

Stock Comparison of the Internet Software Industry and the Internet Hardware Industry Between the Ex-Pandemic Period and Pandemic Period

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Abstract. The spreading use of the Internet brings attention to the stock market. More and more investors are willing to invest their stocks in companies working on the Internet, making these companies an inevitable force in the stock markets. However, the pandemic makes the situation of the stock market different. As a result, based on the data from the representative companies, the passage uses the quantitative analysis method to study and compare the stock trend of the representative companies before the pandemic and after the pandemic. By collecting the different data from those six companies firstly, the passage creates the charts to visualize the data and compares the data before the pandemic and those during the pandemic. The result is that the stocks of the software industry have a better performance during the pandemic, and investing in the stocks of hardware industries has more risks than investing in software industries.

Keywords: Internet; Software Industry; Hardware Industry; Stocks Analysis.

1. Introduction

In the latter two decades of the 20th century, the Internet arose, grew, and expanded, altering the structure, operation, politics, economy, and culture of the world. Internet usage increases dependence [1].

The Internet has grown tremendously in the past decade. Internet growth since 2010 is noted in the "CNGI Construction Market Foresight and Investment Strategic Planning Analysis Report." The World Bank and IWS anticipate that there will be 5.169 billion Internet users by 2021. According to researchers, the Internet has spawned a new society. [2]

The Internet expanded the network economy. IT progress. Hardware enterprise ring sales reached \$690 million in 2021 and will reach \$1 billion in 2028, a 6.0% compound annual growth rate (CAGR) (2022-2028)[3]. The global software market will reach \$134.99 billion in 2020, up 1.8% from 2019, as "non-contact" demand increases as a result of Newcastle pneumonia and managed services investment decreases to \$704.3 billion, down 2.2% from 2019. The demand for non-contact corporate processes and cloud services increased by 6.6% to \$645.6 billion[4].

According to global media, all Internet service providers will battle holiday shoppers[5]. Apple is backed by Google, Amazon, Facebook, and Microsoft. Google Pixel phones, Microsoft Surface tablets and laptops, Oculus VR, Alexa-compatible gadgets. Web and software titans enter the hardware market. Apple is superb. IDC estimates that Pixel phones represent 1% of the market. IDC's Ramon Llamas asserts that these companies produce outstanding software. When they integrate their software and hardware, they get devoted customers[6].

Why do software businesses offer hardware? Internet investments: how profitable are they? Is it lucky or foolish? Software or hardware? This essay will examine all of these factors that impact Internet information investor decisions.

Literature on the Internet information sector consists of analyses of Internet information firms as a whole, software companies, hardware companies, the stock market of software companies before and after the epidemic, and the stock market of hardware companies. M Andreessen(2011) was

considering dumping its ailing PC business in favor of spending more capital[7]. He believed software was eating the world. Barry F. and Van Egeraat. (2008) was researching the demise of the computer hardware industry[8]. He felt that the rising knowledge of the workforce would raise the adaptability of the labor market for suggested hardware companies the vast majority of the research tends to evaluate investment in the Internet information sector from either one of the hardware companies or software companies, and the time period is limited to either phase before or during the epidemic, which is rather singular. Based on the study by Nateson C and Renukadevi P, who studied modern investment of software, and the study by Terry N, Macy A, and Abdullat A, who study the market of hardware, this essay will examine the investment worth of the sector by comparing the performance of hardware and software companies in the Internet information industry before and during the outbreak[9][10].

2. Internet Hardware Industry

2.1 Introduction to the Companies

The main hardware for the Internet Information industry is computers, as a result, the three companies in this essay for hardware are companies that have a great connection with computers. The first one is Intel Corporation (INTC), and this company is famous as the producer of microprocessors found in a large number of personal computers around the world. At the same time, it not only produces microprocessors, but also produces flash memory, motherboard chipset, and other computing devices. The products they produced are widely used by target Computer companies such as Dell, HP, and Lenovo. The second company in this industry is Advanced Micro Devices (AMD). As a rising company these few years, it produces similar products as Intel like microprocessors. It is also a company famous for its graphic technologies which provide a reasonable price to the consumers. Lastly, Nvidia (NVDA) is a company known for designing graphics processing units. Although it does not produce as many products as Intel and AMD, it has a strong market performance compared to AMD and Intel.

2.2 Risk

2.2.1 Current Time Period

The main hardware for the Internet Information industry is computers, as a result, the three companies in this essay for hardware are companies that have a great connection with computers. The first one is Intel Corporation (INTC), and this company is famous as the producer of microprocessors found in a large number of personal computers around the world. At the same time, it not only produces microprocessors, but also produces flash memory, motherboard chipset, and other computing devices. The products they produced are widely used by target Computer companies such as Dell, HP, and Lenovo. The second company in this industry is Advanced Micro Devices (AMD). As a rising company these few years, it produces similar products as Intel like microprocessors. It is also a company famous for its graphic technologies which provide a reasonable price to the consumers. Lastly, Nvidia (NVDA) is a company known for designing graphics processing units. Although it does not produce as many products as Intel and AMD, it has a strong market performance compared to AMD and Intel, as shown in Table.1.

Table 1. Recent Data From NVDA, INTC and AMD

Company	NVDA	INTC	AMD
Current Ratio	5.32	2.13	2.4
Quick Ratio	4.75	1.73	1.96
Debt Ratio	0.26	0.36	0.17
Debt/Equity Ratio	0.42	0.35	0.21
Beta	1.64	0.67	1.94

2.2.2 The Ex-Pandemic Period

From 2016 to 2018, the Debt-Equity Ratio for INTC and NVDA has a close value, approximately 0. The value of the Debt-Equity ratio gives the information that these two companies do not rely on borrowing money for their finance. The trending of their data is pretty like a straight line, which shows that they kept themselves in a safe place. AMD is the special one, and it shows that they were pretty risky during this time period. The value of the Debt-Equity ratio kept changing for three years. Before the second quarter, they got a negative Debt-Equity Ratio, which shows that they have more liabilities than their assets, and it is a warning sign. After the third quarter of 2016, the value of the Debt-Equity ratio seems too high, and the highest one is approximately about 6 in the third quarter of 2016. With such a high value, there was too much debt in this company. Things are becoming better after this quarter, the value constantly drops every quarter, which is a good sign that they were trying to clean out their debt to avoid too many risks. At the end of 2018, the Debt-Equity ratio came to 2, which is a safe number for this ratio.

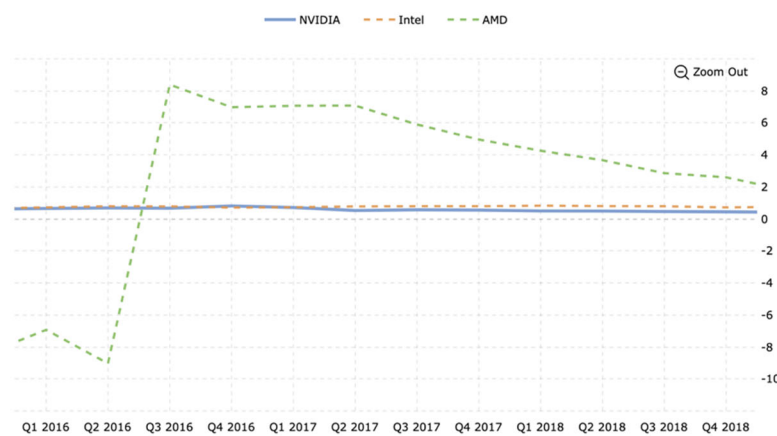


Figure 1. Debt-Equity Ratio in the Ex-Pandemic Period

2.2.3 Pandemic Period

The trending of these companies is quite different from each other. AMD, had the lowest value of the Debt-Equity ratio in the second quarter of 2022, and the chart shows that the value of the ratio keeps decreasing during the pandemic. For INTC, they keep the value of the ratio almost the same during the pandemic, and there is not too much increase or decrease. For NVDA, the chart shows that the value increases during the pandemic, especially in the first two quarters of 2020, and after this, they keep this value until the second quarter of 2022. In the second quarter of 2022, INTC and NVDA share a common value of Debt-Equity ratio, around 0.5.

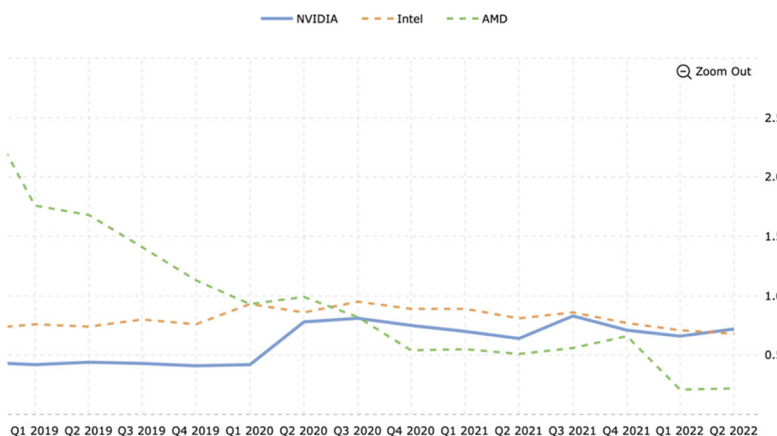


Figure 2. Debt-Equity Ratio in the Pandemic Period

2.3 Profitability

2.3.1 Current Time Period

There are two ways to value the profitability of three companies, and one of them is the product. Asset Turnover and Profit Margin can show how their products perform in the market. According to the graph, NVDA has the highest value of asset turnover, which means that they can sell their product fast and have lots of consumers buying their product. With more and more selling, they can gain lots of profit. The asset turnover of INTC is higher than AMD. AMD does not seem to have a competitive value compared to INTC and NVDA because they hold the lowest value of asset turnover and profit margin. Profit margin is an important factor in profitability, which shows how much profit the company can gain by selling a single product. The graph shows that INTC has the highest profit margin, 0.32, which means that it can gain the greatest profit by selling one product. The profit margin of NVDA is a little higher than AMD. ROE and ROA are two important values that show the return for the shareholder based on a different perspective. As the graph shows, INTC has the highest value of ROA and ROE, which shows that shareholders might be able to gain the greatest return by buying and selling the stocks. Although there is a visible difference between the ROE of INTC and NVDA, the difference between the ROA of the two companies is pretty small. However, AMD has an extremely small number of both ROE and ROA compared to INTC and NVDA, which shows that in the short term, their profitability might be not as good as INTC and NVDA, as shown in Chart.2.3.1.1 and Chart2.3.1.2.

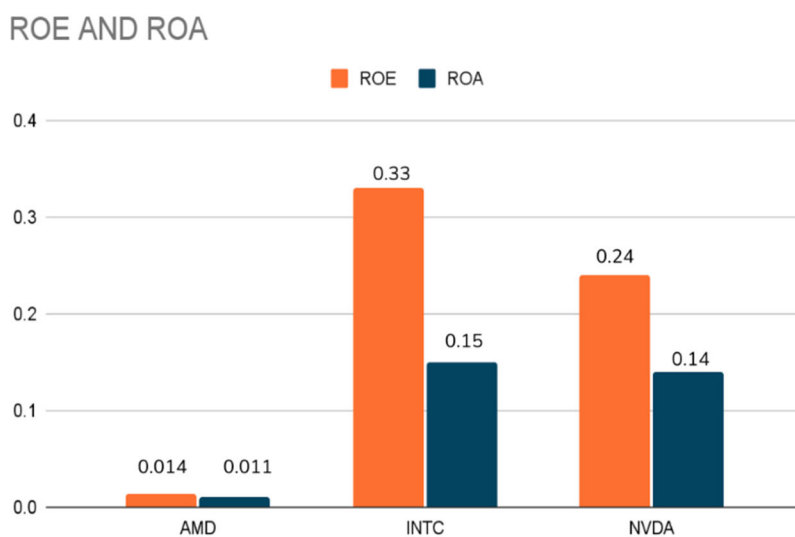


Figure 3. ROE and ROA in Recent Period

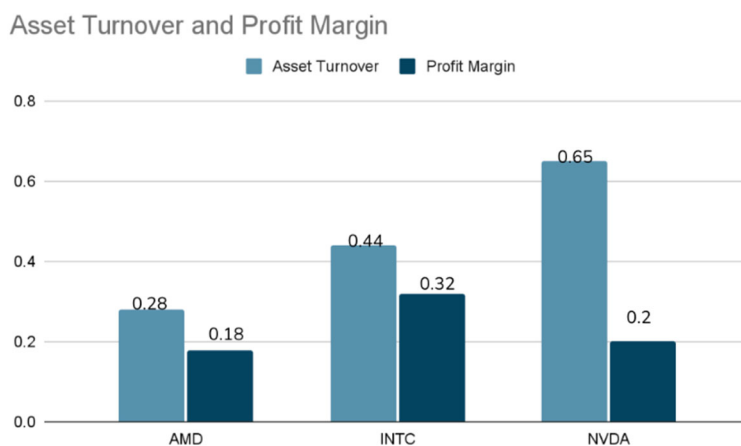


Figure 4. Asset Turnover and Profit Margin in Recent Period

2.3.2 Ex-Pandemic Period

Before the pandemic, both NVDA and AMD seem to have increased in the ROE, and NVDA constantly grows every quarter. At the highest point, it has 3.29, which is a strong number to show their ability to get profit. Although AMD does not have value as much as AMD, at the end of 2018, they still get 1 for the ROE. In contrast, the ROE of INTC keeps negative for a long time, which warns people of their ability to produce profits. By the end of 2017, the value begins to increase, and it reaches 0.48 at the end of 2018. Still, the trend of this chart is increasing, which shows that all of these companies increase their profit before the pandemic.

At the beginning of 2016, all of these three companies share a similar value of asset turnover. As time moves on, NVDA and AMD have higher and higher asset turnover. At the end of 2018, NVDA got 0.548 for asset turnover, and AMD has 0.34 the asset turnover. In contrast, INTC has a totally different situation in which the value of asset turnover keeps decreasing. They have had a negative value of asset turnover since the middle of 2016, which warns that their products do not reflect positive signs in the market. There is a huge difference between the value of INTC and the value of AMD or NVDA.

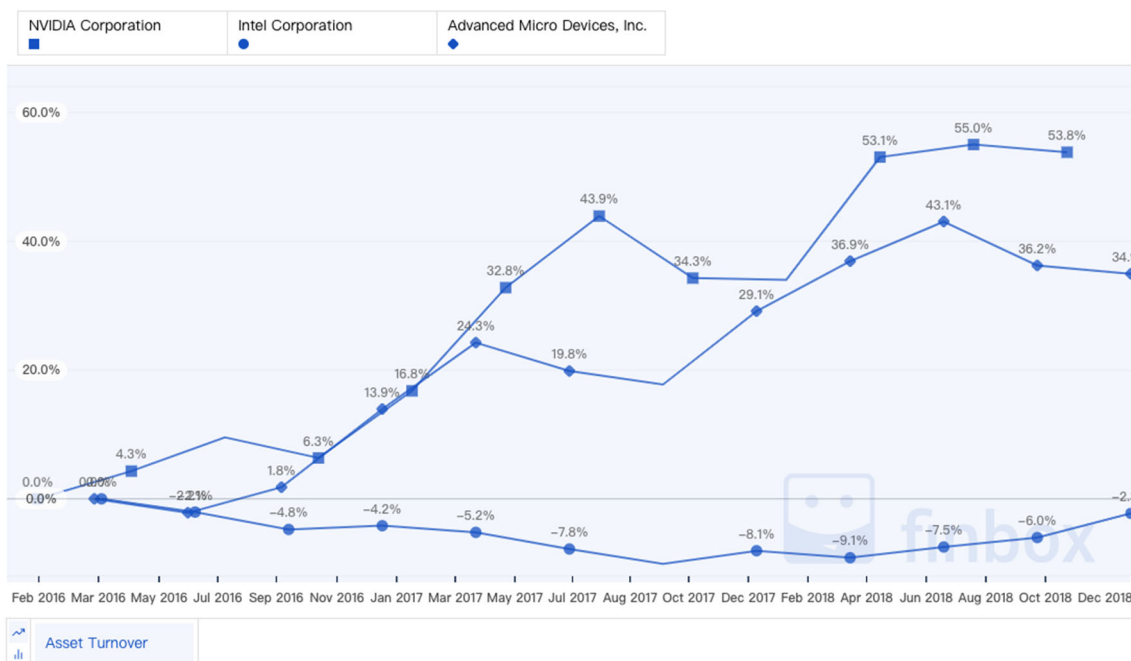


Figure 5. Asset Turnover in Ex-Pandemic Period

2.3.3 Pandemic Period

For the ROE, there is a huge difference for NVDA. The overall situation for NVDA is that they still got increment for asset turnover, but the trend of the ROE is too unstable. There is a huge increment between June 2019 to September 2021, but after that, there is a huge decrease until the end of 2022. For AMD and INTC, the overall trend is pretty stable, and there is not too much change in ROE. No matter at the beginning of 2018 or the end of 2022, the value of ROE is always the same.

The pandemic has had a great impact on the market of these three companies, all of the companies have a huge decrease in asset turnover. For INTC and AMD, they have a similar trend and value of asset turnover before the September of 2020, AMD had a huge increase for a short time and a huge decrease suddenly. In the end, it had such a low number for asset turnover. In comparison, INTC had the highest value of asset turnover among these three companies. For NVDA, it did not have too much change for the asset turnover. Although the value of asset turnover decreased for a few months, it constantly increased after the April of 2020. Overall, the pandemic had a great impact on the whole industry, and it made the profitability of the industry decrease.

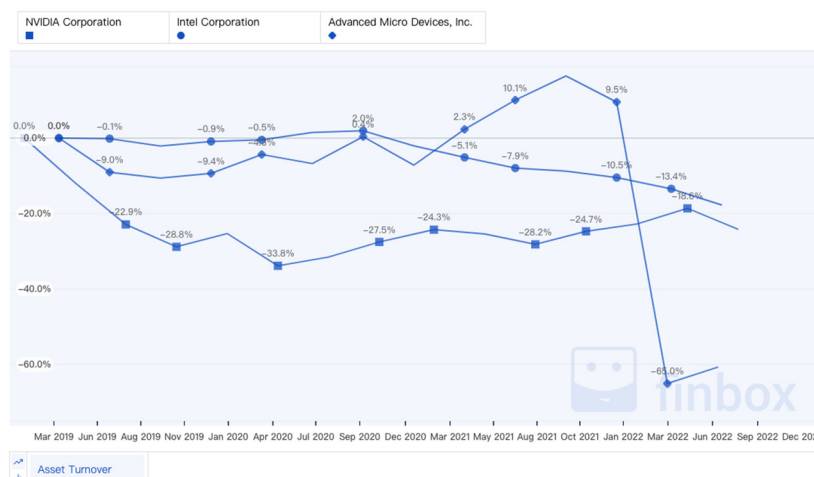


Figure 6. Asset Turnover in Pandemic Period

2.4 Market Ratio

2.4.1 Current Period

There are different ratios to solve the question that what kinds of investors will buy this stock. For INTC, the value investor will be interested in it. The PE Ratio is smaller than 10, which means that investors do not need to spend too much on the stocks. The PB Ratio is close to 1, and the dividend yield is close to 5. All of these are the signs that value investors will add this stock to their portfolio. In comparison, the PE Ratio for NVDA and AMD is too high, which means that they might overpay for the stock. PEG Investors might be attracted to AMD because the PEG Ratio is close to 1. The main idea of the PEG ratio is to not overpay for the stock. The PEG Ratio for AMD shows a strong sign that the price of the stock is appropriate. None of these stocks will be attractive to the momentum investor, and the reason is that the stock price is usually lower than the 200-day moving average. In the current three months, the buying from insiders is more than the sale from the insider, which is what insider buyers would love to see. Especially for NVDA, there is 7.5% of stock buybacks, and this makes insider buyers more confident in buying this stock.

Table 2. Market Ratio in Recent Period

COMPANY	NVDA	INTC	AMD
PE Ratio	47.95	5.93	32.88
PB Ratio	17.5	1.44	2.77
Dividend Yield	0.087%	4.02%	0%
PEG Ratio	2.65	2.03	1.09
200 Day Moving Average	232.26	46.76	113.12
Stock Price	181.28	35.56	100.78
Insider Buying/Sale	3,747,996/940,550	333,819/26,763	1,354,543/318,800
Stock Buybacks	7.5%	0%	3.5%

2.4.1 Ex-Pandemic Period

The reason why using the P/E ratio to value the market ratio is that it shows whether the stock is overpaid. According to the chart, AMD has such a huge change in P/E. This gives the idea that the value of the stock of AMD is very unstable, and the shareholders have to take some risks while holding this stock. In comparison to NVDA and INTC, the overall trend is that the value of the P/E ratio is almost the same. Comparing the value at the beginning of 2016 and the end of 2018, NVDA and INTC have almost the same value of P/E ratio.

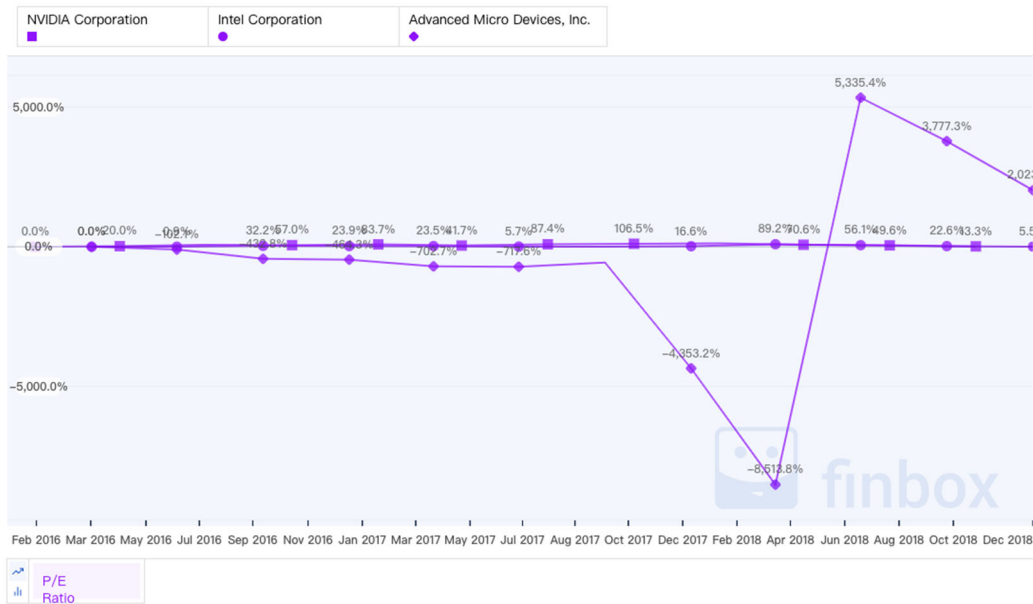


Figure 7. P/E Ratio in Ex-Pandemic Period

2.4.2 Pandemic Period

During the pandemic, these three companies have different situations. For NVDA, there is an increment from the beginning of 2019 to the end of 2022. However, the P/E ratio keeps decreasing since October of 2021. AMD also has a similar trend. The value of the P/E ratio decreased from January 2020 to the end of 2022. The difference between these two companies is that the overall trend of NVDA is an increment. For INTC, although there is a little decrease in the value, it is not as much a decrease as AMD. Overall, most companies can not hold their P/E value as the value before the pandemic, but some companies increase their P/E ratio during the pandemic.



Figure 8. P/E Ratio in Pandemic Period

3. Internet Software Industry

3.1 Introduction to the Companies

Software firms produce computer software, system integration, application services, and other associated technical services as their primary business and source of income. Therefore, the three software businesses included in this thesis are all closely tied to this topic. Facebook is one business. The American online social networking site Facebook is owned by Meta Platforms. Facebook's

declared aim is to increase global accessibility and connectivity. People use Facebook to stay in touch with family and friends, discover what's happening in the world, and share and express their values. Amazon is a big Internet-based company that sells books, music, movies, housewares, gadgets, and toys directly to its millions of consumers or as an intermediary between other retailers and its customers. Microsoft Office is a suite of applications designed to boost productivity and simplify basic computing tasks. You can create and change documents with text and photos, work with spreadsheets and database data, and make presentations and posters.

3.2 Risk

3.2.1 Current Period

The first step in evaluating the risk of these three stocks is to compare their market capitalization. AMZN and MSFT possess more than \$1 trillion, indicating that there is no risk from a market capitalization perspective. However, META's market capitalization is less than \$500 billion. The following value is debt. According to the graph, META's and MSFT's current ratios are greater than 2, which is a positive indicator that these two companies do not need to worry as much about their debt as AMZN, which has a current ratio of 0.95.

META has the greatest current ratio, 5.43, which offers investors confidence despite the risk involved. Compared to the average technology sector current ratio of 2.21 percent, the technology sector's strong current ratio is 5.43 percent. Even if the quick ratios are lower than the current ratios, they are still above the norm for the technology industry. The average quick ratio in the technology industry is 0.91, and all of these firms' quick ratios are greater than this average. The reason why fast ratios are lower than current ratios is likely due to the importance of inventory in current assets.

AMZN has the largest debt ratio among these three companies, at 0.674%, but investors do not need to be very concerned because all three can quickly sell their products, such as laptops, and pay back their debt. Due to the most recent quarter's data, it is difficult to determine whether 0.674 is a warning indication. Comparing the debt ratios of these organizations to the average debt ratio of 1.34 reveals that they are all able to effectively manage their balance condition. This information indicates that the companies do not have a large leverage risk, so they are not concerned about how to handle their debts. One of the most essential values for investors is the Debt/Equity ratio, which indicates how much risk shareholders must assume when investing. AMZN surprisingly has the highest number, 2.44. This alerts potential investors that they must assume a far greater risk than META and MSFT investors. By comparing all debt and equity ratio values to the average value in the technology sector, it is evident that the value of these companies is significantly lower than the sector average. Beta is another approach to assessing risk. According to the chart below, Facebook has the greatest value, 1.41, indicating that this stock may be the riskiest, while MSFT has the lowest value, 0.93, indicating that this stock may be the safest.

Table 3. The Risk Indicators of MSFT, AMZN, META

Stock	Debt ratio	Current ratio	Market cap	Quick ratio	Debt/Equity Ratio	Beta
META	0.25	5.43	427.589 B	2.34	0.00	0.79
AMZN	0.674	0.95	1.231 T	0.68	2.44	1.33
MSFT	0.527	2.17	1.231 T	1.75	1.19	0.63

3.2.2 Ex-Pandemic Period

From 2016 to 2018, MSFT and AMZN have comparable Debt-Equity Ratios, whilst META is close to 0. META's debt condition is relatively stable. MSFT and AMZN have very identical shifting total debt trends. AMZN has the biggest overall debt among these companies, and the graph demonstrates that their debt changes gradually each year. AMZN 's total debt at the end of the fourth quarter of 2017 was approximately 2.7, whilst MSFT and META have only 1.7 and 0.3, respectively.

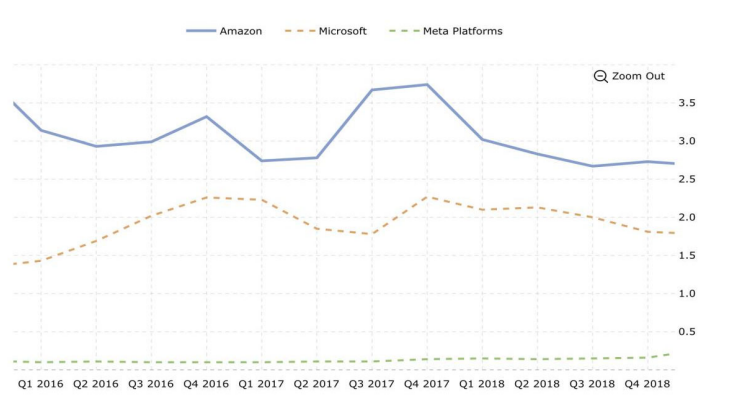


Figure 9. Debt-Equity Ratio from 2016-2018 (source: www. macrotrends.net)

3.2.2 Pandemic Period

The general trends of these companies are comparable. All three variables changed throughout the course of three years. For AMZN and MSFT, the Debt-Equity ratio was lower in the second quarter of 2022 compared to the first quarter of 2019. During the pandemic, the value of the META ratio remains nearly constant, with no excessive increases or decreases. In contrast to the other two equities, its debt-to-equity ratio was greater in the second quarter of 2022 than it was in the same period of 2019.

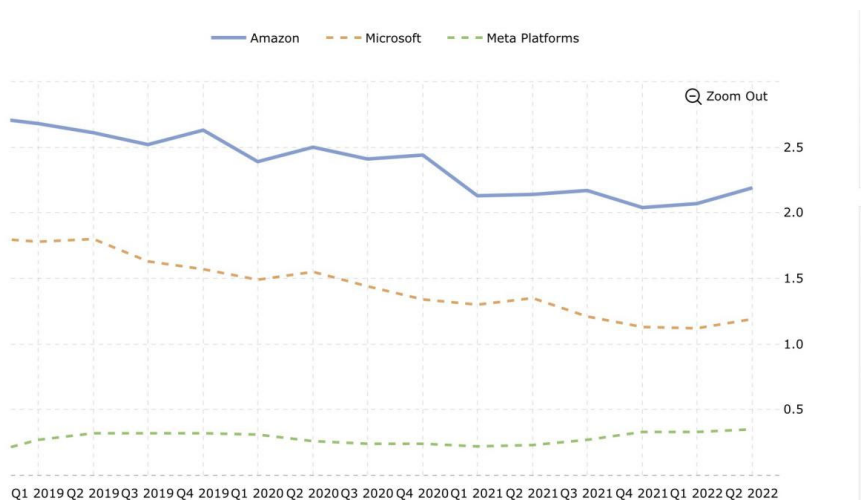


Figure 10. Debt-Equity Ratio in Pandemic Period (source: www.macrotrends.net)

3.3 Profitability

3.3.1 Current Period

There are two techniques to determine the profitability of three companies, with the product being one of them. Asset Turnover and Profit Margin can demonstrate the market performance of a company's products. According to the graph, AMZN has the largest asset turnover value, indicating that it can sell its products quickly to a large number of consumers. With increasing sales, they can generate substantial profits. META has a greater asset turnover than Microsoft. MSFT differs from META and AMZN because its asset turnover and profit margin are the lowest and largest, respectively. The profit margin is an essential aspect of a company's profitability since it indicates how much profit can be generated from the sale of a single product. The table reveals that Microsoft has the highest profit margin, at 33.89 percent, indicating that the company can earn the most profit by selling a single product. ROE and ROA are two essential metrics that illustrate the shareholder return from distinct perspectives. According to the data, MSFT has the best ROA and ROE, indicating that shareholders may obtain the biggest return by purchasing and selling the stock. MSFT's

profitability figures surpass META's by seven percentage points. Microsoft can provide investors with greater rewards. META can improve financial security. AMZN has a very low ROE and ROA compared to META and MSFT, indicating that its short-term profitability may not be as excellent as META and MSFT. Negative indicators for AMZN have permitted us to dismiss the company's profitability.

Table 4. The Profitability Indicators of MSFT, AMZN, META

Stock	ROE	ROA	Asset turnover	Profit margin
META	6.02%	4.33%	71%	26.75%
AMZN	-6.1%	-1.95%	120%	-3.30%
MSFT	45.36%	22.51%	58%	33.89%

3.3.2 Ex-Pandemic Period

Before the pandemic, the ROE of both META and AMZN appeared to be on an upward trajectory, with the exception of Q4 2018 for META. At its peak, it has a 27% profit margin, which is a good indicator of its potential to generate profit. Microsoft's return on equity reaches a peak of 40% in the fourth quarter of 2018, demonstrating its ability to generate profits. By the end of 2017, AMZN's value begins to decline, reaching 10% in the third quarter of 2017. Still, this chart's upward trend indicates that all of these businesses increased their profits before the epidemic.

Beginning in 2016, all of these three companies have comparable asset turnover values. As time progresses, META's asset turnover rate increases. At the end of 2018, META's asset turnover rate was 45%. AMZN and MSFT are in completely different situations as their asset turnover values continue to decline. Since the middle of 2016, their asset turnover values have been negative, indicating that their products do not reflect a positive sign on the market. There is a substantial difference in value between META and MSFT or AMZN.

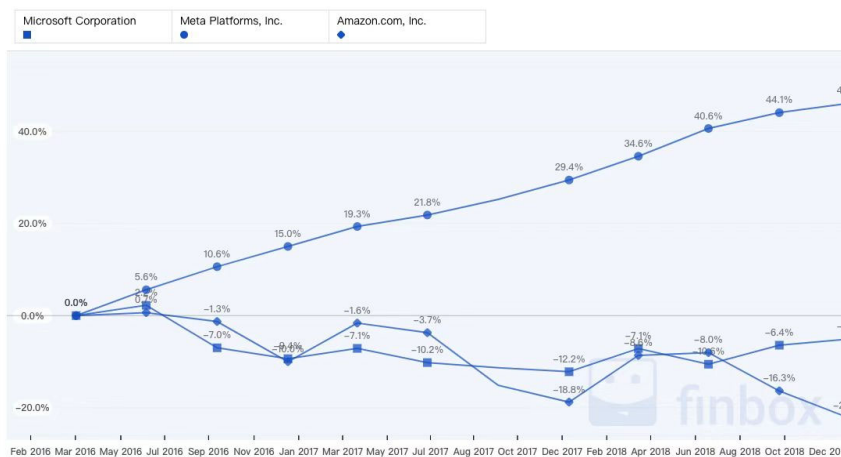


Figure 11. Asset Turnover in Pandemic Period (source: finbox.com)

3.3.3 Pandemic Period

Both MSFT and META displayed a similar pattern of growth during the Pandemic; however, the value of MSFT's return on equity was continuously higher than that of META. It has been stated that Microsoft is the most competitive company out of the three, and that it also has the highest return on equity. In contrast, Amazon's return on equity reached its all-time low in 2022, when it was less than 10% of the company's total revenue.

Beginning in 2019, the asset turnover values of these three companies are equivalent. MSFT and META's asset turnover rate grows as time passes. Both META and MSFT attained the maximum asset turnover rate of 22.9 percent in the second quarter of 2022. AMZN was in a drastically different position as its asset turnover values continue to decrease. Since the middle of 2019, the company's asset turnover values have been negative, showing that its products do not carry a favorable market

signal. The minimum figure was -20.2%. There is a considerable gap between AMZN and MSFT or META in terms of valuation.



Figure 12. Asset Turnover from Pandemic Period source: finbox.com

3.4 Market Ratio

3.4.1 Current Period

There are various ratios for answering the question of what types of investors will purchase this company. Amazon.com Inc. has the lowest investment value of the three stocks. The META stock is perfect for value investors, long-term financial management, and a low level of risk. The P/E Ratio is less than 15, indicating that investors do not need to invest excessively in equities. The PB Ratio approaches 1. All of these are indications that value investors will purchase this stock. Comparatively, the P/E Ratio of META and MSFT is too high, indicating that they may overpay for the company. MSFT stock is suitable for PEG investors who can only hold it for a limited time owing to its rapid growth pace. The company's earnings are not an issue; nonetheless, its asset turnover rate is exceptionally low, and it faces unforeseen obstacles. It is possible to purchase an item at a low price and then sell it for a substantial profit. The purpose of the PEG ratio is to prevent overpaying for a stock. The META PEG Ratio is a solid indicator that the stock price is appropriate. Based on the overall P/E and P/E relative growth rates of the three companies, there is no doubt that META is the superior alternative, as it has the lowest P/E and the lowest relative growth rate compared to the other two, both of which testifies to the stock's consistent and good earnings effect.

Table 5. The Market Ratio Indicators of MSFT, AMZN, META

Stock	PB ratio	PEG ratio	PE ratio	Momentum
META	3.41	1.45	13.18	0.43
AMZN	9.29	6.95	60.97	27.14
MSFT	12.61	2.57	26.9	11.57

3.4.2 Ex-Pandemic Period

Before the epidemic, the P/E ratio of META and MSFT stayed unchanged at less than 50 percent of their respective values. After the end of the third quarter of 2017, there was a noticeable shift in the dynamic between AMZN and the other two companies, which caused the distance between them to widen. AMZN continued to have the highest P/E ratio among these three companies, and in 2018, it reached 75%, which was its lowest position ever recorded.

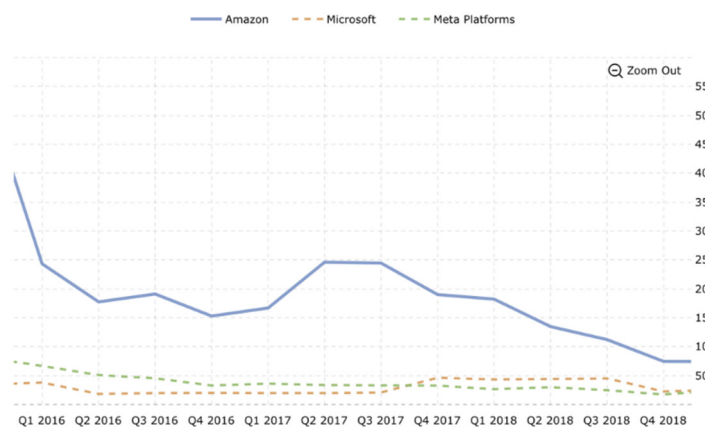


Figure 13. P/E Ratio in Ex-Pandemic Period (source: www. macrotrends.net)

3.4.3 Pandemic Period

These companies face a multitude of challenges as the pandemic phase progresses. As a direct consequence of this, there was a large disparity in the PE ratios of the three companies over the course of these few years. AMZN's P/E ratio has the highest number in the third quarter of 2020, coming in at 105%. The value of AMZN's P/E ratios will continue to drop dramatically over the course of the next quarters, eventually hitting a minimum of 50% in the first quarter of 2021. Both MSFT and META were regularly below 40% and were very close to one another.

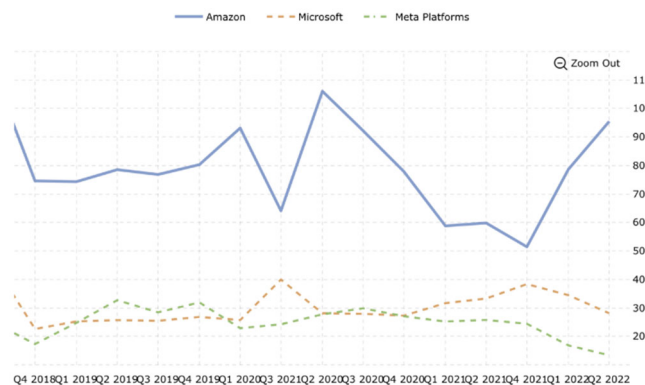


Figure 14. P/E Ratio in Pandemic Period (source: www. macrotrends.net)

4. Conclusion

For the Debt-Equity Ratio, the software industry does not change the value too much. Even during the pandemic, there might be a little decrease in the value. In contrast, some hardware companies could be very unstable even before the pandemic. When the pandemic came, most of the value of the Debt-Equity ratio decreased. As a result, the software industry might have a Debt-Equity ratio, which means that while considering the risk, the software industry could be a better choice.

ROE kept increasing before the software industry pandemic, but many companies' asset turnover decreased before the pandemic. However, many companies increased the value of asset turnover and decreased the value of ROE during the pandemic. Comparing this to the hardware industry, the ROE and asset turnover keep increasing before the pandemic. During the pandemic, there are some decreases in asset turnover, but ROE does not change too much. In consequence, the software industry has a better performance of profitability during the pandemic, and the hardware industry has a better performance without the pandemic.

The value of the PE ratio keeps decreasing before the pandemic, and most companies have a stable PE ratio. During the pandemic, some companies might become very unstable, but there is not too

much change in the value of the PE ratio. Some companies might have a very unstable PE ratio for the hardware industry, and many companies keep the value at the same level. There is a trend of a decrease during the pandemic. In considering not to overpay for the stocks, the hardware company might be a better choice than the software company. However, choosing software companies do not need to take too much unstable risk compared to the hardware industry. The passage analyzes the companies from the ex-pandemic period to the pandemic period, which helps investors to do the decision of investment. Lastly, the passages have not used the other financial models to analyze those companies, which makes the result of the passage cannot apply. The future study could focus on diversifying the data and building the model to apply the result to the stock market.

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