Equity Valuation

May 9, 2022

Company	Ticker	Recommendation	Intrinsic Value	Relative Value
AirBnB	NASDAQ: ABNB	SELL	$53.38	$69.48
SAP	NYSE: SAP	BUY	€124.53	€150.36

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Equity Valuation
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AirBnB (NASDAQ: ABNB)
Hospitality, Internet Software (Services)

May 2023 | Recommendation: SELL | Purab Angreji

I. Company Overview

Airbnb is an online marketplace for users to list, find, and book accommodations. Founded in 2008, the company quickly disrupted the hospitality industry as users elected to use the more intuitive, affordable, and customizable experience Airbnb offers compared to the incumbents in the industry. The company operates in every continent with most of its revenue (~80%) coming from North America and Western Europe. Airbnb earns revenue by taking a commission on each booking. Originally offering only rental services, Airbnb has expanded to offering travel experiences which make up a very small portion of its listings. The company IPO'd in December 2020 for $68/share and is trading today (May 6, 2023) for $120/share.

II. My story for the company and its future

Airbnb, despite not being the first company of its kind in the industry, became the most recognized platform to spearhead disruption in the hospitality industry. Airbnb reported positive earnings since 2017 even through COVID. Despite seeing a drop in earnings during the COVID years, the company effectively navigated the environment where competitors did not and saw 70% revenue growth coming out of the pandemic. I expect this revenue growth to carry through the next few years as Airbnb solidifies its market share.

The growth in revenue will come specifically from investments into and growth of the experience offerings, expanding into developing markets, and consistent growth of listings in domestic markets. Regarding a consistent growth of listings in domestic markets, the customer attitudes regarding hospitality are favorable to Airbnb today. With users electing to use the cheaper service compared to hotels, and travel rebounding after COVID, Airbnb sees strong customer retention. Regarding product development, which Airbnb invests heavily into, Airbnb's CEO is looking to enhance the service with AI. While many firms use AI as a buzzword to draw investments, Airbnb seems to be investing heavily into the technology which may spike revenues in coming years. With high reinvestment rates, strong operating margins, and relatively low tax rates, Airbnb should be seeing a strong long-term valuation. However, I believe the poor long term competitive positioning makes this company overvalued.

Too large a chunk of Airbnb's bookings (23%) is listed by a few property managers. This means that eventually, when the property managers start competing with Airbnb or can list bookings on other sites, Airbnb will lose a significant user base from both ends of the 2-sided marketplace. In the valuation, this equates to a low ROIC compared to what it could be. Moreover, Airbnb faces regulatory hurdles as well. Some states have heavily regulated which markets Airbnb can enter to protect housing markets in cities and densely populated regions. Regulation has been a greater concern for Airbnb especially after reputational issues regarding unethical property management practices (hidden cameras) by their listers. Stricter regulation could severely hinder Airbnb's profitability in the long term as variable costs per listing may increase. I represent this in the intrinsic valuation through the converging operating margin of 12% compared to an expected 20% or even 30% many software companies enjoy. These issues hinder Airbnb's growth and make it overvalued.

III. Discounted Cash Flow Valuation

Airbnb	Mar-23
High Growth, High Profitability, still overrated	
Much like Uber, Airbnb delivers and operates an online marketplace for suppliers and guests which, in the way Uber disrupted the taxi industry, disrupted the hospitality industry. After COVID, Airbnb saw a 90% growth in revenue which I expect to continue at least partially into next year but should plateau thereafter. With a significant rise in competition, their market share will decrease but with more hotel guests turning to online accommodation marketplaces, their short term growth will likely not be threatened. Although the company is profitable and has strong sales to capital ratios, the growth rate and potential market cap of the company I believe is a lot lower than the market expects. Especially after the bear cave short report that came out last week, investors are becoming increasingly wary of Airbnb's long term potential. The report outlines how 23% of the available listings in the short-term market come from only a few property managers who will eventually end up competing with Airbnb. Despite having the brand name and the market share, the rise of competitors with the same value proposition will dilute Airbnb's market share. Because of this, my sales growth projections and profit margins for Airbnb are lower than the market would expect while the discount rate is higher. These discrepancies reduce the terminal value of the company and show that Airbnb is **overvalued.**	

The Assumptions						
	Base year	Next year	Years 2-5	Years 6-10	After year 10	Link to story
Revenues (a)	$8,399.00	35.0%	25.00%		3.38%	Airbnb began as a disruption platform in the hospitality business changing the way travel and accommodations were provided. As the biggest name now in the online hospitality marketplace, Airbnb sees revenue growth along with similar competitors as traditional accommodation providers, like hotels and bed and breakfasts, lose market share. AirBnB, unlike many competitors, was able to navigate COVID pretty well seeing 70% revenue growth in 2019, revenue losses in 2020 but 40% revenue growth in 2022 with the rebound. I expect the growth rate to at least carry a bit of the momentum from last year through next year and slow down over the next 10 years as the industry matures and competitors solidify their stake in the market.
Operating margin (b)	22.83%	24.0%			12.00%	Because Airbnb is an online marketplace it already had relatively little operating costs compared to traditional hospitality service providers. Especially because of COVID, Airbnb had to reduce its fixed and variable costs such as reduction of discretionary marketing program spend, full-time employee headcount, and capital expenditure. This, however, did not seem to impact revenue resulting in a higher operating margin this year compared to previous years.
Tax rate	5.00%		5.00%		21.00%	Airbnb had an effective tax rate of 5% in 2022 increased from 2021 due to increased profitability. As growth stabilized and the company matures, the effective tax rate will likely stabilize at the US corporate tax rate assuming consistent profitability.
Reinvestment (c)		4.70	4.00	2.00	28.17%	Airbnb has a relatively high reinvestment rate compared to hotels due to the nature of its growth. As a relatively young company, Airbnb has and will likely continue to invest heavily into product development, market expansion abroad, and customer acquisition.
Return on capital	60.37%	arginal ROIC	23.65%		12.00%	Airbnb maintains a competitive advantage in the market due to its brand recognition and related network effects. Given this advantage, Airbnb may be able to more efficiently invest capital. Moreover, with it's asset-light business model, Airbnb can generate high profit margins over the next 10 years. As the competitive advantage fades, the ROIC will converge to the ROC.
Cost of capital (d)			12.84%		9.32%	The company's cost of capital is most influenced by its cost of equity which is weighted far more than its cost of debt. The cost of equity is based primarily on the equity risk premium determined by where Airbnb operates. Desipite operating globally, the majority of the revenues come from stable economies which have a relatively low CRP. Moreover, the slightly higher cost of capital can be attributed to the beta of 1.35 indicating that Airbnb is slightly more volatile than the market due to it being a relatively young company.

The Cash Flows						
	Revenues	erating Mar	EBIT	EBIT (1-t)	Reinvestment	FCFF
1	$11,338.65	24.00%	$2,721.28	$2,684.61	$625.46	$2,059.15
2	$14,173.31	21.60%	$3,061.44	$2,908.36	$708.67	$2,199.70
3	$17,716.64	20.40%	$3,614.19	$3,433.48	$885.83	$2,547.65
4	$22,145.80	19.20%	$4,251.99	$4,039.39	$1,107.29	$2,932.10
5	$27,682.25	18.00%	$4,982.81	$4,733.66	$2,768.23	$1,965.44
6	$33,405.83	16.33%	$5,455.55	$5,008.19	$2,861.79	$2,146.40
7	$38,868.36	15.25%	$5,926.78	$5,251.13	$2,731.26	$2,519.87
8	$43,543.44	14.17%	$6,168.17	$5,267.62	$2,337.54	$2,930.08
9	$46,898.03	13.08%	$6,135.57	$5,043.44	$1,677.29	$3,366.14
10	$48,483.18	12.00%	$5,817.98	$4,596.21	$792.58	$3,803.63
Terminal year	$50,121.91	12.00%	$6,014.63	$4,751.56	$1,338.36	$3,413.20

The Value			
Terminal value	$57,461.31		
PV(Terminal value)	$18,873.20		
PV (CF over next 10 years)	$13,972.40		
Value of operating assets =	$32,845.59		
Adjustment for distress	$1,149.60	Probability of failure =	5.00%
- Debt & Minority Interests	$2,888.09		
+ Cash & Other Non-operating assets	$9,656.00		
Value of equity	$38,463.91		
- Value of equity options	$2,164.22		
Number of shares	680.00		
Value per share	$53.38	Stock was trading at =	$120.00

IV. Relative Pricing

A. Multiple Selection

I selected EV/Sales as the best multiple to find an accurate relative market and sector valuation for Airbnb. This selection is because Airbnb is a relatively young company with high projected revenue growth over the next 10 years. EV/Sales is the best multiple to capture high growth unlike other multiples which capture accurate valuations based on current book values. After exploring factors of 2-year beta, total debt/cap ratio %, and return on cap %, I found 2-year estimated growth rate and EBIT margin % had the strongest correlation and were the best indicators of EV/sales. The regression found significant results with p-values < 0.05.

B. Sector Valuation

Airbnb, unlike other companies in the online hospitality industry, is an online marketplace that operates fundamentally differently from traditional hotels brands that have expanded online. Although they differ, using a list of comparable companies with hotels like Hilton and Marriott to other online marketplaces like Uber can draw an accurate picture of the industry Airbnb operates in. Using the sector analysis and plugging in the EBIT Margin % (0.225) and Estimated Growth Rate (14.5) Values to the equation:

EV/Sales=11.505*EBIT Margin % +0.24*Estimated Growth Rate

To arrive at an EV/Sales based on the sector regression of 6.08x. Compared to the EV/Sales ratio based on its earnings report (8.0x), the sector determined EV/Sales multiple is 24% less than expected. This comes out to a price/share of $90.52.

Equity V=EV/Sales*Sales-Debt+Cash=6.08*$8,399M-$3,368M+$9,622M=$57,392M

Price/Share=Equity V/Shares Outstanding=$57,392M/634M=$90.52

Regression Statistics	
Multiple R	0.93561023
R Square	0.8753665
Adjusted R Square	0.78885623
Standard Error	1.88011514
Observations	15

ANOVA

	df	*SS*	*MS*	*F*
Regression	2	322.750848	161.375424	45.652914
Residual	13	45.9528281	3.53483293	
Total	15	368.703676		

	Coefficients	*Standard Erro*	*t Stat*	*P-value*
Intercept	0	#N/A	#N/A	#N/A
LTM EBIT Margin %	11.5048701	1.67059225	6.88670143	1.1072E-05
Est. Annual Revenue Growth - 2 Yr % (Capital IQ)	0.24112477	0.03693699	6.52800273	1.918E-05

C. Market Valuation

Using the market regression to determine the EV/Sales ratio for Airbnb. In the equation:

EV/Sales=2.32+2.60*Est. Growth Rate+10.60*EBIT Margin-1.4*Debt/Cap-3.5*T Rate

I plugged in values for growth (0.145), EBIT margin (0.225), debt/capital ratio (0.293), and effective tax rate (0.05) to get an EV/Sales value of 4.50x which is 43% lower than the EV/Sales expected by the market. This comes out to a price/share of $69.48.

Equity V=EV/Sales*Sales-Debt+Cash=4.50*$8,399M-$3,368M+$9,622M=$44,049M

Price/Share=Equity V/Shares Outstanding=$44,049M/634M=$69.48

V. Valuation Estimate and Recommendation

Current Stock Price (5/6/23)	$119.90
Intrinsic Value Per Share	$53.38
Relative Value Per Share (Sector)	$90.52
Relative Value Per Share (Market)	$69.48
Recommendation	**SELL**

I recommend **selling** Airbnb. Given the recent Bear Cave short report, many investors have started taking a second look at investing in Airbnb. The change in attitude comes after being exposed to some of Airbnb's potential marketplace supply shortages and the impact of the reputational obstacles Airbnb faces frequently. Moreover, Airbnb will continue to lose market share as regulatory hurdles pound the company. While Airbnb will see high revenue growth, it will likely not match the market expectations reflected in the trading price. I recommend using the intrinsic value determined by the DCF to get an accurate picture of Airbnb's true value. If Airbnb can overcome the long-term hurdles, it may be worth a buy but with all 3 valuation methods indicating that the current price overvalues the company, I recommend **selling** Airbnb.

SAP SE (NYSE: SAP)
Enterprise Resource Planning (ERP), Business Analytics, AI & Machine Learning Capabilities

May 2023 | Recommendation: BUY | Leopold Rukavina

I. Company Overview

SAP SE is a German software company that provides enterprise software solutions to businesses worldwide. The company was founded in 1972 and has built a strong reputation for reliability, security, and innovation allowing it to become a leader in the enterprise software market. SAP's core markets are the Americas, EMEA, and APJ regions, generating 45%, 41%, and 11% of its revenues, respectively. The company has three main revenue streams: Cloud, Software Licenses and Support, and Services. SAP's products and services include flagship solutions like SAP S/4HANA and SAP SuccessFactors, which offer software capabilities for finance, risk and project management, procurement, manufacturing, supply chain and asset management, and human resources management. Companies use SAP's services because they offer a suite of software solutions that can be customized to meet their specific business requirements. SAP's business strategy is to offer software that help businesses streamline their operations, improve efficiency, and enhance decision-making by providing real-time data analytics and insights.

II. My story for the company and its future

SAP is well-known for its Enterprise Resource Planning (ERP) software, which helps companies manage their business processes such as accounting, procurement, sales, and inventory management. However, SAP also offers a wide range of other software products and services, including customer relationship management (CRM), human resources management (HRM), supply chain management (SCM), and data analytics solutions, among others. In recent years, SAP has shifted its focus towards cloud-based and AI-driven technologies, expanding its offerings beyond ERP.

SAP's success in the future will depend on its ability to provide innovative AI and Cloud-based technologies to its customers. The company's heavy investment in R&D allows it to continuously improve its software offerings and remain competitive in the market. With its recent focus on Cloud, AI, and Big Data, SAP is well-positioned to drive future growth through its existing capabilities. SAP's Cloud products already utilize AI technologies to drive efficiency and productivity, with SAP Leonardo offering customers machine learning algorithms and predictive analytics to generate real-time insights and drive business growth. The CoPilot assistant provides a conversational interface for users, while AI is integrated into SAP's analytics tools to enable accurate and real-time data analysis. Furthermore, AI-based applications such as SAP Cash Application and SAP S/4HANA Finance automate financial processes and enhance accuracy. In summary, SAP is ready to capitalize on the growing importance of AI and cloud-based technologies in the enterprise software industry by integrating these technologies into its products and services and helping its customers stay ahead of technological disruptions.

III. Discounted Cash Flow Valuation

In the enterprise software market, product differentiation is a crucial competitive factor. The company offers a broad range of services known for their quality, reliability, and scalability, which help differentiate them from their competitors. We believe that SAP's ability to implement AI technology in its products and services will significantly drive up demand, estimating revenue growth of 19.5% in the next year and 22.5% between years 2-5. SAP's Cloud business, which grew at 35% last year and is based on AI technologies, will primarily drive this growth.

SAP's history of reliability and quality has allowed it to form strong partnerships and client relationships with leading technology companies such as Microsoft, IBM, Google, and Amazon Web Services (AWS), as well as with consulting firms such as Accenture to develop and implement new solutions for its customers. SAP has invested heavily in R&D to develop innovative products that meet the changing needs of its customers while maintaining strict cost controls for profitability. Its resilient business model is based on recurring revenue streams such as software licenses and support or Cloud services that help maintain high profitability over time, enabling the company to charge premium prices. As a result, we believe that SAP can maintain these competitive advantages and generate an EBIT margin of 24% until it converges in year 6 to 22%.

SAP's effective tax rate was 44.7% in the recent year, but the company's management announced a decrease to 28%. This reduction in the effective tax rate increases the value of the respective annual FCFFs. Furthermore, we expect the sales to capital ratio to increase to 1.45 for the years 2-5, reflecting the lag between R&D (SAP's main reinvestment) and growth. SAP has a strong record of growing through successful R&D initiatives, allowing the company to be resilient against competitive market forces. Finally, the Detailed Cost of Capital approach calculates the discount rate, using the German 10-Y Bund Yield as the risk-free rate and SAP's current total beta of 1.01, implying almost perfect correlation with the market. The calculated discount rate of 8.61% for SAP is below the sector average, making it less risky than its competitors. Assuming a 0% probability of failure due to its track record in the technology sector for over 50 years and being Germany's largest publicly traded company by market capitalization, we obtain a share price of EUR 124.53.

SAP SE						May-23
Riding the Wave of AI Innovation and Cloud Technology						
SAP SE provides enterprise software solutions globally, with a focus on recurring revenue that supports stable cash flow and enables strategic investments in R&D. SAP's core revenue streams are: Cloud, Software Licenses and Support, and Services. SAP's services allow businesses streamline their operations, improve efficiency, and enhance decision-making.The German-based company has a strong track record of innovation in the tech sector and is well-positioned to capitalize on the growing demand for cloud-based software solutions and emerging AI technologies.						
The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$30,871.00	19.5%	22.00%		2.39%	SAP SE's P/E Ratio reached 60 this year (median i
Operating margin (b)	22.45%	24.0%			22.45%	Rising demand for innovative technology and strong existing customer base
Tax rate	28.00%		28.00%		26.07%	German marginal tax rate over time
Reinvestment (c)		1.21	1.45	1.30	28.68%	Growing reinvestment required for AI and Cloud
Return on capital	7.85%	Marginal ROIC =	29.97%		8.33%	Reinvestment to pay off due to R&D strength
Cost of capital (d)			8.61%		8.33%	Below industry median given company's maturity
The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	€ 36,890.85	€ 0.24	€ 8,853.80	€ 6,374.74	€ 4,994.39	€ 1,380.35
2	€ 45,006.83	€ 0.23	€ 10,569.10	€ 7,609.75	€ 5,611.22	€ 1,998.54
3	€ 54,908.33	€ 0.23	€ 12,752.46	€ 9,181.77	€ 6,845.69	€ 2,336.08
4	€ 66,988.17	€ 0.23	€ 15,384.95	€ 11,077.16	€ 8,351.74	€ 2,725.42
5	€ 81,725.56	€ 0.23	€ 18,558.51	€ 13,362.13	€ 11,321.25	€ 2,040.88
6	€ 96,499.75	€ 0.22	€ 21,664.19	€ 15,681.99	€ 11,349.51	€ 4,332.48
7	€ 110,159.87	€ 0.22	€ 24,730.89	€ 17,997.49	€ 10,493.68	€ 7,503.81
8	€ 121,432.97	€ 0.22	€ 27,261.70	€ 19,944.66	€ 8,659.98	€ 11,284.68
9	€ 129,096.84	€ 0.22	€ 28,982.24	€ 21,315.47	€ 5,887.38	€ 15,428.09
10	€ 132,180.97	€ 0.22	€ 29,674.63	€ 21,939.44	€ 2,369.22	€ 19,570.22
Terminal year	€ 135,338.77	€ 0.22	€ 30,383.55	€ 22,463.57	€ 6,443.21	€ 16,020.37
The Value						
Terminal value			€ 269,703.14			
PV(Terminal value)			€ 118,990.56			
PV (CF over next 10 years)			€ 36,806.54			
Value of operating assets =			€ 155,797.11			
Adjustment for distress			€ 0.00		Probability of failure =	0.00%
- Debt & Minority Interests			€ 19,078.18			
+ Cash & Other Non-operating assets			€ 9,861.00			
Value of equity			€ 146,579.92			
- Value of equity options			€ 1,249.50			
Number of shares			€ 1,167.00			
Value per share			€ 124.53		Stock was trading at =	€ 121.40

IV. <u>Relative Pricing</u>

A. <u>Sector Regression</u>

Since we wanted to benchmark the financial performances of mature companies, we selected firms with a market capitalization of $20 billion and used EV/EBITDA as the primary valuation metric. SAP's main competitors are Oracle, Salesforce, ServiceNow, and Microsoft. SAP's current EV/EBITDA multiple is 22.6x, which is significantly lower than the average of the comps set (31.5x) consisting of 21 other companies in the tech sector that are comparable in market capitalization, leverage ratio, and total beta. We ran descriptive statistics and a correlation for several important independent variables, including EBIT margin, Beta, Effective Tax Rate, Estimated Revenue Growth 2YR, and Return on Capital %.

First, we ran regressions against the individual independent variables to determine their statistical significance for the dependent variable, EV/EBITDA. This allowed us to isolate the independent variables and prevent collinearity from contaminating the regression results.Then, we ran a regression with the two individually most statistically significant risk and growth measures, which were Beta 1YR and EBIT Margin, respectively. The results of the individual regressions and the regression with both variables were similar, indicating low collinearity among the selected independent variables. Using the coefficients and the intercept of the regression, we arrive at the following formula: $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2$. β_0 represents the intercept, and β_1 and β_2 are the corresponding coefficients for LTM EBIT Margin and Beta 1 YR. Plugging in the respective numbers for the regression, we obtain an EV/EBITDA multiple of 30.02x implying a share price of EUR 150.36. Relative to the average EV/EBITDA multiple across the sector, SAP seems to be underpriced.

Regression Statistics	
Multiple R	0.5720564
R Square	0.32724853
Adjusted R Sq	0.25249837
Standard Error	27.7382205
Observations	21

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	6736.78591	3368.39295	4.37789717	0.02822877
Residual	18	13849.3598	769.408878		
Total	20	20586.1457			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	27.2299838	24.2739612	1.12177752	0.27669933	-23.767716	78.2276838	-23.767716	78.2276838
X Variable 1	-129.77474	55.9409511	-2.3198522	0.0323019	-247.30232	-12.247163	-247.30232	-12.247163
X Variable 2	25.1603139	15.9969716	1.57281731	0.13317329	-8.4480764	58.7687041	-8.4480764	58.7687041

B. Market Regression

The market regression is based on the formula EV/EBITDA formula for European companies from Prof. Damodaran's webpage, which is given by: EV/EBITDA= 19.78 + 8.00 g - 9.90 DFR - 13.60Tax Rate. The variable G uses the estimated growth rate of analysts for the next 5 years (6.1%), the DFR ratio is 0.176 and the effective tax rate is given as 28%. The resulting market multiple for EV/EBITDA is 14.71x, implying a value of EUR 71.76. Notably, there is a significant difference between the sector and market multiples, which may suggest that using market multiples for the technology sector may not be the most useful approach as SAP operates in a very specific market segment. Using a sector multiple allows for a more focused and relevant peer group for comparison, which can provide a more meaningful basis for valuation analysis.

EV/EBIDTA	14.71x		
EV	88127.61	Shares Outstanding	1167.00
MVof Equity	83748.61	**Price/Share**	71.76

V. Valuation Estimate and Recommendation

Many companies across industries will have to adopt AI and Cloud based technologies into their business models to stay competitive and take advantage of significant efficiency gains. We expect SAP to be a key partner in helping its customers realize efficiency gains using AI and Cloud-based software solutions that focus on reliability, security, and scalability. Thus, SAP is strategically well-positioned to grow its revenues significantly. SAP's Cloud Business, for which it recorded an impressive 35% revenue growth rate, together with its other growing AI-based solutions, will provide the main revenue stream in the future. SAP faces competition from players like Oracle, Salesforce, and Microsoft in the enterprise software market. However, the company invests heavily in R&D and formed strong partnerships and client relationships with other technology companies to maintain competitiveness. Based on the intrinsic valuation and the sector regression, we advise to **buy** SAP stock as the company is poised to capitalize on the growing adoption of AI and Cloud technologies. The intrinsic value is only marginally higher than the current stock price, however we believe that the market will continue to attach a premium to this value given SAP's ability to help companies navigate through the global business disruption caused by AI.

Current Stock Price (as of 5/6/2023)	€ 121.40
Intrinsic Value Per Share	€ 124.53
Relative Value Per Share (Sector)	€ 150.36
Relative Value Per Share (Market)	€ 71.76
Recommedation	BUY