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Research Project in Finance: NVE Corporation (NVEC)

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Research Project in Finance

7 May 2020

Research Project – NVE Corporation (NVEC)

This project gives an overview of the well-being of the economy as a whole and also does a deep dive into the historical performance of the company while projecting future growth. Each of the future estimations are subject to change, based on numerous factors including but not limited to, US economic growth, international market development, management at NVE, and product innovation. There are many moving parts, but as an analyst, I will use the historical patterns, future expectations, and current financial well-being of NVE Corporation to decide whether this would be a good place for investors to rest their hard-earned cash.

Macroeconomic Forecast Report

This portion of the project will give an overview of the economy in its entirety. This focuses on the well-being of the United States economy, and the effects on NVE will be interpreted. NVE could still very well be affected by international economies, being a company that participates in sales outside of America. These observations are intended to project future economic growth, which will in turn help better project more specific factors that weigh more heavily on NVE.

Leading Indicators

1. Bond Yields

- Bond yields have been diving over the past few years, as the Fed has reduced rates a number of times. Bond yields dropping could indicate a run to bonds or safe-havens.

Additionally, as interest rates fall, bond yields fall along with them. This usually shows economic decline at first but should result in an eventual recover.

2. New Housing Starts/Projects



- Since 2009 there has been a pretty steady increase in the number of new housing starts in the US. However, lately there has been a boom in the new housing starts. This shows that our economy is expanding, as companies are borrowing more money, buying more building materials, and creating more housing units for those who are purchasing houses.

3. Money Supply (M1)

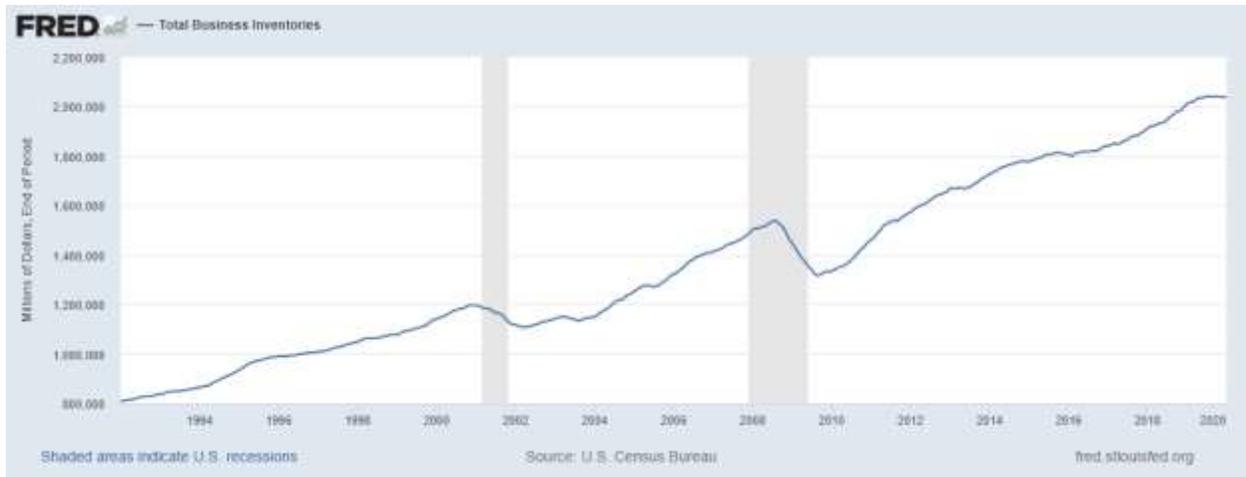


- The M1 Money Stock graph shows that the money supply has been increasing, pretty much since the 2008 housing crisis. Obviously, the money supply started to expand to help the economic machine gain some traction after the bubble. However, since then, it

seems that the supply has been increasing at nearly the same rate. This has seemingly become the new normal, and the economy has done fairly well since this 'new normal'.

With that said, at this rate, the economy should continue on pace to increase, but looking solely at this aspect, the economy shouldn't grow beyond any normal rate.

4. Inventory Levels



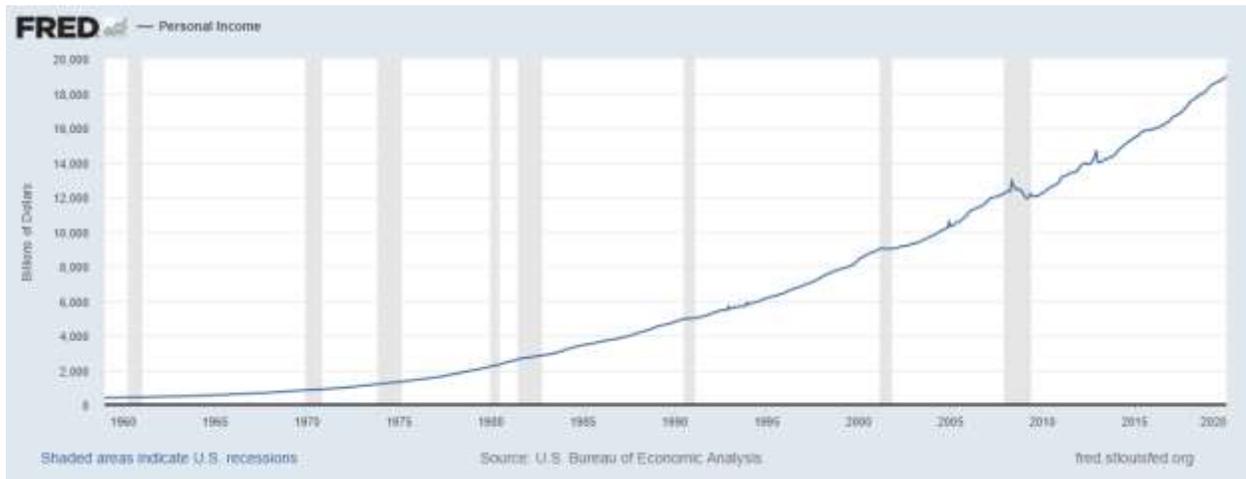
- The Total Business Inventories graph shows that the amount in business inventories has pretty much leveled off since 2019 and has even begun to look downward. This is somewhat of a conflicting indicator because an increase could be good or bad and a decrease could also be good or bad. Here, we could say that inventories are leveling off and beginning to decrease. One thing this could tell us is that businesses are starting to sell more, therefore ending up with less in their inventories because they are struggling to keep up with demand. Next, this could mean the number of businesses could be dropping, and in turn decreasing total inventories. Lastly, this could infer that businesses are starting to order less products to keep in inventory because they see a decrease in sales. So, depending on how one interprets the leveling off of inventory, they may think that the economy shows to be growing so fast that companies are struggling to keep the shelves

full, or that businesses are slow to purchase inventory because they see sales declining.

Personally, I think in this instance it leans to show that demand for inventory is dropping.

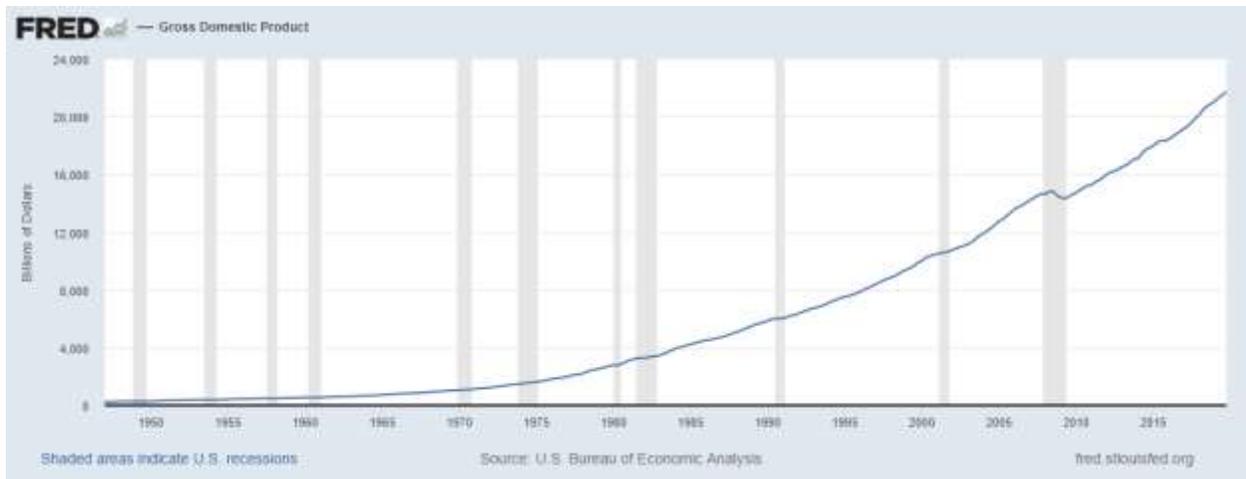
Coincidental Indicators

1. Personal Income



- Personal Income is shown to have been growing, according to the chart above. Personal income increasing is usually a good sign. This could mean that there are more people becoming more educated and getting better jobs, which would increase efficiency in an economy. Secondly, this could mean that there is inflation happening, and people would be making more money because of yearly salary adjustments for cost of living; this situation could be understood in good light because inflation usually comes alongside a growing economy. Both situations would be positive, but in the end, an increase in personal income means there is more money in the economy to spend. This would drive business growth and stimulate the economy. If people are making more, they will either be putting more back into the economy through spending or saving and creating more reserves for people to borrow. This is most likely good for the economy.

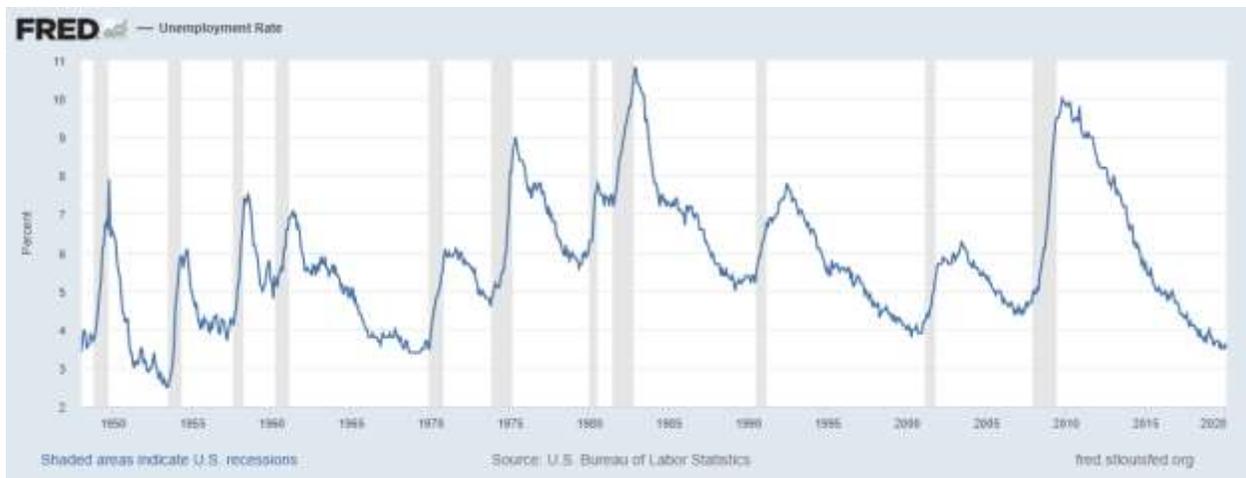
2. Gross Domestic Product (GDP)

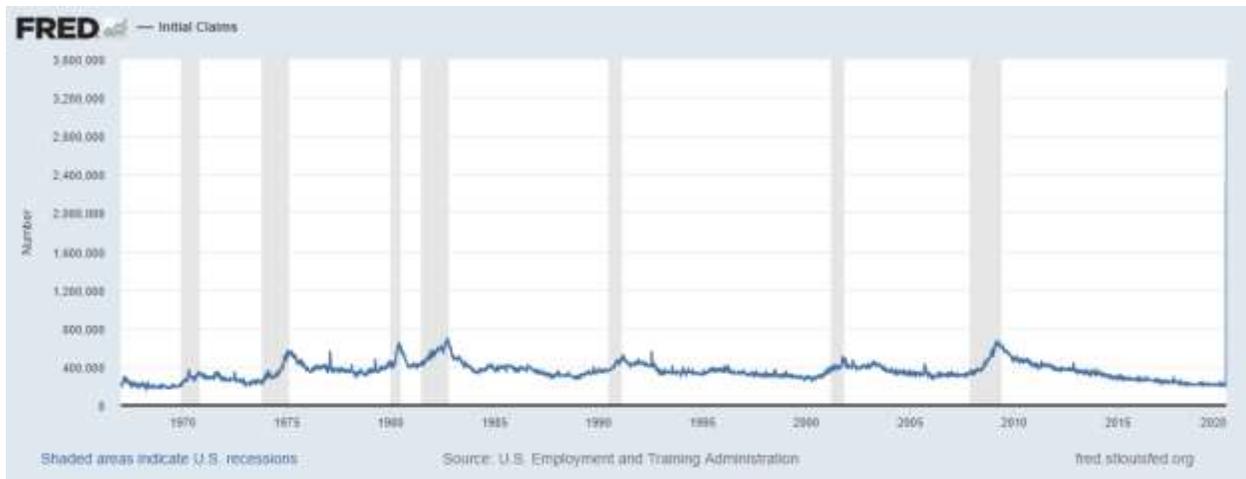


- Gross Domestic Product continues to expand. This shows that America continues to grow its output of goods and services. This could be due to innovation, efficiency, a higher working population, or any combination. This is a good indication for the economy.

Lagging Indicators

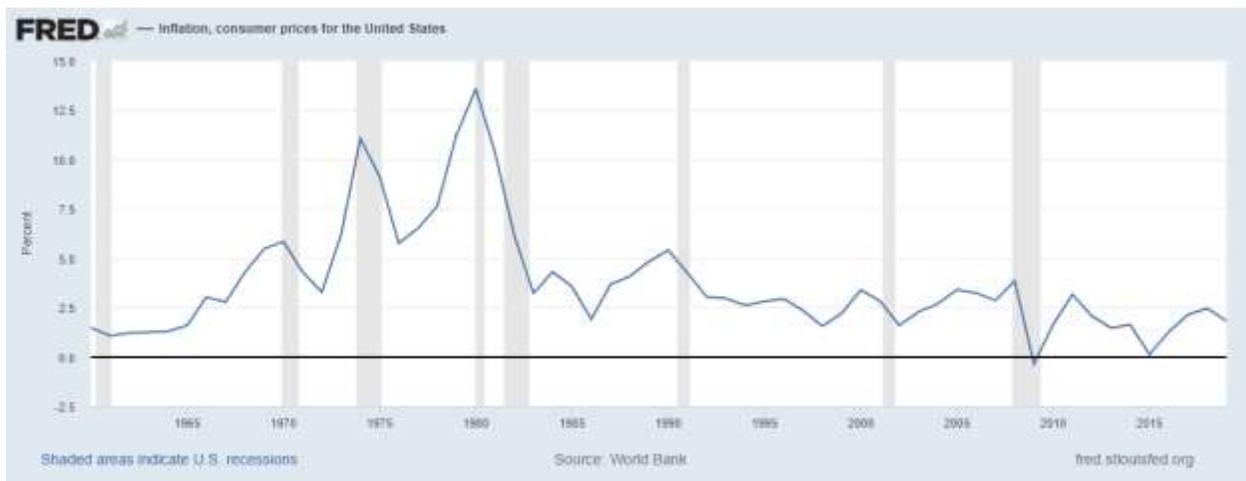
1. *Unemployment Rate





- Above are two graphs, the first is of the unemployment rate, and the second is of initial unemployment claims. Low unemployment is almost always a good thing for an economy, as it results in higher GDP, less crime, more tax revenue, and a myriad of other things. This looked extremely promising, until the recent record-breaking boom in claims due to CO-VID 19.

2. Inflation/Consumer Price Index (CPI)

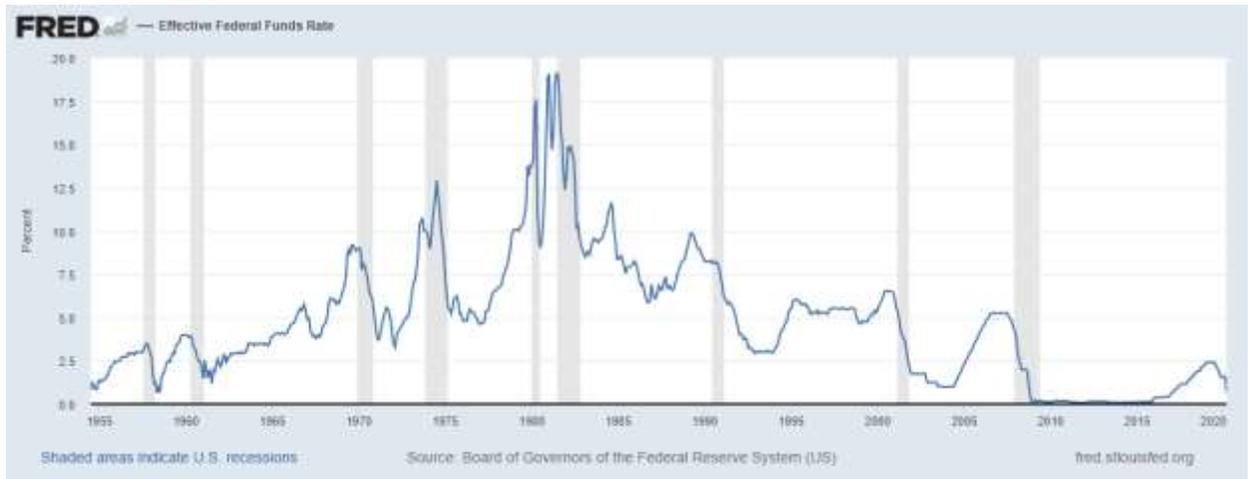




- Inflation is an interesting concept. Many economists and financial gurus debate over the benefits and consequences of inflation and whether it is good or bad, as a whole. Personally, I have not been a big fan of inflation because I see inflation as a decrease in purchasing power of my money, and therefore my money does not go as far. However, inflation is a much more than that. Inflation can help debtors, as the money they pay for their debts later will be less valuable than it was at an earlier point. This makes paying off loans essentially cheaper. The inflation graph above shows inflation is very volatile. The Fed has a goal in reaching a certain inflation rate each year in order to control growth in the economy, and steer away from deflation. If the economy were to rise too quickly, we could run into hyper-inflation, too slowly and it may fall into decline and we hit deflation. The graph above depicting inflation shows it can change depending on the supply and demand of the money supply, economic spending, growth, and the Fed's policy. I believe a drop in inflation could mean that the economy is slowing down already, or we will be seeing a slow down soon due to decreases in spending or a change in the Fed's policy. Secondly, the CPI continuing to increase is a bad thing for the consumer because it means that a basket of the same goods today is more expensive than they used to be. I cannot say that this is horrible for the economy, though, because the

CPI has been exploding well over 50 years, and through many economic expansions. The CPI will largely increase as the money supply does.

3. Interest Rates



- Interest rates are very powerful in is essentially the oil to the great American economic machine. As the graph above shows, since 2015 the rates have been rising until some time in 2018. This can be a good and a bad thing. First, as a lagging indicator I think that it proves to be a bad thing. If interest rates are falling, we should see economic decline in a few months. Interest rates dropping usually means that the government is trying to stimulate the economy and encourage borrowing. This is painful for savors and lenders, but it will get people pulling out loans. Now, on the other hand interest rates can also be seen as somewhat of a leading indicator. If interest rates have been low for a prolonged period of time, as we can see is beginning to be the case, people will have been borrowing and spending with credit for a longer period of time and the economic machine will be pounding ahead. Of course, something like CO-VID19 has the power to prolong low rates even further if we are required to shut businesses down and life as we know it comes to a screeching halt.

4. Balance of Trade



- Balance of trade portrays the balance between a country's exports and imports. Obviously, America has been losing at this game for a while. This chart, however, shows a recent recovery beginning around 2019. With the whole trade war between the US and China, the balance of trade should be expected to recover at least by a bit considering the US is fixing age old trade agreements with the second largest economy in the world. Keep in mind that China is only second to the U.S. and is gaining ground quickly. The balance of trade beginning to lean toward recovery is a good sign. This means that America will export more than we import. If we export more than we import, we will not only have to produce more goods and services, but we will be paid more by those who are exporting our goods. More money in and less money out is usually a good business and economic strategy.

5. Corporate profits



- Corporate profits experienced a drop in the first half of the past 5 years but have seemed to start recovering since. This is a good sign for the U.S. economy. The more money our businesses are making, the more jobs they can create, the more money and product they can put back into the economy, and the more taxes they pay. CO-VID19 has already begun to take a toll on specific sectors earnings and will probably make more of an impact before it is all over. We will not know the true effects until it is all said and done.

Additional Indicators

1. Idea Multiplier
 - This indicator, just recently researched and discovered by Vanguard, essentially tracks the number of academic citations in circulation. This is used as a leading indicator of at least 4-5 years in advance. The data historically shows that as a certain sector, industry, or idea increases in citations, that same sector, industry, or idea tends to boom, beginning a number of years after the increase. This increase in citations means that new ideas are being formed, new products being invented, and new processes will be implemented. Of the most recent white paper findings, the sectors with the largest Idea Multiplier increases are Transportation and Civil Engineering, Material Sciences, and Machinery. From the Transportation and Civil Engineering sector they found growth of ideas in specifically

smart energy grids and advanced traffic pattern recognition. In the Material Sciences sector a boom in natural fiber composites and supercapacitor carbons citations were found. And lastly, in the Machinery sector there was massive growth in specifically solar cells and cybernetics. Considering the Idea Multiplier alone, there is expected to be higher future growth due to a higher absolute Idea Multiplier across the board, year after year. Additionally, due to ever-increasing global sharing of information and academic citations, future growth is even further solidified. The amount of academic citation and ideas has not only grown in size and sharing capability but has grown in influence. “We find that in 1980, one influential idea led to 40 more ideas...But a recent surge in our normalized Idea Multiplier is clearly evident: One idea now leads to 400 additional ideas on average.” (The Idea Multiplier) This discovery in research was an incredible feat, beginning with an insurmountable database of academic citations. With the persistence and expertise of the researchers at Vanguard, we can now see the future through the eyes of not only just another indicator, but a far-off leading indicator that is also accurate.

2. Composite Index of Leading Indicators/Leading Economic Index (LEI)

Looking at the LEI, they come out with monthly reports that relay the state of economic indicators, leading, lagging, and coincidental, as a class. The report that came out March 19, 2020 showed that the LEI for the U.S. slightly increased in February. This is great for the economy, as the leading indicators as a group are showing growth. With this said, this mere 0.1 percent increase is following a 0.7 percent increase throughout January, so the rate of growth has fallen immensely. The report points out that the February numbers do not include the effects of CO-VID19, “which began to hit the U.S. economy in full by early March.” (The Conference) February did not only show promise in the leading

indicators index, but also the coincidental and lagging indexes. The coincidental index increased 0.3 percent in February, following a 0.1 percent increase in January and the lagging index increased 0.4 percent in February, following no change in January. This report shows that the U.S. economy would have been expected to continue growing, all things held constant. There has yet to be a report posted for the month of April, but once it does come out I would not be surprised one bit if the economic picture looks a bit deranged from what was initially expected.

****Disclaimer:**

Any of the economic forecast above could be completely nullified by the effects of CO-VID19 that has struck the world over the past 4 months, and especially hit the US in the past month. While the US economy was pounding ahead prior to this pandemic, it has nearly halted all business activity due to mandatory stay at home orders from government officials. We are not sure when this virus will become controlled, or when we can start back to our normal daily routines. This is going to be a big indicator on how the US economy, or stocks, will be able to perform in the short-term future. Over the long-term, however, stocks have historically always rebounded and surpassed historical highs.

Industry Overview

According to MarketWatch, the U.S. holds the majority of global market share in the semiconductor industry, however, “84% of the U.S. semiconductor manufacturing equipment sales take place outside of the United States”. (Semiconductor) MarketWatch was able to analyze the Global Semiconductor Equipment Market report 2019 and they summarized some of their findings. They mentioned the major growth that is expected from China in consumption and

even potentially supply of semiconductor manufacturing equipment. This emergence of China in this industry makes the outlook of the U.S. semiconductor industry somewhat volatile and uncertain. With that said, MarketWatch points out that “The global Semiconductor Equipment market is valued at 47400 million US\$ in 2017 and will reach 80700 million US\$ by the end of 2024, growing at a CAGR of 6.9% during 2019-2024.” (Semiconductor) ValueLine points out a different element of the semiconductor industry saying, “The semiconductor industry is inherently more volatile than many other sectors...[and] members of the group constantly have to deal with the effects of the broader economic cycle, ever-shortening product lifecycles, and persistent peer competition.” (Publishing) In summary, the Semiconductor Equipment market is one that is expected to boom in the next 4-5 years, with cycles of substantial volatility. The only question is which region will be dominating that growth. Should it remain in the US or will it begin to favor China? This will determine how much volatility an investor would experience, and how much they will receive in capital gains.

Porter Analysis

1. Supplier Power

Supplier power depends on a couple of factors including the number of suppliers, the switching costs, and what they supply. What they supply will affect the number of suppliers and the switching costs. The switching costs would not be too high in this industry unless there are contracts and supply lines already in place. If a company were to switch providers then, they would not only have to pay penalties for breaking a contract, but also find new supply lines. The number of alternative suppliers in the industry of Semiconductors is plentiful, but in the niche of spintronics, there are few, if any. The semiconductor industry’s suppliers have strong bargaining power, and even more so in some of the sub-industries. I researched the competitors of NVE and

according to the company profiles on TD Ameritrade, nobody matches that of NVE. If anyone else operates in spintronics, it is for a specialized use and not a large portion of their operations. NVE operates nearly solely in spintronics, which is a niche set-apart because their devices uniquely use electron spin for data processing, memory, and transmission.

2. Buyer Power

Buyer power is largely dependent on the size of the underlying customers. If there is a small base of buyers, each buyer has more percentage of power. So, depending on the size of a company, and where their revenue streams originate, the power of their buyers will be adjusted. As of March 31, 2019, NVE has only 48 employees and can only serve so many people. They are a business-to-business company and have several long-term agreements with medical providers such as St. Jude Medical and Phonak AG. (NVE Fact) Due to the layout of NVE Corp.'s business structure, they are probably susceptible to higher buyer power, but if they continue to lock in longer-term agreements, that is one way to mitigate that risk. These bigger buyers have purchasing power and can potentially decrease NVE's profit margins. However, as I have already mentioned, NVE is the only company that I have been able to find that focuses on spintronics in their devices. If they are the only quality provider available, they can push profit margins higher when contracting with firms. If there is minimal competition, there is minimal price interference. The lack of competitive rivalry highlights the potential limited buyer power, depending how NVE continues to structure their agreements with customers going forward.

3. Competitive Rivalry

Rivalry between firms in this industry depend on where the company operates. The industry as a whole has pretty tough competition with a large number of firms, but the more specific a company gets the more innovative and differentiated they become. The more uniquely they

operate, the more they will drive down rivalry with other firms. While the semiconductor industry at large has massive competition, the sub-industries in this sector often have much less to zero competitive rivalry. NVE has low rivalry competition because of where they operate. NVE operates in a niche of spintronics. Spintronics is a very differentiated sub-industry, and NVE does not have many direct rivals. However, because of the volatility of this industry due to business cycles, and the change in tastes of consumers due to innovation, the competitive position of companies in this sector can change at any point.

4. Threat of Substitution

The threat of substitution in this industry is always evolving. This industry is highly dependent on technology, meaning there will always be innovation. And if we pull from findings of the Idea Multiplier, we know that technological innovation should be booming over the next decade. Technology is always getting better, more efficient, and faster. Quicker consumption and bigger data will create and sustain an environment where more innovation can take place because of increases in speed and data size. One great way that NVE can diminish the threat of substitutions both as a company is “by being service oriented rather than just product oriented.” (Department) Their product’s use of spintronics for their data keeps them from facing many substitutions.

5. Threat of New Entry

Prezi has a nice slideshow outlining the entire Porter’s Analysis of the semiconductor industry. According to the slideshow, the main elements concerning entry are: capital requirements, economies of scale, product differentiation, and barriers to entry. They mention that it costs about “\$500[million] R&D costs to develop a new CPU...[and] \$2 billion to establish a new factory.” (Porter’s) These two obstacles alone are substantial for anyone that hopes to land a

place in this industry. Not only are those capital costs massive, but then a new entrant must bring along extremely high-quality human capital in to create a new idea or even be a fast-follower and simply mimic those that create ground-breaking innovation. Lastly, we all know how much consumers want the new thing. As soon as a new iPhone comes out, people are standing in line for hours just to get one of the first editions, even if they know that the first version will usually have some kind of a bug that will take time to fix. Innovation is not the only thing that is extremely important for this industry, but speed of that innovation is likely more valuable. This is a tough industry to get into and garner respect and market cap.

SWOT Analysis

NVE's specialty in spintronics is their biggest strength. The use of spintronics changes their products' speed and processing in comparison with their competitor's products. I would also consider their management history to be a strength. "NVE was founded by Dr. James M. Daughton, a former Honeywell executive." (NVE) Honeywell is a leading company in manufacturing innovative solutions for aerospace, home and building, and materials companies. Dr. Daughton had an image and the expertise to set up an effective business model and find good human capital to go into business with. The current management of the company, President and Chief Executive Officer down to their Chairman and Director have all been at the company for at least 15 years. This allows an obvious advantage to a company in a niche market space. As a derivative of sound management, NVE Corp has "[a] successful track record of integrating complimentary firms through mergers & acquisition. It has successfully integrated number of technology companies in the past few years to streamline its operations and to build a reliable supply chain." (Department, NVE) Another internal advantage for the company is their rock-solid liquidity positioning. They lead their industry times over in the current, quick, and cash

ratios. This allows them to deploy much more cash in research and development, investing in long-term assets, and training their team. Lastly, two other major advantages that NVE lays claim are their smaller size and business structure. NVE has room to grow, holding a market cap of only around \$275 million. NVE also focuses on contracts with other businesses, opposed to retail aimed at individual consumers. This allows them to lock in longer-term deals with much more volume. From the internal perspective, NVE looks to be in a good position against the rest of the industry and their main competitors but has some factors that leave them exposed.

Looking for specific weaknesses of NVE, we do not have to look far. The website for NVE Corp looks like a very underdeveloped site and could use some more investment of time and money. Being an innovative and tech-driven firm, their website should reflect that image. Two other weaknesses that Fern Fort University research points out are “Organization structure is only compatible with present business model thus limiting expansion in adjacent product segments [and that] there are gaps in the product range sold by the company. This lack of choice can give a new competitor a foothold in the market.” (Department, NVE) These weaknesses leave NVE vulnerable to loss in market share due to competitors filling missed product line or hindering themselves in expansion of a particular segment. Although every company has weaknesses, it is important to find ways to improve on them while operating in their strengths. To help battle the product issue, NVE should continue to push their products that are promising, while creating new product availability in those segments that they have not yet covered. Secondly, they can work on the expansion limitations by continuing to focus on acquisitions. This way, they themselves would not have to expand their model, but build on top of their model through the companies they are annexing. While strengths and weaknesses are more of an internal concern of a company, external factors can lead to opportunities.

The best opportunity comes with the recent economic change. With every economic season, there are certain opportunities that come to light. NVE has done a wonderful job in maintaining little to no debt till this point. This cycle of historically low borrowing rates would allow NVE an opportunity to incur some debt at an exceptionally low cost. This may allow NVE to use leverage and accelerate growth, improve training procedures for employees, and even go acquire more companies to help boost market share and product diversification. The situation of their sizable cash reservoir, as mentioned earlier, could also give them the opportunity to integrate other companies at a low cost.

The most important threat to every company is their competitors. For NVE, their main competitors, when considering market cap, operational strategy, and company overview are: Analog Devices (ADI), Interlink Electronics, Inc. (LINK), Everspin Technologies, Inc. (MRAM), and Inphi Corp. (IPHI). NVE will always be dealing with these companies but can continue to dilute the threat as they differentiate themselves and grow further. One threat that NVE faces has been a problem over the past few years. Due to the trade war with China, there has been a fair share of regulations and tariffs put on numerous products and industries. America pursuing a policy to protect domestic companies “can lead to similar reaction from other government thus negatively impacting the international sales” (Department). This may keep international sales. On the same international trail, there is always a threat of counterfeit and low-quality products disrupting market share, “especially in the emerging markets and low-income markets” (Department). Lastly, while the economic downturn may provide opportunities in lending and acquisitions, it can create lack of demand or premium in higher quality, higher priced product lines. NVE has plenty of threats and must continue to protect themselves through a myriad of business strategies.

Conclusion

In conclusion, NVE corp. seems to be positioned very well, but must continue to operate strategically. The biggest downsides to their industry are the number of suppliers and the business cycles. On the other hand, the best thing they have going for them is their niche sub-industry position, and great human capital working for them that allow them to have a competitive edge in innovation. Because “a change in consumer demand or taste can be an opportunity,” the opportunities in NVE’s market will always be changing. (Contributor) If NVE can continue to further insulate themselves from threats and take advantage of upcoming opportunities while operating on their strengths and improving their weaknesses, they can expect a bright future and booming market cap.

Financial Ratio Analysis

These ratios are intended to help investors and managers better understand the positioning of their company. If compared against competitors, it can show what the company does well and what they need to work on in relation to their industry. Secondly, looking at NVE’s numbers alone, we can see how they stand in their ability to pay obligations, the effectiveness of their assets and inventory, and how they structure their financing.

Liquidity (shorter term) Ratios

1. Current Ratio (Working Capital Ratio) \rightarrow Current Assets / Current Liabilities = Measures firms’ ability to cover short term outflows with short term inflows. The higher this number, the better. A ratio of 2:1 is considered solid, but the higher the number, the more cash the company has left over to invest and expand.

Current Ratio = 32.83; Competitors: ADI = 1.32, LINK = 13.17, MRAM = 6.63, IPHI = 1.90,
Industry = 3.27

This ratio shows that NVE Corp. adequately covers their current liabilities with their current assets. This is not only promising when looking at their sole positioning but shows to be a very strong number when comparing it with their competitor's ratios. NVE not only covers their shorter-term outflows with shorter term inflows, many times over, but they do it better than the industry by a large amount. NVE has much more of their short-term inflows that can go towards investing and R&D.

2. Quick Ratio (Acid Test Ratio) \rightarrow $(\text{Cash} + \text{A/R} + \text{Short-term or Marketable securities}) / \text{Current Liabilities}$ = Stricter version of the Current Ratio. This ratio is considered solid if it is 1:1. A higher value could be considered negative in that the company hangs on to too much cash, and doesn't put it back into the business or they may have a slow accounts receivable turnover. If this number is low, this could mean the company leans on their inventory to cover current liabilities.

Quick Ratio = 26.75; Competitors: ADI = 0.52, LINK = 10.98, MRAM = 2.57, IPHI = 1.65;
Industry = 2.35

Coming in at 26.75, NVE Corp. once again proves that are in a great position when it comes to meeting their current liabilities with only certain current assets. This ratio is stricter when it comes to which portion of current assets are calculated to cover current liabilities. However, even in this more restricted current asset portion, NVE is substantially covered. Once again, this leaves much more cash to throw into investments and expansion.

3. Cash Ratio \rightarrow $(\text{Cash} + \text{Short-term or Marketable securities}) / \text{Current Liabilities}$ = This ratio should also be as high as possible. This is the most conservative Liquidity ratio

because it only includes assets that are cash or cash equivalents to see how much of current liabilities they can cover.

Cash Ratio = 23.16; Competitors: ADI = 0.10, LINK = 9.73, MRAM = 1.84, IPHI = 1.45, Industry = 1.60

Holding a ratio of 23.16, NVE Corp. continues to show that their liquidity position holds strong. This is an even stricter consideration of current assets than both the current ratio and the quick ratio. Only seeing how well a company covers current liabilities with only their cash and cash equivalents, NVE proves to be in a solid position. They are head and shoulders above the industry and competition and have much more short-term capital to employ elsewhere, not having to worry about finding any other money for covering their current liabilities.

Efficiency Ratios

1. Accounts Receivables-to-Sales \rightarrow Accounts Receivable / Net Sales = Measures what portion of a sale's occur on credit. A larger portion of sales on credit can be a liability for a company. The higher amount of sales that are in cash means less time and resources that are dedicated to chasing down accounts or outsourcing collections. A lower number here would represent a small portion of sales that are based on credit.

Accounts Receivables-to-Sales Ratio = 0.11; Competitors: ADI = 0.11, LINK = 0.09, MRAM = 0.15, IPHI = 0.16, Industry = N/A

Coming in at 0.11, NVE seems to be in a better position than most of their competitors. NVE already has impressive amounts in their cash accounts and if they can keep this ratio low, they will keep their liquidity ratios extremely high by collecting cash easily. This also keeps their Accounts Receivables down, and that will help their financial position.

2. Days' Receivables Ratio $\rightarrow 365 / \text{Sales to Receivables Ratio} =$ Measures average number of days that accounts are outstanding. Usually a lower number is better, but if a company has a higher number, it could mean two things. It may mean they are hanging on to their own cash longer, or they could not have enough cash to cover quickly.

Days' Receivables Ratio = 32.25 days; Competitors: ADI = 34.44, LINK = 41.67, MRAM = 25.10, IPHI = 22.24, Industry = 44

This ratio proves that NVE has collected on their accounts at about the same rate as the rest of their direct competitors. They are in a good position here and do not have too much to worry about. Considering the financial positioning in their cash accounts and their lack of debt, NVE could probably even afford a bit longer days' receivables.

3. Asset Turnover Ratio $\rightarrow \text{Net Sales} / \text{Total Assets} =$ This ratio helps investors see how efficiently a company uses their assets to make money. This number needs to be as high as possible and would usually represent good management and good use of assets.

Asset Turnover Ratio = 0.32; Competitors: ADI = 0.28, LINK = 0.93, MRAM = 1.06, IPHI = 0.37, Industry = N/A

This value for NVE is slacking, coming in at a good portion below all of their competitors. NVE must improve how and where they employ their assets, having a higher standard of the revenues that are created from them. Considering that NVE has zero debt, this ratio will not harm them all too much. However, if they can improve this ratio then they will find massive revenue and profit growth. This will help them gain market share.

4. Inventory Turnover Ratio $\rightarrow \text{Cost of Goods Sold} / \text{Average Inventory} =$ This ratio represents the number of times a firm can recover their investment in inventory per period. A higher number is a better number, unless it is blown out of proportion. This

could mean that there is inefficiency in customer service or there may be shortages in inventory that lead to lack of sales.

Inventory Turnover Ratio = 1.32; Competitors: ADI = 0.83, LINK = 1.58, MRAM = 0.57, IPHI = 0.87, Industry = N/A

This is a great sign for NVE. They have a solid number in comparison to their competition. This shows that they recover their costs that they pay in inventory and earn some more each period. This is a solid number, which means their inventory is a great investment. They can make more revenues if they simply purchase and sell more inventory at the same proportion as they are currently.

5. Days' Sales in Inventory Ratio \rightarrow $365 \text{ days} / \text{Inventory Turnover Ratio}$ = This represents the amount of days it takes to flip inventory. A longer number means that inventory is in storage longer, which could be a bad sign. Companies usually want to have their number close to that of the average but be leading the pack. A number too low could mean they don't have enough in inventory.

Days' Sales in Inventory Ratio = 277 days; Competitors: ADI = 442 days, LINK = 231 days, MRAM = 646 days, IPHI = 420 days, Industry = N/A

This ratio also sheds good light on NVE. The 277-day time frame in which it takes NVE to turnover their inventory is a great number compared to a much higher average of their competition. This is in-line with their great inventory turnover ratio. If they continue to pump out their inventory at this rate, their revenues will expand. As is, their efficiency seems like it is pretty impressive.

Solvency (longer term) Ratios

1. Interest Coverage Ratio \rightarrow Operating Income / Interest Expenses = This ratio paints a picture on how well a company can cover its interest expenses. A higher number is most definitely a better thing in this situation because that means they could cover their interest payments times over. As the number gets closer to one, it may mean a company has to sell off current assets to help cover interest, which would be detrimental.

Interest Coverage Ratio = 8.92; Competitors: ADI = 7.47, LINK = N/A (has no interest expense), MRAM = -19.29 (has negative operating income), IPHI = 1.25, Industry = 3.09

NVE has an impressive number in this ratio. NVE can cover their interest nearly 9 times with their operating income. This gives them a great position to deploy their capital elsewhere, since they will not have to worry about their financial structure. NVE should continue to push this ratio as high as they can possibly get it.

2. Debt Ratio \rightarrow Total Debt / Total Assets = Measures how much of a firm's capital is financed through debt. This ratio can give light to how much will be left for investors if a firm can pay off its liabilities in bankruptcy.

Debt Ratio = 0 (has no debt); Competitors: ADI = 0.45, LINK = 0.07, MRAM = 0.48, IPHI = 0.64, Industry = 0.39

Here, NVE is in an unbeatable position. They have zero debt and that is extremely attractive to investors. If a company has zero debt, there is essentially no credit risk. While this is an incredible feat for any company in pretty much any sector or industry, this could slow growth. NVE could even come up a few points to around the industry average, and that would allow them to have leverage and grow quicker. Currently holding small market cap, that would be very advantageous.

3. Equity Ratio \rightarrow Total Equity / Total Assets = Measures how much of a firm's capital is financed through equity. This is a very vital ratio to investors because it shows how much of the firm's assets, they lay claim to. This also reiterates the debt ratio by showing the investors own nearly all of the company and there is hardly any debt financing. The higher this number, the safer an investor's money should be in bankruptcy. Companies should try and get this ratio as high as possible, with 1 being the highest it can go.

Equity Ratio = 0.99; Competitors: ADI = 0.55, LINK = 0.93, MRAM = 0.52, IPHI = 0.36,
Industry = N/A

NVE looks extremely good to investors when looking at this ratio. Investors that are worried about credit worthiness will be especially attracted to NVE. If the firm were to go into bankruptcy, the investors would receive a good percentage of what is left since there would be such a small amount of liabilities to pay first. NVE could take on a bit more debt financing and not be in harms way. This would help them use some leverage to grow.

Profitability Ratios

1. Return on Assets \rightarrow Net Income / Avg. Total Assets = Shows how well management uses assets to generate income. This number should be as high as possible.

ROA = 16.96%; Competitors: ADI = 1.63%, LINK = 1.45%, MRAM = -9.12% (has negative net income), IPHI = -1.95% (has negative net income), Industry = N/A

NVE is in a good position here, as they get much more return on their assets in comparison to their competition. Unlike their asset turnover ratio, this ratio proves NVE has managed their assets well in comparison to their competition. They need to continue to work on this ratio, but as of right now they are getting good return on their investment in their assets.

2. Return on Equity \rightarrow $\text{Net Income} / \text{Owners Equity} =$ Shows how well management is using their equity investment. Higher number is better. A low number can mean management is being ineffective and a higher number means there is higher earnings and higher future growth, along with effective management.

ROE = 17.53%; Competitors: ADI = 11.64%, LINK = 6.92%, MRAM = -79.34% (has negative net income), IPHI = -21.01% (has negative net income), Industry = N/A

Once again, NVE is proving to be extremely profitable. Not only do they have no debt, but they are looking to be in an impressive position in their return on investments. They are dominating their direct competitors and prove to be set-apart in their operations here. They seem to have effective management who make smart investments.

3. Gross Profit Margin \rightarrow $(\text{Total Revenue} - \text{COGS}) / \text{Total Revenue} =$ Shows amount of profit a company makes after paying off Cost of Goods Sold. Higher number means a company has more money left over for investment or R&D.

Gross Profit Margin = 80.30%; Competitors: ADI = 67%, LINK = 55.08%, MRAM = 48.88%, IPHI = 58.21%, Industry = N/A

NVE is dominating their competitors in this ratio. They are able to keep most of the money that they acquire and do it by a good percentage better than their competition. If they can continue their profitability trend, they will continue to dominate their industry.

Time Series Analysis

In all their liquidity ratios, NVE has had an upward trend, but has dropped a small percentage in the last year. NVE has an impressive position in their liquidity, having extremely high cash accounts and being able to cover their current liabilities many times over. I believe that NVE has little to worry about and is still in a very liquid position. Concerning efficiency ratios,

NVE is doing well in half of them and is trending downward in the other half. They need to work on their inventory management and push their inventory back up to historical numbers and pull down their days' sales in inventory. Their percentage of sales on credit is holding strong, days receivable has been dropping, and asset turnover has held over the past few years. Next, the solvency ratios are all extremely attractive. First off, they can cover their interest time over again, and this allows them to spend their revenues more freely. Secondly, they are debt free. This is what investors like to see and helps them ensure their investment is safe when it comes to risk of default. With extremely low debt financing, investors lay claim to nearly all NVE's assets. Lastly, profitability ratios are trending upwards beautifully. NVE has continued to build a strong balance sheet to ensure financial soundness, but they are making themselves even more attractive by managing their assets and taking advantage of opportunities to increase their profitability. NVE looks like a safe place for investors to invest their money with promising trends to expect profits to rise.

Dupont Analysis

NVE's return on equity of 17.53% looks promising when comparing it on the surface with the competitors' numbers. When looking deeper, we can see that according to this specific analysis that there really is not all that much to worry about. Their financial leverage is second to none, profit margin is over 50%, and their asset turnover is decent. Lumens Learning points out, "companies with low profit margins tend to have high asset turnover, while those with high profit margins tend to have low asset turnover." (Boundless) NVE falls guilty to this claim, having a below average asset turnover ratio. If NVE can just continue to work on the way they employ their assets, and maybe use some leverage to do so, they can increase their return on equity.

Pro Forma Statements

This portion is covering the pro forma balance sheet and the assumptions that were used to create the forward-looking estimates. Concerning Cash & Short-term Investments I just used an average of the pre-existing financial statements for the most recent 5 years. I decided to use this to calculate the estimates because the amount of Cash & Short-term Investments a company keeps totally depends on their industry, the industry standards, and their growth stage. I am not assuming that NVE Corp. wants to keep any money in their cash and short-term investments pile due to their already extremely impressive liquidity ratios and their industry requiring high research & development efforts to grow. Additionally, they are a small cap company and are burning through cash extremely quickly as they continue the effort to get off the ground and expand operations, so I would not expect them to be increasing their cash accounts.

Projecting the Accounts Receivable portion of the balance sheet, I decided to find the average across the previous 5 years and project that forward. The Accounts Receivable numbers were extremely volatile, going up one year and down the next year, twice among the previous statements. This shows lack of consistency in increases and decreases and would include some large outliers if I decided to take the average change in the number across the 5 years. Therefore, I believe the average number will better serve the forward projections. In addition, the Days Receivable ratio showed a relatively smooth average over the past 5 years. If that number continues to be consistent, we can expect the Accounts Receivable to be somewhere near the 5-year average in the future.

Concerning the inventory, it seems to have no relation to revenue decreases or increases, so I decided to go with an average change across the pre-existing financial statements of the past 5 years. I can project the average change across the forward-looking statements because I believe

that will give us a better number when considering a pretty consistent number in the inventory turnover ratio. If this ratio remains similar across multiple years, I feel that the change in inventory across those years should be a good estimate to project forward.

Prepaid's do not seem to have a direct correlation with revenues either, or they don't have huge outliers when it comes to % growths year over year. Here, I decided to go with a simple average of growths year-to-year. It comes out to nearly 11%, and will continue to increase prepaids, as it looks, they have done nearly every year in the previous 5 years.

Because I used outright average numbers over the past 5 years, and not percentages or percentage growths, the total current assets will not grow all that quickly. However, considering that both Cash & Short-term Investments and Total Receivables are averages that will not grow over the next 5 years the slow growth of just under 1% in the Total Current Assets category makes sense. The Total Current Assets value will only grow at the rate of inventory and prepaids growth. If I were to make projections over more than 5 years, I would most definitely adjust this and use average percentages or percentages alone to project the Account Receivables and Cash & Cash Equivalent accounts. However, in this instance, looking 5 years out, I think averages make sense, especially since the Cash & Cash Equivalent and A/R accounts are so unpredictable.

Looking toward Property/Plant/Equipment, I think it is reasonable to take average growths of Buildings and Machinery/Equipment accounts. These seem to be growing at around the same rate each year. So, in these accounts, I will take the percentage growth year-to-year and average those out over the pre-existing financial statements and project those forward at the same percentage growth rates. And Depreciation is going to be nearly fixed against the buildings and machinery/equipment accounts so in the projections I took the average of the depreciation divided by Property/Plant/Equipment, Gross. I then used that number and multiplied it by the

projected Gross Property/Plant/Equipment in order to get the projected Depreciation. This makes sense because Depreciation is an outcome of the buildings, machinery, and equipment.

Long-Term Investments will be projected at a 1% growth rate. I am not taking into account the previous 5 years numbers, but I am making this assumption based on the 4% revenue growth rate. If revenue grows at 4% and total current assets is growing just below a 1% rate I think it is fair to estimate that long-term investments grow at a rate of 1%, considering that the company will probably be spending the other 2% increase in revenue left over on R&D.

Deferred Income Tax will be projected out at an average that was calculated across the previous 5 years. For the Income Taxes on the Income Statement I used a constant average rate of around 21%, so I think it is reasonable that I defer income taxes at a constant rate as well. This would be inline with the assumption of a constant income tax rate.

Next, the Liabilities portion of the Balance Sheet will be projected. First, Accounts Payable seems to go hand in hand with Revenue increases or decreases. The years that revenue grew in the past, this line did, and the years that revenue declined, this line did also. So, I decided to take the average growth year-over-year, coming in at nearly 2%, and I will add that 2% to the previous year's number. This makes sense to me because a 4% revenue growth rate would be inline with the nearly 2% growth rate in accounts payable. Second, the Accrued Expenses line will be projected at the average growth year-over-year. This number comes in at just below -16% and makes sense because there has been nearly a consistent 5-year decline in this category, with two of those years being 20% decline or higher. This will continue the trend. For Other Current Liabilities, there has been many years with no value, or no reading, but two years have had one. So, I decided to just take the simple average over those 5 years. And lastly, Total Liabilities will be a summation of all the liabilities above in the balance sheet.

The Shareholders' Equity portion of the Balance Sheet will be projected, starting with Common Stock and Additional Paid-In Capital. Both of these will be averaged across the previous 5 years and be projected out. The Retained Earnings has continually shrunk over the past 5 years, so I will use the average percentage change year-over-year to produce these projections. This will come in at about -7.7%. This will ensure the Retained Earnings continues the pattern of falling over the next 5 years. Looking to Other Equity, I do not see any type of pattern whatsoever, so I will simply take the average of the past 5 years and use that to project it forward. The Total Equity line and the Total Liabilities and Shareholders' Equity line are both functions of other calculations. The Total Equity equals all of the lines above it including common stock, additional paid-in capital, retained earnings, and other equity. The Total Liabilities and Shareholders' Equity line is equal to Total Liabilities plus Total Equity. And lastly, the total common shares outstanding will be averaged over the past 5 years, because this will be volatile as the company decides to issue more shares or repurchase more shares over time, neither of which they have decided to commit to doing insofar.

This section is over the pro forma income statement and the assumptions I made when creating the estimates. I used a lower revenue growth rate of 4% for the Pro Forma statements. Over the past 5 years, NVE Corp has had an average of -3% growth on their revenues. Of course, this has been a few years of down trends and a couple of up trends, so it is not consistent. Therefore, I decided to just use an average. With this negative average in mind, NVE caters their products to just a few sectors that have been growing over periods at a pretty solid rate. Their technology is "found in industrial, scientific, and medical applications." (Online) The two sectors that NVE Corp sells the most are industrials and health care industry. These are the sectors that will benefit most from the scientific and medical applications. Over the past 6 months, which

will affect the nearest years revenue growth, the industrial sector grew just over 6% and the health care industry exploded at nearly 14%. Looking at a much further time horizon, over the most recent 5 years health care grew at just over 30% and industrials grew a bit more than 40%. These would be yearly averages of 6% for the health care sector and 8% for industrials. From here, the 4% growth rate makes much more sense. When we take a 6-8% annual growth in the most influential purchasing sectors for NVE Corp's products, and add it to an average revenue growth rate of -3% and we get to somewhere around 4%. This is considering that these sectors continue to grow at the same 6-8% rate over the next 5 years, but I believe the growth will be much faster because of the recent quarantines and recession. People are ready to get out, invest, and spend money. We have been reminded that we cannot take business, or life, for granted.

Looking at the Total Cost of Revenue portion, I decided to go with the average. First, I created common size percentages by dividing the Total Cost of Revenue for the particular year and dividing it by Total Revenue. Then, I found the averages of the Total Cost of Revenue in proportion to the Total Revenues between the years on the original statements. There was one year up big, with the other two dropping in terms of the Total Cost of Revenue versus the Total Revenue. Therefore, I decided to go with the average. Additionally, I believe that Total Cost of Revenue is a variable cost. However, that variable cost will be tied into the revenue because the more revenue the company, the more goods they have sold. So, when they revenue increases, the cost of their revenue follows. Therefore I decided to use the average of the preceding years and keep that average the same in terms of the particular year's revenue.

When it comes to the Sales/General/Administrative Expenses, I decided to go with the average change in SG&A divided by Revenue. This was also calculated based on a common size against the revenue for the particular year. Due to the percentage of SG&A in terms of the

Revenue decreasing each year in the original statements, it only makes sense that it is more of a fixed cost, or the company is finding ways to continually cut costs. If this were a fixed cost it would make sense that it would be a lower percentage of revenue year over year, especially if revenues continued to climb. So, with this said, there is an average of a negative 0.92% change in this ratio when looking across the past statements. In using the average, I would multiply the previous year average percentage by the negative -0.92% and add it to the previous year average. This usually got me a number that was 0.04% less than the previous year, showing that as the revenues increase, this number does not grow quite at the same rate. The absolute value of SG&A costs will still increase year over year, which I think is necessary. However, they do not grow at the same rate as revenue, and that is because SG&A expenses are largely a fixed cost.

For Research & Development, I decided to use the same method for the pro forma calculations as I did for the SG&A Expenses. I believe that Research & Development is a variable cost, but a company can only spend on R&D when they have money left over to spend. So, here I took the average change in R&D as a percentage of revenue, which is a positive increase of 0.86% per year. I can then multiply the previous year's percentage by 0.86% and add that on top of the previous year's total. This means the R&D expense as a percentage of revenue will continue to increase as the company makes more money. The R&D expense is a variable expense but is somewhat fixed to how revenue is doing. If revenue continues to increase, so will R&D expense.

Total Operating Expenses seemed to be largely in tune with revenue increases or decreases throughout the original statements. The years that revenue increased, this number increased and the years that revenues dropped this number normally dropped. So, this number

will increase as the total expenses from Research & Development, SG&A, and Total Cost of Revenue.

Just like the Total Operating Expenses, the Total Income Tax seemingly moves up and down along with revenue changes. So, here I will also use the average of the common size percentage between the Total Income Tax against the Total Revenue. This will allow the taxes to drop when revenues drop, which is very practical, and allow the taxes to increase as revenues increase. Doing it this way is very realistic, especially if the company is moving from lower tax brackets to higher ones, or vis-a-versa.

Moving to Interest & Investment Income, Non-Operating I decided to find the average between the common size percentages of Inter/Invest Inc, Non-Operating over Revenues for the year. I believe this is the best method because I know these costs are variable, but not based on revenues. These can vary based on the Federal Funds rate for interest income and investment income will vary on market performance and market interest rates. So, I do not believe this should increase or decrease along with revenue but be an average across the years of revenue. Since there is no way to accurately predict this, going with an average percentage would be better than adjusting the averages by an expectation.

Depreciation and Amortization are fixed costs of a company. They are allocated across a certain time horizon. With this said, as a company's revenue increases, they should have more money to allocate toward property, plant and equipment, which is what is depreciated. Additionally, amortization is allocating costs of intellectual property across a time period. Once again, as a company makes more money, they should have more to spend on research and development which will in turn, hopefully, result in more intellectual property. This process means that as the revenue increases throughout the pro forma statements that the amortization

and depreciation should as well but be fixed against it. Therefore, I decided to use the average Depreciation and Amortization against the revenue to calculate across the forward-looking statements.

In summary, these pro forma statements are forward-looking and are made up of many assumptions including previous averages, industry expectations, market performance, and projected numbers. These numbers would change depending on the time horizon of the projection. For example, I would not keep accounts receivable the same number if I were doing a 10- or 20-year projection, but a quarterly or 6-month projection may call for higher numbers. However, volatility is tough to capture in projections, and my numbers are no better at solving that problem. It is hard to accurately predict small cap companies' real numbers due to growth potential, risk, and volatility.

External Financing Needed (EFN)

I used average historical growth rates in order to calculate my pro forma statement numbers. I also pulled from current and expected economic conditions to adjust calculations and make my final projections on the forward-looking financial statements. According to my Pro Forma Statements, NVE Corp will have to have some sort of external financing over the next 5 years. They will need growing External Financing over the next 5 years, as the number gets bigger each year. This shows that their internal funding is not meeting their financing needs. This is reasonable because of the sector in which NVE Corp operates. This sector requires tons of cash for research & development, and additionally, NVE Corp is a small cap company and is burning through more cash than that of others in their space because they are trying to lift off and come into some more market cap.

Stock Valuation

Before I get into explaining my price valuations, I would like to cover the assumptions I made in calculating the share price estimates. First, I will cover my calculations via the discount cash flow approach. In calculating Free Cash Flows, I just had to borrow numbers for the particular year on my pro forma statements. Once I found all the FCF's, I started to calculate Terminal Value, but not before I made two rate assumptions. The terminal growth rate I decided to use was 4%. I feel that 4% is a good rate to choose because that is the rate that the pro forma revenues are expected to grow year-over-year and that is below the annual growth in their main sales segments. Industrials and health care companies, both of whom are the main purchasers of NVE Corp's products, have grown between 6% and 8% annually over the past 5 years, and have even higher growth rates in shorter time horizons. I think it is safe to say that their solid growth will spill over to NVE through their expanded purchasing of assets that NVE Corp can offer them. For the Weighted Average Cost of Capital (WACC) rate, I am using the assumption from gurufocus.com. Guru finds the WACC for NVE Corp to be 8.86%. (NVE Corp) The terminal value was calculated by multiplying the future value of the last year's cash flow (year 2024 in my situation) by 1 plus the terminal growth rate divided by WACC minus the terminal growth rate. This calculation gave me the future value of the terminal value. I then had to find the present value of the terminal value to and add it to the present value of the total cash flows to come up with the enterprise value. The next step was to find the market value of equity and to do that I had to subtract the debt from the estimated enterprise value. Lastly, I divided the market value of equity by the number of shares outstanding. This gave me an estimate of \$21.20 per share, which is over 60% below the current price of around \$55. While this number shows the

stock being far too overvalued in the market, the price multiple methods seem to give a more in-line estimate.

This portion covers the calculations in finding the price per share estimate using the EV/EBIDTA approach. First off, some of my numbers that I pulled from my pro forma statements may seem to be different than I reported via the pro forma statements. This is the case because on my pro forma statements my numbers were in thousands, however on the share price estimation excel sheets, I decided not to have my numbers in thousands, to simplify calculations. In calculating the EV/EBIDTA industry average, I found the weighted average between the semiconductor and semiconductor equipment sub-industries. The numbers I used were from a database on the New York University website, that were broken up by sub-industry. (Enterprise) I had to combine the numbers from the semiconductor sub-industry and the semiconductor equipment sub-industry because NVE Corp. participates in both. However, since there were more companies in the semiconductor sub-industry it would be best to use a weighted average opposed to just a simple average, to get a more accurate number for the industry. Once I found the EV/EBITDA industry average, I calculated NVE Corp.'s EBITDA by taking numbers from year 2020 estimations on the pro forma statements. These were then multiplied together to find the Enterprise Value. Next, I took the Enterprise Value and subtracted it from the debt (which were the 2020 total liabilities on my pro forma statement) to get the Intrinsic Market Value of Equity. Once I had this number, I divided it by the shares outstanding in order to get the estimated share price using the EV/EBIDTA approach of \$33.98. This estimate not only differed from the estimate when using the P/E approach but is nearly 40% below the current market price of around \$55.

The P/E approach began its calculations by finding the industry average Price/EPS, otherwise known as the Price-to-Earnings ratio. I came up with this number from the research tools on TD Ameritrade. The semiconductors and semiconductor equipment industry came up with a P/E ratio of 22.33. (Online) I found the Earnings per Share for NVE Corp. by looking back to my 2020 estimations on the pro forma statements. The formula for EPS is Net Income minus Preferred Dividends (if any) divided by shares outstanding. While NVE does offer a dividend, there were no preferred dividends reported on the income statement. The calculation gave me an EPS of \$2.56. Lastly, I calculated the Price per Share by dividing the industry's average P/E by the EPS of the company. The estimated price per share came out to be \$57.07. This number seems to be the most in-line of them all. Instead of being below the current price by more than 40%, this estimation differs from the current price by a mere 3.5%. While these numbers are different, they may be a more accurate representation of the true value of the stock price when put together.

I figured that a simple average would best to represent an estimate of the share price, as there is really no way to weigh these three valuation models. The simple average of the price came out to be \$37.42, which is still nearly 32% cheaper than the current price of about \$55. Each method comes with its benefits and its downfalls. The DCF approach can be tough to have accurate numbers because of the assumptions it requires. Often, analysts do not see a market downturn on the horizon, an obstacle in the way, or a potential breakthrough technology that the company patents. These make it extremely tough to use this method, on top of the complexity. However, as hard as these assumptions can be to accurately project, I think this is also the biggest benefit to this analysis tool. The DCF model includes input of scenarios that analysts can test, is deeply precise in the kind of assumptions that must be made and allows for sensitivity

analysis along the way. (DCF) Moving on to the price multiples models we see plenty of pitfalls and reasons to use them, as well. The P/E model is widely known for management manipulation or inflation of stock price. These two things can deeply mislead investors when using this model as a stand-alone. The EV/EBIDTA approach “does not include capital expenditures, which for some companies can be a huge expense...[but] it strips out debt costs, taxes, appreciation, and amortization, thereby providing a clearer picture of the company’s financial performance.”

(Maverick)

In summary, there are plenty of calculations an analyst can perform to estimate the true value of a share price, but the true numbers are ever-fleeting. While it helps to use more valuation methods, there is never a perfect answer. Some valuation methods will correct for what others’ lack, and some lack for what others’ correct. At the end of the day, we must understand that the market is volatile and always changing. Shares are often above or below, sometimes by enormous amounts, their true value. With this all said, using these three methods, the share price that was estimated is below the real share price of NVE corp. and that may worry some investors. According to all my research, however, I would feel comfortable investing in this company due to many factors, but especially their financial strength and their upcoming opportunities in a differentiated product market. Many stocks trade above their estimated value, and industries as a whole can as well.

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