

Research on Capital Structure and Investment Value of the Technology Industry

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Abstract: This paper aims to discuss the changes in the IT development industry under the influence of the worldwide pandemic. The worldwide pandemic has had a very significant impact on economies all over the world. In this context, the result and the changes produced by the IT industry, which has been strongly developed recently, are undoubtedly significant. With the impact of the epidemic, all countries need to consider the spread of the epidemic. This has led to the temporary closure of schools, stores in many countries. People need to use the Internet to work, study and shop. This has made people more dependent on the IT industry. While most industries are slowing down due to the epidemic, the IT industry is growing more rapidly due to people's needs. This paper compares the WACCs of Intel, Qualcomm, and Advanced Micro Devices for the first quarter of 2023 and examines why the WACCs differ from a consumer perspective. This paper also discusses how to observe and invest in these three companies from an investor's perspective.

Keywords: information technology, WACC, risk

1. Introduction

1.1. Background

Economies around the world were greatly affected during the global pandemic. This led to a worldwide economic recession. This was due to the spreading nature of the epidemic, and most countries temporarily closed factories, schools, stores, and other facilities. This led to a significant impact on the country's GDP. This led to many industries going into recession. However, the information industry has grown rapidly as an excellent way to reduce the epidemic's impact. The IT industry can help people use the Internet to work, study, and shop remotely to meet their daily needs. People using Internet activities instead of offline activities can be very good at reducing the frequency of human contact. This has effectively kept the pandemic under control. Therefore, the development of the information technology industry has had an extremely important impact on people's lives.

1.2. Related Research

He et al. talked about the impact of Covid 19 on healthcare systems, education systems, and economies worldwide. With the threat of Covid 19, people need to find ways to reduce the impact of covid 19. It has been found that using information technology such as telemedicine and teleworking

can minimize the effect of covid 19 on society, organizations, and people [1]. Ye et al. talked about how information technology has helped China cope with the crisis brought about by Covid 19. The information technology industry helped China predict the outbreak's trend and track the close contacts of the virus. This has effectively helped China to control the epidemic. In the case of a pandemic in China, information technology helped China to prevent the spread of the epidemic [2]. Soni talked about the global economic collapse as the world is affected by the covid 19 pandemic. The advancement of the information technology industry has contributed to the development of the world. Information technology has allowed students to take classes remotely through the Internet. Information technology has effectively reduced the impact that students received due to school closures due to the pandemic [3].

Popescu et al. talked about the impact of digital globalization in the wake of a year-long global pandemic. As a result of the study, covid19 contributed significantly to digital globalization. The measures taken to stop covid 19, such as remote learning and remote work, are the same worldwide. From a global perspective, the steps are similar in most countries. This effectively illustrates the existence of digital globalization [4]. Akram et al. talk about the closure of offline stores, rising market demand, and changes in customer behavior can affect the demand for online stores due to the global impact of the pandemic. Akram et al. observe changes in e-sales during the pandemic by investigating the experience and happiness of customers of different age groups who make online purchases during the pandemic [5]. Graesch et al. talked about the relationship between information technology and marketing. Information technology allows for the digitization of marketing. Information technology tools can help people interact better with customers and achieve business success. Graesch et al. focus on data collection and analysis, customer relationship management, and digital marketing campaigns. They feel that the relationship between marketing and IT will become more critical as the IT industry grows [6].

Almeida et al. talked about how digitalization has helped companies reduce the impact of the pandemic after the world experienced a pandemic caused by covid 19. Almeida et al. identify the effect of digitalization by analyzing three research areas: labor and social relations, marketing and sales, and technology. The conclusion finds that companies will emphasize marketing through digital channels when companies be digital [7]. Shankar talked about the impact of the pandemic on IT services in the world. Before the world pandemic, IT services required employees to work in an office for most of the first five years of their working lives. As a result of the world pandemic, employees needed to move their office computers home to do their work. This required employees to acquire the ability to work independently, a greater sense of personal responsibility, and how to assist on the network. This requires employees to have an extreme capacity to learn [8].

He et al. talked about the changes in stock prices of various industries in a global pandemic scenario. he et al. calculates the changes in stock prices of different industries and find that manufacturing, information technology, education, and health industries all have positive price changes during covid 19. The mining, power, and environmental industries had declining stock prices during covid 19 [9]. Marinova and Bitri talked about the problems faced by manufacturers producing semiconductors under the influence of covid 19. Factories worldwide are facing shutdowns under the impact of the global pandemic. This meant a drop in the production of semiconductors. However, the demand for semiconductors has risen worldwide due to the effects of covid 19. This exposed the problems of chip production and supply chain [10].

1.3. Objective

This paper will analyze the impact of the pandemic on the information industry. This paper will examine the impact of the pandemic on the information industry in terms of its effect on the economy and stock prices and whether the result is positive or negative. This paper will also compare the

WACCs of Intel, Qualcomm, and Advanced Micro Devices and explain why the WACCs of these three information technology companies differ at the business level. This paper will also analyze these three companies from an investor's perspective and provide recommendations for investing in these three companies.

2. Method and Situation

2.1. WACC

As shown in Table 1, the WACC calculation process, This paper uses the market value of the company, debt, debt-to-equity ratio, corporate tax rate, risk-free rate, market risk premium, beta, expected cost of debt capital and expected cost of equity to calculate the WACC.

Table 1: WACC calculation process.

Market value of equity	129.55 billion
debt	50.27 billion
Leverage and debt-to-equity ratio	50.07
Corporate tax rate	12%
Risk-free rate	3.95%
Market risk premium	7%
Beta	0.87
Expected cost of debt capital	0.28%
Expected cost of equity capital	10.04%
WACC	7.35%

2.2. The Impact of the Pandemic on the Information Technology Industry

The global pandemic caused by Covid19 has left healthcare systems, education systems, and economies worldwide facing significant challenges [1]. The information technology industry can help the world better reduce the impact of covid 19. As the second most populous country in the world, China will be much more affected by a pandemic than a country with a smaller population density. The information technology industry is helping China to reduce the impact of covid 19. China used information technology to predict the trend of the pandemic effectively and to track close contacts of the virus with the technology [2]. For example, when someone has covid 19, China can effectively mark the locations that the patient has recently visited based on information technology tools. China can use these flagged locations to find people who have recently seen these locations. These people may have been in close contact with the patient, and China can then focus on isolating them to reduce the risk of secondary transmission. This has effectively helped China to slow down the pandemic. This means the IT industry was crucial during the covid 19 pandemic. The information technology industry can also help students around the world. Schools choose to close their schools during a pandemic. This is because schools need to ensure the safety of their students. The information technology industry can help schools with remote classes [3]. For example, in the absence of the IT industry, people would have to stop going to school in such a situation. However, IT has helped students to be able to attend classes remotely through the Internet. This effectively allows students to save time. This has also helped the education system to reduce the impact of covid 19. The information technology industry helped many countries reduce the impact of the pandemic during the global pandemic. This allowed the information technology industry to grow more rapidly during the worldwide pandemic. This is because people need the IT industry to help the health care system, education system to reduce the impact from covid 19. During the pandemic, global digitalization

evolved exceptionally rapidly. Most countries used similar methods, such as teleworking and online classes, to reduce the impact of covid 19. This effectively illustrates the growth of global digitization [4]. Under the influence of the pandemic, offline stores were temporarily closed. Based on the market demand, online shopping has become the main shopping method for people [5]. This implies an acceleration of global digitalization. During the pandemic, collaboration between companies has shifted to an online approach. Information technology enables the digitization of marketing and can help people to better interact with customers and achieve business success. Under the influence of the pandemic, marketing digitalization has become more popular. This can help companies and employees to close deals better and reach business success [6]. By looking at labor and social relations, marketing and marketing, and technology, the researchers found that when companies are digital when companies are digitized, companies emphasize marketing through digital channels [7]. People also have difficulty working remotely because it requires employees to work independently. This needs people's responsibility and ability to learn [8]. During the global pandemic, the stock prices of most companies in the information technology industry increased [9]. This means that the IT industry has had good growth during the pandemic. However, some companies in the information technology industry have been affected by transportation. This category of companies usually focuses on manufacturing hardware. Due to the global pandemic, the transportation industry has been affected worldwide. This can lead to a lack of raw materials to manufacture hardware because of the supply chain problems of the information technology companies that mainly manufacture hardware. And the massive factory shutdown resulted in a lot of hardware that could not be manufactured. The demand for semiconductors also rose during the pandemic. These led to shortages and price increases for semiconductors [10].

3. Compare the Differences Between Intel, Qualcomm and Advanced Micro Devices' WACC

Table 2, WACC calculation process, shows that Intel's WACC is the lowest at 7.3 percent, Qualcomm's WACC is 11.4 percent, and Advanced Micro Devices' WACC is the highest at 17.19 percent.

Table 2: Comparison of WACC.

Company	Intel	Qualcomm	Advanced Micro Devices
WACC	7.3%	11.4%	17.19%

According to Intel's data for the first quarter of 2023, Intel's Market value is 129.55 billion, the debt is 50.27 billion, and the Leverage and debt-to-equity ratio is 50.07. Intel's Marginal corporate tax rate is 12%. The risk-free rate is 3.95% based on 20-year treasury data. The market risk premium is assumed to be 7%. The definition of beta is 0.88. The expected cost of equity capital equals the risk-free rate plus the market risk premium times the definition of beta, which is $3.95\% + 7\% * 0.87 = 10.04\%$. The expected cost of debt capital equals 0.141 dividends by the market value of debt which is 0.28%. Intel's WACC=7.3%.

Qualcomm is a competitor of Intel. According to Qualcomm data for the first quarter of 2023, Qualcomm's Market value of equity is 120.18 billion, the debt is 15.99 billion, and the Leverage and debt-to-equity ratio is 81.15. Qualcomm's Marginal corporate tax rate is 11%. The risk-free rate is 3.95% based on 20-year treasury data. The market risk premium is assumed to be 7%. The definition of beta is 1.26. The expected cost of equity capital equals the risk-free rate plus the market risk premium times the definition of beta, which is 12.77%. The expected cost of debt capital equals 0.141

dividends by the market value of debt which is $0.179/15.99=1.1194\%$ Qualcomm's WACC is calculated in the same way as Intel's WACC, which is 11.4%

Advanced Micro Devices, Inc. is also a competitor of Intel. According to Advanced Micro Devices data for the first quarter of 2023, Microsoft's Market value of equity is 144.7 billion, the debt is 2.85 billion, and the Leverage and debt-to-equity ratio is 5.21%. Advanced Micro Devices' Marginal corporate tax rate is 14%. The risk-free rate is 3.95% based on 20-year treasury data. The market risk premium is assumed to be 7%. The definition of beta is 1.94. The expected cost of equity capital equals the risk-free rate plus the market risk premium times the definition of beta, which is 17.53%. The expected cost of debt capital equals 0.141 dividends by the market value of debt which is 0.0877% Advanced Micro Devices' WACC is calculated in the same way as Intel's WACC, which is 17.19%.

AMD is the company with the most market capitalization in terms of market capitalization. This means that AMD is the most valuable of the three companies. Intel has far more debt than the other two companies at 50.27 billion, about three times Qualcomm's and more than twenty times AMD's. Debt can be a good tax offset based on the interest tax shield. This can reduce the value of WACC. This is why AMD's WACC is the highest, and Intel's WACC is the lowest.

4. Investment Recommendations

4.1. Analysis of WACC from the Consumer Perspective

Intel Corporation, a global leader in the semiconductor manufacturing industry, has many products and services. Intel's main products are graphics cards, CPU, SSD and chips. These products are computer hardware that is an integral part of assembling a computer. Most of Intel's consumers are computer manufacturers such as Dell and Hp. This means that Intel has a stable sales channel because of the company. Intel has a stable sales channel also means that it has a stable consumer base. This is because most of Intel's consumers are computer manufacturers. A large percentage of the consumers of these computer manufacturers are individual sellers. This type of consumer is likely to change their buying tendencies due to some product changes. This means that computer manufacturers are less likely to change their brand of computer hardware. For example, if a computer manufacturer has been using Intel graphics cards, it is unlikely that the computer manufacturer will change all of its computers to AMD graphics cards. This is because the computer manufacturer's consumers have become loyal users of Intel's graphics cards. If the computer manufacturer suddenly changes the graphics card supplier, it is likely to lose a large number of users. This will make the computer manufacturer has become a loyal consumer of Intel. When Intel Corporation has loyal consumers, it reduces the company's business risk. This will reduce the company's WACC. This is because loyal consumers can make the company's revenue more stable. This can reduce the business risk of the company. Lower business risk can reduce a company's WACC.

Qualcomm is a world-renowned semiconductor manufacturing company. Qualcomm differs from Intel in that Qualcomm is a company that focuses on wireless communications technology. Qualcomm's consumers are primarily cell phones, network equipment, and automotive manufacturers. Qualcomm has a loyal customer base because Qualcomm's products are the hardware that these manufacturers must use. Qualcomm's strong brand presence as a globally recognized company will make these manufacturers choose Qualcomm as their preferred supplier. These loyal, stable consumer groups will continue to purchase Qualcomm products. This could help Qualcomm have a higher market capitalization and thus lower Qualcomm's WACC.

Advanced Micro Devices (AMD) products are similar to Intel Corporation's. AMD's products are mainly CPUs and GPUs, and most of AMD's consumers are computer, game console, and server manufacturers. AMD's products are very similar to Intel's in terms of functionality. This causes AMD

to affect Intel's profits to a great extent. For example, AMD has launched a new graphics card that is 20 percent more powerful than Intel's graphics card at the same price as Intel's. This will make many individual consumers choose to buy AMD's graphics card. These individual consumers are also the primary consumers of computer manufacturers, which will make computer manufacturers also tend to buy AMD graphics cards. This will allow AMD to get more market share. This means Intel will lose market share. AMD, one of the world leaders in CPUs and GPUs, also has a stable consumer base. This can reduce AMD's WACC.

4.2. Investment Advice from WACC

From an investor perspective, all three companies have a stable consumer base. This means that all three companies have a steady revenue stream. From the company's mindset, a stable revenue stream means regular profits. Stable profits can reduce the risk of investment, which is very attractive to investors. In terms of market share, all three have a good market share. In Intel and AMD's market share, whichever company can create more affordable and performing products will get more market share. However, Intel is now the world's largest manufacturer of CPUs and GPUs. More market share means more profits, and consumers will prefer the company with more profits. From a risk-averse perspective, Intel is the most attractive to them. This is because Intel's WACC value is the lowest. This means that in terms of WACC, Intel's risk is the lowest among the three companies. Risk-averse does not like risk. The risk-neutral idea of Qualcomm is the most attractive to them. This is because risk-neutral is not risk averse but will not choose a company with too much risk. Risk appetite will choose AMD. Risk appetite likes companies with high risk and high returns, and AMD is the highest-risk company among the three companies, which means that it has the highest expected return.

5. Conclusion

This paper examines the impact on the information technology industry during the pandemic and analyzes the WACC of three companies, Intel, Qualcomm, and AMD. During the pandemic, economies around the world have been significantly impacted. This caused economic recession all over the world. While most industries were negatively affected by the recession, the information technology industry entered a period of rapid growth as an industry that could mitigate the effects of the pandemic. This led to faster global digitization. From the historical data of the three companies, we can see that the more debt the company has, the lower the WACC. This is because debt is tax deductible. This is because of the existence of the interest tax shield. Analyzing the three companies from a consumer perspective, we can see that all three companies mainly sell to manufacturers. This ensures that all three companies have stable shipments and profits. From an investor's perspective, AMD and Intel's stocks can hedge the risk. This is because both companies are primary CPU and GPU manufacturers. From a risk perspective, the more people who can accept high risk and reward will choose the company with a high WACC. The information technology industry is one of the most important industries for the future of humanity. The IT industry can help companies to do better marketing and allow people to live their daily lives better. During the pandemic, the information technology industry successfully protected many people's lives.

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