Valuation Project

Spring 2023

Company	Current Price	Value/Share	Pricing/Share	Recommendation
Airbnb	$119.90	$80.75	$121.79	Sell
MTN Nigeria Communications Plc	N229.00	N347.40	N229.00	Buy
Spotify Technology	$141.75	$86.24	$152.66	Sell
Tencent Holdings Limited	$342.80	$438.31	$583.67	Buy

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Airbnb

Investment Recommendation: Sell
Target Price: $80.75
Current Price: $119.90

1. Company Overview

Airbnb, founded in 2007, facilitates the sharing economy in the housing industry by connecting homeowners who want to rent out their units or houses with renters. The company earns a percentage of the transaction revenue without owning any of the units, so it operates on asset light model. Airbnb has a vast global reach, covering 220 countries and offering a wide range of services in 100,000+ cities and towns. Company reported first full year of profitability in 2022 with operating margins of 21.5%.

2. DCF Valuation

Assumptions:

The Assumptions						
	Base year	*In 2023*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues as % of Gross Bookings	13.29%	13.50%			15.00%	Maintain the ratio in 2023 and will see marginal improvement with the continuing econmies of scale in new markets
Operating margin (b)	21.45%	21.5%			30.00%	Contuinue the current margins and improve overtime like a matured platformn business like Booking.com
Tax rate	4.80%	0.00%			25.00%	Global/US marginal tax rate, after NOLs are used up.
Reinvestment (c)		Sales to Capital =	2.50		38.76%	Low as it doenst invests in properties. It will continue to acquire other companies though
Return on capital	NM	Marginal ROIC =	83.49%		9.70%	Has generated more cash than raised, so the negative number is not meaningful (NM), but can generate high return compared to industry for next 10 years
Cost of capital (d)			11.09%	9.70%	9.70%	Cost of capital moves down over time

The DCF model for Airbnb assumed that the company would experience a growth rate of 20% in the next year, which is a decline from the rapid growth rate seen during the COVID pent-up demand period in 2022. Additionally, the model predicted a growth rate of 15% for years 2 to 5 and growth eventually declining to the risk-free rate after year 10. In terms of operating margin, the model predicted that Airbnb would continue with its current margins of 21.5% and improve over time to reach a matured platform business like Booking.com, with margins of 30%. These assumptions were made based on the expectation that Airbnb would continue to improve its platform over time and increase profitability as it matures. Other assumptions are detailed in the table above.

Cash Flows and Valuation:

The Cash Flows						
	Gross Bookings	*Revenues*	*Operating Margin*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 75,854.40	$ 10,240	21.50%	$ 2,202	$ 737	$ 1,465
2	$ 87,232.56	$ 12,104	23.63%	$ 2,859	$ 745	$ 2,114
3	$ 100,317.44	$ 14,107	24.69%	$ 3,483	$ 801	$ 2,681
4	$ 115,365.06	$ 16,440	25.75%	$ 4,233	$ 933	$ 3,300
5	$ 132,669.82	$ 19,154	26.81%	$ 5,136	$ 1,086	$ 4,050
6	$ 149,587.88	$ 21,877	27.86%	$ 6,096	$ 1,089	$ 5,007
7	$ 165,300.59	$ 24,485	28.93%	$ 7,084	$ 1,043	$ 6,041
8	$ 178,947.80	$ 26,842	30.00%	$ 8,053	$ 943	$ 7,110
9	$ 189,698.99	$ 28,455	30.00%	$ 8,536	$ 645	$ 7,891
10	$ 196,831.67	$ 29,525	30.00%	$ 8,857	$ 428	$ 8,429
Terminal year	$ 204,232.54	$ 30,635	30.00%	$ 6,893	$ 2,672	$ 4,221

The Value		
Terminal value	$ 71,060	
PV(Terminal value)	$ 25,779	
PV (CF over next 10 years)	$ 24,445	
Value of operating assets =	$ 50,224	
Adjustment for distress	$ 1,256	Probability of failure = 5.00%
- Debt & Minority Interests	$ 1,987	
+ Cash & Other Non-operating assets	$ 9,622	
Value of equity	**$ 56,603**	
- Value of equity options	$ 2,177	
Number of shares	674.00	
Value per share	$ 80.75	Stock was trading at = $119.90

Based on the current share price of $119.90, the share is trading at a premium of 48.5%

Operating Margin and Terminal Growth Sensitivity:

	Operating Margin					
Terminal Growth	15.00%	20.00%	25.00%	30.00%	35.00%	40.00%
2.00%	$45.41	$56.32	$67.23	$78.13	$89.04	$99.95
3.00%	$46.06	$57.24	$68.42	$79.60	$90.79	$101.97
4.00%	$46.72	$58.18	$69.65	$81.12	$92.59	$104.05
5.00%	$47.40	$59.16	$70.91	$82.67	$94.43	$106.19
6.00%	$48.10	$60.16	$72.22	$84.27	$96.33	$108.39
7.00%	$48.82	$61.19	$73.55	$85.92	$98.29	$110.65

Running a sensitivity analysis based on operating margin and the terminal growth rate, we found that the operating margin after year 10 is the most important factor. At terminal growth rate of 4%, the target price is $81.1 at operating margin of 30% and this drops to $46.7 if the operating margin is 15%. So, our DCF is very sensitive to the operating margin assumptions. The company has demonstrated 21.5% operating margin in 2022 so we assume that it is moving towards a matured platform like Booking.com and can achieve 30% margin in 10 years but this is a critical assumption in our valuation.

3. Relative Valuation

To conduct a comparable company analysis, we screened companies classified as "Online Hotel Booking Services" doing business globally. Since Airbnb is a technology platform company, we chose **EV / Last year Sales** and **Operating profit in Year 2025** as we saw that the valuation for platform company like Airbnb is very sensitive to operating profit. We took Year 2025 for operating profit as not many companies are profitable today. Then we clean the raw 1) Drop all the companies with a market capitalization of less than $100 million because smaller companies are not comparable to Airbnb. 2) Removed all the companies which are not expected to generate positive operating margin by 2025. Finally, we checked the list and confirmed that these companies represent online business as Airbnb, We ran the regression on these 14 selected companies and the results are summarized below.

Regression Statistics	
Multiple R	0.789175843
R Square	0.622798511
Adjusted R Square	0.591365054
Standard Error	2.571479891
Observations	14

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.422637215	1.214074198	0.348114815	0.733784484
X Variable 1	29.00491686	6.51619269	4.451206132	0.000791201

The R square was 0.79 and adjusted R square was 0.59, suggesting reasonable explanatory power for multiple regression. Using the above regression, we found that EV/Sales = 0.4226 + 29.004* 2025 EBIT margin = 9.12x for Airbnb. This gives a equity value of today at $82,115 or share price of $121.79

4. Market Valuation

Given Airbnb is a global technology platform company, we used EV/Sales regression for global market.

EV/Sales = 2.32 + 2.60 g + 10.6 Oper Margin - 1.40 DFR- 3.5 Tax rate

So Aibnb should be valued at:

EV/Sales = 2.32 + 2.60 * (15.98%) + 10.6 * (21.5%) - 1.40 * (2.42%) – 3.5 * (4.8%) = 4.81x

This implies a stock price of $59.97, compared to current trading price of $119.90 suggesting that Airbnb is trading at a premium of 100%

5. Option Value

For Airbnb, there is optionality in the platform because they have a large and growing user base that provides valuable data about user preferences and behavior. This data can be leveraged to develop new products and businesses, such as expanding into other travel-related services or even into non-travel related areas. Airbnb has been experimenting with different revenue streams, such as experience, however, Airbnb has not done particularly well in the experiences space, and it is difficult to quantify the value of these options. Therefore, while there may be some optionality in the platform, it may not add a significant amount of value to the overall valuation.

6. Final Analysis

Airbnb's business model is very strong and proven in many countries. The company is on track to be the top player in the hotel industry, as its asset light model with the networking effect enables faster growth. There is a lot of room for further growth for at least next 10 years with the entry in new markets and expansion in the current ones. As Airbnb is a high growth company which reported first full year of profitability in 2022, we believe that intrinsic valuation best captures the value of the shares. Based on our DCF analysis (intrinsic value = $80.75), we estimate that the share is currently overvalued at $119.90 per share and we recommend "Sell".

MTN Nigeria Communications Plc (NSE: MTNN)

Investment recommendation: Buy

Target Price: N347.40

Current Price: N229.00

1. Company Overview

MTN Nigeria was incorporated on November 8, 2000 as a private limited liability company. It was granted a license by the Nigerian Communications Commission to undertake the business of building and operating GSM Cellular Network Systems and other related services nationwide. The company went public on the Board of the Nigerian Stock Exchange on 16 May 2019. MTN revenues come from its principal activities which are the provision of broadband fixed wireless access service and high-quality telecommunication services. It is a market leader within its industry with a market share of ~38% and more than 70M subscribers on its network.

2. DCF Valuation

The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	NGN 2,011,935.00	15.00%	13.00%		6.07%	Revenues will keep growing at a CAGR of 14% for the next 5 years, (slightly lower than the recent growth trends of >20% but still high growth) and will gradually slow down to risk free rate. Factors that will drive revenue growth in near future are: Significant increase in data revenues due to increase in MTN's 5G/4G LTE coverage and per user consumption; Increase in market share due to superior service delivery; Upward review of voice, sms and data tariffs in response to high inflation.
Operating margin (b)	38.02%	35.0%			30.00%	Margins are maintained close to historical levels
Tax rate	32.64%		32.64%		30.00%	From effective to marginal tax rates over time
Reinvestment (c)		0.4	33.00%	32.00%	37.94%	Maintained at current level
Return on capital	35.28%	Marginal ROIC =	81.92%		16.00%	Strong competitive edge: widest network coverage in the country; superior service delivery & efficient utizilation of existing infrastructure (MTN has buit a massive cloud infrastucture over time and this is now being outsourced to enterprises and contributing to the botton line)
Cost of capital (d)			13.38%		12.00%	Median emerging market cost of capital. It is a reasonable estimate when compared to their bond yield rate and cost of equity

Key Assumptions:

- I have assumed that revenues will keep growing at a CAGR of 14% for the next 5 years, (slightly lower than the recent growth trends of >20% but still high growth) and will gradually slow down to risk free rate. Factors that should drive revenue growth in near future are: Significant increase in data revenues due to increase in MTN's 5G/4G LTE coverage and per user consumption; Increase in market share due to superior service delivery; Upward review of voice, SMS and data tariffs in response to high inflation.

- I assumed that operating margins will be maintained close to historical levels and that the Management will continue to reinvest at current levels.
- I assumed that they will continue to raise capital at the median emerging market cost of capital.

Cashflows and Valuation

The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	NGN 2,313,725.25	35%	NGN 809,803.84	NGN 545,483.86	NGN 75,447.56	NGN 470,036.30
2	NGN 2,614,509.53	34%	NGN 888,933.24	NGN 598,785.43	NGN 85,938.37	NGN 512,847.06
3	NGN 2,954,395.77	34%	NGN 989,722.58	NGN 666,677.13	NGN 97,110.35	NGN 569,566.78
4	NGN 3,338,467.22	33%	NGN 1,101,694.18	NGN 742,101.20	NGN 109,734.70	NGN 632,366.50
5	NGN 3,772,467.96	33%	NGN 1,226,052.09	NGN 825,868.69	NGN 144,666.91	NGN 681,201.77
6	NGN 4,210,602.39	33%	NGN 1,398,305.66	NGN 949,281.74	NGN 146,044.81	NGN 803,236.93
7	NGN 4,641,262.80	32%	NGN 1,504,087.98	NGN 1,029,036.83	NGN 143,553.47	NGN 885,483.36
8	NGN 5,051,643.26	32%	NGN 1,596,550.62	NGN 1,100,725.86	NGN 136,793.49	NGN 963,932.37
9	NGN 5,428,293.78	31%	NGN 1,672,038.78	NGN 1,161,598.78	NGN 125,550.17	NGN 1,036,048.61
10	NGN 5,757,791.21	30%	NGN 1,727,337.36	NGN 1,209,136.15	NGN 109,832.48	NGN 1,099,303.68
Terminal year	NGN 6,107,289.14	30%	NGN 1,832,186.74	NGN 1,282,530.72	NGN 486,560.09	NGN 795,970.63

The Value		
Terminal value (in millions)	NGN 13,422,776.18	
PV(Terminal value) (in millions)	NGN 3,966,496.36	
PV (CF over next 10 years) (in millions)	NGN 3,725,859.19	
Value of operating assets (in millions) =	NGN 7,692,355.55	
Adjustment for distress	NGN -	Probability of failure = 0.00%
- Debt & Minority Interests (in millions)	NGN 1,417,157.00	
+ Cash & Other Non-operating assets	NGN 787,618.00	
Value of equity (in millions)	**NGN 7,062,816.55**	
- Value of equity options (in millions)	NGN 1,631.07	
Number of shares (in millions)	20,325.70	
Value per share	NGN 347.40	Stock was trading at = NGN 229.00

Based on this DCF valuation, MTN Nigeria shares are trading at a discount of 34% at the current market price of N229.

Sensitivity Analysis

		WACC				
		10.00%	**11.00%**	**12.00%**	**13.00%**	**14.00%**
Terminal Growth	**4.00%**	NGN 348.63	NGN 319.06	NGN 296.91	NGN 279.70	NGN 265.95
	5.00%	NGN 387.91	NGN 346.86	NGN 317.57	NGN 295.63	NGN 278.58
	6.00%	NGN 446.82	NGN 385.78	NGN 345.13	NGN 316.11	NGN 294.37
	7.00%	NGN 545.01	NGN 444.17	NGN 383.70	NGN 343.42	NGN 314.67
	8.00%	NGN 741.39	NGN 541.47	NGN 441.56	NGN 381.65	NGN 341.74

I performed a sensitivity analysis on the cost of capital and terminal growth rate to observe how changes in both values would impact the value per share. From my analysis, a 2% decrease in terminal growth rate coupled with a 2% increase in cost of capital will still leave the stock slightly undervalued by ~12%.

3. Relative valuation

To perform a comparative analysis, I selected a sample of companies similar to MTN Nigeria using the following criteria:

- operating in the same primary industry, Wireless Telecommunication Services
- operating in the same geographical region, Africa and the Middle East
- with revenues between 1000M – 20000M USD

Regression Statistics	
Multiple R	0.48153871
R Square	0.23187953
Adjusted R Square	0.12713583
Standard Error	12.4512564
Observations	26

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	1.92348279	5.56605772	0.34557363	0.73294572
Debt ratio(DFR)	-11.053502	13.7747493	-0.8024467	0.43087833
g	16.1968191	18.5049087	0.8752715	0.39088229
ROIC	83.556115	47.7831821	1.74865112	0.094293

The resulting ratio was EV/Invested Capital = 1.92 + 16.2g + 83.56ROIC – 11.05DFR with an R-squared of 23.2%. The low R-squared may be indicative of the fact that even though these companies are similar in size and market, the scope and dynamics of their individual operations are vastly different results. Applying the resulting ratio to MTN Nigeria, we arrive at an EV/IC of 31.1 and value per share of ₦2203.77 implying a 90% discount at current market price.

4. Market valuation

Using the EV/Invested Capital regression ratio derived for emerging markets with an R squared of 58.4%;

EV/IC = 2.80 + 1.2g + 4.00ROIC – 2.90DFR

EV/IC (MTN) = 2.8 + 1.2(0.134) + 4(0.3528) – 2.9(0.228) = 3.7108

EV (MTN) = N5,419,953M

Therefore, value of equity in common stock is N4,788,783M and the value per share, N235.60 This implies that relative to the current market price of N229, MTN Nigeria shares are trading at a discount of 3%.

5. Final Analysis

My investment recommendation for MTN Nigeria is a BUY based on the results of the DCF valuation of N347.40 per share. MTN Nigeria is a company that has shown relentless growth in the 21 years of its existence. It has outdone competition by making significant investment over the years in the quality and expansiveness of its service; investments that are expected yield more fruits going into the future from their now advantaged position in the market.

MTN Nigeria is not a company performing at the level of the average company in emerging markets; it is an outlier, and so it understandable that the market valuation is coming in rather lower.

The Management of MTN has shown themselves to be very sound and have earned the trust of shareholders. For this reason, I believe that the market price will converge to the actual value in due time and am issuing a BUY recommendation.

Spotify Technology

Investment Recommendation: Sell
Target Price: $86.24
Current Price: $141.75

1. Company Overview

In 2018, Spotify went public, with a direct listing on the New York Stock Exchange. This move marked a significant milestone for the company and helped it to raise over $30 billion in market capitalization. Today, Spotify is one of the world's leading music streaming services, with over 345 million monthly active users across 170 countries. The company continues to innovate and expand, focusing on personalized recommendations, podcasting, and new markets like India and Africa.

2. DCF Valuation

The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	1296520.00%	12.00%	12.00%		3.76%	Spofity faces business disruption, ever chaning consumer preference changes in its multiple businesses. Its revenue is growing significantly but will stable after Year 10.
Operating margin (b)	-5.54%	2.0%			10.00%	Margins improve, aided by entry of emgerging market, diverse revenue streams & continued adoption of innovation, predicatable recoup of upfront investment
Tax rate	0.00%		0.00%		25.00%	Global/US marginal tax rate over time
Reinvestment (c)		5	5.5	6	38.76%	Maintined at Sptify's current level
Return on capital	-80.05%	Marginal ROIC =	117.99%		9.70%	Stronge competitive edges and adoption of innovation gurantee Spotify's retun of capital.
Cost of capital (d)			12.45%		9.70%	Cost of capital close to median company

Through its dedication to providing a high-quality, legal music streaming service, Spotify has revolutionized the music industry and changed the way people consume music. However, competition in the music streaming services intensifies as many players emerge in the past few years, including Amazon Music, Youtube Music, Apple Music etc, Spotify has continuous listener expansion and revenue increase. Different players satisfy different consumer prefenrences, geograhies, and music consuption behaviors. Besides, Spotify's stock has been skyrocketing over the pasy year without new impressive features and strong differentiating points. Based on those factor, we expect its stock might fall or stay stagnant in the following years.

Cash Flows and Valuation:

The Cash Flows						
	Revenues	*Operating Margi*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 14,521.02	2%	290	$ 290	$ 311	$ (21)
2	$ 16,263.55	5%	846	$ 846	$ 317	$ 529
3	$ 18,215.17	7%	1,239	$ 1,239	$ 355	$ 884
4	$ 20,400.99	8%	1,714	$ 1,714	$ 397	$ 1,316
5	$ 22,849.11	10%	2,285	$ 2,285	$ 408	$ 1,877
6	$ 25,214.45	10%	2,521	$ 2,395	$ 394	$ 2,001
7	$ 27,409.12	10%	2,741	$ 2,467	$ 366	$ 2,101
8	$ 29,343.11	10%	2,934	$ 2,494	$ 322	$ 2,172
9	$ 30,929.98	10%	3,093	$ 2,474	$ 264	$ 2,210
10	$ 32,092.95	10%	3,209	$ 2,407	$ 194	$ 2,213
Terminal year	$ 33,299.64	10%	3,330	$ 2,497	$ 968	$ 1,529

The Value		
Terminal value	$ 25,747	
PV(Terminal value)	$ 8,575	
PV (CF over next 10 years)	$ 7,240	
Value of operating assets =	$ 15,815	
Adjustment for distress	$ -	Probability of failure = 0.00%
- Debt & Minority Interests	$ 1,898	
+ Cash & Other Non-operating assets	$ 3,530	
Value of equity	**$ 17,447**	
- Value of equity options	$ 803	
Number of shares	193.00	
Value per share	$ 86.24	Stock was trading at = $141.75

The $86.24 valuation indicates that Spotify is currently overvalued as it is trading at $141.75.

Below are the sensitivity analysis results, which demonstrate different valuation prices based on varying operating margins and terminal growth rates. Running a sensitivity analysis based on operating margin and the terminal growth rate, we found that the operating margin after year 10 is the most important factor. Below are the sensitivities.

		Operating Margin ==> After Year 10				
		6.00%	**8.00%**	**10.00%**	**12.00%**	**14.00%**
Terrminal Growth	**2.00%**	$49.15	$66.24	$83.33	$100.42	$117.51
	3.00%	$50.01	$67.49	$84.96	$102.44	$119.91
	4.00%	$50.91	$68.78	$86.65	$104.52	$122.39
	5.00%	$51.83	$70.10	$88.38	$106.66	$124.93
	6.00%	$52.78	$71.47	$90.16	$108.86	$127.55
	7.00%	$53.75	$72.88	$92.00	$111.12	$130.25

3. Relative Valuation

As Spotify is an industry specifically categorized as Multimedia Streaming Service.
For the comparable company analysis, we screened the global companies in the same category and filtered by Total Enterprise Value greater than 10 million US dollars. The total dataset is 28 companies, including Spotify Technology.

The multiple analyzed is EV/Sales, which we believe is appropriate for the industry. The equation and regression table are shown below.
The expected EBIT margin in 2025 is 6.8%, and we apply this value to the formula and get the ultimate multiple.

EV/Sales = 1.886+0.057*EBIT Margin = 1.886+0.057*6.8 = 2.27

Regression Statistics	
Multiple R	0.54515287
R Square	0.29719165
Adjusted R Square	0.27016056
Standard Error	1.35781001
Observations	28

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	1.88565897	0.26139572	7.21380971	1.16E-07
X Variable 1	0.05739915	0.01731087	3.3157862	0.00269978

The R^2 of the regression was 0.3, suggesting modest explanatory power. Additional variables failed to achieve the necessary t-statistic threshold for inclusion. These findings imply that Spotify Technology should trade at an EV/Sales ratio of approximately 2.27x , yielding a share price of $152.66.

4. Market Valuation

EV/Invested Capital= 3.53 + 1.30 g + 7.30 ROIC – 4.20 DFR

g= 12%
ROIC= 32.35%
DFR= 0.266

Applying those values, we get the multiple is 4.9x, and the price of a share is $45.7.

5. Final Analysis

Despite fierce competition in music streaming services, Spotify's current stock price of $141.75 is overvalued. The comparable company analysis did yield a per-share value higher than Spotify's current share price, however, the low r-squared associated with the model suggests the results should not be relied upon. As Spotify is a high growth company without good comparables available, we believe that intrinsic valuation best captures the value of the shares. Based on our DCF analysis (intrinsic value = $86.24), we estimate that the share is currently overvalued at $141.75 per share and we recommend "Sell"

Tencent Holdings Limited

Investment Recommendation: Buy

Target Price: $438.31

Current Price: $342.8

1. Company Overview

Tencent, founded in 1998 by Pony Ma, is a Chinese multinational technology conglomerate headquartered in Shenzhen, China. As one of the world's largest technology companies, Tencent specializes in various internet-related services and products, including social media, gaming, digital advertising, and cloud computing. The company operates some of China's most popular platforms such as WeChat, QQ, and Tencent Cloud. With a strong presence in the global gaming industry through investments and acquisitions, Tencent has become a dominant player, catering to a vast user base. Its commitment to innovation and strategic partnerships has cemented its position as a global tech leader.

2. DCF Valuation

The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	63319030.00%	20.00%	13.00%		5.00%	After several lockdowns in 2022, the growth is expected to rebound in 2023. In 2-5 years, Tencent is expected to grow at the industry average level because of the Chinese government's attitude to big techs. In the long run, the growth would be slightly higher than the GDP growth of China because of its high-tech nature.
Operating margin (b)	24.03%	24.6%			27.00%	Tencent has a diversified product portfolio across social media, value-added services, advertising, gaming, fintech, SaaS, etc. But due to the political risks, the terminal growth rate refers to the weighted average of comparable companies from these sectors in the U.S. with a 10% discount.
Tax rate	10.23%		10.23%		25.00%	Tencent has had an extremely low effective tax rate in the last three years. But it's not sustainable considering the 25% marginal tax rate in China.
Reinvestment (c)		1	1	1.5	33.33%	Tencent will gradually get benefits from aggressive investment in new technologies and emerging markets
Return on capital	12.05%	Marginal ROIC =	35.93%		15.00%	Tencent has dominant competitive advantages across several segments in China's technology industry
Cost of capital (d)			11.11%		7.94%	The risk free rate is low because of China's low government bond rate and low currency risk. But the software sector has a quite high beta. In the long run, the cost of capital declining to median.

Tencent has built its moat with social media, advertising, gaming, fintech, and SaaS leader in China. And it continues to solidify its leading status in China internet and technology industry by developing new cutting-edge technologies, investing in promising startups, and expanding into global markets. Tencent has built its moat with social media, advertising, gaming, fintech, and SaaS leader in China. And it continues to solidify its leading status in China internet and technology industry by developing

new cutting-edge technologies, investing in promising startups, and expanding to more segments. But as the company becomes huge mature, Tencent must keep investing to maintain its growth. The biggest cloud over Tencent's head may not come from business challenges and technological disruptions but from the Chinese government's attitude and actions toward big tech companies.

The Cash Flows						
	Revenues	*Operating Margi*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$ 759,828.36	25%	186,918	$ 167,787	$ 126,638	$ 41,149
2	$ 858,606.05	25%	215,796	$ 193,710	$ 98,778	$ 94,932
3	$ 970,224.83	25%	246,437	$ 221,215	$ 111,619	$ 109,596
4	$ 1,096,354.06	26%	281,398	$ 252,597	$ 126,129	$ 126,468
5	$ 1,238,880.09	26%	321,283	$ 288,400	$ 95,017	$ 193,383
6	$ 1,380,112.42	26%	361,589	$ 313,904	$ 94,155	$ 219,749
7	$ 1,515,363.44	26%	401,066	$ 336,331	$ 90,167	$ 246,163
8	$ 1,639,623.24	27%	438,326	$ 354,632	$ 82,840	$ 271,793
9	$ 1,747,838.37	27%	471,916	$ 367,873	$ 72,143	$ 295,730
10	$ 1,835,230.29	27%	495,512	$ 371,634	$ 58,261	$ 313,373
Terminal year	$ 1,926,991.80	27%	520,288	$ 390,216	$ 130,072	$ 260,144

The Value		
Terminal value	$ 8,848,432	
PV(Terminal value)	$ 3,365,277	
PV (CF over next 10 years)	$ 990,094	
Value of operating assets =	$ 4,355,371	
Adjustment for distress	$ -	Probability of failure = 0.00%
- Debt & Minority Interests	$ 501,158	
+ Cash & Other Non-operating assets	$ 328,700	
Value of equity	**$ 4,182,913**	
- Value of equity options	$ 14,133	
Number of shares	9,511.10	
Value per share	$ 438.31	Stock was trading at = $342.80

The $438.31 DCF valuation result suggests that Tencent's current stock price $342.8 is undervalued. Running a sensitivity analysis based on the initial WACC and the terminal growth rate, we found that the terminal growth rate is the most important factor. As the terminal growth rate decreases to 3% or below, the stock becomes overvalued. And Tencent also tends to be overvalued when the cost of capital increases to 12% and above. But this scenario could be very rare since Tencent is one of the largest tech firms globally and it's listed in the Hong Kong Exchanges.

		Operating Margin				
		23.00%	**25.00%**	**27.00%**	**29.00%**	**31.00%**
Terminal Growth	**3.00%**	$270.50	$295.11	$319.73	$344.34	$368.95
	4.00%	$308.56	$336.61	$364.66	$392.70	$420.75
	5.00%	$371.09	$404.70	$438.31	$471.92	$505.52
	6.00%	$495.79	$540.37	$584.95	$629.53	$674.12
	7.00%	$880.86	$959.06	$1,037.25	$1,115.45	$1,193.65

3. Relative Valuation

To conduct a comparable company analysis, a screen of companies classified as Interactive Media and Services doing business globally was used. Since Tencent is a technology company, we chose EV / Sales as the best multiple. We also pick the factors that Prof. Damodaran used in the market regression.

Then we clean the raw data following these steps: 1) Drop all the companies with a market capitalization of less than $1 billion because smaller companies are not comparable to Tencent. 2) Set a marginal tax rate for those companies without an effective tax rate due to negative earnings and other reasons. 3) Remove those without an analyst estimated revenue growth because we don't have the resources to accurately estimate these companies.

Finally, we checked the list and confirmed that these companies represent a diversified business portfolio as Tencent, they have a similar risk profile from the credit rating perspective, and the list has a decent global presence. We ran the regression and the results are summarized below.

Regression Statistics	
Multiple R	0.867788448
R Square	0.753056791
Adjusted R Square	0.72953839
Standard Error	4.259858784
Observations	47

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	6.029443398	1.840932311	3.275211893	0.002120308
Revenue Growth	0.256819706	0.029486184	8.709831921	5.86E-11
Operating Margin	0.049531412	0.031325783	1.58117073	0.121341484
DFR	-0.118397995	0.056744391	-2.08651449	0.043041576
Tax Rate	-0.052921012	0.048569613	-1.08959099	0.282105689

The adjusted R square is 0.73, suggesting quite strong explanatory power for multiple regression. Consistent with our perception of technology company valuations, revenue growth is the most significant factor with a high t Stat. The result suggests that Tencent should trade at an EV/Sales ratio of approximately 9.06x, implying $583.67 per share. It means that the stock was undervalued by 41% compared to its peer group.

4. Market Valuation

Given Tencent is a technology company with global presence, we used the EV/Sales regression for global market.

EV/Sales = 2.68 + 2.50 g + 8.10 Oper Margin + 2.10 DFR- 5.10 Tax rate

It suggest that Tencent should be valued at:

EV/Sales = 2.68 + 2.50 * (14.37%) + 8.10 * (24.3%) + 2.10 * (11.01%) - 5.10 * (10.23%) = 4.69x

This implies a stock price of $292.93, suggesting that Tencent was overvalued by 18%. The result is not a big shock as technology companies tend to be overvalued compared to the whole market.

5. Final Analysis

The turmoil of macro factors such as the pandemic and politics has bothered Tencent in the last three years. But WeChat still has over 1.3 billion monthly active users. It is the most used super-app and the only messenger/social media platform focusing mainly on one market. In terms of revenue, Tencent is the largest company in the largest sector of the media industry, gaming. It's also a leading SaaS provider in China. Fundamentally, Tencent's competitive advantages are still supporting its operating margin and growth. Considering that the market regression result ($292.93) may not be a good estimate for a big tech, we think the relative valuation ($583.67) generated by a high-R square regression and the FCFF-based intrinsic valuation ($438.31) are better estimates of Tencent. After its stock price fell more than 55% from its highs two years ago, we think Tencent shares are **undervalued** and give Tencent a **Buy** at the current price.