The Use of Beta Value, ROIC, WACC In Investment Risk Assessment for Constructive Industries in the US.

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Abstract. This paper recognizes the importance of risk analysis for investment decisions. Therefore, it examines and calculates a few key parameters and compares the risk level for Jacobs Engineering Group Inc (J), Fluor Corporation (FLR) and MasTec, Inc. (MTZ) among the top three companies in the "Heavy Construction Other Than Building Construction Contractors" industry in the United States (US). There are two main factors to consider when assessing the riskiness of a company: equity beta (or leveraged beta) and asset beta (or unleveraged beta). Furthermore, this paper discussed the possible risks that may affect the performance of the companies in this industry, as well as possible challenges that the companies may face in this field.

Keywords: High constructive industry, Equity Beta, Asset Beta, Business risk, ROIC, WACC.

1. Introduction

1.1 Background

It is important to keep in mind that every investment has a level of risk attached to it, and even the safest investments, like bank savings, still possess a level of risk. Knowing the risk of investing in a company based on the financial information published by that company is crucial. This means calculating and assessing the risks associated with the investment based on the financial information published by the company itself. Individual investors may be particularly susceptible to the risk of asymmetric information, especially when investing in, for example, shares. This is because they may not be aware that they may be making risky investments when they invest their money. There is also a strong tendency for the majority of individual investors to have a low-risk tolerance. In this regard, if they make a mistake when investing, they can be exposed to huge amounts of money at any time or even suffer bankruptcy if the choice is incorrect.

There is a wide range of concepts associated with risk composition, and it is a complex subject. It is possible for a number of business risks to be of an external nature, such as changes in the market environment. In recent years, several companies have been forced to close their doors due to the subprime crisis in 2008 and the COVID-19 plague which has made a huge impact on the economy. Additionally, changes in policy can have a varying impact on risk. This includes negative impacts from carbon emission restrictions or the emergence of new energy sources on the fossil fuel industry. It is also pertinent to remember that some risks can be internal, such as those associated with operational risks, financial risks, strategic risks, or security risks. Even if a company manages its risks well, residual risks can still exist. Thus, a quantitative examination of financial data from a company along with a qualitative analysis of its risks can offer a more precise estimate of the investment risk connected with the company as a whole. A more rational investment decision can be made as a result of this.

1.2 Related research

It would be fair to say that most investors, when they go for a particular investment, are primarily concerned with the associated risks and returns. This is because investments typically have an allied risk that is dependent upon the market's fluctuations. In a world filled with uncertainties, it is impossible to avoid the possibility of taking risks. When it comes to investing, risk is the variance between what has happened and what has been expected in the investment plan. This can be defined as the variance between the return on investment and the return that was anticipated. In addition, a risk can also be defined as uncertainty about the future. There is a direct correlation between the deviation from the expected return and the risk of the business [1].

According to Abidin et al. [2], risks can be categorised into systematic risks and unsystematic risks. A type of risk that cannot be eliminated by diversification strategies is known as systematic risk. It can result from outside forces that affect businesses, such as interest rates, inflation, tax reforms, recessions, liquidity risks, credit risks, operational risks, economic stagnation, and political events. Generally, it is shown by the abbreviation Beta (β). In addition, Husted [3] makes the argument that business and financial risks constitute the two dimensions of systematic risk, which are interconnected. Business risk can be defined as the type of systematic risk that a common stockholder of a company might face if the company did not have leverage issues. In contrast, there is another kind of risk that is associated with debt funding, namely the financial risk, and it is taken on by general stockholders.

Research on systemic risk has a great deal of significance in the field of accounting research, particularly that on capital markets. To assess the economic effects of accounting decisions and the adoption of new accounting standards, it is critical to quantify the "announcement effect" in event studies. The power of the tests to identify whether the accounting reports contain information that is pertinent to the company can be increased simply by using the firm-specific returns component. There is evidence that during a pandemic, construction companies experience a number of difficulties, including a labour scarcity, cautious clients, material delays, a lack of predictability in demand, and the underutilization of renewable resources [13]. One or more potential clients might be unable to make payments in the case of a recession or due to the COVID-19 pandemic's possible negative effects on economic activity. It is normal for businesses to experience problems getting paid from these clients. If a client fails to make payments on a project for which they have committed considerable resources, the organization's operations, cash flow, and liquidity outcomes may be materially and adversely impacted [14]. However, the tax rate, the level of earnings, and the rate of earnings growth are all inversely correlated with market beta. As a result, it is almost independent of bankruptcy costs. Hong & Sarkar's [6] analysis makes it abundantly evident that the risk-free interest rate for high leverage ratios has also been rising.

1.3 Objective

Thus, this study aims to evaluate and compare the level of risk of the top three companies in the "Heavy Construction Other Than Building Construction Contractors" industry in the United States (US) based on several key parameters. This type of company is defined as an entity that carries out heavy construction work other than building, such as highways, streets, and bridges, which are normally not associated with or associated with buildings or buildings related projects, as per the United States Department of Labour. The IFRS financial report for the period ended 31 December 2021 indicates that Jacobs Engineering Group Inc (J), Fluor Corporation (FLR) and MasTec, Inc. (MTZ) are the leading companies in this industry. After comparing the data of these three companies, we will analyze their possible risk composition and the factors that could contribute to investment risk and provide investment advice accordingly.

2. Method and Data

2.1 Methodology

The main reference factors for company risk are Equity Beta (or leveraged Beta) and Asset Beta (or Unleveraged Beta). The equity beta measures the volatility of a company's stock returns in comparison with those of the broader market. Therefore, it is a measure of risk that takes into account the capital structure and leverage of a company. Investors can measure a security's sensitivity to macroeconomic risks by evaluating the equity beta. Otherwise, a company's asset beta is its beta without regard to the impact of debt. It is known as the "asset beta" because a company's volatility in the absence of leverage is only a function of its assets. The volatility of a corporation is also known as its return volatility, which ignores its financial leverage. It contrasts the market risk with the risk of an unleveraged corporation.

The formula for Equity Beta is

$$\beta_E = \frac{\text{Covariance (Ri,Rm)}}{\text{Variance (Rm)}} \tag{1}$$

By dividing the covariance between individual stock market returns and market returns by the variance of market returns over a time period, beta can be computed. On this basis, the formula for calculating Asset beta is

$$\beta_A = \frac{\beta_E}{1+(1-t)\times\frac{D}{E}} \tag{2}$$

Asset Beta equals Equity Beta divided by 1 minus the tax rate multiplied by the leverage ratio plus 1, where leverage ratio is total Debt divided by total Equity, i.e., $\frac{D}{E}$.

The weighted average cost of capital can also be used to decide whether a company is worthwhile for investment. WACC is the average interest rate that an organisation expects to charge to all holders of its securities in order to fund its assets. The firm's cost of capital is frequently used interchangeably with the WACC. The financing of a company's assets is frequently done with debt and equity. The WACC is a representation of the average cost of these sources of funding based on their respective usage in each circumstance. The formula is

$$\text{WACC} = E/(E+D) * \text{Cost of Equity} + D/(E+D) * \text{Cost of Debt} * (1+ \text{Tax Rate}) \tag{3}$$

In this case, the cost of equity is calculated according to the Capital Asset Pricing Model (CAPM), with the formula

$$\text{Cost of Equity} = \text{Risk-Free Rate of Return Beta of Asset} * \\ (\text{Expected Return of the Market} - \text{Risk-Free Rate of Return} \tag{4}$$

The formula for cost of debt is

$$\text{Cost of Debt} = \text{Interest Expense/Total Book Value of Debt} \tag{5}$$

The Return on Invested Capital (ROIC) is calculated to determine how well a corporation allocates the capital it owns to lucrative investments. ROIC indicates how effectively a company utilizes its capital to generate profits. The formula is,

$$\text{ROIC} = \frac{\text{NOPAT}}{\text{Invested Capital}} \tag{6}$$

Where: NOPAT = Net operating profit after tax

If a corporation uses its invested capital effectively, it can be determined by comparing its return on invested capital to its weighted average cost of capital (WACC).

2.2 Listed company

Jacobs company has been able to provide a diverse range of services including construction services for nuclear stations, wind tunnels, design-build projects for the water sector, and construction management services for clients with industrial, commercial, and government backgrounds. In 2021, the Jacobs company provided integrated solutions and technical support to NASA centres to assist with the development and launch of the James Webb Space Telescope, which was launched in August. Also, I have worked closely with the Dubai Government in managing the new Dubai Noida international airport, as well as Expo 2022 Dubai, which will take place in the city. As a result of such projects, J was able to increase revenues, operating profits, and total assets in a stable manner. With a total revenue of USD 14,091 million and an asset value of USD 14,804 million, this company is ranked first in the IFR financial rating, with total revenue of USD 14,091 million.

Having a total of USD 12,435 million as well as assets of USD 7,280 million, FLR was the next runner-up with a total of USD 12,435 million. Aside from maintaining our position as the industry leader in mining copper and gold, FLR has also signed important contracts with leading life sciences companies such as Fuji Film and DSM. Due to the U.S. bipartisan infrastructure bill, which was signed into law in November 2021, FLR was able to secure a share of the $110 billion in funding for road and bridge work as a result.

The primary business activity of the MTZ company is Water, Sewer, Pipeline, Communications and Power Line Construction. In 2021, MTZ constructed the water storage and pumping improvements for the City of Tamarac Water Treatment Plant. MTZ has a total revenue of USD7952 million and a total asset of USD7121 million.

3. Results

The calculated data for the three companies up to June 2022 are shown in Table 1 (some data referenced from gurufocus.com).

Table 1. Financial values of three selected companies

	Jacobs	FLR	MTZ
Market Value of Equity (millions USD)	16971.55	3814.92	6281.15
Book Value of Debt (millions USD)	3200.31	1437.13	1888.84
Total Equity (millions USD)(for the quarter that ended in June 2022)	5933.29	1514.00	2480.83
Total Debt (millions USD)(for the quarter that ended in June 2022)	4379.15	1161.00	2530.44
Leverage Ratio	0.74	0.77	1.02
The Latest Two-Year Average Tax Rate	26.02%	100.00%	23.60%
Risk-Free Rate	2.84%	2.84%	2.84%
Market Risk Premium	6.00%	6.00%	6.00%
Expected Return of Market	8.84%	8.84%	8.84%
Expected Cost of Equity Capital (rE)	6.92%	18.62%	11.06%
Expected Cost of Debt Capital (rD)	2.27%	5.88%	2.83%
Annual Return on Invested Capital (ROIC)	7.33%	7.27%	1.53%
Weighted Average Cost of Capital (WACC)	6.09%	13.53%	9.00%
Equity Beta (βE)	0.68	2.63	1.37
Asset Beta (βA)	0.52	2.63	0.98

In Table 1, Jacobs has a market value of equity of 16971.55 million, which is significantly higher than the market value of equity for the other two companies (FLR 3814.92 million and MTZ 6281.15 million). As of June 30, Jacobs, FLR, and MTZ had equity totalling 5933.29 million, 1514.00 million, and 2480.83 million, respectively. In terms of market share, Jacobs continues to lead. However, Jacobs has the highest book value debt at 3200.31 million in comparison with FLR at 1427.13 million and MTZ at 1888.84 million. Based on the calculated debt value before June 2022, Jacobs has total debt of 4379.15 million, while FLR has 1161.00 million and 2530.44 million. Even though Jacobs has the highest debt value, it has the largest total assets, so it has the lowest leverage ratio of 0.74, as opposed to FLR's 0.77 and MTZ's 1.02.

Rather than using the marginal tax rate, Table 1 used the tax rate for the last two years, which provides more current information. The tax rate is calculated by dividing the tax expense by the pre-tax income. According to the data, Jacobs paid 26.02% of its capital and MTZ paid 23.60%. The average tax rate for FLR is greater than 100%, which indicates that FLR's earnings before taxes were generally lower than its tax expenses. There is a total risk-free rate of 2.84% and a market risk premium of 6.00% for these three companies, which contributes to the overall market return of 8.84%. The expected cost of equity capital for Jacobs is 6.92% and the expected cost of debt capital is 2.27%, while the expected cost of equity capital for FLR is 18.62% and 5.88%. It is estimated that MTZ's equity capital costs will be 11.06 per cent and its debt capital costs will be 2.83%. According to Equation (3), Jacobs' WACC is 6.09%, FLR's is 13.53%, and MTZ's is 9%. In terms of WACC, FLR had the highest and Jacobs had the lowest.

According to equation (2), Jacobs, FLR, and MTZ have equity betas of 0.68, 2.63, and 1.37, respectively, and asset betas of 0.52, 2.63, and 0.98, respectively. Among the three companies, Jacobs' equity beta and asset beta are the lowest, while FLR's equity beta and asset beta are equal and the highest.

4. Discussion

Jacobs' stock beta, or beta E, is 0.68, as seen in Table 2, which is less than 1. As a result, when the market increases, this company's stock will increase less than the market, and when the market decreases, it will decline less than the market. In other words, this stock's volatility is lower than the markets. Comparatively, FLR and MTZ have stock beta values of 2.63 and 1.37, respectively, which are greater than one, indicating that these two companies, especially FLR, are more volatile than the market. βA or unleveraged beta excludes the impact of debt-related risk on the company's overall risk profile. All three companies have relatively high leverage ratios, with MTZ having a leverage ratio of 1.02, so debt may have a significant impact on their corporate risk. Both Jacobs and MTZ have a lower βA compared to the βE of these three companies, meaning that both companies have net debt greater than zero, however FLR's βA and βE are identical, this may reflect that FLR's risk is not affected by its debt. Debt does not affect the risk of the company.

Table 2. Equity Beta and Asset Beta of three selected companies

	Jacobs	FLR	MTZ
Equity Beta (βE)	0.68	2.63	1.37
Asset Beta (βA)	0.52	2.63	0.98

The corporation confronts substantial business risks in addition to the financial risks brought on by debt. These three businesses would face a number of commercial risks given their involvement in the construction sector. The demand for services may be affected by modifications to governmental laws, rules, and policies, as well as by adjustments to licences and tax incentives. Any of these components could cause a drop in demand, a delay in the start of development, or the cancellation of future projects. The outcomes of operations, cash flow, and liquidity of the company may be negatively impacted if an organisation is unable or unwilling to adapt to such changes or activities [7].

Second, there is fierce competition in the heavy construction sector. Most marketplaces are competitive; smaller independent businesses serving local markets compete against larger businesses serving regional and national markets. As an alternative, current and potential clients could employ staff to carry out comparable services independently. Due to the comparatively low entry barriers in several heavy construction sectors, any company with sufficient financial resources, access to technical expertise, and qualified employees may become a contender [8]. A business risks being driven out of the market if it does not promptly accept and grasp new technologies as they emerge or adjust to shifting client needs. However, in the construction sector, innovation is frequently viewed as an expensive investment with long-term benefits.

Additionally, this sector usually uses bidding or multi-stage bidding processes to award projects, and companies may not always be successful in their bids. Adverse selection is a significant issue because it is impossible to know the real cost of building until the project is finished. When the contract winner underestimates the project's actual cost, it results in an adverse selection. As a result, the successful contractor is likely to experience a loss or at the very least, profits that are below average [10]. As a result, being chosen to carry out the project may not be advantageous to the successful bidder.

Due to unfavourable environmental conditions and uncertainty such as pandemic outbreaks like the COVID-19, and/or economic downturn, capital expenditures in this industry may be reduced and potential customers may be negatively impacted, which could lead to decreased demand or impair customers' ability to pay. The cyclical nature of heavy construction services has traditionally persisted and is likely to do so going forward [11]. They are also sensitive to broader economic downturns. According to reports, unfavourable market circumstances, market instability, disease outbreaks like the COVID-19 pandemic, and/or economic downturns may negatively affect customer demand for the services of those customers as well as their profitability [12]. There is evidence that during a pandemic, construction companies experience a number of difficulties, including a labour scarcity, cautious clients, material delays, a lack of predictability in demand, and the underutilization of renewable resources [13]. In the event of a recession or due to the probable detrimental impacts of the COVID-19 pandemic on economic activity, one or more potential clients could not be able to make payments. It is typical for businesses to have issues collecting payment from these customers. The operations, cash flow, and liquidity outcomes of the company may be considerably and negatively impacted if a client fails to make payments on a project for which they have invested significant resources [14].

Moreover, comparing ROIC and WAAC while analyzing the risk of a company can also assist investors in making investment decisions.

Table 3. Comparison of ROIC and WACC of three selected companies

	Jacobs	FLR	MTZ
Annual Return on Invested Capital (ROIC)	7.33%	7.27%	1.53%
Weighted Average Cost of Capital (WACC)	6.09%	13.53%	9.00%

According to Table 3, Jacobs' ROIC exceeds its WACC, while the other two companies have a higher WACC than ROIC. As a result, only Jacobs' cost of capital is lower than the company's earnings, indicating that only Jacobs has been able to build upon its company value. In contrast, the other two have higher costs of capital than earnings, which suggests an underperformance when it comes to increasing value. Unconstructive investments can lead to a decline in the value of a company, for example investing in non-profitable assets. Therefore, the FLR and MTZ do not seem to be capable of sustaining profits on a continuous basis. When compared to Jacobs, investors would be taking a greater risk by investing in FLR and MTZ.

5. Conclusion

Based on the calculation and comparison of key parameters such as equity beta, asset beta, ROIC and WACC for Jacobs, FLR and MTZ, which are the top three companies in the "Heavy Construction Other Than Building Construction Contractors" industry in the United States (US). Jacobs has lower volatility than FLR and MTZ and produces a higher return on investment. It appears that Jacobs might be a relatively more stable and profitable investment option for investors. By calculated results, FLR and MTZ are not recommended due to their high beta values and ROIC values significantly lower than WACC values. Further, this paper discussed the possible risks that may affect the performance of the companies in this industry, as well as the possible challenges they may face. It is important for investors to scrutinize the performance of companies based on the risks and challenges they face, and to be inspired to invest based on beta values, ROIC, and WACC values.

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