

Analyzing the Financial Risks and Investment Values of Chinese Airline Companies

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Abstract. This paper aims to examine the financial risks faced by Chinese airline companies and provide useful information to investors who are interested in investing in these firms. The study will conduct valuations on the three largest airline companies in China, namely China Southern Airlines, Air China, and China Eastern Airlines, and assess the differences in the financial risks taken by these companies. The methodology used will be the Capital Asset Pricing Model (CAPM) and the metric of beta, which is used to assess the volatility of a stock or portfolio compared to the entire market. The paper provides a literature review of related research on the use of beta, risk factor models, and other financial measures to evaluate the performance and risk profile of firms in various industries. The study aims to contribute to the existing knowledge of the financial risks of airline companies and their potential impact on investor decisions.

Keywords: CAPM; WACC; Unlevered Beta; Financial Risk; Airline Industry.

1. Introduction

1.1 Background

Being one of the most essential means of long-distance transportation, the airline industry has always been an area of investment for global investors. However, ever since the outbreak of COVID-19, the airline industry has been heavily affected due to the travel restrictions imposed by each nation; in the last three years, all the major airline companies in China have been reportedly making negative profits. Therefore, it is worth revisiting the financial risks faced by firms in the airline industry to examine whether the drastic changes brought by COVID-19 have altered the risks in a certain way. There has yet to be a paper that specifically focuses on the analysis of Chinese airline companies in the post-pandemic period; therefore, this paper will provide useful information to investors who are specifically intending to invest in Chinese airline firms.

1.2 Related research

Through the use of beta, the Sharpe ratio, the risk factor model, primary research, and the "financing waterfall," Shrimali conducted research on the risk profile and financial performance of the stocks in India's fossil fuel and renewable energy power sectors. She concluded that the former sector's stocks have been more alluring to investors than the latter's, and the two sectors' primary risk factors are the same [1]. Using quantitative research and comparative analysis methods, Tran et al. conducted a study on how market risk changed for Vietnamese businesses in the tourism, hotel, airline, and entertainment sectors between 2015 and 2017 following the end of the low inflation period. The outcome demonstrates that, even though these businesses' risks are typically declining as a result of leverage adjustment, the entertainment sector is the riskiest of the three, and the airline and travel sectors see the most risk variation [2]. Grater and Chasomeris researched the effects of COVID-19 on the shipping industry in Africa utilizing the tax rate, regulatory asset base, and asset beta and concluded that both the freight rate and the cargo quantities dramatically fell during the lockdowns. Finally, Grater and Chasomeris recommended a reduction in the tariff rate [3].

Using the OLS method, Zaimovic investigated the CAPM model's applicability in the Bosnian and Herzegovian capital markets and concluded a positive link between risk and return, making the CAPM model suitable for application there [4]. Barr and Van Den Honert conducted a study on the

change in systematic risk for an acquiring firm by contrasting the equity beta and asset beta, concluding that the asset beta is preferable because it eliminates the influence of leverage [5]. Using statistical models to examine the relationship between expected return and financial risk measures like beta and leverage, Du Toit researched the relationship between various financial risks and the market return on ordinary shares in South Africa and concluded that there is no linear relationship between these variables for the South African capital market [6].

By contrasting the Build Up model, CAPM, and Fama and French Three Factor Model, Machova et al. researched the various approaches to determining risk premiums for farm enterprises in the Czech Republic and concluded that the Build Up model is the most appropriate [7]. Using the panel regression approach, Gharaibeh, and AL-Tahat researched the variables that affected the capital structures of service companies in Jordan in the past 4 years since 2018. They concluded that non-debt tax shields and tax have a positive impact on leverage, while business risk and profitability have a negative effect [8].

Dondeti et al. adjusted the CAPM equity beta using the Hamada methodology and DOL to study the average business beta for Pepsi and Cola-Cola from 2004 to 2012 and concluded that these companies' average business betas are 0.1882 and 0.1369, respectively [9]. Using risk the CAPM model exponentially weighted moving averages, and assessment models, Perroni et al. researched the impact of energy savings from government programs in Brazil on the risks faced by Brazilian energy companies from 2000 to 2013 and concluded that the potential increase in energy efficiency has no bearing on these risks [10].

1.3 Objective

This study will conduct valuations on the three biggest airline companies in China, including China Southern Airlines, Air China, and China Eastern Airlines. The objective of this study is to answer the research question: What leads to the difference in financial risks taken by different airline companies?

2. Method

In corporate finance, beta is a metric used to assess how volatile a stock or portfolio is in comparison to the entire market. It is a widely used indicator to evaluate the risk associated with a financial investment or investment portfolio. The Capital Asset Pricing Model (CAPM) uses beta to determine the anticipated return on investment. A stock or portfolio with a beta of 1 move in step with the market. A stock or portfolio with a beta greater than 1 is more volatile than the market, whereas one with a beta lower than 1 is less volatile. Stocks with larger betas are typically riskier investments since their prices tend to be more erratic and susceptible to fluctuations in the market. Because they are more stable and tend to move less in response to fluctuations in the market, stocks with lower betas are typically regarded as being less hazardous.

Capital Asset Pricing Model (CAPM) is used to determine the expected return on investment. It is predicated on the notion that an investment's expected return should be equal to the sum of the risk-free rate of return and a risk premium that accounts for the systematic risk of the investment. The CAPM equation is expressed as follows:

$$\text{Expected Return} = \text{Risk-Free Rate} + \text{Beta} \times (\text{Market Risk Premium}) \quad (1)$$

Where:

Expected Return: The return that investors expect to earn from an investment.

Risk-Free Rate: The rate of return on a risk-free investment

Beta: The measure of an investment's volatility compared to the overall market.

Market Risk Premium: The excess return that investors require to invest in a risky asset

The CAPM makes the logical and risk-averse assumption that investors are rational and will only tolerate higher levels of risk if they are compensated with better returns. With all other factors being

equal, an investment with a high beta (i.e., higher volatility) should yield a higher return than an investment with a low beta (i.e., lower volatility).

The weighted average cost of capital (WACC) is a financial metric used to calculate the cost of financing a business' operations using a combination of debt and equity. The cost of each capital source, including debt and equity, is a weighted average based on how much of each they represent in the capital structure of the organization.

The formula for WACC is:

$$WACC = (E/V \times Re) + (D/V \times Rd \times (1 - T)) \quad (2)$$

Where:

E = the market value of the company's equity D = the market value of the company's debt V = the total value of the company's equity and debt Re = the cost of equity Rd = the cost of debt T = the company's marginal tax rate

The proportion of each source of funding in the total cost of capital is calculated using the weights of debt and equity in the company's capital structure. The WACC is a benchmark used to assess if a project or investment will result in a return greater than its cost of capital and, therefore, whether it is worthwhile to pursue.

For valuation purposes, such assumptions are made:

(1) The marginal cooperate tax rate for all firms is 25%, which is the standard tax rate under the Cooperate Income Tax law.

(2) The risk-free rate for all firms is 3.48% and the market risk premium for all firms is 7.70%. This is data provided by the US Department of the Treasury [11] and S & P Equity Risk Premium Index [12].

(3) The exchange rate between US Dollar and Renminbi used is 1:6.78, an approximate exchange rate is given by the US Federal Reserve on the date of 2/10/2023 [13].

3. Results

Table 1 shows all the key ratios needed to make a comparison between the three companies. It is seen that the leverage across firms varies from 57% to 68%, indicating the airline industry to be relatively highly leveraged. In terms of equity beta, the companies' performances range from 0.68 to 1.07, with two firms below the market risk (China Eastern Airlines, Air China) and one company slightly above the market risk (China Southern Airlines). The expected cost of equity capital and expected cost of debt follow the same trend - China Eastern Airline leads among the other two firms with the lowest expected cost of equity capital at 8.72% and expected cost of debt at 2.72%. When it comes to the expected cost of capital (WACC), the results for the three companies range from 4.18% to 6.86%, with the lowest WACC belonging to China Eastern Airlines again and the highest WACC belonging to China Southern Airlines. China Eastern Airlines keeps its leading role in asset beta and business risk since it has the lowest asset beta of 0.26 and business risk of 5.50%. It is worth pointing out that the other two firms, China Southern Airlines, and Air China, have nearly identical asset beta of 0.47 and business risk of 7.10%.

Table 1. Key Ratios.

Company	China Southern Airlines	China Eastern Airlines	Air China
Index	Value (USD_Million)	Value (USD_Million)	Value (USD_Million)
The market value of equity (Yahoo Finance) [14]	17490	15650	21654
The market value of debt (Yahoo Finance) [14]	30180	33044	28969
Leverage	63%	68%	57%
Debt-to-equity ratio	173%	211%	134%
The marginal corporate tax rate	25%	25%	25%
Equity beta (Yahoo Finance) [14]	1.07	0.68	0.94
The expected cost of equity capital	11.72%	8.72%	10.72%
Rf	3.48%	3.48%	3.48%
Market risk premium	7.70%	7.70%	7.70%
The expected cost of debt	5.34%	2.72%	3.17%
The weighted average cost of capital	6.86%	4.18%	5.96%
Asset beta	0.47	0.26	0.47
Ra	7.10%	5.50%	7.11%

4. Discussion

In this section, the qualitative and quantitative factors that lead to China Eastern Airlines' low financial risk will be examined. Overall, the business model developed by China Eastern Airlines is proved to be the most successful among the three firms. China Eastern Airlines has a diversified business model with a focus on both domestic and international routes. They have a well-balanced fleet, with a mix of wide-body and narrow-body aircraft, which allows them to cater to different market segments. This diversified business model may help them to mitigate risks associated with fluctuations in one market segment, resulting in lower financial risk.

One factor to take into consideration is Chinese Eastern Airlines' fleet structure. China Eastern Airlines has effectively managed its fleet of aircraft, ensuring that it has the right number of planes to meet market demand. This has allowed the company to minimize its capital expenditure on aircraft and reduce its financial risk. In 2021, China Eastern Airlines introduced a total of 33 aircraft of major models and retired a total of 6 aircraft. By the end of 2021, China Eastern Airlines owns a total of 97 wide-body aircraft, 648 narrow-body aircraft, 7 regional aircraft, and 6 business aircraft.

Geographic presence is also a factor that contributes to China Eastern Airlines' success. China Eastern Airlines has a well-established presence in the domestic market and has expanded its routes internationally. This has allowed the company to diversify its revenue streams and reduce its financial risk by having a more stable revenue stream. By the end of 2021, China Eastern Airlines offers flights to over worldwide 1000 destinations in 177 countries. Compared to Air China, which offers flights to 36 countries and China Southern Airlines, which offers flights to only 18 countries, China Eastern Airlines undoubtedly has a more diverse stream of revenue, which makes it less volatile than the other firms.

5. Conclusion

In this study, the CAPM model and WACC approach are used to examine the financial risks and investment values of Chinese airline firms. Comparisons and assessments are made of China Southern Airlines, Air China, and China Eastern Airlines, the country's three largest airlines. China Eastern Airlines is deemed to have the lowest risk after evaluating the financial hazards of the three businesses. The operating methods of the three firms are then analyzed qualitatively and quantitatively, and it has

been shown that China Eastern Airlines' minimal risk-taking is mostly attributed to its fleet structure and geological presence.

This paper provides useful information to investors who are specifically intending to invest in Chinese airline firms. It also adds to the body of knowledge on risk assessment across different industries. The study demonstrates that geographic presence and fleet structure are important factors in determining investment decisions in the airline business. In conclusion, this article stresses the significance of performing an in-depth financial risk analysis before investing in any sector, especially in times of crises like the COVID-19 epidemic. Noting that financial risk is a complicated notion that cannot be entirely captured by these measurements alone, it should be noted that each airline's risk profile may be influenced by additional factors.

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