

Comparative Research of Investment Value of Three Technology Companies

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Abstract. This article provides a detailed financial analysis of Intel, Northrop Grumman, and Qualcomm. The aim of this study is to gain insights into the effective investment strategies of these companies. The study included the analysis of the companies' recent financial figures, such as exploring the meaning of various data, and exploring the asset selection challenges faced by four different investor types (including value, PEG, index, and momentum investors). By collecting, analyzing and comparing these data, this paper summarizes the trend of stock investment changes in the past and future. Leveraging established model, value investor tends to buy Intel, PEG investor will buy none of them, Index investor tend to buy Intel and Qualcomm, Momentum investor tends to buy NOC and Qualcomm. Furthermore, the insights gained from these analyses help develop tailored investment strategies, ultimately aiming to optimize financial gains in the technology sector and maximize returns on investment.

Keywords: Stock; Technology; Risk; Profitability; Ratio.

1. Introduction

Many people accumulate wealth through various investments, such as stocks, real estate, bonds, and futures, since the stock market is perceived as more stable, most people choose to invest in it [1]. Additionally, the stock market has a low investment threshold, and its information is transparent and publicly available [2]. Yet, with numerous companies listed on the stock market, the primary challenge investors face is selecting the right stocks. Investors aim to choose stocks with high returns and low risk, but high returns typically come with high risk, and low risks come with low returns [3]. Since the Internet boom in the 1990s, technology stocks have been a popular choice in the investment community. Although technology stock has experienced a bubble burst, technology stocks are still very vibrant [4]. The companies selected in this article are representative companies in the semiconductor industry and military industry and are also companies with relatively high investment popularity. This research undertook an extensive analysis of the investment behaviors exhibited by four distinct investor profiles using their financial data and models.

2. Brief Introduction

Qualcomm was established in 1985 by Irwins Jacobs and six other co-founders. It is an American multinational corporation headquartered in San Diego, California. It designs semiconductor, software and services related to wireless technology. It creates the standard of 5G,4G, CDMA2000, TD-SCDMA and WCDMA mobile communications standards. Known for its early work on CDMA technology, Qualcomm has expanded its portfolio to include semiconductor products and software for a variety of devices, including vehicles, watches, laptops, Wi-Fi systems, and smartphones, operating primarily through a fabless manufacturing model.

Intel is a leading digital chipmaker that designs and manufactures microprocessors for the personal computer and data center markets. It is known for executing Moore's Law (predicting that the number of transistors on an integrated circuit will double approximately every two years) and the x86 architecture for microprocessors, which is the instruction set for nearly all other personal computers [5]. Intel was the best-performing company and dominant player in the industry during the tech stock



boom of the late 1990s [6]. In recent years, however, Intel has fallen behind the changing semiconductor landscape and competition in its core business lines has intensified as demand has shifted from personal computers to mobile devices and cloud computing. While Intel is trying to catch up to TSMC's manufacturing levels. Intel has also developed some artificial intelligence products, but its efforts are nowhere near those of larger companies such as Nvidia [7].

Northrop Grumman build advanced aircraft and rocket. Only Lockheed Martin and Boeing can compete with it. Northrop Grumman is an American multinational aerospace and defense company with 95,000 employees and annual sales of more than \$30 billion. It is one of the world's largest weapons manufacturers and suppliers of military technology. They build advanced aircraft and rocket. Only Lockheed Martin and Boeing can compete with it. The firm ranked No.101 on the 2022 Fortune 500 list of America's largest corporations. In the future, with the introduction of weapons replacement plans by the U.S. forces. Especially the USAF's new generation bomber plan and the scale expansion of USSF. There is no doubt NOC will dominate the project. So, the investment of NOC is still worth looking forward to.

3. Risk

Risk refers to potential loss with investing capital into various assets, like real asset, stock, bonds. Risk assessment is primarily based on stock price and financial data. It usually related to the company's financial health [8]. This article selects the following 3 indicators to measure the risk. Market capitalization measures the total value of a publicly traded company's outstanding shares. Beta is an indicator of how the price of a specific stock tends to move in comparison to the movements of a broader market index. The Total Debt Ratio is a financial metric intended to measure the proportion of a company's overall assets that are financed by debt. This indicator provides valuable insights into the level of leverage a company employs to support its operational activities and investment efforts. The relevant indicators of the three selected companies are shown in Table 1 below.

Table 1. Risk

Risk	Market cap	Beta	Total Debt ratio
Qualcomm	193.101B	1.27	8.92%
Intel	88.284B	1.05	42.50%
Northrop Grumman	73.664B	0.32	70.00%

According to the table, all of them are big companies since their market capitalization are more than 100 billion or nearly more than 100B. These three companies are all part of the Fortune Global 500 and are leaders in their respective fields.

The Beta of Qualcomm is 1.27 which is the highest one. This shows that the change in stock prices is highly correlated with the market index. This also means Qualcomm is the highest risk to invest. The Beta of Intel is also greater than 1. In fact, the Beta ratio of their peers also larger than 1. This is obviously because they are popular for investment. The Beta of Northrop Grumman is 0.32 which indicate the stock is not highly correlated with the market ratio. This is obviously related to its unique business. It has a stable source of customers (US government). A small number of competitors (only Boeing and LMT) and stable order have given it a very low risk.

The Debt ratio of Qualcomm is the lowest among three companies. Among similar enterprises, this is also the lowest. But the Debt ratio of Intel is not good like Qualcomm. Because of Intel's deteriorating business situation. Its debt keeps ballooning. In recent years, Intel's debt keeps ballooning. Its liquidity is enough to repay 2/3 of its debt in 2023. But today, as you see that. That is about 1/2 Northrop Grumman got the highest Debt ratio among three companies, that is about 70.00%.

But thanks to the credibility brought by its unique business structure, it is nothing and its liquidity is enough to pay its debt [9].

4. Profitability

Profitability is the ability to generate profits or positive financial returns from business operations. It provides insight into a company's ability to create value for shareholders and sustain operations over the long term [10]. The study selected four indicators to measure risk. Total Assets (TA) is the sum of all valuable resources owned by a company or individual. Profitability is a financial ratio that represents the difference between revenue and costs. Return on Assets (ROA) is a financial ratio used to measure a company's ability to generate profits. Return on Equity (ROE) is a financial ratio used to evaluate a company's profitability relative to shareholders' ownership. The relevant indicators of the three selected companies are shown in Table 2 below.

Table 2. Profitability

	Intel	Northrop Grumman	Qualcomm
Total asset	28.10%	84.41%	17.70%
Profit margin	7.36%	5.38%	23.03%
ROA	0.24%	3.81%	11.14%
ROE	3.79%	14.70%	38.27%

For total Assets. Northrop Grumman has the highest percentage of total assets at 84.41%, indicating it has a larger asset base relative to its size compared to Intel and Qualcomm. For Profit Margin. Qualcomm has the highest profit margin at 23.03%, suggesting it is the most profitable company among the three in terms of revenue relative to expenses. For ROA. Qualcomm also leads in ROA with 11.14%, indicating it is the most efficient in generating profit from its assets. For ROE. Qualcomm again has the highest ROE at 38.27%, showing it provides the highest return to its shareholders. Overall, Qualcomm appears to be the most profitable and efficient company based on the given metrics, while Northrop Grumman has the largest asset base. Intel shows moderate performance across all metrics.

5. Market Ratio

Market ratio refers to various ratios used to evaluate a company's performance and market value. The research selects 4 Common ratios. The price-to-earnings ratio (P/E) is a ratio used to evaluate the value of a company. The price-to-book ratio (P/B) is a measure of book value. The price-to-earnings growth (PEG) is a financial ratio used to evaluate the relationship between a company's price-to-earnings ratio and its projected earnings growth rate. Momentum (Mom) is a trading strategy used when a stock is rising or falling significantly. The relevant indicators of the three selected companies are shown in Table 3 below.

Table 3. Market ratio

Market ratio	PE	PB	PEG	Momentum(200days)
Qualcomm	22.02	7.83	1.24	2.98
Intel	86.94	0.77	1.96	-10.49
NOC	32.90	5.15	1.00	20.44

According to the table Qualcomm and Northrop Grumman and Qualcomm are growth stocks because of the high PE and PB ratio. And they maintain a positive momentum. This is obviously because they

are a popular choice for investors. Compared with the others in the table. Intel’s performance is very poor, although it still maintains a high PE ratio.

6. Asset Selection

This paper analysis the selection of 4 types of investors in these 3 stocks.

Value investor tends to focus on identifying and purchasing stocks or other assets that appear to be undervalued by the market. The core principle of value investing is to buy securities for less than their intrinsic value, with the expectation that the market will eventually recognize and correct the mispricing, leading to capital appreciation. PEG investor is an individual who uses the Price/Earnings to Growth (PEG) ratio as a primary tool to evaluate and select stocks for investment. PEG investors focus on identifying stocks that are undervalued relative to their earnings growth potential. By incorporating the company's growth rate into the valuation process, PEG investors aim to find stocks that offer a good balance between price and growth prospects. Index investor is someone who follows a passive investment strategy by investing in index funds or exchange-traded funds (ETFs) that aim to replicate the performance of a specific market index. Momentum investor is an individual who employs a trading strategy that seeks to capitalize on the continuation of existing trends in the market. This strategy is based on the idea that stocks or other assets that have performed well in the past will continue to perform well in the future, and similarly, that poorly performing stocks will continue to underperform. Momentum investors attempt to buy securities that are trending upwards and sell them when they show signs of reversing, or short-sell securities that are trending downwards and cover the position when they show signs of recovery. The result of asset selection is presented in the following Table 4.

Table 4. The asset selection

Type of investor	Intel	Qualcomm	NOC
Value	Y		
PEG			
Index	Y	Y	
Momentum		Y	Y

Based on the PEG data alone, none of the three companies seem to be the choice for value investors. However, the core of value investing lies in selecting companies whose value is underestimated. Although Intel's stock performance has been poor in the past two years, with the bold reforms mentioned earlier, Intel's stock value seems likely to turn around in the future. All three companies have PEG ratios greater than 1, so PEG investors would not choose these three companies. Index investors value the positive correlation between stock prices and market indices, so they would choose Intel and Qualcomm, as these two companies have a high correlation with market indices. Qualcomm and Northrop Grumman have significant Momentum indices, making them the choice for Momentum investors.

7. Conclusion

This research a detailed financial analysis of three technology companies: Qualcomm, Intel, and Northrop Grumman. The study seeks to develop practical investment guidance for technology stock investor by analyzing current financial metrics of three companies in the search and investigating the risk encountered by four distinct types of investors. The indicators of the three companies are very different, so it is obvious that investors do not have a convergence in their choices among the three companies. In conclusion, value and index investor tends to buy Intel, Index and momentum investor tends to buy Qualcomm, only momentum investor tends to buy NOC.

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