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Corporate Tax Rate Change Impacts on Beta

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NORTHERN ILLINOIS UNIVERSITY

Corporate Tax Rate Change Impacts on Beta

A Thesis Submitted to the

University Honors Program

In Partial Fulfillment of the

Requirements of the Baccalaureate Degree

With Upper Division Honors

Department Of

Finance

By

Alejandro Perez

DeKalb, Illinois

May 12, 2018

University Honors Program

Capstone Approval Page

Capstone Title (print or type)

Corporate Tax Rate Change Impacts on Beta

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Abstract

The new corporate tax rate change will have an impact on company financing strategies. Higher levels of corporate borrowing or debt will lead to higher measured beta for firms. An examination of average company betas before and after the last significant corporate tax change in 1986 is performed to test for increased risk taking by firms. We look at rolling betas between 1975 and 1997 using observation periods of 6, 12, 18, and 24 months. We then apply the results of the analysis in predicting the effects of the more recent corporate tax change in 2017. We use data collected from the Center for Research in Security Prices as sourced from Wharton Research Data Services. Our findings are a reduction in betas after the tax change consistent with a reduction in debt levels and risk taking by firms. We may conclude companies will restrain borrowing in the coming years in reaction to the reduced corporate tax rate.

The taxing system in the United States has been a debatable issue for years. Numerous Presidents have changed the tax system and inputted their reasonings on why they changed the taxing system and how it would impact the country. According to Marketplace.org, President Donald Trump proposed and congress passed a 21% corporate tax rate for all the companies in the U.S. The new tax rate will take into effect on taxing year of 2018. (Marketplace.org) His theory is that by reducing the taxes it would invite more U.S. based companies outside of the country to make their headquarters in the U.S. In turn, it will help give more jobs for Americans and decrease the unemployment rate. However, from a perspective of an investor, I believe that it will make companies riskier. As we all know public companies receive funding by either equity or debt. Why do big companies like Apple borrow money, even though they are sitting on billions of dollars of cash? To avoid the tax rate here in the U.S., and rely on the tax rates in other countries that are far less than the tax rate domestically. By relying more on debt, public companies would become more valuable therefore riskier for investors. In other words, investors would want a higher return for their investment. Since I won't have data for the new corporate tax rate considering that it was just passed. I will use data by an earlier corporate tax change in 1986. Former President Ronald Reagan proposed, and passed by congress, a corporate tax rate change from 48% to 35%. According to New York Times, The new tax rate during the Reagan Administration was proposed in 1986, and took effect in accounting year 1987. (Nytimes.com) Data was collected from 1975-1997 in all the companies that were in the S&P 500 and their returns. From there we would calculate the Beta for each company. Beta is the level of risk compared to S&P 500 which returns a Beta of 1. Anything above 1 is considered risky and anything below one is considered less risky compared to the S&P 500. By collecting all Betas, we can see the difference between those years, especially after 1987 since that is when the new tax rate took into effect. Based on the results we could determine that

there is a possibility that could happen with the new tax rate. This project does not include any outside entities that could affect the market or any unlevered betas. Just keep in mind that the market is volatile and it could change returns for the company. I will further explain the process of how the data was retrieved, and then I will demonstrate my findings and explain the end results of each graphs that I will present in this paper.

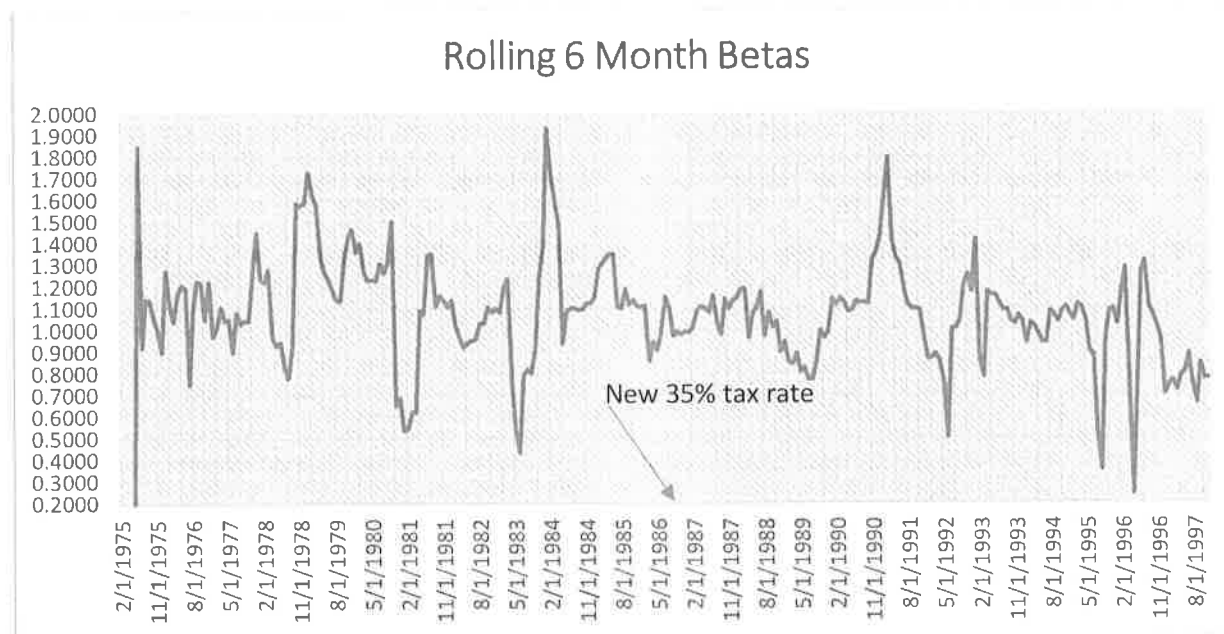
Process of Retrieving Data

We first had to come up with retrieving the data and find out how to retrieve the data. So the Finance Department has access to Wharton Research Data Services that provides all kinds of financial data going back decades. We had to come up with a time frame that would be suitable in having enough data to come up with a solution. So we decided to have a time frame of about 1975-1997, in order to have roughly 10 years of data for both before and after tax change. This was by far the hardest part of the project due researching the database and coming up with large amounts of data for that specific timeframes. We were able to retrieve the data by permanent numbers which is sourced by Center for Research in Security Prices (CRSP). As companies change names, get merged, or acquired by other companies, their tickers change in the market. So permanent numbers stay the same regardless of ticker changes. The permanent numbers stay the same regardless of issued securities. We also gathered the returns of all those companies and we decided to compound them monthly that we can see the monthly betas for the companies. An issue we encountered when we received the returns is that our returns were not an accurate rate. Meaning that there are some returns that don't come till later in the years and some that start in 1975. That is because some companies were removed from the S&P 500 due to various reasons. So if we compile the data just like that, we would get a lot of N/A's due to insufficient information. So we had to sort the returns and add in a logical calculation that sorted the returns and got rid of the N/A's. Once we sorted it

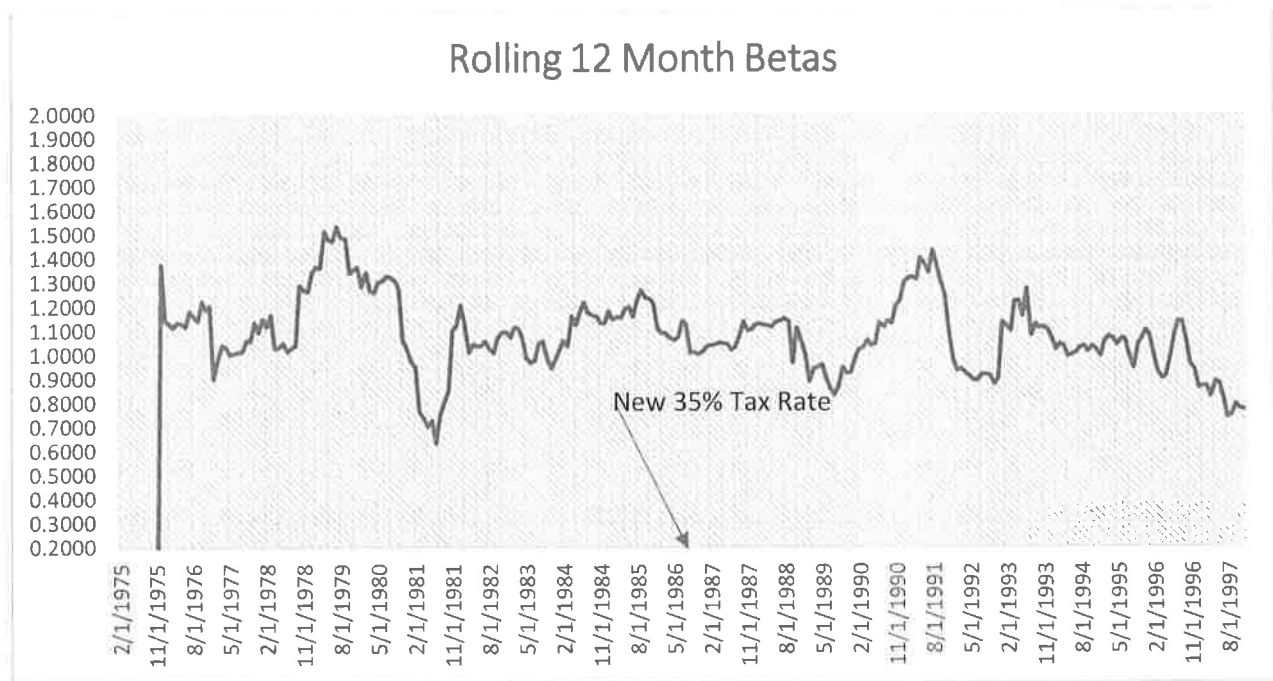
out we were able to start the calculation of the set companies. We did a minimum lookback and minimal observations that way we can see the best result for this paper in regards with beta and alpha. In our project we did a minimal observation of 6, 12, 18, and 24 months. Based on the best results we can determine the best outcome for beta and alpha in regards with the tax change after 1987.

Beta

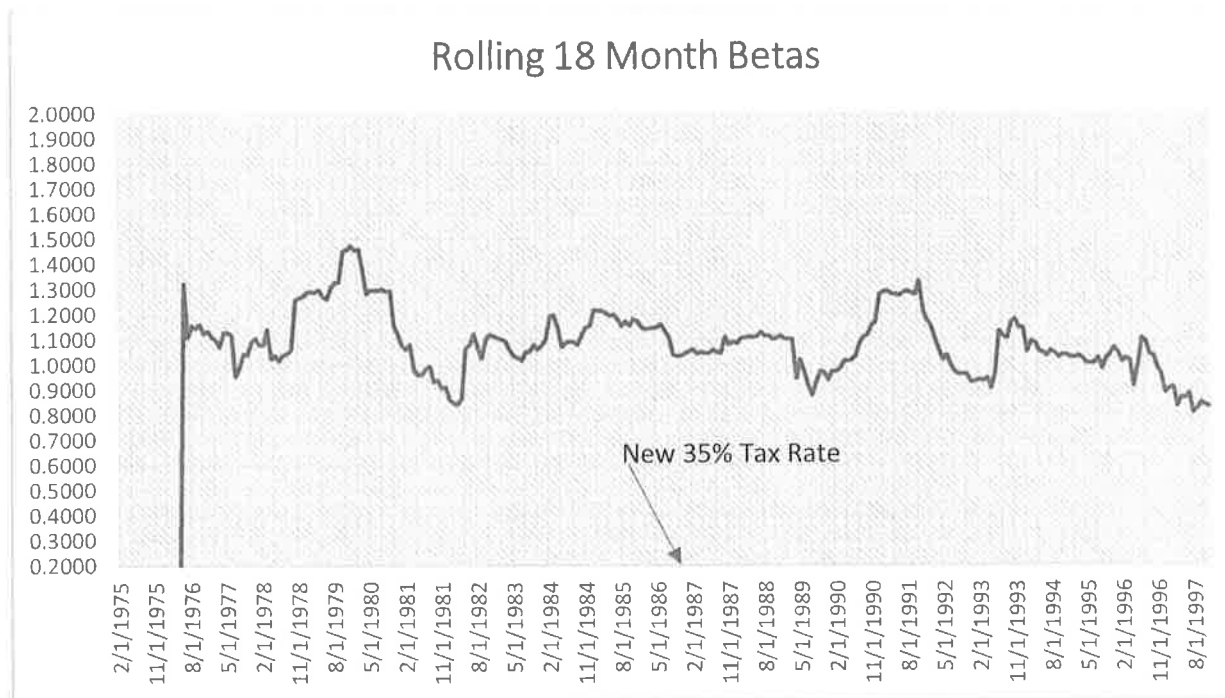
As stated earlier in the paper, beta is measure of risk for an investment compared to the S&P 500 beta of 1, and computed as a regression analysis. The initial formula, according to Investopedia, for beta is the covariance between company and market divided by the variance return for the market. Anything above one is considered riskier or more volatile than the market, and anything below that is considered less risky or less volatile. (Investopedia) The results that I found is based on levered beta which includes debt into consideration. There is an unlevered beta which excludes debt, and it was very difficult in trying to find the components of unlevered beta. According to our theory, we believe that beta would become more volatile after the tax rate change. We decided to do our betas in rolling months of 6, 12, 18, and 24. We did rolling returns to find the average returns for that specified period and can offer a better insight of the average history of betas. We will first look at the rolling 6 months of betas in a specified period.



We have the rolling 6 months of betas between 1975-1997. I added a note on the proposed and approved tax rate change which took into effect in accounting year of 1987. As you can see that before the tax rate change, the betas are very volatile especially the span between 1978 to 1984. There could be potential market factors that have involved in the analysis of the volatile betas. It looks like the betas are riskier than the market which could have potentially affected portfolios back then. After the tax rate change, there is a peak in an increase in beta in the early 1990's, however it decreased exponentially by mid-to-late 1990's. In theory, with a lower tax rate means that companies have to borrow more to compensate the additional debt. Therefore, it leads to increase in risk which results in a higher beta. According to Investopedia, the last 1990's received low betas which I believe is a start of a bubble that would cause the dot.com recession in the early 2000's. (Investopedia)

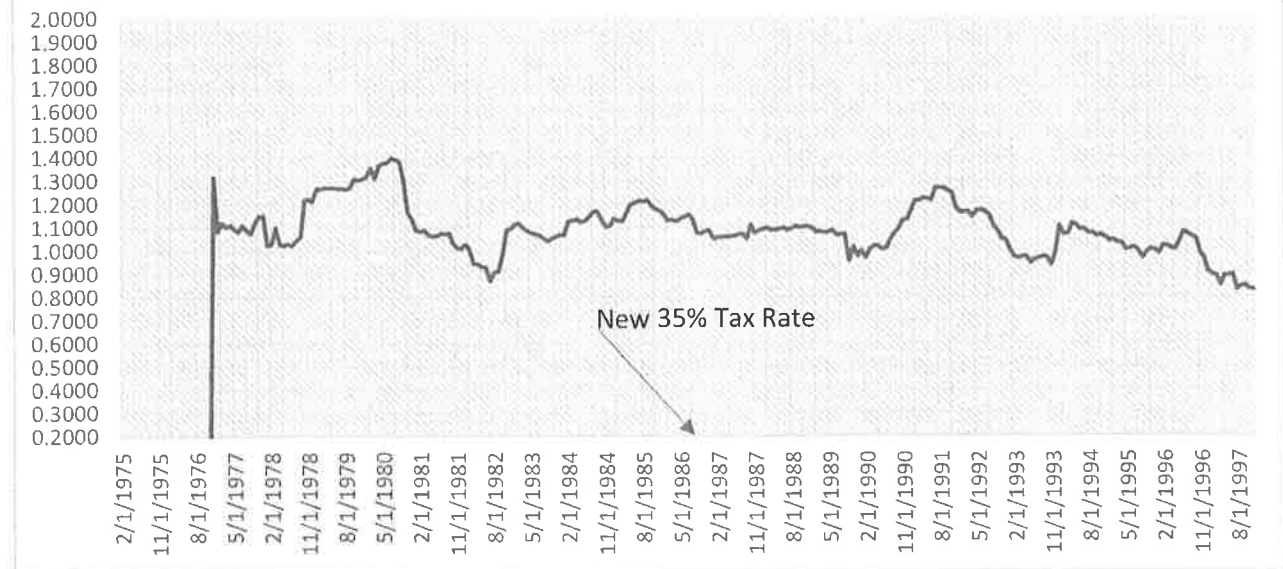


As you can see the markets are less volatile for the 12 month rolling betas. In 1981, there is huge dip in the betas. As the rolling periods increase, betas will become less volatile or react in a slower pace which makes the betas smoother in the graph. In the beginning of 1978-1981 there seems to be an increase in the betas that was caused by a market factor. After the tax change it seems that the betas compared to the 6 month rolling periods are less volatile. The early 1990's has had increase in betas that again was caused by a market factor. After the early 1990's, the betas seem more stagnant for a while up until the mid 1990's. The following graph is the 18 month rolling of betas.



The rolling 18 month beta seems to have a higher volatility before the tax rate change of 1986. Just like the 12 month rolling beta, it appears that betas are high starting in 1978-1980, and then took a dip from 1981-1982. The past three graphs it appears that it has been taking a while for betas to increase after the tax rate change. The whole purpose of a corporate tax rate change is to bring jobs back to the U.S., I believe there is a correlation between that and the investment perspective in measuring betas. There is a potential that companies are taking a while to borrow money. It also appears that as soon as beta increases, there are constant decreases in beta right after. Throughout the late 90's there is seems to be a beta decrease leading into the early 2000's, which again could be a potential cause of the dot.com recession. The following graph for beta is a 24 month rolling period for beta.

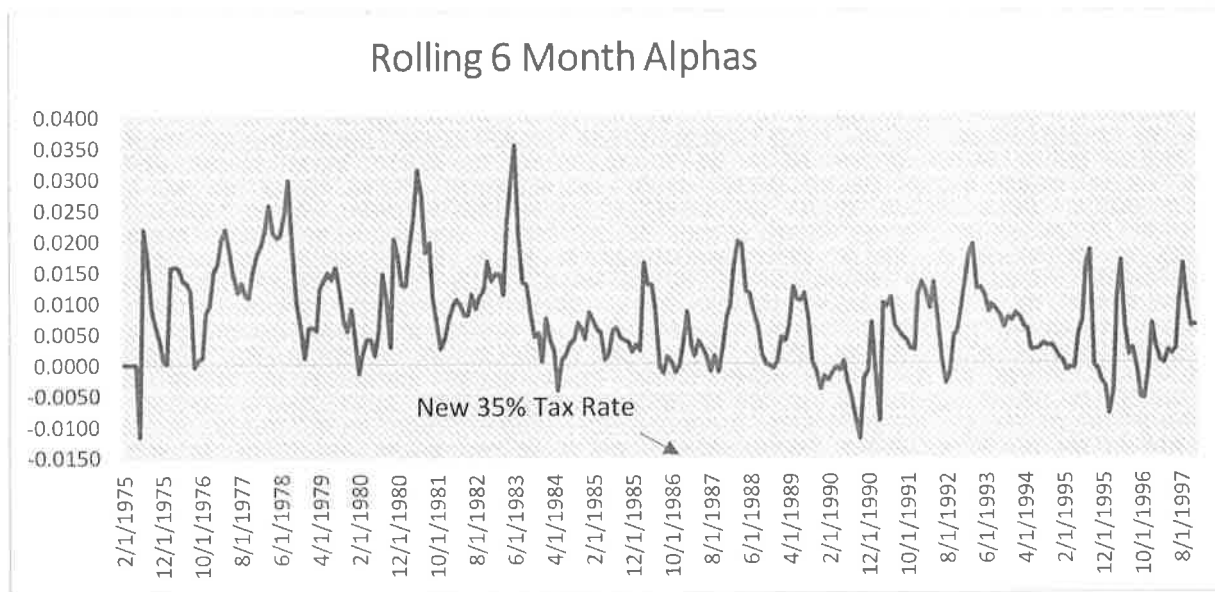
Rolling 24 Month Betas



This is the last graph for the rolling betas. As you can see the pre-tax betas are higher than the after-tax betas. Again, the highest point in betas appears to be between 1978-1981. Then it decreases right after in the early to mid 1980's. I have noticed in all four graphs that right before and after the tax rate change, it appears that it decreased a small fraction. That actually surprised me because I was expecting a major change in beta due to the tax rate change. We can conclude that the tax rate change has little effect on the beta changes in the beginning stages. Also, it seems that beta is constant for about 5-6 years of the market before and major changes happen. For the 21% tax rate change in we can expect the same results for the beta changes. I am surprised that betas were not slightly higher than what I had previously expected. Steady minor changes in the market could have an impact on beta and allow it to be stable or less volatile than the pre-tax era of betas.

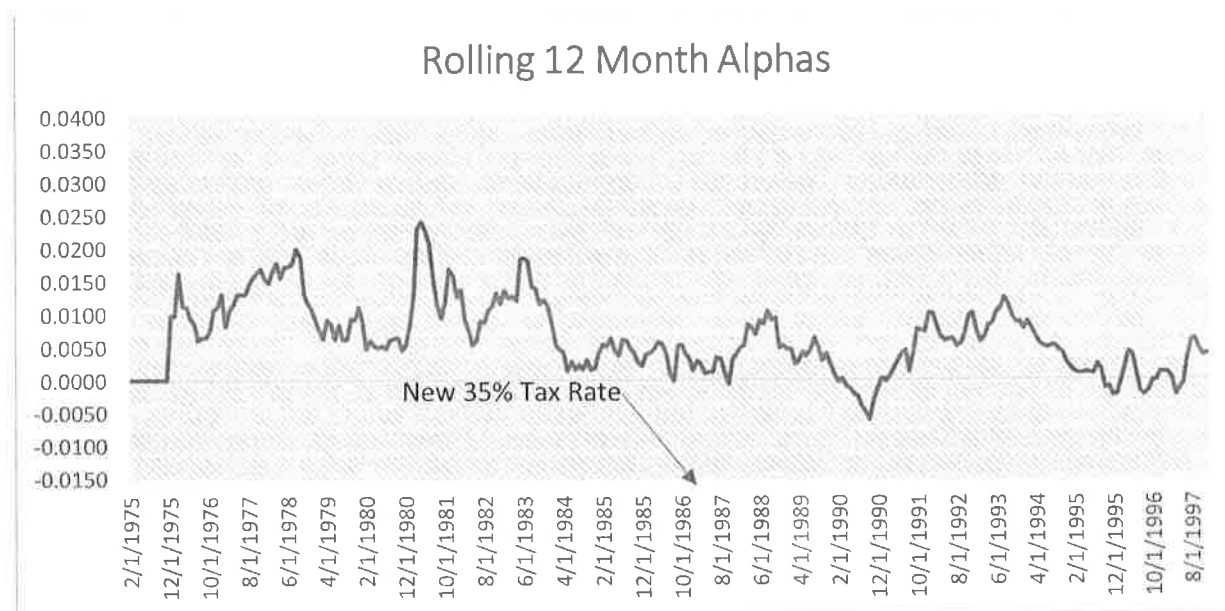
Alphas

Unlike beta, alpha is used to measure a performance of a portfolio. An example would be a mutual fund or several mutual funds. According to Investopedia, the alpha measure should be closer to zero in comparison with the S&P 500. Alphas measure the excess returns on an investment. (Investopedia) Alpha is mainly used to analyze returns on an investment. It works in conjunction with beta in order to analyze a portfolio thoroughly. It is used to view returns on a portfolio. So with the tax rate change, we expect a lower alpha due to the market change that was caused by the tax rate change. The formula for is the sum of the end price and distribution per share subtracting start price, divided by start price. Again, the following graphs through a 6, 12, 18, and 24 rolling periods. We go over the overall performance of the graph, and then compare it with the beta graph described earlier. The first graph we will look at is the 6 month rolling period graph.



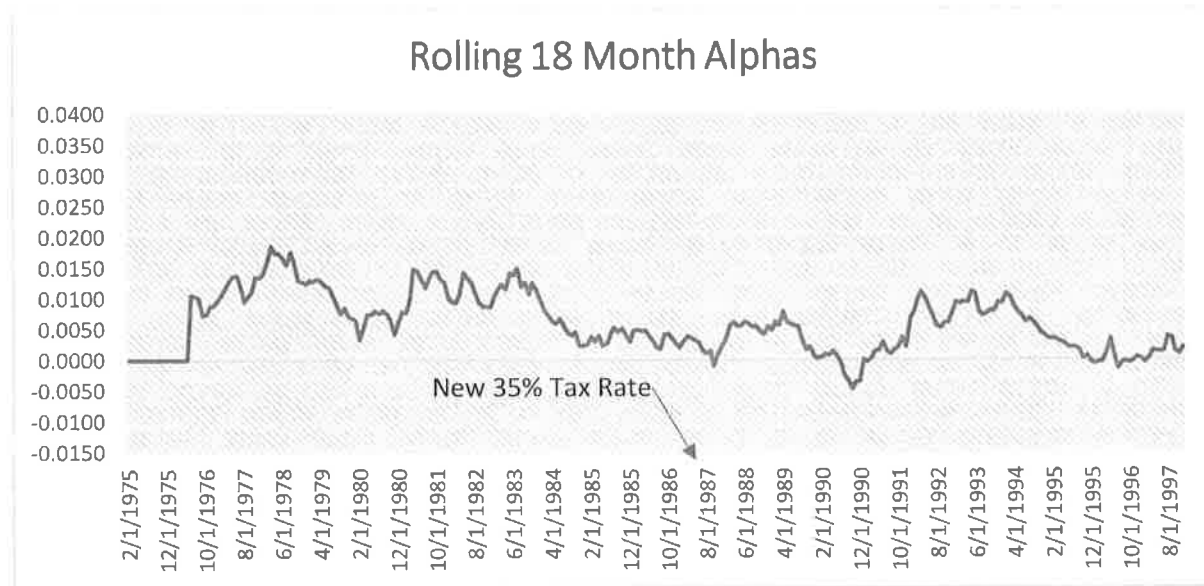
The pre-tax alphas are very volatile, especially in the 1980's ear. It appears that the excess returns were doing really good in that aspect. After the tax-rate change alphas were becoming less

volatile and actually experienced more negative alphas. In comparison with betas in the 1980's, it appears that beta was less than 1 during that time. In way it could be a good thing because there is not that much level of risk, therefore you could get a return but more than likely a small return. Another example is that the early 1990's, alpha was at a negative value and beta was really high during that time. Investors were very lucky if they received a return during that time considering the high risk and low excess returns. The next graph we will look is the 12 month rolling period for alphas.



According to the graph, the pre-tax alphas seem more volatile than the after-tax alphas. During the pre-tax era, alphas did not face any negative values which was actually surprising. Especially when betas are very volatile during the pre-tax era for 12 month rolling periods. During the after-tax era, the alphas during the 1990's less than -0.5% which the beta was at its highest during after-tax era. Again, along with external factors, I believe that the change in beta and alpha was because of the changed corporate tax rate. The betas decreased shortly after which in turn increased alphas and boosted investor confidence within the market. Alphas decreased as well,

which I believe in conjunction with the dot.com bubble in the late 1990's. The following graph is the 18 month rolling period for alphas.



The rolling 18 month alphas had the same results as the 12 month rolling period. The pre-tax era seems to be having high alphas, which probably gave a lot of investor confidence. However, after the tax change, there are some negative points in the early 1990's. After that, the alphas increased during the 1990's until the end. In comparison with the 18 month rolling betas, the end of the 1990's was almost same for betas and alphas. That was an interesting find considering the outside factors during that time. The final graph is the rolling 24-month period for alphas, and then we will do a comparison with rolling betas for 24 months.



The last alpha shows the same results as the previous alpha graphs. Very high alpha rates which it must seem that it was a good time for excess returns, however, there was a point with high betas around the late 1970's. During that time was a big risk, however the market was able to give decent excess returns for that period. Again, the after-tax rate change era seems to be in a worse condition given the fact there are negative values for alpha. The alphas reach its lowest in the early 1990's which I believe is part of the corporate tax rate change. In the mid 1990's the alphas increased while betas decreased. The returns during that era were great for investors and boosted investor confidence in the market.

Conclusion

The original theory for this project was that betas would increase after-tax rate change in comparison with the pre-tax era. However, it appeared that it was the slight opposite after the tax change. In reality alphas changed a lot after the tax change and actually caused negative excess returns for investors. Based on the data, we can conclude that similar data could happen with the new corporate tax rate that President Donald Trump proposed and passed by congress. According to the book Corporate Finance by Ivo Welch, with a decreased tax rate, there could a reduction in

debt which reduces risk. (Welch) With the change in risk, it will decrease the average beta throughout time. The only question lies if the market would be able to keep with lower betas and keep excess returns at a positive note? Given all the market changes like getting rid of free trade and adding tariffs could affect the feasibility of the market. As you can see that alphas are more volatile, so we could possibly conclude that they could potentially be even more volatile with even more decreasing corporate tax rate change. So the corporate tax rate change could potentially be a good idea to bring in more jobs for U.S., however as you can see, it can become a negative impact within the market. Small market changes can cause a huge impact in the pocket of an investor, and I think this a perfect example of this case. One thing is for sure is that betas became more controlled during the after-tax era. Overall the market is very volatile and based on speculation betas have a possibility to being more stable with volatile alphas. However, external factors can change the market and change outcomes of beta and alpha.

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