

The Financial Modeling for Airbus by Free Cash Flow Model

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Abstract—An investment advice report for the company Airbus is presented in this document. The Free Cash Flow (FCF) model was the approach that carrying out this research. Various technologies provide Airbus with higher external value, while FCF brings Airbus with internal value. The report forecasts the next four years based on the analysis of the economic data of the previous four years. To make a prediction, the external value factors of the aircraft industry operated by Airbus are found. In addition, the FCF variable was evaluated, and the results showed that as of December 31, 2021, the equity value was 8.8 million, and in Weighted Average Cost of Capital, growth would affect the company's value and value of equity per share. This study also provides a scenario analysis that illustrates two scenarios: bullish and bearish, and their relative impact on the company's value and equity value. Then, the price earnings ratio, EV / EBIT, are used for comparative evaluation. The results show that Airbus is undervalued compared to its competitors. This study points out that the results of FCF method and relative valuation method can provide reference to investment recommendations of persons and institutions.

Index Terms—Free cash flow, financial modeling, airbus

I. INTRODUCTION

In 2020, international passenger traffic plummeted by 60%, bringing total air travel back to 2003 levels, and the Covid-19 pandemic has cost airlines \$370 billion losses. The decline in air traffic has crippled income streams, creating liquidity strains throughout the aviation industry's value chain, putting the sector's financial stability in doubt, and endangering millions of jobs globally [1].

Airbus is a leading designer, manufacturer, and provider of products, services, and solutions to more than 125000 customers worldwide. In 1960s, there was only hope of success in Europe if it combined the vast amounts of talent and expertise of various companies and countries to compete directly with Americans who make up more than 80% of the world market. As a result, Airbus came out [2]. Deliveries of aviation aircraft and helicopter orders provide most of their revenue. We can observe that the amount of airline purchases has significantly decreased over the last four years since the outbreak started in 2020. Therefore, making an accurate valuation for Airbus is of great significance to investors in the aviation industry, which can give them confidence and support the aviation industry.

This paper reviews the literature from two aspects, the research scope of enterprise value assessment. Another is the enterprise value assessment methods. There are two main methods of firm valuation, relative valuation, and absolute valuation (discounting cash flows). First, Because the relative valuation model is simple to use, analysts favored it over Free

Cash Flow (FCF) in the 1990s. In relative valuation, the value of an asset is contrasted with the market value assigned to similar assets. Prior to implementing relative valuation, we must first identify comparable assets and ascertain their market prices [3]. Since absolute prices cannot be compared, the next step is to convert these market values into the standardized values. Price multiples (EV/EBITDA, P/E, Price/Book) are produced because of this standardization process [4].

However, with increased competition in global markets, the relative valuation model is believed to be far less accurate than in early 1990s. The theory of enterprise valuation is developed from the theory of capital value. Fisher argues that the value of capital is the discounted value of future income, and further argues that the value of any asset derives from the right to generate expected monetary income [5]. By deriving its creation of arbitrage-free valuation theory and deduce the firm price when individual behavior is perfectly rational under complete capital market value evaluation model, namely discounted cash flow (DCF) model. After Miller development, the DCF model is developed into three comparisons mature models: discounted dividend model, discounted equity free cash flow model (FCFE model), public company free cash flow discounted model (FCFF model). Some scholars compared these three DCF models [6].

Rappaport proposed the concept of free cash flow in the 80s of the 20th centuries, cash generated by the enterprise, remaining after meeting the reinvestment needs, and without affecting the sustainable development of the company, can be distributed to the shareholders and creditors of the enterprise [7]. This view quickly gained popularity after being interpreted by McKinsey executives with specific formulas. Therefore, this paper presents how to use the FCF model to value the aviation company, Airbus, which produce a more accurate assessment, despite this model need more complex process.

II. DATA

The data was used to perform this valuation, from yahoo finance, Bloomberg which are professional sources. Meanwhile, the 4 years financial data from Annual Reports on airbus official website was also used to support the findings [2, 9–11]. The price of Airbus provided by Bloomberg on 8 August 2022, shows 26.88 EUR per stock. While, based on the formula we calculate, the number is 28.

A. Preliminary Financial Performance

The main purpose of this paragraph is to conduct a series of studies and summaries by modeling the sales and financial data of Airbus, by collecting the number of airline aircraft orders and deliveries of the company to calculate the growth rate of annual revenue. From this, the basis for sales growth

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is extracted. At the same time, the revenue growth rate and EBITDA are presented in the Table I, which to calculate the subsequent FCF model. Meanwhile, we can see the company has good debt repayment ability, which probably can give the investors stable income.

TABLE I: BALANCE SHEET OF AIRBUS

	12/30/2021	12/30/2020	12/30/2019	12/30/2018
Total Assets	107,047,000	110,095,000	114,409,000	115,198,000
Total Liabilities	97,561,000	103,639,000	108,419,000	105,479,000
Total Capitalization	21,069,000	18,989,000	12,866,000	16,880,000

B. Sales and Revenue

Airbus' sales are mainly supported by the delivery of orders for aviation aircraft helicopters, and the defense & space. From Fig. 1, it can be seen from the chart revenue is in a general state of steady growth from 2017 to 2021. Except for the impact of revenue from 2019 to 2020, the aviation

industry has suffered a serious decline in orders, which will lead to the aviation industry. The revenue of Airbus has basically remained at around 8% and steadily increased.

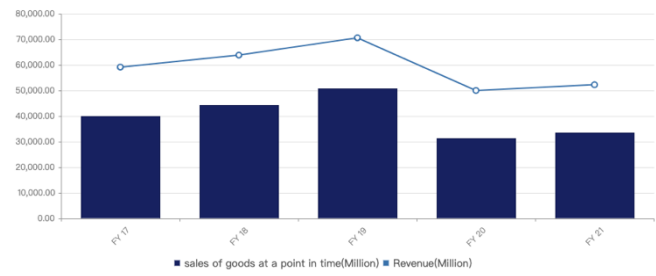


Fig. 1. Revenue.

The good performance, according to International Air Transport Association (IATA), and Chief Executive Officer of Airbus, was fueled by increased deliveries of commercial aircraft, strong results in the helicopter, defense, and space industries, as well as measures to manage costs, just like Table II shows [12].

TABLE II: AIRBUS DELIVERIES.

Year	2018	2019	2020	2021	2022	2023	2024	2025	changes
Airbus	800	863	566	611	674	737	800	863	63
Helicopters	356	332	300	338	320	302	284	272	(18)
Order book (in units)	1,156	1,195	866	949	994	1,039	1,084	1,135	-

The new crown outbreak has not yet totally subsided, and there may still be tensions in the supply chain, logistics, and labor. To sustain high levels of production and customer service, Airbus also looked ahead to important operational goals for 2022. Airbus has a 720-plane commercial delivery capacity. Investors typically think that this demonstrates Airbus's confidence in the future of the aviation industry.

III. METHODOLOGY

This section will explain why choose the FCF model utilized to value the company. As a publicly traded corporation, Airbus' annual report, other financial information available to the public, and yearly statistical data are all transparent and verifiable. It is mainly based on the flow and more suitable for the cash flow discount model. However, each possession has a its own worth. The valuation will be affected by any prejudices or preconceptions that a person brings to the appraisal process. The focus of a valuation analysis is on cash flow creation and its sustainability during the asset's lifetime [8].

A. FCF Model

If we use FCF to assess a company, then we must discuss DCF model, for it is included of that. The anticipated cash flows of an asset are the basis for a DCF value that is called discount cash flow model [13]. The method follows two principles: additional cash flow and the time value of capital in financing. This is a process in which the buyer and the seller obtain information and convenience by discounting the company value according to the free cash flow created by the company. Assets with high and predictable cash flow should be assigned higher value than those with low and uncertain cash flow [14]. Equation(1) is used to calculate the present

value of the predicted free cash flow.

$$Value = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} \quad (1)$$

where $CF = \text{expected cash flow in period } t$, $r = \text{discount rate}$.

Equation(1) contains three basic variables: enterprise value, free cash flow and capital cost. Obviously, under the FCF model, the key indicator that drives enterprise value is free cash flow, which is the essential factor of value promotion. The cost of capital mainly represents the risk [15]. This FCF model usually forecast the free cash flow for next 5 years, using the changes of sales. The formula is:

$$FCF = EBIT - tax - Capex + depreciation - \text{changes working capita} \quad (2)$$

McKinsey & Company, Inc. Professor Tom Copeland and one of the senior leaders elaborated on the concept of free cash flow in 1990 and gave a specific calculation method: Free cash flow equals the company's Net Operating Profit less Adjusted Tax (NOPAT), which is the company's total operating profit excluding interest expense after deducting earned income tax plus non-cash expenses such as depreciation and amortization, minus additional working capital and investments in property, plant equipment and other assets. The economic implication is that a company's free cash flow is the maximum amount of cash available for distribution to shareholders and creditors.

Using FCF model to evaluate the company's value can be divided into three stages: determining the weighted average cost of capital, estimating the future annual free cash flow, and estimating the company's current intrinsic value [16].

1. Determine the weighted average cost of capital. Since the FCF model evaluates the overall intrinsic value of the company, the free cash flow reflects the cash flow of all the investors of the company (including the cash flow of the creditor's rights owner and the equity owner), the discount rate used when discounting it should reflect the return rate required by all investors, that is, the weighted average cost of capital (the weighted average of the cost of equity capital and the cost of debt capital) [16].

2. Estimate the free cash flow in the future. Free cash flow is the cash held and freely disposable by the company. It is the remaining cash flow that can be distributed to shareholders after deducting operating expenses, investment expenses, income tax and depreciation from the profit before interest and tax without endangering the survival and development of the company [16].

3. Estimate the current intrinsic value of the company. The internal value of the company can be obtained by discounting the obtained free cash flow of the future years to the current at the weighted average cost of capital as the discount rate and summing them up. If the company is assumed to be a sustainable operation, it will be difficult to estimate and discount the future annual cash flow.

1) *EBIT*

EBIT means income tax, interest, and tax before it can be called cash. Changes can be calculated using Eq. (3) and Eq. (4). Before calculating EBITDA, however, EBITDA is a statistic for measuring the operational success of a company [15]. The total cash flow generated by the company's operations can be considered as an unspecified contribution. It is usually used as a starting point for calculating free cash flow in financial modeling. Interest, taxes, and depreciation are a typical amount of money, so it can be useful to use it as a reference point. The EBITDA formula for the net income deduction rate of external taxes of Depreciation and Depreciation.

On the other hand, some investors like Buffett specifically ignore this metric because it doesn't consider the devaluation of a company's assets, which seems no reality.

$$EBIT = \text{net profit of the enterprise} + \text{interest expense paid by the enterprise} + \text{income tax paid by the enterprise.} \quad (3)$$

$$\text{Change rate of EBIT} = \frac{\text{change rate of earnings per share of stock}}{\text{financial leverage coefficient}} \quad (4)$$

2) *Growth rate*

The predicted growth rate, we need to calculate the growth rate and change rate of each year by calculating the percentage of the quality and income. By going to the annual average and the industry average trend, we can get an interest rate trend of about ±5% to calculate the forecast. subsequent profits.

3) *Tax*

Airbus states that taxation charge differs across the Group. Thus, an average effective tax rate is determined for each annual report using profit, before tax data but removing the

share of post-tax returns from equity-accounted investments.

4) *Depreciation and Amortization*

Depreciation refers to assets and amortization refers to expenses Depreciation generally refers to the depreciation of fixed assets. Amortization generally includes the amortization of low value consumables, intangible assets, deferred expenses, and long-term deferred expenses. The amortization period of amortization expenses is one year at most. If it exceeds one year, it should be accounted as long-term deferred expenses. Depreciation and amortization are included in the cost gradually. Choosing the average of growth of revenue as the basis to predict the number of Depreciation and Amortization.

5) *Capex*

Investment expenses are those made over several accounting periods, as are income from assets or services. As a result, these expenses should be triggered, added to the property category at first, and subsequently moved, if possible, to the suitable category for departure. The capex is forecasted by the changing rate of former year.

6) *Working capital*

Working capital segment is net working capital, Operating capital is a general term for the company's assets and liabilities. The amount outstanding of subtracting current liabilities from operating capital is called net operating capital. Management capital management includes continuous asset management and continuous debt management. The higher the net operating capital, the lower the risk of repayment. Therefore, the level of net operating capital may reflect the ability to repay short-term debt. However, net capital is the difference between current assets and current liabilities. Therefore, Net Working Capital = Total Current Assets – Total Current Liabilities.

B. *Weighted Average Cost of Capital (WACC)*

WACC means weighted average cost of capital, employed to evaluate business capital investments in financial activities. Many businesses have previously employed the project loan discount rate because the cost of financing is affordable. To determine the share of each fund in a normal fund, you can utilize the book value, market value, and target weight. The market price of bonds and stocks determines market value. The weighted average capital cost calculated by this method reflects the actual situation of the firm [14]. The formula is:

$$WACC = \frac{\text{Debt}}{(\text{Debt}+\text{Equity})} * \text{Cost of Debt} + (1 - \frac{\text{Debt}}{(\text{Debt}+\text{Equity})}) * \text{Cost of Equity} \quad (5)$$

The cost of a public limited company is the last income of the objects. In addition, the bank's average interest rate is like the interest rate. The data may be of interest, under this valuation. So, the cost of the company's debt × (final income from objects or average interest) × (1 is tax rate). Skin changes are typically stored in WACC instead of direct debt, for example: WACC Primary Value × Primary Stock Weight × General Stock Weight × Foreign Weight × Value × Tax Rate) Data of WACC is about 6.65%.

1) Cost of debt

Cost of debt refers to the cost paid by enterprises for raising funds by borrowing (including loans from financial institutions and issuance of corporate bonds). Cost of debt can be calculated by Eq. (6).

$$\text{cost of debt} = (\text{risk free rate} + \text{debt spread}) * (1 - \text{effective tax rate}) \quad (6)$$

The issuance of debt is typically viewed as a less expensive source of financing than the issuance of equity when acquiring external finance. One explanation is that fixed interest rates are associated with debt, such as corporate bonds. However, there are claims on earnings in equity financing. A shareholder's participation in the prospective growth of those earnings increases with their ownership investment in the company. It is relatively easier to assess the cost of debt than the cost of equity since observable interest rates are a significant factor in measuring the cost of debt. The cost of debt not only reflects a company's risk of default but also the level of market interest rates. Additionally, it plays a crucial role in determining a company's WACC or weighted average cost of capital.

When the enterprise does not pay income tax, it is the interest paid to the creditor; When an enterprise pays income tax, it is equal to the interest multiplied by (1-tax rate). Cost of debt relies on the interest rate made by central bank, about 0.0294. Risk free rate is based on the 10-year Treasury yield is a risk-free yield, and the risk-free yield is 0.0399.

2) Equity risk premium

The difference between the returns on equities or individual stocks and the risk-free rate of return is known as the equity risk premium. With no chance of the government defaulting, longer-term government bonds can be used as a benchmark for the risk-free rate of return. It is the additional return that a stock gives to the owner in exchange for the risk the owner is incurring, over and above the risk-free rate. It serves as the investor's reward for choosing equity investments over risk-free products and assuming a higher level of risk. Equity Risk Premium can be calculated by Eq.

(7).

$$\text{Equity risk premium} =$$

$$\text{Rate of return on stock market} - \text{Risk free rate} \quad (7)$$

According to the average annual return of the FTSE 100 Index in the past 5 years as the expected return of the market portfolio, the expected return of the market portfolio can be obtained as 0.0294.

3) Equity beta

The beta coefficient of the company is determined by linear regression between the growth rate of the London Stock Exchange Index and the growth rate of the company's stock price. It states that Beta (5Y Monthly) is 1.90.

4) Cost of equity

It is also known as the minimum annual rate of return and used to indicate the compensation given by a company to the rights and interests of ordinary shareholders and investment risks, that is, the minimum annual rate of return required by the company's equity parties. In most cases, businesses combine debt and equity finance, with equity capital being more expensive. Cost of Equity can be calculated by (8).

$$\text{cost of equity} = \text{risk free rate} + (\text{equity bate} * \text{equity risk premium}) \quad (8)$$

IV. RESULTS AND DISCUSSION

Though the data analysis, the purpose of this article is to conduct a series of valuations on Airbus through the FCF model. By comparing the calculated number 28 with the 26.88 per share price on the original stock market, it can provide some suggestions for investors to buy, for this stock is undervalued.

This paper predicts the average revenue growth of Airbus by calculating the growth rate of the number of orders delivered in the future and completes the FCF forecast model. The results show in Table III.

TABLE III: FREE CASH FLOW

	History				Forecast			
	FY2018	FY2019	FY2020	FY2021	FY 2022	FY2023	FY2024	FY 2025
Revenue	63,707	70,478	49,912	52,149	56,226.5	59,601.0	62,074.5	65,633.3
Airbus	47,970	54,775	34,250	36,164	40,968.0	44797.4	48626.7	52456.1
Helicopters	5,934	6,007	6,251	6,509	5,988.5	5,651.6	5314.8	5090.2
Defence&Space	11,063	10,907	10,446	10,186	10165	10067	9063	9032
T&E	(1,260)	(1,211)	(1,035)	(710)	(895)	(915)	(930)	(945)
EBITDA	7,511.0	9,497.0	3,392.0	7,750.0	8,190.5	10,217.1	10217.1	11,765.0
EBIT	5,067.0	6,570.0	561.0	5,425.0	5,635.4	7,565.2	7,743.0	8,967.0
D&A	1,942.0	2,364.0	2,377.0	1,807.0	1873.091	1941.6	2012.61	2086.225
Revenue growth rate	3.05%	3.35%	4.76%	3.47%	3.66%	3.81%	3.92%	3.71%
Tax	1418.76	1839.6	157.08	1519	1577.912	2118.26	2168.04	2510.76
Effective tax rate	28%	28%	28%	28%	28%	28%	28%	28%
Capex	-2,285.0	-2,340.0	-1,759.0	-1,928.0	-2,333.3	-2,554.7	-2,785.0	-3,045.0
Net working capital	2.4	(162.6)	13.5	17.6	(32.3)	(14.3)	1.8	15.7
FCF	224.0	1,623.0	-7,187.0	2,790.0	3,567.0	4,527.0	4,875.0	5,112.0

A. Sensitive Analysis

Sensitivity analysis is a tool used in financial models to determine whether the values of independent variables. How it affects certain dependent variables in each situation. It is

especially useful when studying and analyzing. A "black box process" which results in an opaque function of multiple inputs. Sensitivity analysis methods can be divided into single-factor sensitivity analysis method and multi-factor sensitivity analysis method.

1. Determine sensitivity analysis indicators
2. Calculate the target value of the technical solution
3. Selection of uncertain factors
4. Calculate the degree of influence on the analysis indicators when the uncertain factors change.
5. Identify sensitive factors, analyze, and take measures to improve the risk-resistant ability of technical solutions.

Sensitive analysis results show in Table IV. The FCF was produced using a WACC of 6.64% as well as a growth rate of 1.76% at which enterprise value is 84,338.3 million Euro. As the model presents if raise growth rate, Enterprise value will increase following it, while the trend of WACC opposite to that.

TABLE IV: SENSITIVE ANALYSIS

		Growth rate		
		1.46%	1.76%	2.06%
WACC	6.34%	83,596.5	86,983.1	90,785.7
	6.64%	81,959.6	84,338.3	87,696.8
	6.94%	79,348.1	82,457.6	83,916.2

B. Scenario Analysis

The fundamental method of using scenario analysis for decision forecasting is to predict and evaluate the project's overall perspective. Three scenarios optimistic, normal, and pessimistic are typically laid forth in scenario analysis. The expected value of each variable varies depending on the different scenarios. In the most pessimistic scenario, for instance, the expected value of each variable is the most pessimistic estimate, and the consequent net present value and intrinsic rate of return are similarly the lowest or even negative among the three possibilities. In this case, we test two extreme situations, the lowest and the highest growth to calculate the enterprise value, one is at 8,3456 million Euro, the other is about 9,1260 million Euro.

C. Relative Value

P/E ratio is the ratio of stock price to earnings per share, which is a static index. In general, the stocks with a lower P/E ratio need to pay a lower cost to obtain the income of 1 Euro. It is typically used to calculate a company's input-output ratio.

Enterprise value (EV) to earnings before interest, taxes, depreciation, and amortization (EBITDA) is compared in a ratio called EV/EBITDA. A highly helpful statistic for market participants is the EV/EBIT ratio. A high ratio suggests that the shares of a company is overpriced. While advantageous for a quick stock sale, the scenario can be disastrous and cause stock values to crash if the market catches up and gives the company the correct value. A low EV/EBIT ratio, on contrast. In the end, the corporation is more solid and safe financially the lower the EV/EBIT [17].

TABLE V: MULTIPLE OF BOEING & AIRBUS

	Boeing	Airbus
EPS	-8.28	4.83
P/E	35.67	21.37
EV/EBITDA	12.73	11.06
EV/EBIT	16.87	15.97

Through a series of comparable comparative values, we can determine that the market valuation of Airbus is

somewhat inflated. Even though Airbus is much more overvalued than Boeing, the relative valuation model produces less reliable results than the absolute valuation model as the Table V shows.

We can find the enterprise value is 8,433 million Euro and the equity value is 8,827 million Euro higher than market cap, which is obviously undervalued. Therefore, investors are better to buy in quantity. Relative value shows that P / E ratio, the ratio of stock price to earnings per share, which is a static index is higher than Boeing.

V. CONCLUSION

In conclusion, due to the impact of the COVID-19 epidemic in 2020, many financial data in 2020 decline sharply. Airbus, as the leader of the aviation, whether recover from this terrible blow make great difference. Through the establishment of FCF model, a series of research and summary are carried out for the financial data of Airbus, and the enterprise value of Airbus is obtained by calculating the free cash flow. Comparing this result with the stock market price at that time, the conclusion that the company is undervalued is drawn. In the process, when calculating the EBITDA, EBIT and D&A parameters, the predicted growth rate in the next four years is based on the income growth rate, and the accuracy of the data obtained is insufficient. Meanwhile, the forecast time for the future is not long enough, and two more years of financial data can be added to reach 2027. In the future, these problems can be solved, and the airbus still has high ability to pay for the debt, which making the debt holders gain stability and security of the cash.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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