Equity Valuation Final Project (Spring 2023)

Name	Company	Price	DCF	Pricing	Recommendation
Shawn Chen	iQIYI	$6.01	$6.33	$8.82	Hold
Kaden Lhee	Grab	$3.01	$1.59	$2.79	Sell
Hannah Lin	Etsy	$90.00	$60.28	$100.64	Hold
Tiffany Wang	Estee Lauder	$203.54	$160.07	$184.02	Sell
Frank Xu	Coca-Cola	$64.02	$36.47	$35.84	Sell
Constance Zhang	Pepsi	$194.27	$177.18	$182.45	Hold/Sell

1. iQIYI, Inc. (NASDAQ: IQ)

Money-Losing & Non-US Company; Chinese Entertainment and Media Company

Company Overview

iQIYI is a Chinese online streaming platform that provides a wide range of video content, including licensed TV shows, movies, animation, and other original content, with nearly 6 billion hours spent on its service each month and over 500 million monthly active users (MAUs). The company was founded in 2010 by Baidu (NASDAQ: BIDU), China's largest online search engine, and was publicly listed on NASDAQ in 2018. Over 60% of its revenue comes from membership services and the remaining from online advertising services and content distribution. As of the latest quarter 1Q23, one of its hit dramas *Knockout* achieved a 65% market share in terms of peak video views. IQ's diversified 50+ in-house studios across key content genres, rich supply of talents and content-producing teams, and China's stable regulatory environment ensure long-term sustainable growth and high-quality content delivery.

DCF Valuation

iQIYI, Inc. (NASDAQ: IQ) — **May-07-2023**

The Disruption Platform Rolls on

In the future, iQIYI is poised to maintain its position as the top provider of premium content in China, leveraging its strong in-house studio network to drive growth in its core business of premium content subscriptions. As a result of this growth, the company is expected to enhance its operating margins, which will give it a competitive advantage in the sizable Chinese market. It is anticipated that margins will increase significantly next year due to the vibrant Chinese market and the growing consumer demand for Premium Video On Demand (PVOD). While the company is expected to sustain a slower yet high growth rate over Years 2-5, it will face headwinds from regulations set forth by the Chinese National Radio and Television Administration, which could result in a 24% probability of failure.

The Assumptions

	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$4,204,249.00	8.0%	10.00%		3.44%	Booming growth rate with strong consumer demand for PVOD and competitive edge in the Chinese market. New initiatives such as IQ Lite and and Suike are proven business model and poised to serve as additional revenue/profit driver
Operating margin (b)	2.40%	7.0%			21.00%	Growing margin with its economies of scale and in-house production which helps to reduce content cost
Tax rate	25.00%		25.00%		25.00%	Given IQ has a negative earnings before tax, we decided to use the Global/Chinese marginal tax rate over time
Reinvestment (c)		1.20	1.50	1.80	21.50%	Decreasing capital expenditure aiming to consolidate and optimize its existing streaming network infrastructure and content offerings
Return on capital	1.93%	Marginal ROIC =	61.54%		16.00%	Sustainable competitive advantages with high ROIC in the near long term
Cost of capital (d)			10.74%		9.38%	Multibusiness (Global) for beta estimation. Cost of debt is caculated through synthetic rating, which is rated B3/B-

The Cash Flows

	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$4,540,588.92	7.00%	$317,841.22	$301,355.17	$280,283.27	$21,071.90
2	$4,994,647.81	9.80%	$489,475.49	$367,106.61	$302,705.93	$64,400.69
3	$5,494,112.59	11.20%	$615,340.61	$461,505.46	$332,976.52	$128,528.94
4	$6,043,523.85	12.60%	$761,484.01	$571,113.00	$366,274.17	$204,838.83
5	$6,647,876.24	14.00%	$930,702.67	$698,027.00	$335,751.33	$362,275.68
6	$7,225,443.73	13.56%	$979,907.27	$734,930.45	$320,870.83	$414,059.63
7	$7,758,392.45	15.42%	$1,196,454.53	$897,340.90	$296,082.63	$601,258.27
8	$8,228,861.37	17.28%	$1,422,025.32	$1,066,518.99	$261,371.62	$805,147.37
9	$8,619,896.87	19.14%	$1,649,889.15	$1,237,416.86	$217,241.94	$1,020,174.92
10	$8,916,421.32	21.00%	$1,872,448.48	$1,404,336.36	$164,735.81	$1,239,600.55
Terminal year	$9,223,146.21	21.00%	$1,936,860.70	$1,452,645.53	$312,318.79	$1,140,326.74

The Value			
Terminal value	$19,197,419.86		
PV(Terminal value)	$7,180,438.94		
PV (CF over next 10 years)	$2,283,565.97		
Value of operating assets =	$9,464,004.92		
Adjustment for distress	$908,544.47	Probability of failure =	24.00%
- Debt & Minority Interests	$3,156,420.85		
+ Cash & Other Non-operating assets	$1,112,543.02		
Value of equity	$6,511,582.62		
- Value of equity options	$456,527.92		
Number of shares	956,700.00		
Value per share	$6.33	Stock was trading at =	$6.01

Revenue: The Chinese online video industry has increased the adoption of in-house content across the industry. IQ's differentiated strategy to focus on in-house content with higher quality control and lower production costs continues to benefit its subscription growth and ROI. As IQ keeps taking advantage of this market shift, its revenue is expected to rise sharply. For Year 6 and onwards, a slower growth rate as the firm finishes the intensive studio development phase.

Operating Margin: Improved margins can be attributed to various factors including the creation of original content, an increase in active users, higher subscription fees, and expansion into overseas markets. In-house production helps to reduce content cost, with total content cost declining from 84% of revenue in 2018 to 70% level in 2019-21 and further down to 57% in 2022. We expect IQ's operating margin to drastically increase propelled by revenue growth and economies of scale (e.g., less SG&A expenses).

Reinvestment Rate & Return on Capital: IQ started to focus on in-house production in 2018. We expect that IQ will gradually slow down its capital expenditure and begin to leverage its content creation and technology infrastructure, shifting its focus to revenue and cash flow generation. Therefore, we expect sales/capital to gradually increase, which allows IQ to achieve a high ROC.

Relative Valuation

Comparable Companies: US-based and Asia-based movies and entertainment and broadcasting companies with a market capitalization over $1 billion (sample size = 32 firms). Some firms were removed because they have Not Meaningful (NM) data points.

Multiple: As IQ is a money-losing company, after running regression on EV/Sales, EV/EBITDA, and PBV, I selected EV/Sales which produces the highest R^2 ($R^2 = 0.81$), demonstrating a strong correlation with the selected independent variables, ROIC and annual revenue growth.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.900796146
R Square	0.811433697
Adjusted R Square	0.798429124
Standard Error	1.270224075
Observations	32

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	201.3481432	100.6740716	62.39602937	3.12054E-11
Residual	29	46.79060681	1.6134692		
Total	31	248.13875			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.693316966	0.334195756	2.074583393	0.04700547	0.009809899	1.376824033	0.009809899	1.376824033
ROIC	11.3143625	3.140523909	3.602699047	0.001162506	4.891269905	17.73745509	4.891269905	17.73745509
Annual Revenue Growth	16.37081318	1.465482714	11.17093571	5.05234E-12	13.37356449	19.36806186	13.37356449	19.36806186

EV/Sales = 0.69 + 11.31 * ROIC + 16.37 * Annual Revenue Growth Rate

Regression Analysis: Given IQ's ROIC of 3.3% and annual revenue growth rate of 9.4%, the calculated implied share price is shown below:
<u>EV/Sales</u> = 0.69 + 11.31 * 0.033 + 16.37 * 0.094 = 2.61x
<u>EV</u> = 2.61 * 4,204 (sales) = $10,954 million
<u>Value of Equity in Common Stock</u> = 10,954 +1,029 (cash) + 83 (non-operating assets) - 3,142 (debt) - 13 (minority interest) - 468 (options) = $8,443 million
<u>Implied Share Price</u> = 8,443 / 956.7 (# shares) = **$8.82**

<u>Market Valuation</u>
IQ is a non-US company with ADR listed. Therefore, we decided to use the U.S. regression for market valuation with $R^2 = 0.31$, the calculated implied share price is shown below:

EV/Sales = 2.32 + 2.60 g + 10.60 Oper Margin - 1.40 DFR - 3.50 Tax rate
<u>EV/Sales</u> = 2.32 + 2.60 * 0.094 + 10.60 * 0.045 - 1.40 * 0.349 - 3.50 * 0.250 = 1.68x
<u>EV</u> = 1.68 * 4,204 (sales) = $7,063 million
<u>Value of Equity in Common Stock</u> = 7,063 +1,029 (cash) + 83 (non-operating assets) - 3,142 (debt) - 13 (minority interest) - 468 (options) = $4,552 million
<u>Implied Share Price</u> = 4,552 / 956.7 (# shares) = **$4.76**

<u>Option Pricing</u>
IQ is a money-losing company with significant debt obligations. Its debt to market value ratio is 53.5%, which exceeds the 40% threshold. Therefore, we decided to use the option pricing model. With the industry average standard deviation for firm value and bond price, as well as a weighted average debt maturity of 6 years, the estimated value per share from the option pricing model is $6.30 per share.

Output				
Stock Price=	$7,952,133.04		T.Bond rate=	3.44%
Strike Price=	$3,142,964.85		Variance=	0.319959
Expiration (in years) =	6		Annualized dividend yield=	0.00%
d1 =	1.511708491			
N(d1) =	0.934695981			
d2 =	0.126155905			
N(d2) =	0.550195742			
Value of equity as a call =		$6,026,072.11	**Number of Shares Outstanding =**	$956,700.00
Value of outstanding debt =		$1,926,060.92	**Value Per Share =**	$6.30
Appropriate interest rate for debt =		8.50%		
Risk neutral probability of default =		44.98%		

<u>Final Analysis</u>
Across different valuation methods, iQIYI trading in line with the current market price of $6.01/share. Therefore, we would recommend existing investors of iQIYI to hold on to their stocks to wait for the potential upside.

To sum up, we recommend **<u>HOLD</u>** iQIYI.

2. Grab

Money-Losing & Non-US Company & High Growth; Singaporean Transportation/Fintech Company

Company Overview

Founded in 2012, Grab is Southeast Asia's leading super app that operates across the deliveries, mobility, and digital financial services sectors in over 400 cities in eight countries in Southeast Asia (SEA). It is headquartered in Singapore and remains to be a dominant player in the region. Grab acquired Uber's Southeast Asia operations in 2018, which led to Grab becoming the category leader in both mobility and food deliveries segment. Grab's ecosystem has more than 25mn monthly transacting users (MTUs), 5mn driver partners, and 2mn merchant partners. Users are able to access rideshare functions, delivery services, and an array of financial services all through one app. Grab generates the majority of its revenue through service fees and commissions paid by the driver and merchant-partners. Depending on the services, Grab earns different levels of commission. Grab also offers several incentives to its driver- and merchant-partners, which are deducted from the fees normally received from the driver-or merchant-partners. Grab offers consumer incentives such as discount vouchers or shipping subsidies to expand and maintain their user base. Recently Grab has also been expanding their financial services segment, acquiring licenses to operate digital banks in Singapore. Furthermore, they have expanded their e-wallet service to capture 23% of the Southeast Asian market. It should also be noted that they have submitted applications in Malaysia for digital banking licenses and are working on expanding their presence in the digital banking industry.

DCF Valuation

GRAB — **May-07-2023**

Fierce Competition Signals a Rocky Path

Grab continues to gain more market share in operating countries while developing their new financial arm. Improving momentum from ride-hailing services will offset the potential long term losses seen in their deliveries segment providing a reliable source of cash. As regions continue to loosen regulation post-pandemic ride-hailing services will see an increase in both driver supply and user demand while normalizing costs such as fuel. Competition within their delivery segement remains fierce and is somewhat uncertain due to the multitude of competitors. Yet it does not seem disruptive so it should be of lesser concern in the forseeable future. Recent growth may have been damped as well due to slow reopening in each operating country combined with the borrowing costs required to develop their data security in their finance and software arm. However, despite this the company should continue to grow as it has in the past as each of its segements continue to expand and grow.

The Assumptions

	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$1,433.00	50.0%	25.00%		5.00%	Growing market penetration in all countries and developing business segements
Operating margin (b)	-78.02%	-30.0%			10.00%	Margins will improve as financial and mobility arms continue to develop
Tax rate	0.00%		0.00%		17.00%	Converges to Singapore tax rate over time
Reinvestment (c)		5.00	3.00	2.50	35.71%	Continued development of business segments and increased market share spurs continued reinvestment
Return on capital	-16.27%	Marginal ROIC =	69.52%		14.00%	Outcompeting similar companies in the region and continues to develop a competitive advantage through constant development of new arms
Cost of capital (d)			8.88%		8.50%	Cost of capital is expected to stay around the same range and slightly improve as the company matures and captures market.

The Cash Flows

	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$2,149.50	-30.00%	-$644.85	-$644.85	$143.30	-$788.15
2	$2,686.88	-16.67%	-$447.81	-$447.81	$179.13	-$626.94
3	$3,358.59	-10.00%	-$335.86	-$335.86	$223.91	-$559.77
4	$4,198.24	-3.33%	-$139.94	-$139.94	$279.88	-$419.82
5	$5,247.80	3.33%	$174.93	$174.93	$419.82	-$244.90
6	$6,349.84	10.00%	$634.98	$634.98	$440.82	$194.17
7	$7,429.31	10.00%	$742.93	$742.93	$431.79	$311.14
8	$8,395.13	10.00%	$839.51	$839.51	$386.32	$453.19
9	$9,150.69	10.00%	$915.07	$915.07	$302.22	$612.84
10	$9,608.22	10.00%	$960.82	$797.66	$183.01	$614.65
Terminal year	$10,088.63	10.00%	$1,008.86	$837.36	$299.06	$538.30

The Value		
Terminal value	$15,380.02	
PV(Terminal value)	$6,638.25	
PV (CF over next 10 years)	-$1,073.96	
Value of operating assets =	$5,564.29	
Adjustment for distress	$0.00	Probability of failure = 0.00%
- Debt & Minority Interests	$1,302.00	
+ Cash & Other Non-operating assets	$1,976.00	
Value of equity	$6,238.29	
- Value of equity options	$84.92	
Number of shares	3,867.00	
Value per share	$1.59	Stock was trading at = $3.02

The DCF model valued Grab at $1.59 per share compared to a trading price of $3.02. Many of its arms are still developing; Grab's delivery arm has yet to benefit from pricing power as competition increases and take rates remain relatively low. As competition shows no signs of dying down, this could prove to be a volatile path for the company and delay its progress towards profitability. Since Grab is a high growth money losing company, the inputs of the DCF may not reflect the future financial performance due to the volatility in cash flow and growth rates.

Revenue Growth: The initial short-term revenue growth may be linked to the sudden rebound and prosperity of its mobility arm as it recovers from the COVID-19 pandemic. Additionally, further revenue may be generated from its financial services arms as its offerings continue to expand along with its user base. Within SEA, there are not many that can currently match Grab's market leadership. Their superapp ecosystem hosts millions of consumers, merchants, and drivers across SEA and is scalable which allows for cross-selling at lower costs and drives its growth potential of an emerging market such as SEA with rapid growth and profitability. Its mobility segment has a 70% regional market share and boasts one of the highest global take rates. We expect to see Grab's mobility arm expand and dominate the region. Recent ventures into financial services also provide Grab with a path to profitability. As an e-wallet market leader, it maintains low take rates while capitalizing on its large user base to sell other products such as loans and insurance. Its partnership with Singtel and banking license allows it to compete in the digital banking market and expand its reach. Yet this segment is still highly underdeveloped and with low barriers to entry one can expect fierce competition in the years to come making it difficult for Grab to monetize this position in the near future.

Operating Margin: Grab's current operating margin is negative due to the industries it operates in and its age. Grab continues to develop its mobility and financial services arms. We believe that it will be able to increase as its position within the region stabilizes. Yet it will be difficult to maintain the profitability of all of its arms in the long run, especially as most of them are currently underdeveloped and volatile.

Reinvestment: It is expected that Grab will continuously reinvest as it continues to expand into new markets and industries as it continues to grow its financial services and delivery arms. A key factor behind its profitability is the constant development, innovation, and expansion of its services. Yet some expenses can be spared as Grab will be able to leverage its user base to create synergies within its platform to create compounding effects. However, it is uncertain if such a commitment will yield short term profitable results.

ROC: We expect their ROC to decrease as their initial competitive advantages fade with time as the company stabilizes, industries adapt to its entrance, and more competition enters the market. Taking these concerns into account we believe that Grab still needs to improve its financial services, delivery, and transportation arms before it can truly stabilize in the region. While it remains a dominant player in the ridesharing industry, that is not enough for it to turn profit and will need to successfully develop its other segments in order to truly establish itself. Thus, until further growth is observed in its other arms, we believe that Grab is currently overvalued and its value in the stock market will fall.

Relative Valuation

Regression Statistics	
Multiple R	0.71548628
R Square	0.51192061
Adjusted R Square	0.44684336
Standard Error	1.50880504
Observations	24

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	35.8153881	17.9076941	7.86635271	0.00460976
Residual	21	34.1473896	2.27649264		
Total	23	69.9627778			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	2.16745261	0.39305931	5.51431439	5.9439E-05	1.32966652	3.0052387	1.32966652	3.0052387
ROIC	4.98444019	2.2604704	2.20504554	0.04347478	0.16636158	9.8025188	0.16636158	9.8025188
EBITDA margin	-2.31789773	0.61532353	-3.76695772	0.0018651	-3.62942879	-1.00636667	-3.62942879	-1.00636667

EV/Sales= 2.16 + 4.98 * ROIC% + (-2.32) * EBITDA Margin

In the relative valuation of Grab, we chose EV/Sales as the multiple due to it having one of the highest R squared values of 0.51. It should be noted though that as Grab has many segments, the utilized comps were only able to reflect the company from a broad standpoint. Additional regression with different multiples should be performed on each segment with their industry specific comps and then reconciled to provide a more accurate reflection of the company. However, as the comparables chosen for this regression included companies from all the industries Grab operates in, it is by no means an insignificant result. Because Grab is a money losing, young growth company, we used Grab's future ROIC and margins and discounted back to present. After performing the regression analysis, we produced an EV/Sales multiple of 3.7x and a value per share of $2.87. This indicates that Grab is currently overvalued.

Market Valuation

As Grab's operations and headquarters exist in emerging markets we decided to use the EV/Sales regression for emerging markets EV/Sales = 3.22 + 1.60 g + 4.40 Oper Margin + 1.50 DFR-2.80 Tax rate and followed a similar logic as to the comps valuation. Doing so produced an EV/Sales multiple of 3.6x and a value per share of $2.79. This also indicates that Grab is currently overvalued.

Final Analysis

Given the uncertainty of assumption in the DCF model, we believe that relative valuation is a better indicator of Grab's performance. From the DCF, relative valuation, and market valuation we can gather that Grab is currently overvalued and overpriced. Thus we recommend to **SELL** Grab.

3. Etsy (NASDAQ: ETSY)

High-Growth Company, Retail Sector

Company Overview

Etsy is an e-commerce company that operates an online marketplace for buying and selling unique and handmade goods, as well as vintage items. The company was founded in 2005 with the mission of providing a platform for independent artists, crafters, and vintage sellers to sell their products directly to buyers around the world. Etsy's business model is based on providing a platform that connects buyers and sellers, taking a commission on sales made through the site. Sellers can set up their own storefronts on Etsy, where they can list their products, manage inventory, and communicate with customers. Buyers can search for and purchase products from a wide range of sellers, and can also leave reviews and feedback on their purchases. In addition to its core marketplace, Etsy has also developed a range of additional services and features to support its sellers. These include tools for managing listings and inventory, marketing and promotion services, and educational resources and community forums to help sellers grow their businesses. Over the years, Etsy has expanded its product offerings to include a wide range of handmade and unique items, including clothing, jewelry, home decor, art, and more.

DCF Valuation

Etsy						May-22
Growing with the Online Market						
Etsy has had a high growth with the ability to offer businesses an online platform to sell homemade and vintage pieces. Their platform quickly grew with the shift to online consumer market due to COVID-19 and the development of technology. Etsy also gained major recognition and experienced a spike in stock price in 2021 after a tweet about them from Elon Musk. Since Etsy currently does not have any stakes in any other businesses like their major competitors such as Amazon and they're spending relatively little on research and development, their growth is expected to level out within the next couple years or keep in pace with the growth of the online retail market.						
The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$2,329,114.00	35.0%	25.00%		3.44%	Currently experiencing high growth and expected to continue to have high growth from the momentum of most people shifting to an online market
Operating margin (b)	28.24%	15.0%			11.00%	Margins decrease as growth levels out and Etsy may consider expanding their business.
Tax rate	0.00%		0.00%		25.00%	Global/US marginal tax rate over time
Reinvestment (c)		0.96	0.96	5.66	38.74%	Increase as Etsy continues to develop and diversify
Return on capital	159.96%	Marginal ROIC =	7.76%		8.88%	May lose competitive edge as more and more online retailers sell similar things and because Etsy does not currently have any other businesses aside from being a third party vendor
Cost of capital (d)			9.00%		8.88%	Cost of capital close to median company
The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$3,143,605.17	15.00%	$471,540.77	$471,540.77	$820,407.35	-$348,866.57
2	$3,929,506.46	14.20%	$557,989.92	$557,989.92	$1,025,509.19	-$467,519.27
3	$4,911,883.07	13.80%	$677,839.86	$677,839.86	$1,281,886.48	-$604,046.62
4	$6,139,853.84	13.40%	$822,740.41	$822,740.41	$1,602,358.10	-$779,617.69
5	$7,674,817.30	13.00%	$997,726.25	$997,726.25	$280,329.61	$717,396.63
6	$9,262,583.50	12.60%	$1,167,085.52	$1,108,731.25	$267,807.29	$840,923.96
7	$10,779,424.18	12.20%	$1,315,089.75	$1,183,580.77	$229,598.64	$953,982.13
8	$12,079,853.91	11.80%	$1,425,422.76	$1,211,609.35	$165,332.36	$1,046,276.98
9	$13,016,284.18	11.40%	$1,483,856.40	$1,187,085.12	$79,054.74	$1,108,030.38
10	$13,464,044.36	11.00%	$1,481,044.88	$1,110,783.66	$81,774.22	$1,029,009.44
Terminal year	$13,927,207.49	11.00%	$1,531,992.82	$1,148,994.62	$445,106.02	$703,888.59

The Value				
Terminal value	$12,939,128.58			
PV(Terminal value)	$5,483,716.52			
PV (CF over next 10 years)	$1,230,873.55			
Value of operating assets =	$6,714,590.07			
Adjustment for distress	$0.00		Probability of failure =	0.00%
- Debt & Minority Interests	$112,701.00			
+ Cash & Other Non-operating assets	$984,612.00			
Value of equity	$7,586,501.07			
- Value of equity options	$0.00			
Number of shares	125,863.00			
Value per share	$60.28		Stock was trading at =	$90.00

Revenue and Growth: Etsy's high revenue growth is largely attributed to increased demand for online shopping during the COVID-19 pandemic, as well as ongoing growth in the company's core business of connecting independent sellers with buyers around the world. With its increase in popularity as well as the continuing shift towards online retail, it is expected that Etsy will continue to grow at a high rate.

Margin: Etsy's current operating margin is high as attributed to the increased revenue however they most likely will not sustain this high level as their growth levels out when the growth in the online retail sector levels out and more competition enters the market. In addition, Etsy has already indicated its efforts to expand and diversify with discussions surrounding acquisitions of other small retail companies.

Reinvestment: It is expected that Etsy will increase its reinvestment level as it currently only operates as a third party seller. With discussions surrounding acquisitions of other small retail companies, it seems that Etsy is looking to expand and diversify thus their reinvestment levels will most likely increase.

Return on Capital: It is expected that Etsy's return on capital will decrease as they lose their competitive edge considering how their current operations only involve being a third party seller and there are not as many barriers to entry in the online retail sector.

Relative Valuation

In qualitatively observing Etsy in comparison to its comparable companies in the online retail sector, we can see that Etsy's multiples are above the median for its comparable companies, indicating that Etsy is overvalued.

Summary Statistics	TEV/Total Revenues LTM - Latest	TEV/EBITDA LTM - Latest	TEV/EBIT LTM - Latest	NTM TEV/Forward Total Revenue (Capital IQ)	NTM TEV/Forward EBITDA (Capital IQ)	NTM Forward P/E (Capital IQ)
Median	2.2x	12.1x	19.1x	2.01x	12.70x	19.20x

Etsy, Inc. (NasdaqGS: ETSY)	4.7x	27.6x	32.5x	4.43x	15.99x	20.44x

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.80765565
R Square	0.65230765
Adjusted R Square	0.58711534
Standard Error	1.94916245
Observations	20

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	114.044252	38.0147505	10.005898	0.00059251
Residual	16	60.7877484	3.79923428		
Total	19	174.832			

	Coefficients	*Standard Erro*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-2.5059769	1.19717453	-2.0932427	0.05261487	-5.0438735	0.03191978	-5.0438735	0.03191978
Return on Capital %	9.52665235	4.32552825	2.20242518	0.04264533	0.35694209	18.6963626	0.35694209	18.6963626
Total Revenues, 5 Yr CAGR %	6.08808009	2.20192286	2.76489254	0.01380467	1.42021214	10.755948	1.42021214	10.755948
5 Year Beta	3.04609974	0.92944614	3.27732786	0.00474034	1.07576193	5.01643754	1.07576193	5.01643754

However, we observed that Etsy was undervalued with further analysis using a sector regression. In a comparable valuation of Etsy, after comparing the relationships between different variables, we chose return on capital, expected growth rate in the next 5 years, and 5 year Beta to be the independent variables and EV/Sales to be the dependent variable in our regression which has a correlation of 65.23%. The regression includes 20 of Etsy's comparable companies from the online retail sector with a market capitalization above 3 million. Using the sector-comparable companies, we obtain a price/share of $100.64.

Market Valuation

Since Etsy, is currently mainly in the business of being a third-party vendor and is headquartered as well as mainly established in the United States, we decided to use the market regression for US companies for Etsy.

EV/Sales = 2.32 + 2.60 g + 10.60 Oper Margin -1.40 DFR- 3.50 Tax rate

2.32 + 2.6 (.3497) + 10.60 (.2824) - 1.4 (.2042) - 3.5 (0) = 5.94

We then used the EV/Sales multiple to obtain the enterprise value and then the equity value to arrive at a price/share of $115.16.

Final Analysis

From the DCF, it seems that Etsy is overvalued. The market and industry regression indicate that Etsy is undervalued. Considering the contradicting indicators from the DCF and the market and industry regressions, I would recommend to **HOLD** Etsy. Considering how Etsy is an online retailer heavily affected by the shift to online marketplaces due to COVID-19, it is unclear how Etsy will fare as the growth in the online retail sector levels out and new competitors continue to emerge.

4. The Estée Lauder Companies, Inc. (NYSE: EL)

Service Company in Retail Sector

Company Overview

The Estée Lauder Companies Inc. is an American multinational cosmetics company founded in 1946 which manufactures and markets four major product categories: Skin Care, Makeup, Fragrance, Hair Care. It is the second largest beauty company in the world and is distributed internationally in over 150 countries and territories, offering a range of brands between the spectrum of Classic to Progressive, and Entry Price Point to Premium, but with a larger focus on premium/luxury brands. EL's strategy is that they focus on the personal nature of their products and the wide array of consumer preferences and tastes to markets. EL sells products independently and on authorized retailer websites, third-party online malls, in stores in airports, in duty-free locations and in their own and authorized freestanding stores. Online, EL sells products from most of their brands D2C through their brand.com sites and third-party online malls, but also wholesale to authorized retailers that resell online through retailer.com and pure-play sites in approximately 50 countries. A majority of online sales are generated in mainland China, then the United States and the United Kingdom.

DCF Valuation

Estee Lauder						May-23
The Global Distribution Platform Rolls on						
Estee Lauder is the second largest beauty company globally, with strong growth and presence in its key categories such as skincare, makeup, and perfume and is especially known for its luxury beauty. EL holds a broad portfolio of well established brands with distinct brand identities and well-loved products in over 150 countries, which is its competitive advantage in a competitive industry such as beauty. It will continue its shift from brick and mortar stores to expand it's online retailer platform, and continue to innovate products, and use brand acquistions to drive growth. EL will see growth overall with the targeted expansion in Asia/China specifically and increased revenue from travel retail and online distribution channels to attain higher profitability. There may be headwinds due to Chinese pandemic regulations and other policies within the next year that will slow growth as shown in the recent Q3 earnings report, but EL will refocus marketing and expansion efforts into the Chinese market, which has been a rapidly growing consumer base with a strong demand for luxury products. As a result of higher investments within upcoming years to improve distribution and e-commerce channels internationally, margins are expected to remain stable.						
The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$17,737.00	8.0%	11.00%		3.44%	Strong presence in multiple beauty businesses and targeted expansion into Asia and especially China, along with growth of travel beauty. Trend of consumers paying premium for self-care after the pandemic, especially with luxury beauty products. EL's luxury image has driven growth in markets such as China. Project further stronger growth in the perfume section as well, which has seen around 30% growth in the last year as well as high projected growth in makeup.
Operating margin (b)	18.40%	19.0%			20.00%	Margins slightly improve over time through building new production factories in Shanghai, China and Tokyo, Japan. Growth/expansion is targeted for East Asian markets, and EL will also be improving supply chain distribution channels on their online platforms.
Tax rate	20.69%		20.69%		25.00%	Global/US marginal tax rate over time
Reinvestment (c)		1.90	2.40	2.80	40.09%	Maintained at Estee Lauder's current level. Overall will expand into Asian markets, so I expect more investment being made early on into new developments in Asia
Return on capital	22.88%	Marginal ROIC =	55.00%		8.58%	Strong competitive brands/fan bases, cultivation of luxury image but also expansion into lower priced beauty through DECEIM acquisition
Cost of capital (d)			7.87%		8.58%	Cost of capital close to median company
The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$19,155.96	19.00%	$3,639.63	$2,886.77	$746.82	$2,139.95
2	$21,263.12	19.25%	$4,093.15	$3,246.48	$877.98	$2,368.50
3	$23,602.06	19.38%	$4,572.90	$3,626.99	$974.56	$2,652.43
4	$26,198.28	19.50%	$5,108.67	$4,051.93	$1,081.76	$2,970.17
5	$29,080.10	19.63%	$5,706.97	$4,526.48	$1,029.22	$3,497.26
6	$31,839.22	19.75%	$6,288.25	$4,933.25	$985.40	$3,947.85
7	$34,378.71	19.88%	$6,832.77	$5,301.47	$906.96	$4,394.51
8	$36,600.95	20.00%	$7,320.19	$5,616.49	$793.66	$4,822.83
9	$38,413.43	20.00%	$7,682.69	$5,828.31	$647.31	$5,181.00
10	$39,734.85	20.00%	$7,946.97	$5,960.23	$471.94	$5,488.29
Terminal year	$41,101.73	20.00%	$8,220.35	$6,165.26	$2,471.85	$3,693.41
The Value						
Terminal value			$71,856.17			
PV(Terminal value)			$33,029.79			
PV (CF over next 10 years)			$23,517.95			
Value of operating assets =			$56,547.74			
Adjustment for distress			$0.00		Probability of failure =	0.00%
- Debt & Minority Interests			$9,028.00			
+ Cash & Other Non-operating assets			$9,752.82			
Value of equity			$57,272.56			
- Value of equity options			$15.56			
Number of shares			357.70			
Value per share			$160.07		Stock was trading at =	$203.54

The valuation obtained by the DCF is $160.07 compared to stock price at $203.54.

Revenue: EL has stated that it will focus on growth and entry into Asian markets, particularly in China, which has been an early-stage market. The emerging Chinese consumer class places a premium on luxury brands for skincare, make-up, and perfumes and EL's portfolio of brands such as La Mer, Estee Lauder, Tom Ford, and Jo Malone are trusted brands associated with quality and status. This development has been limited within the past year due to restrictions placed on China's pandemic/travel policies, but the Chinese beauty market is one that has high growth potential and represents a significant revenue driver for the upcoming years. According to the recent earnings release however, net sales fell 8%, primarily driven by headwinds and a slower-than-expected recovery in Asian travel retail in China. Despite that, organic net sales grew in nearly every market, including the developed markets of the United States, the United Kingdom and Hong Kong, and in emerging markets globally. Considering current macroeconomic conditions, I projected next year revenue growth to be lower than historicals at 8%, but will rebound as Asia travel retail recovers. EL expects to grow its travel beauty sector. China is the most important country in the travel retail channel for beauty with ~50% of global customers, making a reopening of the region especially important for the beauty industry. Travel Retail comprised 23% of sales, so recovery of Travel Retail will be a significant driver of revenue growth. Historically, much of EL's growth has also been driven through brand acquisitions and licensing agreements, and the company has cultivated a portfolio of strong brand names whose products have persisted throughout time as fan favorites and developed a strong consumer base. While EL is known for more high end and luxury products, the acquisition of DECIEM in 2021 adds more budget friendly alternatives to its portfolio and expands the consumer base. I project that EL's M&A will complement organic growth and there is ample capital to support growth-based acquisitions. Despite the current macroeconomic conditions, we believe that since EL largely operates in the premium segment of the beauty market, customer loyalty has historically remained strong and demand is resilient through economic cycles.

Operating Margin: Margins stay relatively constant around current levels. EL is investing into online distribution channels and building other manufacturing locations in Asia, such as new factories in Shanghai and Tokyo, increasing future operating margins. The target operating margin is based on historicals as well.

Reinvestment Rate: It is expected that EL will increase its reinvestment level to expand into new markets such as Asia, Turkey, and Western Europe, and thus will likely increase reinvestment levels.

Return on Capital: Competitive advantages of strong brand portfolio and acquisitions of new trending brands is likely to sustain due to the established premium acquisition power and loyal fan base.

<u>Relative Valuation</u>

US-based and international beauty companies (sample size = 29 firms). Some firms were removed because they have Not Meaningful (NM) data points. Overall looking at the comps, we can see that Estee Lauder is trading at a premium compared to the other median multiples. This could indicate that the stock is overvalued. The beauty industry is competitive, but EL's portfolio includes brands that have historically performed well, with differentiated brand identities and products, and the market is paying a premium for that.

Summary Statistics	EV/ Revenue	EV/EBITDA	EV/EBIT	P/Diluted EPS	P/BV	EV/Fwd Revenue	EV/Fwd EBITDA	Fwd P/E
EL	4.9x	21.9x	39.4x	67.1x	12.3x	4.34x	19.17x	29.36x
Median	2.9x	17.7x	22.4x	36.0x	4.4x	2.87x	16.11x	26.15x

Running a regression on different multiples, we found that EV/EBITDA yielded the highest R squared value of 0.78 and so we chose EV/EBITDA as the most reliable output multiple.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.88707291
R Square	0.78689835
Adjusted R Square	0.77050592
Standard Error	5.81771905
Observations	29

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	3249.45605	1624.72802	48.0037519	1.8691E-09
Residual	26	879.992229	33.845855		
Total	28	4129.44828			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	13.4756387	2.36527064	5.69729251	5.3941E-06	8.61375526	18.3375221	8.61375526	18.3375221
2 Year Revenue Growth	1.41318559	0.15179466	9.30985041	9.1978E-10	1.10116719	1.72520398	1.10116719	1.72520398
ROIC	-0.20178694	0.11511731	-1.75288094	0.00091408	-0.43841396	0.03484008	-0.43841396	0.03484008

Based on the EV/EBITDA multiple through the regression, the EV/EBITDA multiple was 17.3x and we backed out to the EV of $65,114 - $9,028.00 (Debt) + $3,957.00 (Cash) + $5,795.82 (Non-operating assets) = $65,839.02 (Equity Value) - $15.56 (Options) /357.70 Shares = Implied stock price at $184.02.

<u>Market Valuation</u>

EV/EBITDA= 23.93 + 25.40 g - 8.20 DFR - 34.40 Tax Rate
 = 23.93 + 25.40*(0.0518) - 8.20*(0.11) - 34.40*(0.207) = 17.21x
Based on the EV/EBITDA multiple through the regression, the EV/EBITDA multiple was 17.21x and we backed out to the EV of $64,760 - $9,028.00 (Debt) + $3,957.00 (Cash) + $5,795.82 (Non-operating assets) = $65,524.78 (Equity Value) - $15.56 (Options)/357.70 Shares = Implied stock price at $183.03.

<u>Final Analysis</u>

Overall, our recommendation is to **<u>SELL</u>**. Based on all the valuation methods used, we can conclude that the Estée Lauder stock is overvalued. The stock performed well during the pandemic and peaked to around the $300 range. We believe EL has strong growth prospects within the Chinese market, but it may take time to capture the market as seen with the recent headwinds in the most recent earnings release. We expect that the stock will trade closer to pre-pandemic levels around our valuation price.

5. The Coca-Cola Company (NYSE: KO)

Multinational Beverage Company

Company Overview

Coca-Cola is a leading American multinational corporation that operates in the non-alcoholic beverage industry. The company's flagship product is the Coca-Cola soft drink, which is one of the most recognizable brands in the world. Coca-Cola's product line has expanded to include a range of other beverages, including carbonated soft drinks, fruit juices, energy drinks, sports drinks, and bottled water. The company has a global presence and operates in over 200 countries.

Coca-Cola's competitive advantages include its strong brand recognition, extensive distribution network, and diversified product line. The company invests heavily in marketing and advertising to maintain its brand image, and it has established partnerships with major retailers and distributors to ensure its products are widely available. Additionally, the company has expanded its product line to include healthier beverage options to cater to changing consumer preferences.

Coca-Cola sources ingredients and materials from a range of suppliers, including sugar and corn syrup suppliers, aluminum can manufacturers, and packaging materials suppliers. The company has implemented a sustainable sourcing policy and works closely with its suppliers to ensure they adhere to ethical and environmental standards.

DCF Valuation

Coca-Cola						May-23
The Disruption Platform Rolls on						
Coca-Cola aims to improve its operational efficiency and transform by optimizing its distributions and saving structural costs. If Coca-Cola successfully opened the new market and cut cost, there could be sustainable high growth in the near future. However, according to its latest 10-K, the Asia and Europe market seems to be highly saturated with potential competions in shifting customer interest in healthier drinks.						
The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$43,493.00	5.0%	5.40%		3.44%	Stable growth during the projection period due to strong demand in Latin America and development of Bottling Investment Group.
Operating margin (b	25.45%	28.0%			32.00%	Margins improve from resources allocation and improved operation and ads distribution efficiency
Tax rate	19.46%		19.46%		21.00%	Global/US marginal tax rate over
Reinvestment (c)		0.78	0.90	1.00	14.96%	Stable cap expenditure in the future given established market standing and increasing saturated market
Return on capital	15.19%	Marginal ROIC =	40.71%		23.00%	Industry leader with strong competitive edges, solid liquidity to back up transformation
Cost of capital (d)			7.75%		9.38%	CoC close to median level

The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$45,667.65	28.00%	$12,786.94	$10,298.60	$2,788.01	$7,510.59
2	$48,133.70	29.00%	$13,958.77	$11,242.40	$2,740.06	$8,502.34
3	$50,732.92	29.50%	$14,966.21	$12,053.79	$2,888.02	$9,165.77
4	$53,472.50	30.00%	$16,041.75	$12,920.03	$3,043.98	$9,876.05
5	$56,360.02	30.50%	$17,189.80	$13,844.67	$2,887.52	$10,957.15
6	$59,182.53	30.36%	$17,968.74	$14,416.68	$2,822.51	$11,594.17
7	$61,914.39	31.18%	$19,305.39	$15,429.64	$2,731.87	$12,697.78
8	$64,529.65	32.00%	$20,649.49	$16,440.30	$2,615.26	$13,825.03
9	$67,002.43	32.00%	$21,440.78	$17,004.25	$2,472.78	$14,531.48
10	$69,307.31	32.00%	$22,178.34	$17,520.89	$2,304.88	$15,216.01
Terminal year	$71,691.49	32.00%	$22,941.28	$18,123.61	$2,710.66	$15,412.95

The Value				
Terminal value	$259,477.21			
PV(Terminal value)	$117,610.31			
PV (CF over next 10 years)	$72,923.71			
Value of operating assets =	$190,534.02			
Adjustment for distress	$0.00		Probability of failure =	0.00%
- Debt & Minority Interests	$45,455.58			
+ Cash & Other Non-operating assets	$14,074.00			
Value of equity	$159,152.44			
- Value of equity options	$1,396.04			
Number of shares	4,326.00			
Value per share	$36.47		Stock was trading at =	$64.02

The DCF valuation method gives a value per share of **$36.47** for Coca-Cola's operating assets, compared to its trading price of **$64.02**.

Revenue: Coca-Cola's revenue consists of seven operating segments: NA, LatAm, EU, Middle East & Africa, Asia Pacific, Bottling Investment Group, Global Ventures, and Corporate. Last year, those segments together contributed an annual revenue growth rate of 11.3%, mainly because of the full recovery from Covid. Double-digit growth in the NA market and Bottling Investment Group is unlikely to happen again, and 0.6% growth in the Asia Pacific also indicates obstacles to further expansion. Hence, I give a growth rate of 5% for next year, followed by a constant 5.4% in the near future. Emerging countries and markets will be the main driver for Coca-Cola, and the CEO also revealed to transform from distribution-oriented to investing-oriented. Given Coca-Cola's established market position and healthy liquidity, it has enough space to try different directions and strategies without harming its profitability and operations.

Operating Margin: Due to the difference in the business model that focuses only on distribution, Coca-Cola has a significantly higher margin than its competitors. And this margin is expected to grow further from 25% to 28% and to 33% ultimately. According to Coca-Cola's CEO on the last annual earning call, Coca-Cola aims to increase efficiency in advertisement distribution and resource allocation to increase its operating margin and efficiency. There would also be attempts to shift the business's focus from retailing to investments driven by Bottling Investment Group and Global Ventures. The increase in margin in the short term is due to cost cuts in the current business, and the increase in the long term is led by the transition of the business focus. There could be fluctuations in margins or more space to increase, given the uncertainty of its transformation.

Reinvestment: Given the established and gradually saturated market, we expect Coca-Cola to maintain its current reinvestment level. There could be increases from relocation and new constructions of warehouses to improve current allocation efficiency.

Return on Capital: It is expected that Coca-Cola can maintain its market standing and leading position in the beverage industry due to its strong brand name and bargaining power. The operational efficiency is also estimated to increase due to aims to improve advertisement utility and resource allocation efficiency.

<u>Relative Valuation</u>

Comparable Companies: Global companies operating in the beverage sector with a market cap larger than $500 million, positive net income, and established market scale.

Multiple: After running regression on EV/Sales, EV/EBITDA, and PBV, I selected EV/EBITDA, which generates the highest R^2 ($R^2 = 0.66$), demonstrating a strong correlation with the selected independent variable, annual revenue growth, ROC, and Effective Tax Rate.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.813911
R Square	0.66245
Adjusted R Square	0.590118
Standard Error	6.195
Observations	18

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regression	3	1054.451	351.4835	9.158458	0.001317
Residual	14	537.2923	38.37802		
Total	17	1591.743			

	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*.ower 95.0%*	*Jpper 95.0%*
Intercept	1.219175	3.687802	0.330597	0.745845	-6.69037	9.128725	-6.69037	9.128725
Est. Annual Revenue Growth - 2 Yr % (Capital IQ)	0.793023	0.292117	2.714743	0.016765	0.166494	1.419553	0.166494	1.419553
LTM Return on Capital	0.37859	0.151267	2.502795	0.02533	0.054155	0.703025	0.054155	0.703025
LTM Effective Tax Rate	19.53397	7.10157	2.750655	0.015625	4.302617	34.76532	4.302617	34.76532

EV/EBITDA= 1.219175 + 0.793023 * (Est. Annual Revenue Growth Rate) + 0.37859 * (Return On Capital) + 19.53397 * (Effective Tax Rate in %)
=1.219175+0.793023*4.9+0.37859*16.6+19.53397*19.46%
=15.191
EV=15.191*12272=186423.952
EqV=186423.952-43804.58-1651+12004+2070=155042.372
Implied Share Price=155042.372/4326=**$35.84**

<u>Market Valuation</u>

Because Coca Cola is a traded company in US, I use the regression equation of EV/EBITDA for US companies:
EV/EBITDA= 23.93 + 25.40 g - 8.20 DFR - 34.40Tax Rate
=23.93+25.4*0.054-8.2*(42400/(42400+26868))-34.40*0.1946
=13.588
EV=13.588*12272=166752.118
EqV=166752.118-43804.58-1651+12004+2070=135370.538
Implied Share Price=135370.538/4326=**$31.29**

<u>Final Analysis</u>

Overall, our investment recommendation is **<u>SELL</u>**, as all valuation methods above indicate that Coca-Cola is currently overpriced and overvalued.

6. PepsiCo, Inc. (NASDAQGS: PEP)

Multinational Beverage Company

Company Overview

Founded in 1919, Pepsi is a leading global beverage and convenience food company with a complementary portfolio of well-known brands, including Lays, Doritos, Cheetos, Gatorade, Pepsi-Cola, Mountain Dew, Quaker, and SodaStream. Through its operations, authorized bottlers, contract manufacturers, and other third parties, Pepsi manufactures, markets, distributes, and sells various beverages and convenient foods, serving customers in more than 200 countries and territories, The convenience foods segment accounts for the majority of Pepsi's revenue, with 40% of its total revenue coming from the international market. In recent years, Pepsi has been focused on expanding its global presence through strategic acquisitions and partnerships, such as its joint venture with Beyond Meat, diversifying its product portfolio to include healthier options, and improving sustainability. Despite the large fluctuations in the beverage and food market, Pepsi's financials have shown great stability in profitability, with its gross profits still growing steadily under the impact of COVID-19.

DCF Valuation

Pepsi						May-23
The Story						
In the future, PepsiCo is well positioned to capitalize on its diversified product portfolio, which are suppoted by its extensive distribution networks, strong retailer relationships, expanding capacity, and significant cost advantages that leads to economies of scales. Recent developments and financial performance have demonstrated PepsiCo's ability to navigate macro deadwinds and commitment to explore growth opportunities. As a result, the company will achieve stable top line growth coupled with increasing margins. Its strong competitive edges allow its return on capital to grow rapidly over time						
The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$86,392.00	6.5%	5.50%	4.26%	3.44%	Industry leader in the food and beverage industry with continuous innovations in the diverse product portfolio, strategic acquisitions and partnerships for market expansions, and brand investments to drive consumer demands
Operating margin (b)	13.38%	16.0%	17.30%	19.00%	20.00%	Margins improve stably mainly due to the execution of cost-leading strategy to create economies of scale
Tax rate	16.13%		16.13%	21.00%	21.00%	US marginal tax rate over time
Reinvestment (c)		1.67	1.65	1.61	13.23%	Continuous but slowing down capital investments as market expansion reaches its height
Return on capital	18.32%	Marginal ROIC =	49.79%		26.00%	Strong and sustainable competitive edges of cost leadership and scale benefits allow the ROIC to sustain and improve to a level near the Beverage(soft) industry average
Cost of capital (d)			7.87%	9.38%	9.38%	Cost of capital close to Beverage(soft) industry median

The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$92,007.48	16.00%	$14,721.20	$12,346.67	$3,362.56	$8,984.10
2	$97,067.89	16.80%	$16,307.41	$13,677.02	$3,066.92	$10,610.11
3	$102,406.63	17.20%	$17,613.94	$14,772.81	$3,235.60	$11,537.21
4	$108,038.99	17.60%	$19,014.86	$15,947.76	$3,413.55	$12,534.21
5	$113,981.13	18.00%	$20,516.60	$17,207.28	$3,690.77	$13,516.50
6	$119,780.49	17.35%	$20,782.32	$17,227.72	$3,602.09	$13,625.63
7	$125,381.43	18.01%	$22,584.65	$18,501.80	$3,478.84	$15,022.96
8	$130,727.69	18.68%	$24,413.62	$19,762.34	$3,320.66	$16,441.68
9	$135,763.33	19.34%	$26,253.35	$20,995.85	$3,127.72	$17,868.13
10	$140,433.58	20.00%	$28,086.72	$22,188.51	$2,900.78	$19,287.72
Terminal year	$145,264.50	20.00%	$29,052.90	$22,951.79	$3,036.70	$19,915.09

The Value			
Terminal value	$335,270.92		
PV(Terminal value)	$150,764.89		
PV (CF over next 10 years)	$88,829.38		
Value of operating assets =	$239,594.27		
Adjustment for distress	$0.00	Probability of failure =	0.00%
- Debt & Minority Interests	$40,807.00		
+ Cash & Other Non-operating assets	$47,976.00		
Value of equity	$246,763.27		
- Value of equity options	$1,017.68		
Number of shares	1,387.00		
Value per share	$177.18	Stock was trading at =	$194.27

The valuation obtained by the DCF is $177.18 compared to stock price at $194.27.

Revenue: According to the management guideline, PepsiCo expects to see 6% revenue growth in 2023, despite the "volatile" macroeconomic market. While the macro environment remains inflationary with a lot of supply chain challenges across the industry, Pepsi is able to stretch to higher prices (fueling sales) without losing many customers as their investment in the brands in the last few years was paying off. However, as costs continue to rise, and forex challenges remain, PepsiCo isn't going to be able to drive consistent revenue growth by simply raising prices. Thus, brand investment will remain crucial to driving consumer demand in the future. Looking specifically at the Pepsi brand, Pepsi Max (Zero Sugar) line is growing significantly faster than full sugar all over the world. Frito-Lay (including Lay's and Doritos) delivered 17% YoY revenue growth in 2022. These jewelries of Pepsi are going to support Pepsi's top-line growth. Pepsi's strong snack portfolio and diversified beverage business also make the company resilient to falling demand for a particular product.

For the next two to five years, I expected revenue to grow at 5.50%, driven by 8% growth in snacks and 2% growth in beverages. The snacks' demand is driven by the brands' strong performances, while the beverage's flat growth is because of consumers' changing preferences for healthier, non-carbonated categories, where Pepsi is seeking to expand its market share.

Margins: PepsiCo's gross profit and gross profit margin are relatively stable, among which gross profit is still growing steadily under the impact of COVID-19. The gross profit margin has remained at about 54.5% in the past four years, which is of great significance to the stability of PepsiCo's net profit margin. PepsiCo has successfully executed the cost-leading strategy to create economies of scale. I expect the operating margin to increase gradually from 13% to 20% (10 year) in the future, driven by gross margin expansion from manufacturing efficiency gains in snacks and more efficient, technology-driven distribution spending.

Reinvestment: Again, brand investment, marketing and advertising spending, product innovations, are crucial for the company. Pepsi also plans to strengthen its agricultural production capabilities and regenerative agricultural transformation on its farms. However, I expect continuous but declining investments in the next couple of years as Pepsi has a lot of practices (acquisitions, partnerships, value chain investments) to digest and will find itself have fewer avenues to expand in ultimately. Thus, the reinvestment will decline over time to 13.23% in year 10.

Return on Capital: Pepsi's robust distribution network, close retail relationships, and technology driven direct-to-store logistics system gives Pepsi the ability to reinforce brand awareness and pricing power. Moreover, its large cost advantages and scale benefits render Pepsi significant competitive edges that allow its ROIC to improve from 18% to 26% in year 10.

Relative Valuation

Comparable Companies: 25 comparable public companies in the food and beverage industry with a market cap larger than 500 million US dollars.
Multiple Choice: EV/Sales ratio compares a company's enterprise value (EV) to its revenue (sales). The resulting ratio provides insight into how much the market is willing to pay for each

dollar of a company's sales. Though this multiple is generally preferred by companies with unstable or limited profitability, I still chose it as it still applies to mature companies such as Pepsi and its regression generates the highest R^2 among other multiples.

Regression Statistics	
Multiple R	0.89957267
R Square	0.80923099
Adjusted R Square	0.78197827
Standard Error	1.57676074
Observations	25

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	221.470337	73.8234456	29.6935904	9.5905E-08
Residual	21	52.2096633	2.48617444		
Total	24	273.68			

	Coefficients	*Standard Erro*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-2.5547379	0.91167925	-2.8022332	0.01067606	-4.4506787	-0.6587971	-4.4506787	-0.6587971
EBIT Margin %	20.7544008	2.8263819	7.34309856	3.1619E-07	14.8766179	26.6321838	14.8766179	26.6321838
Est. Annual Revenue Growth - 2 Yr %	0.30694311	0.03947622	7.77539274	1.2961E-07	0.22484782	0.3890384	0.22484782	0.3890384
1 Year Beta	2.14232148	0.82821926	2.5866598	0.01721114	0.41994523	3.86469773	0.41994523	3.86469773

Regression: EV/Sales = -2.55 + 20.75 * (Pre-tax Operating Margin) + 0.31 * (Expected Annual Revenue Growth) + 2.14 * (Levered Beta)
EV/Sales = -2.55 + 20.75*13.8% + 0.31*5.1+ 2.14*0.45 = 2.858x
Enterprise Value = 2.858*86392 (latest annual revenue) = $246908.34 million
Equity Value = 246908.34 - 39071 (Debt) - 1736 (Minority interests) + 4954 (Cash) + 43022 (Non-operating assets) - 1017.68 (Option value) = $253059.66 million
Share Price = 253059.66/1387=$182.45

Given the regression result, Pepsi would have an implied share price of $182.45, representing a 6.48% overprice of its share price of $194.27 as of May 5th, 2023.

Market Valuation

Regression: EV/Sales = 2.32 + 2.60 g + 10.60 Oper Margin - 1.40 DFR - 3.50 Tax rate
EV/Sales = 2.32 + 2.60*5.50% + 10.60*13.8% - 1.40*(39071/(39071+251125.85)) - 3.50*16.13% = 1.99x
Enterprise Value = 1.99*86392 = $171920.08 million
Share price = (171920.08-39071-1736+4954+43022-1017.68)/1387=$128.39

Given the regression result, PepsiCo would have an implied share price of $128.39, representing a 51.3% overprice of its share price of $194.27 as of May 5th, 2023.

Final Analysis

Based on all the valuation methods used, we can conclude that PepsiCo stock is moderately overvalued. Although the company has strong fundamentals and sustainable growth strategies, the current share price appears to have fully priced in these benefits, which limits further upsides in the future. Thus, my recommendation is to **HOLD/SELL** PepsiCo.