Freight Railroad Corporations: Basics and Analysis of Sample Stocks

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Abstract. This paper chose to focus on the industry of freight railroad corporations in the United States because of their particular relevance in the age of online shopping and their steady performance during & after the pandemic. This paper introduces the basics of the United States freight railroad and the moat of this industry. The freight transportation industry covaries strongly with the overall economy, showing stable long-run growth potential and a relatively low risk. The second half of the paper analyzed the stocks of Union Pacific, CSX and Norfolk Southern via key performances index, including current ratio, earning per share, return on equity, etc. Using Union Pacific as an example, this paper calculated the Weight Average Cost of Capital (WACC) by applying the Capital Asset Pricing Model. Overall, freight railroad companies are a good choice to be a part of investment portfolio for its stable return and low risk.

Keywords: Rail Industry · Capital Asset Pricing Model · Risk · Investment · Transportation

1 Introduction

Railroad transportation is not a sector that catches much public attention, nor does it appear under the spotlight in most investor's portfolio. However, the railroad system still makes up a huge part of the United States' transportation today. According to a statistic from the Association of American Railroads in 2020, the US freight network extends over 140,000 miles, generating $219 billion of economic output and $71 billion in wages in the year 2017 alone [1]. It is worth noticing that, unlike the passenger railroad system, the US freight railroads are almost entirely privatized. The major passenger railroad service company in the United States, the National Railroad Passenger Corporation (commonly operated under the name of Amtrak), is owned almost exclusively by the Federal Government of the United States and not publicly traded. The major corporations of the freight railroad, on the other hand, are all publicly traded except BNSF. Therefore, it will be worthwhile to look into this sector as an investor and see if the industry has investment potential. Since the major publicly traded railroad companies are quite homogenous in business model and performance indicators, the author will primarily rely on Union Pacific as an example.

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2 Basics About the Industry Moat

It might be tempting to view the freight railroad industry competition as an oligopoly. Indeed, there are only 7 Class I freight companies outstanding, defined by the Federal Railroad Administration as those with annual operating revenue of $490 million or more.

However, given the very special nature of the industry, it is possible to view each and every one of them as a regional monopoly (Fig. 1).

As it may be noticed from the map by AAR, each of the major corporations occupies a certain part of the railroad market. The western half of America is dominated by BNSF and Union Pacific, while the other is primarily occupied by Norfolk Southern and CSX. In that regard, the bicoastal market looks like two duopolies. But unlike operations in Canada, the vast majority of the freight companies in the United States run on their own tracks exclusively, making them monopolies in their own territory. Compare to most oligopolistic competitions in other sectors of the economy, business expansion in freight railroads is not primarily done by increasing railroad mileage. Instead, most of the expansional investments goes to increasing and improving trains that runs on existing tracks. Also, it might appear counter intuitive that the chief competitor against the geographical expansion of a specific railroad company is not another one of its kind, but truck transportation. Potential track expansion for local coverage will meet sharp diminishing returns to scale, since trucking can enjoy a much lower average cost, significantly smaller initial investment and a much more liquid operation. The incremental cash flow for going into a more local level is unlikely to justify the huge investment that such projects require.

As for long-distance land transportation, freight railroad is both the most cost-effective and the most environmentally friendly. For most interstate shipping, especially those longer than 500 miles, freight rails are much cheaper. According to AAR, trains are also about 3 to 4 times more fuel efficient than trucks [1]. Another study from US

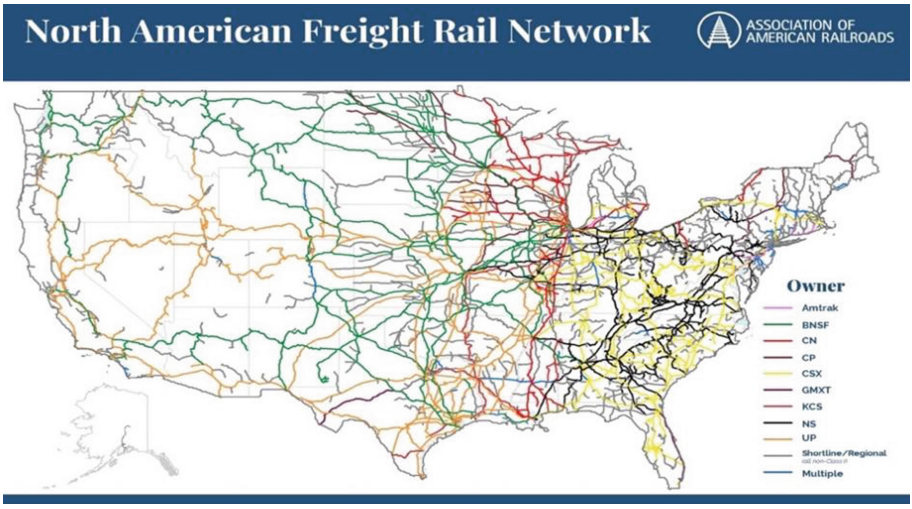

Fig. 1. Freight Railroad by Company Ownership

Environmental Protection Agency points out that railroads account for only 2% of US transportation carbon emissions while carrying 1/3 of all intercity freight volume [2]. Such feature enables freight railroad to be less susceptible to potential governmental regulations against carbon emissions, also making their business stronger against international or political risk. One research in economics introduces the concept of carbon saving profit, and derived new market equilibrium under the current competition model. It found out that with respect to environmental costs, freight rail transport should have a lower price and a higher market share (compare to other transportation methods like highway) [3]. This finding aligns with the economic model of positive externalities, where goods with higher positive/ lower negative externalities will have lower price and higher quantities. So far, freight railroad are unrivaled in terms of carbon efficiency. Still, the chief risk associated with operation is oil price fluctuations. Union Pacific addresses this as one of their financial risks in the 10-K report for the operating year 2021. Since the freight industry takes the initial hit of oil price shocks, it is likely to be affected by a greater proportion.

Apart from that, the demand for freight rail transportation is very inelastic. Even though the percentage volume of bulk commodities moved by freight rail is constantly decreasing over the years, such commodities like coal and corn still make up 52% of the total load [4]. Such goods rely almost exclusively on freight shipping, making the operation of such companies less likely to be swayed by shocks. The remaining half, which is also the primary source of growth in absolute volume over recent years, are consumer goods, such as long-distance shipments from Amazon. This suggests that the future growth in revenue of freight companies is very closely tied to the GDP growth of the nation as a whole. If we assume that the economic activity over the entire US will grow in the long run, then almost certainly so will the revenue of the freight giants. In fact, all of the Class-I corporations reached a positive sales growth over the last year. Furthermore, the government-owned passenger rail service, Amtrak, runs mostly on freight company owned rails, as Amtrak owns very little of the rails they operate on. When Amtrak runs on freight-owned tracks for the majority of their operations, it pays the owner fees. Though Amtrak is constantly losing money over recent years, it still receives a steady government fund to maintain its service. This further ensures the profitability of the freight companies, as rail traffic hardly reaches the full capacity of the rails themselves, allowing Amtrak operation to generate extra revenue for them.

To this day, freight rail is by far the most efficient way of interstate transportation, and is unlikely to be replaced by any drastically innovative technology in the near future. That is why Warren Buffett acquired BNSF in 2009 as part of his “Betting on America” initiative. As investors, we can examine the remaining publicly traded corporations and analyze their performance.

3 Analyzing Major Competitors Through the Lens of 10-K, 2020

The following section will be broken down in two parts: an analysis of key performance indicators of major competitors in the market, and an evaluation of its current price using the capital asset pricing model. This section will rely primarily on data from 10-K released on February 2022 for operational year 2021, and will put emphasis on

Union Pacific, CSX, and Norfolk Southern, the current largest publicly-traded freight rail corporations in the US.

First of all, the largest public freight corporation, Union Pacific, achieved a noticeable Earnings per Share of $9.95 in the previous year, far in the higher end of S&P 500 companies [5]. Being one of the oldest companies in the US, Union Pacific demonstrated its ability to maintain a high profit. One of its competitors in the other half of the US, CSX, has an EPS of $1.68, while Norfolk Southern reached $12.11 EPS in the previous year [6, 7]. Even though these companies vary in EPS, almost all of the Class I freight companies enjoyed an increase in Earning per share over the previous year. In fact, apart from the bounce after 2020 across the entire economy, most of them perform better than their pre-pandemic level.

Union Pacific, CSX, and Norfolk Southern have Return on Equity of 41.9%, 28.4%, and 21%, respectively, while they share a normal Debt to Equity ratio of about 2. This shows that these companies are good at turning equity to profit. But in terms of short-term finance, these corporations differ. CSX has a current ratio of about 1.73: 1, more than enough to pay off the current portion of debt. In fact, last year, CSX has a current ratio of more than 2. Since their current assets are primarily cash or cash equivalents, it might be helpful for them to put part of these current assets into investments or dividends. Therefore, there is a positive outlook for dividends in the future. Norfolk Southern, on the other hand, suffers from a current ratio of only 0.86:1. This is an indicator for risk, since they might be facing a deficit because of the current portion of debt. Even though NS maintained its ability to generate income through operations, it is facing difficulty in short-term financing.

For evaluation, we measure the companies' cost of equity by using the Capital Asset Pricing Model. As reported by NYU Stern in January 2022, the beta parameter for railroad transportation is 0.73 [8]. This shows that railroad corporation, on average, fluctuate less compared to the market portfolio. As for March 31, 2022, S&P 500 reported a one-year return of 14.04%, and here it will be used as the market rate [9]. As for March 31, 2022, US Department of Treasury reported a 1.61% yield on a one-year treasury bill, and it will be used for the risk-free rate in the CAPM calculation [10]. Therefore, the cost of equity for railroad companies is calculated as:

$$\text{Cost of Equity} = 0.0161 + 0.73 * (0.1404 + 0.0161) = 13.0\%.$$

Thus, we have determined an appropriate discount rate for this industry using the data of March 2022. As for the cost of debt, the bond issued by Union Pacific will be used as an example. Union Pacific is currently issuing bond with maturity ranging from T + 90 to T + 160. They generate an annual coupon yield of about 3.5%, and we will use this to approximate the cost of debt. Other freight corporations generally share a similar coupon rate, so Union Pacific will be used as an estimate of the industry. Using the above two parameters, we can calculate Union Pacific's Weight Average Cost of Equity (WACC). (The final element is the volume of debt and equity of the company. Since Union Pacific did not clearly state it in its 10-k for 2021, UNP's 10-Q for the 3rd quarter of 2021 will be used.)

$$\begin{aligned}\text{WACC} &= [\text{ Debt} * \text{Cost of Debt} / (\text{Debt} + \text{Equity})\,] + [\text{ Equity} * \text{Cost of Equity} / (\text{Debt} + \text{Equity})\,] \\ &= [48443 * 0.035/(48443 + 13917)] + [13917 * 0.13/(48443 + 13917)] = 5.62\%.\end{aligned}$$

This value does not include tax. The exact marginal rate of tax is beyond the scope of this paper, and we will use 25% to approximate that. We adjust for tax by using:

$$\text{WACC} = [48443 * 0.035 * (1-25\%)/(48443 + 13917)] + [13917 * 0.13/(48443 + 13917)] = 4.94\%.$$

This rate can be used to discount all annual cash flows in the predictable future. With future discounted cash flows, we can produce an estimate for the net present enterprise value for Union Pacific and other similar corporations. But the data from this year is not ideal for company valuation, and the reason will be explained below. Assume that Free Cash Flow is net CF from Operations plus net CF from investments. From 10K 2020, we know that FCF for Union Pacific in 2020 = 9032 – 2709 = $6323 million. The growth in sales revenue in the previous year is 12%, and we may use it to estimate future growth rate. An important notice here is that this might be a huge overestimate because of the enormous drop—recover effect due to the global pandemic. The growth rate of this year might not be very representative in the long run. With these parameters, we will use a simple way to calculate corporate value:

PV = FCF / (r - g). But notice that the growth rate of this year exceeds required the rate of return, for the most sensible choice of r we can choose from. The problematic parameter this year is g, and we can only compute a reasonable estimate of valuation once we have (or can forecast) a stable long-term growth rate.

Price to Earnings ratio can be used to capture the overall market perception of a corporation's future growth. As for March 31, 2022, Union Pacific, CSX and NS have a P/E ratio of 27.86, 22.55, and 23.8, respectively. With respect to a rail industry P/E ratio of 30 published by NYU Stern, these companies seem to be undervalued. Overall, these freight transportation companies have great potential for investment.

4 Conclusion

This paper has shown that publicly traded freight railroad companies have good potential to fit in investors' portfolio, as they have a promising future growth and a low risk: betting on the railroad companies is close to betting on the market itself. With unique competition structure and a huge barrier to entry, existing railroad companies are likely to maintain their good returns in any perceivable future. The limits to the evaluation of KPI this year are largely due to the context of the global pandemic, since data this year cannot fully capture what it would have been in a stable long run. Apart from that, company valuation is an art as much as it is a science, and a huge number of assumptions need to be made to perform these calculations. This paper is merely an introduction to the freight rail industry, and does not intend to provide an accurate quantitative prediction for their future cash flows. A great amount of work needs to be done for almost every estimate of an element in the valuation, and a better estimate will certainly produce a more informative numerical result.

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