative for a firm who maintains a book of orders and an inventory for certain stocks. These are the firms Citadel, GTS, and Virtu Americas.
- The DMM can either transact directly with the broker or match their order to other brokers.

The NASDAQ is a computer network of **dealers** who post the prices at which they are willing to buy (the **bid** price) and sell (the **ask** price) securities in their inventory. They transact electronically with other dealers directly, in **over-the-counter** transactions.

Under the NYSE and NASDAQ umbrellas, there are additional exchanges and markets, for example, NYSE Arca (an **electronic communication network**, **ECN**, that electronically matches buyers and sellers) or NASDAQ Global Select Market (largest and well-known companies). The **Chicago Board Options** (**Cboe**) includes ECNs (like the BZX Equities Exchange).

Payment for Order Flow, Dark Pools, and Internalization

Secondary market transactions can occur in a number of additional ways.[4]

Internalization occurs when a broker internally matches buy and sell orders in house rather than going to an exchange.

Dark pools are trading systems that preserve anonymity and volume of trades to prevent large orders from moving prices.[5]

How can large orders move prices if they are publicly disclosed?

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Payment for order flow occurs when a broker (i.e., Robinhood) sends its clients' buy and sell orders directly to a **wholesaler**, also known as a **dealer**, **market maker**, or **high frequency trader** (i.e., Citadel). As the name implies, the dealer pays for this privilege, because they can sell the securities they purchased for slightly more than they paid for. The broker makes their revenue from the dealer rather than charging commission to the investor to trade.

ORDER EXECUTION

When you place an order to buy or sell a security, your broker thus has options (markets, internalization, payment for order flow, etc.) By SEC rule, brokers are required to execute the trade in the best interest of the customer.

There is no single stock price. There are many competing buyers and sellers at any given time, and many ways in which a buy or sell order may be executed.

> "*To comply with this requirement, brokers evaluate the orders they receive from all customers in the aggregate and periodically assess which competing markets, market makers, or electronic communications networks (ECNs) offer the most favorable terms of execution.*[6]"

Market Indices

An **index** summarizes the performance of many stocks or investments trading in secondary markets, allowing investors to compare current levels to that of the past. There are thousands of indices, but among the most popular are the S&P 500, DJIA, and Nasdaq.

Popular Market Indices

- **Dow Jones Industrial Average (DJIA)**[7] consists of 30 "blue-chip" companies (highly reputable with sustained growth and interest among many investors) across many sectors. **Constituents** include UnitedHealth, Goldman Sachs, Home Depot.

- **Standard and Poor's Composite 500 (S&P 500)**[8] consists of 500 large companies in the United States. Combined, all companies in the S&P 500 represent about 80% of the total size of the U.S. stock market. Constituents include Apple, Berkshire Hathaway, Tesla.

  Though all companies are large, they are not the top 500 *largest*. Companies must have positive earnings, and S&P Global carefully constructs the index to represent all major industries.

- **Nasdaq Composite**[9] consists of all 3,000+ stocks listed on the tech-oriented Nasdaq Stock Market. Constituents include Apple, Alphabet, Meta.

Figure 4: Stock Market Indices (finviz.com)

In general, the "level" of the index is somewhat arbitrary. How this level changes over time in percentage terms is more important. It reveals how the values of the constituent stocks are changing.

Other popular indices include the **Wilshire 5000**[10], **CRSP Total Market**[11], and **Russell 3000**[12] which seek to capture the performance of the US stock market overall. The **Nikkei 225**[13] tracks the performance of large Tokyo Stock Exchange-listed stocks across many sectors.

Indices Construction and Weighting

There are three primary ways in which indices are constructed:

1. **Equal Weighted** (many investment funds and portfolios)
2. **Value Weighted** (S&P, Nasdaq, Wilshire, CRSP, Russell)
3. **Price Weighted** (DJIA, Nikkei)

In an equally weighted index, the return of the index is a simple average of the returns of all the stocks in the index. The index has the same amount of money in each stock. In a value weighted index, the return of the index is determined by a weighted average of the stocks in the index, with larger firms having greater weight than smaller firms. In a price weighted index, the return of the index is determined by adding up the *prices* of all stocks in the index and dividing by a **divisor**, which is originally the number of stocks in the index (though it requires adjustment through time).

? If you expect small stocks to do very well next year relative to large stocks, which type of index weighting would you prefer to invest in, all else equal?

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Equal weighted indices require **rebalancing**: as the value of the constituent stocks change over time, some shares will need to be traded to reestablish the equal weighting.

If you create a portfolio that is equally weighted, how might rebalancing effect your transaction costs and taxes? What does rebalancing imply you must do with your "winning" and "losing" stocks?

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Value weighting does not require rebalancing: it naturally occurs by construction of the index.

PRACTICE: Given the three stocks with the information below, we can construct an equal and value weighted index. How many shares should you hold of each stock, and what is the return on the index if it is equally weighted? What if it is value weighted?

Stock	Beginning Stock Price	Ending Stock Price	Shares Outstanding	% Return
VMI	$100	$108	1 M	8%
RIC	$200	$206	3 M	3%
WMR	$150	$147	8 M	-2%

SOLUTION: An equal weight index would have __________ of its funds in each stock. If you created an index at the beginning with $10,000, the number of shares to hold of each:

$$Shares_{VMI} = \frac{\quad}{\quad} =$$

$$Shares_{RIC} = \frac{\quad}{\quad} =$$

$$Shares_{WMR} = \frac{\quad}{\quad} =$$

And the overall return of the index would be the simple average, since there is an equal amount in each:

$$\% \; Return = \frac{\qquad\qquad}{} =$$

Given the return of VMI was greater than the return of the index, you'd have to then ___________ shares of VMI and ___________ shares of WMR to maintain the equal weighting.

For a value weighted index:

Stock	Stock Price	Ending Stock Price	Shares Outstanding	Return	Beginning Value	Ending Value
VMI	$100	$108	1 M	8%		
RIC	$200	$206	3 M	3%		
WMR	$150	$147	8 M	-2%		

And the return would be the difference in the beginning and ending values:

INTERPRETATION: The key takeaway is that in an equal weighted portfolio, rebalancing is required to ensure all stocks have the same amount of dollars invested. Value weighted indices do not require rebalancing, as stocks that perform better *should* maintain a greater weight than stocks that perform worse.

Price weighted indices require adjustments as firms adjust their stock price, for example through **stock splits**. This may make it easier for smaller investors to invest in the firm.

EXAMPLE: Assume Apple is in a price weighted index, and management decides to split the stock 4-for-1. Overnight, it could appear as if the index crashed:

Stock	Before Apple Split	Immediately After Apple Split
AAPL	$192	$48 (=192÷4)
TSLA	$250	$250
IBM	$160	$160
Level of the Index	$\frac{192+250+160}{3} = 200.67$	$\frac{48+250+160}{3} = 152.67$

Did the index fall 24% (or (152.67-200.67)/200.67= -24%)? No. If a stock splits, the divisor must adjust to offset the change in the numerator:

Stock	Before Apple Split	Immediately After Apple Split
AAPL	$192	$48 (=192÷4)
TSLA	$250	$250
IBM	$160	$160
Level of the Index	$\frac{192+250+160}{3}=200.67$	$\frac{48+250+160}{d}=200.67$

The level of the index should remain unchanged since the stock prices aren't moving due to market conditions. The new divisor is solved algebraically:

$$\frac{48+250+160}{d}=200.67 \quad \Rightarrow$$

d = ______________

Interpretation: The level of the index should only capture movements in stock prices due to changes in the market prices of those stocks, not discretionary corporate action. If a stock splits, the divisor must *fall* to offset the decrease in the numerator. If a stock **reverse splits**, the divisor must *rise* to offset the increase in the numerator. Apple, a member of the DJIA, enacted a 4-for-1 stock split on August 24, 2020.[14] Each investor's 1 share (worth approximately $500 at the time) was converted to 4 shares (worth approximately $125), and the DJIA divisor was adjusted.

Since the Dow Jones Industrial Average's first computation of 12 stocks in 1896, the divisor has seen numerous adjustments. Each time a company was added or removed, or split or reverse split its shares, the divisor was adjusted. If a lower priced stock replaces a higher priced stock, the divisor should *fall*, and vice versa.

The current divisor is published in the print edition of the WSJ daily. As of the end of 2023, it was 0.15172752595384.

REGULATION OF SECURITIES MARKETS: THE SEC

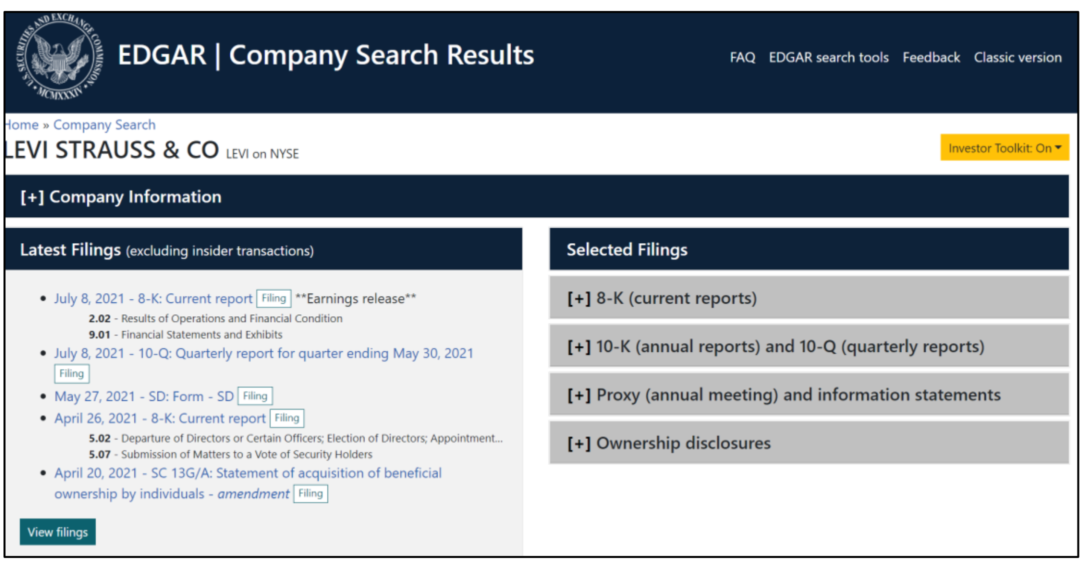
The **Securities and Exchange Commission (SEC)** was established following the Securities Act of 1933 and the Securities Exchange Act of 1934 to restore faith in markets following the Great Depression.

The SEC requires publicly traded companies to tell the truth about their businesses, the securities they sell, and the risks associated with those securities. Disclosure requirements include:

- **10-K**: Annual report
- **10-Q**: Quarterly report
- **8-K**: Quarterly earnings releases and material changes to the firm
- **DEF 14A**: Proxy statement
- **Forms 3, 4, and 5**: new insiders, insider transactions, and unreported insider transactions[15]

> The SEC's **Electronic Data Gathering Analysis and Retrieval (EDGAR)** system contains these filings and is an excellent source for security analysis.

Figure 5: SEC EDGAR



Firms found to be in violation of securities laws, and individuals who engage in **insider trading**, or trading on information that is not publicly available, may be investigated, penalized, or otherwise subject to discipline by the SEC.

CRITICAL THINKING QUESTIONS

1. What are the two ways in which firms generally raise capital for investing in projects? When it comes to the cashflows or ownership of the firm, what are each of these sources of funds entitled to?
2. Firm managers may be concerned with increasing the size of their department and their power within the firm (known as *empire building*) rather than working to increase the value of the firm overall. What is this an example of, and how might owners of the firm combat this problem?
3. Given a firm's share price doesn't directly affect the profitability of the firm, why might the firm and managers care about the stock price?
4. Do public or private firms have more liquid ownership interests? What does it mean for ownership interest to be liquid, and why might this be desirable?
5. What is the commonly known way in which firms compensate employees and managers of a firm with ownership interest, and how might this address the agency problem?
6. Is the creation and issuance of new shares in a seasoned equity offering a *primary market* or *secondary market* transaction?
7. You are the founder of a public firm. You own 10 million shares of the firm's common stock trading on exchanges (out of 50 million total shares outstanding), but you decide to sell 500,000 of your shares for cash. Is this a *primary* or *secondary* market transaction?
8. A SPAC itself must first go public and be listed on an exchange before finding a private company target. Why doesn't the private company just go public directly?
9. In which of the markets/exchanges/networks that we discussed are the following transactions likely to have occurred?
    a. A dealer views bid and ask prices for shares of DKNG, and trades from their own inventory, selling shares at their own ask and another dealer's bid
    b. An investor submits a large order for NCLH stock in a way that keeps the price from fluctuating by preserving anonymity
    c. A large institutional client submits an order to their broker to purchase 50,000 shares of RCL. Their broker seeks out a specialist who matches their buy order with another party's sell order.
    d. A broker submits an order for a purchase to buy 80,000 shares of BLK, and this order is automatically matched to a sell order.
10. You'd like to purchase 10 shares of stock in DLTR. You place an order on your brokerage app. In what ways might your order be satisfied? What methods are more likely given you are only transacting 10 shares?
11. What is PFOF and why is it controversial?
12. Where does one find firm filings submitted to the SEC? Why are they valuable for investors?
13. In which of the SEC filings that we've discussed would you find the following items? (Some may appear on multiple filings).
    a. Microsoft announces earnings per share (EPS) last quarter was $8.05.
    b. Mark Zuckerberg discloses that he has sold 10,000 shares of Meta.

c. Adobe Inc.'s financial statements (income statement, balance sheet, cash flow), in a filing submitted to the SEC annually.
d. A firm announces it is filing for bankruptcy.
e. Google announces the items on the firm's ballot at the annual meeting and provides recommendations for how shareholders should vote.
f. Following the fiscal quarter, Visa files an abbreviated filing that includes firm financial statements.

14. What might be a disadvantage of the existence of dark pools regarding market efficiency?
15. What are the three major market indices we've discussed? How is each weighted? Describe the number and types of stocks in each.
16. What are the three major "total market" indices we've discussed?
17. Describe the process of rebalancing. For which type of index is rebalancing required?
18. What are the implications of rebalancing on transaction costs and taxes?
19. Which type of index does not require rebalancing? Why?
20. How is a price weighted index's *initial* divisor determined? Why must it be adjusted for stock splits or reverse stock splits?
21. CHALLENGE Comment on the **dilutive** effects of a seasoned equity offering. For example, if you own one share out of a firm's 100 shares just prior to the firm issuing 100 new shares to raise additional capital, what does it mean for your ownership stake in the firm?
22. CHALLENGE **Shelf registration** allows a firm to issue shares gradually over a period of three years rather than all at once through an IPO. How might a firm use this to take advantage of favorable market conditions?
23. CHALLENGE **IPO Underpricing** occurs when the investment bank syndicate goes to market with shares at a set price, and the shares begin trading in secondary markets higher than they were originally sold. For example, assume a syndicate and firm settles on an IPO price of $54/share, sells the shares to the market at that price, but the shares immediately shoot up to $88/share on the secondary market that day. What does this imply about the amount of money "left on the table" by the firm having the IPO? What if the underwriting syndicate asks for too high of a price on the IPO day?

ANALYTICAL QUESTIONS

1. Below is a list of companies in the DJIA and their prices as of the end of 2023. Use it to answer the questions below.

UNITEDHEALTH GROUP INCORPORATED (XNYS:UNH)	$	526.78
THE GOLDMAN SACHS GROUP, INC. (XNYS:GS)	$	385.77
MICROSOFT CORPORATION (XNAS:MSFT)	$	376.04
THE HOME DEPOT, INC. (XNYS:HD)	$	346.54
CATERPILLAR INC. (XNYS:CAT)	$	295.88
MCDONALD'S CORPORATION (XNYS:MCD)	$	296.47
AMGEN INC. (XNAS:AMGN)	$	288.02
SALESFORCE, INC. (XNYS:CRM)	$	263.14
VISA INC. (XNYS:V)	$	260.35
THE BOEING COMPANY (XNYS:BA)	$	260.66
HONEYWELL INTERNATIONAL INC. (XNAS:HON)	$	209.71
APPLE INC. (XNAS:AAPL)	$	192.53
The Travelers Companies, Inc. (XNYS:TRV)	$	190.49
AMERICAN EXPRESS COMPANY (XNYS:AXP)	$	187.34
JPMORGAN CHASE & CO. (XNYS:JPM)	$	170.10
INTERNATIONAL BUSINESS MACHINES CORPORATION (XNYS:IBM)	$	163.58
WALMART INC. (XNYS:WMT)	$	157.65
JOHNSON & JOHNSON (XNYS:JNJ)	$	156.74
CHEVRON CORPORATION (XNYS:CVX)	$	149.16
THE PROCTER & GAMBLE COMPANY (XNYS:PG)	$	146.54
3M COMPANY (XNYS:MMM)	$	109.32
NIKE, INC. (XNYS:NKE)	$	108.57
MERCK & CO., INC. (XNYS:MRK)	$	109.02
THE WALT DISNEY COMPANY (XNYS:DIS)	$	90.29
THE COCA-COLA COMPANY (XNYS:KO)	$	58.93
Dow Inc. (XNYS:DOW)	$	54.84
CISCO SYSTEMS, INC. (XNAS:CSCO)	$	50.52
INTEL CORPORATION (XNAS:INTC)	$	50.25
VERIZON COMMUNICATIONS INC. (XNYS:VZ)	$	37.70
WALGREENS BOOTS ALLIANCE, INC. (XNAS:WBA)	$	26.11
Sum of Prices	$	5,719.04

   a. Confirm the level of the DJIA is 37692.83 if the divisor is 0.151727526.
   b. If the sum of these stock prices tomorrow is $5800, by how much did the index rise?
   c. What would move the index more, all else equal: Goldman Sach's stock rising 15% or Nike's stock rising 15%? (Hint: no calculation required)
   d. Would the divisor increase or decrease if Tesla (with a stock price of $250) replaced 3M? (Hint: no calculation required)

2. Below is a table displaying the top 10 holdings of the S&P 500 index as of the end of 2023. Referencing this table, answer the questions below.

Name	Market Value	Weight (%)	Shares
APPLE INC	$2,236,212,332.25	6.92	13,061,225.00
MICROSOFT CORP	$2,084,960,715.75	6.45	6,603,201.00
AMAZON COM INC	$1,025,796,238.32	3.17	8,069,511.00
NVIDIA CORP	$954,895,267.88	2.95	2,195,212.00
ALPHABET INC CLASS A	$690,018,498.72	2.14	5,272,952.00
TESLA INC	$614,082,667.62	1.90	2,454,171.00
META PLATFORMS INC CLASS A	$593,010,817.20	1.84	1,975,320.00
ALPHABET INC CLASS C	$591,400,517.40	1.83	4,485,404.00
BERKSHIRE HATHAWAY INC CLASS B	$567,765,189.10	1.76	1,620,797.00
EXXON MOBIL CORP	$418,330,474.46	1.29	3,557,837.00

a. What percentage of the total index do the top 10 companies in the index comprise? What does this imply about the influence companies in the bottom 10 of the index have on the index's movement?
b. Looking at the types of companies in the top 10, what industry or sector largely drives the movement of this index?
c. Nvidia's stock price was about $495 at the time this table was generated. Apple's stock price was about $193. If Nvidia's stock price increases 2% while Apple's stock price falls 2%, will the overall index rise, fall, or stay the same (assuming all other stock prices do not move)? Would this trigger a rebalancing of the S&P 500?

CFA QUESTIONS

Answers are in the *Notes & References* section below.[16]

1. An analyst gathers the following data for a value-weighted index:

	Beginning of Period		End of Period	
Security	Price (£)	Shares Outstanding	Price (£)	Shares Outstanding
A	20.00	300	22.00	300
B	50.00	300	48.00	300
C	26.00	2,000	30.00	2,000

The return on the value-weighted index over the period is:

a. 7.1%
b. 11.0%
c. 21.4%

2. An analyst gathers the following data for an equally weighted index:

	Beginning of Period		End of Period	
Security	Price (¥)	Shares Outstanding	Price (¥)	Shares Outstanding
A	20.00	300	22.00	300
B	50.00	300	48.00	300
C	26.00	2,000	30.00	2,000

The return on the index over the period is:

a. 4.2%
b. 6.8%
c. 7.1%

NOTES & REFERENCES

[1] See https://advocacy.sba.gov/wp-content/uploads/2023/03/Frequently-Asked-Questions-About-Small-Business-March-2023-508c.pdf.
[2] See https://www.wsj.com/articles/sports-betting-operator-draftkings-gets-shareholder-vote-to-go-public-11587669479 and https://draftkings.gcs-web.com/static-files/3162edf3-45f2-4e0b-99b1-9fbaa3b208ac.
[3] See https://www.wsj.com/articles/direct-listings-have-paid-off-for-investors-so-far-11630315801.
[4] See https://www.investor.gov/introduction-investing/investing-basics/how-stock-markets-work/executing-order.
[5] See https://www.finra.org/investors/insights/can-you-swim-dark-pool.
[6] The SEC's discussion of "Best Execution": https://www.sec.gov/fast-answers/answersbestexhtm.html
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[11] CRSP Total Market Index construction and methodology: http://www.crsp.org/products/investment-products/crsp-us-total-market-index
[12] Russell 3000 construction and methodology: https://www.ftserussell.com/products/indices/russell-us
[13] Nikkei 225 construction and methodology: https://indexes.nikkei.co.jp/en/nkave/index/profile?idx=nk225
[14] Apple stock split: https://www.wsj.com/articles/what-the-apple-stock-split-means-11596150158
[15] Resources on how to read various filings are available at https://www.investor.gov/introduction-investing/getting-started/researching-investments/how-read-10-k
[16] CFA Question answers: 1) B, 2) C