Top vs Bottom Line Information and Portfolio Return Variability: A Case Study of the DJIA Index

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Abstract

This paper examines a set of standard corporate financial reporting numbers, and their growth rates, in particular, influencing stock return variability in a portfolio. I examine the influence of growth in sales versus changes in net earnings. Using stock return data from member companies listed in the DJIA index, I find that growth in sales is likely to have a much larger explanatory power in determining return uncertainty in the DJIA, in comparison to the influence of changes in net profit.

Key words: Sales growth, portfolio return variability, growth in earnings, DJIA, earnings management and expectations, portfolio management

Introduction

"As is well- known, learning has to cope with confusing experience and the complicated problem of balancing the competing goals of developing new knowledge (i.e., exploring) and exploiting current competencies in the face of dynamic tendencies to emphasize one or the other." Levinthal et al (1993)

In 1968 Ball and Brown find positive relation between earnings and stock returns. Their finding has been reiterated in a number of other academic papers since then. This paper sets out to further explore this relationship, this time within a portfolio context.

Managing investment portfolios can be a complex task, considering time, returns expectations, and variances and covariances of those returns. This paper focuses on investment portfolio return, and in particular, the second moment of its probability distribution, i.e. the risk with which a portfolio manager can accomplish delivering expected returns to investors.

This paper sets out to question the relevance of changes in net earnings on the variability of portfolio rates of return, in comparison to changes in the top line of the income statement – i.e. sales growth.

Due to diversification guidelines, equity investments are required to be held within a diversified portfolio. Portfolio managers, both amateur and professional, thus work towards maximizing expected return, while minimizing the dispersion, of a portfolio of securities. Whilst we have seen earnings as explanatory factors in determining individual securities expected return, in this study, I focus on return variability of a portfolio of securities.

Specifically, I compare the effects of changes in earnings, both short-term and long-term, to the changes in sales growth, and their influence on the variability of securities' returns held in a diversified portfolio, such as the DJIA. I find, that sales growth influences portfolio return variability more than changes in earnings do. In this respect, information from the top line may be more important to investors and portfolio managers than pure profit focus.

One can argue that net earnings results, such as profit margins, convey information predominantly about cost management. Whereas, sales numbers reflect product attractiveness, timeliness, market share, pricing ability, competition, business cycle awareness, etc. Are investors well-served by financial analysts recommending individual securities due to their earnings track-record, if at the end of the day, the task of an investor is one of managing a portfolio, rather than focusing on individual security investments, one at-a-time?

Literature Review

Reviewing existing literature, I find a number of publications pointing towards a possible disconnect between the information received by investors, information supplied by financial analysts, and management teams of publicly traded companies.

For instance, in Brauer, Wiersema (2017), the authors state: "Financial analysts fulfill an important information brokerage and monitoring function for investors. By providing investment advice, financial analysts also influence the demand for a firm's stock and thus its price. Executives pay close attention to financial analysts' earnings forecasts and recommendations, so much so that they are frequently criticized for excessive focus on their forecasts at the expense of the long-term interests of the firm." These findings point out the role of a financial analyst as an important "middle man" that is in direct contact with both the investor and the management. While the analyst serves as an information facilitator, the position also allows for filtering information flow.

For instance, in Piotroski and Roulstone (2004), the relationships between analysts, investors and management are investigated in terms of their eventual influence on stock price returns. "We investigate the extent to which the trading and trade-generating activities of three informed market participants-financial analysts, institutional investors, and insiders-influence the relative amount of firm-specific, industry-level, and market-level information impounded into stock prices, as measured by stock return synchronicity."

Investors traditionally rely on financial analysts to analyze the prospects of investing in a company. They are looking to make positive returns with as little risk as possible. So why are financial analysts so focused on earnings as opposed to other metrics? In particular, it seems that a large part of their efforts is concentrated around choosing companies that will beat, or at least meet, analyst-issued earnings forecasts. If the general investing public is long-term investors, would they really be interested in companies that show a temporary stock uptrend as a result of a favorable earnings announcement? If so, then that would suggest that investors are in the game in order to essentially outperform each other and receive a "speculative premium".

We can find such a stipulation in Harrison, Kreps (1978). The authors find that indeed investors are hoping for speculative gains from their investments. "We say that investors exhibit speculative behavior if the right to resell a stock makes them willing to pay more for it than they would pay if obliged to hold it forever. It is shown how members of one class bid up the price of the stock in anticipation of future opportunities for selling it to members of other classes, at higher prices than they themselves would be willing to pay. It is seen that, if an equilibrium price is to be found, it must exceed what any class would be willing to pay for the stock if obliged to hold it forever. Typically, the minimal consistent price will exceed every investor's expected present worth of future dividends. Investors are willing to pay a "speculative premium" because of anticipated capital gains."

The speculative premium is an intriguing concept for both investors and traders alike. Some investors may very well be interested in a quick profit. Perhaps, more accurately, trading profit, rather than investment returns.

In this study, let us focus on the non-speculative part of the market participant populus. In particular, I assume that both long-term individual and/or institutional investors seek relative safety, consistent growth, and capital preservation. It may, in fact, be the case that the majority of investing public, investing their pension funds throughout their productive lifetimes, may prefer investments in firms that will survive and thrive in the long-run.

<u>On the Topic of the Dynamic between Managers and Analysts</u>

Bartov at al. (2002): "Expectation management takes place whenever management purposefully dampens analysts' earnings forecasts to produce a positive earnings surprise (or avoid negative earnings surprise) upon earnings release." Indeed, there are quite a few articles written on the topic of the dynamics between financial analysts and firms' management teams. Essentially, these studies stipulate that managers and analysts tend to work together to sell a product, namely the company shares, to potential investors. The question that is being asked in this paper is about the validity of earnings as the best marketing tool to do so. As an example, consider Matsumoto (2002) stating: "I also examine whether firms manage earnings upward or guide analysts' forecasts downward to avoid missing expectations at the earnings announcement."

WhileBartov, Givoly and Hayn (2002), DeFond and Park (2000), Kasznik and McNichols (2000) and Lopez and Rees (2000) present evidence of positive market responses to meeting or beating analyst earnings forecasts, Skinner and Sloan (2001) and Kinney, as well as Burgstahler and Martin (2002) show significant stock price declines associated with even insignificant negative earnings surprises. This suggests a possible asymmetry in responses to good versus bad news. It is no surprise that management would act to avoid the arguably relatively more pronounced reaction to the "bad" news.

Another angle the market seems to reward is consistency in meeting expectations. Kasznik, McNichols (2002) investigate whether the market rewards firms meeting current period earnings expectations, and whether any such reward reflects the implications of meeting expectations in the current period for future earnings or reflects a distinct market premium.

"We find, however, that the market assigns a higher value to firms that meet expectations consistently, controlling for an estimate of the firm's fundamental value." Boguth et al. (2019) make a similar analogy of market risk premium being larger after an FOMC press conference, than with a simple announcement, without a press conference.

Focusing more on growth stocks, for a moment, they too exhibit an emphasis on earnings, albeit they also exhibit great focus on revenues and EBITDA. In the case of growth companies, this may be a practice that is indeed justified, as their stock return punishment following a disappointing earnings announcement tends to be relatively large. We find evidence in Skinner, Sloan (2002): "We show that while growth stocks are at least as likely to announce negative earnings surprises as positive earnings surprises, they exhibit an asymmetrically large negative price response to negative earnings surprises."Such an asymmetry in market reaction can be attributed to a number of behavioral finance phenomenon.

Additionally, Westphal, Clement (2008) find that disclosures of negative firm information may prompt top executives to render personal and professional favors for security analysts, who may reciprocate by rating firms relatively positively. "… supportive findings suggest that corporate leaders enhance and perpetuate external support for their firms via social influence processes…"While the intention of clear and close communication between management and financial analysts should be constructive, it may, in some instances, leave the investor interest on the sidelines. In such cases, we can speculate, investors may be ill served.

Thus, one of the key roles in the process is played by the company management. They may manage their earnings results upwards. For instance, in Zhang, Gong (2018), the authors state: "pressure to meet or beat earnings forecasts from security analysts leads managers to improve short-term earnings by cutting strategic investments at the expense of long-term competitiveness."It is possible that earnings, especially in the short-term, are being purposefully managed so that they appear as high as possible. The aim of this effort has been on meeting or beating analysts' estimates, and thus generating "good news" and a positive, albeit short-term, positive market response. At the same time, one may pose a question about this tactic leading to long-term adverse effects for companies' growth and their competitiveness.

Are investment returns truly reactive to short-term earnings so much so, that other metrics, such as sales, market share, investment, or R&D, become far less relevant? Zhang, Gong (2018) further observe: "we find that the negative impact of earnings on a firm's strategic investments is strengthen when it receives performance feedback from lower stock returns but is weakened when the firm receives performance feedback from lower sales growth… we find that sales growth has a stronger moderating effect."

It has been documented that negative stock returns have a large negative feedback on strategic growth investment. Weaker overall sales numbers have a relatively smaller effect on strategic investment compared to stock returns. Why is that? Is this due to the manager's role as a value maximizer to shareholders? And the consensus is that the stock price will increase if we meet or beat the analyst expectation. But what about the bigger picture? Is there, indeed, a disconnect between the mandate of company managers and the interests of investors? What about the fact that investor share holdings are always held in a portfolio? Investors care about the portfolio return, and the portfolio variance – i.e. the risk with which they will ultimately achieve their portfolio return. What are the relevant variables then? Is it still earnings? Is it still meeting or beating the forecasted earnings? This paper argues that it may not be.

Zhang, Gong (2018): "We contribute to literature by demonstrating how stock price and sales growth differentially influence managerial responses to earnings pressure. We highlight the possibility that performance feedback influences managerial responses to earnings pressures in ways that managers may not fully consider."Is it the immediate and observable feedback that managers get from lower stock price reaction to earnings disappointment that ultimately drives their arguably stronger focus on earnings rather than sales growth. Is it, in fact, a bit of psychological factors that drives them to put out the "immediate fire" first… concentrating on cost cutting, rather than revenue generation through a strong and ever-growing market share.

Wales et al. (2020) state that their investigation reveals that sales growth is principally driven by entrepreneurial strategic orientation of firms. Secondly, their results show that it is the shared effect of entrepreneurial, market, and learning orientation that explain a significant portion of the variance in sales growth. Sales growth depends on firms' leadership focus, priorities and strategic goals. The management will demonstrate ability to learn, pay attention to the firm's market share with an intention of increasing it, and staving off competition pressures.

Further, in order to "beat the earnings expectations", the management may work to manage the analysts' expectations downwards. We see this in Bartov at al. (2002) "the findings indicate that the premium to meeting or beating earnings expectations (MBE) is a leading indicator of future performance.

This premium and its predictive ability are only marginally affected by whether the MBE is genuine or the result of earnings or expectations management."Firms' managers have at their disposal tools to manage expectations of financial analysts. At times, they choose to employ those tools and manage down expectations. Doing that will make it more likely to eventually beat those already lower expectations. In turn, making stock prices react positively.

Additionally, in Bernhardt, Murillo (2007) "We find that earnings forecasts tend to grow pessimistic over the forecast horizon and these forecast changes and their timing are key determinants of whether firms generate positive earnings surprises."At times we can see earnings forecasts change with time. Somewhat surprisingly, the changes are mostly in the direction of lowering the expectations. "Downward consensus revisions lead to large abnormal returns following the earnings announcement." Essentially, lowering one's expectations enough, any result can be made to look impressive, giving a boost to stock prices after the announcement. The authors conclude: "… the impact from reduced forecasts dominates the gain from generating positive surprises."

Similarly, Burgstahler and Eames (2006) find evidence that managers hyper-focus on delivering a positive earnings surprise. The authors state "managers avoid reporting earnings lower than analyst forecasts. We provide empirical evidence of both (1) upward management of reported earnings and (2) downward 'management' of analysts' forecasts to achieve zero and small positive earnings surprises."The authors also investigate the role of the press, stating that financial press focus attention on instances and consequences of realized earnings that differ from forecast earnings is significant. Thus, based on the author's analysis and empirical evidence, they conclude:"to meet or slightly beat analyst forecasts, earnings are managed upward and forecasts are managed downward." The role of the press can be investigated further in terms of using the earnings season as an opportunity for free marketing. As long as there is a story, it will be appearing in the media. If the story is positive, it can be regarded as a positive externality.

Consensus earnings estimates of Wall Street analysts demonstrate that their initial forecasts differ significantly from actual reported earnings. There seems to be a process of adjustment to analyst expectations that occurs within the time span of an initial forecast and the actual earnings release date. This phenomenon is described in Berry (1995). "The error rates are not meaningfully affected by the business cycle or industry groupings. The average error also appears to be increasing over time. These findings question the use of finely calibrated earnings forecasts that are integral to the most common valuation models and indirectly question the valuation methods themselves."

On the Importance of the Income Statement Information

Let us focus on investor concern for a minute. Investors make investment with the goal of wealth accumulation. Whileinvesting in financial securities, as well as other assets, investors essentially seek positive returns on their investment. Long-term investors seek consistent positive returns, with acceptable levels of risk. We know that earnings and changes in reported earnings are at the forefront of media coverage, and as a result, at the forefront of investor decision-making process. Let us examine other financial results that may play a role as well.A good place to start may be right at the top of the income statement, i.e. the revenues.

A number of researchers have looked at the "earnings release" phenomenon, and have been able to successfully argue that other results reflected in the financial statements are frequently of greater interest to portfolio managers than the bottom line. Indeed, what if one would compare the influence of revenue growth on portfolio risk and return characteristics? For instance, a recent paper by Joseph and Wilson (2018) suggests that corporate interventions direct managerial attention away from focusing on pure profit, but towards the identification and advancement new opportunities in support of growth.

Excessive focus on earnings management through cost-cutting as opposed to efforts directed to increasing market share and sales growth, may be viewed as counter-productive in the long run. Zhang, Gimeno (2010) "We argue that firms under such earnings pressure strive to increase current profits by exploiting market power opportunities and tightening output, even though these acts could encourage rival output expansion."

Zhang andGimeno (2016) further attempt to identify whether managerial reactions to earnings pressure suggest evidence of intertemporal trade-offs. They find that "the results suggest that companies with more long-term-oriented investors and long-term-aligned CEOs with unvested incentives are less likely to soften competitive behavior in response to earnings pressure, relative to companies with transient investors and CEOs with vested, immediately exercisable stock-based incentives."

Likely, long-term investor interest is affiliated to a greater extend to that of management teams that are in it for the long haul, paying less attention to immediate earnings management tactics. Zhang and Gimeno (2016): "The evidence is more aligned with the view that the pursuit of short-term earnings as a result of earnings pressure may be detrimental to long-term competitiveness.

"This finding is extremely important to investors, all of whom essentially invest in the future prospects of their chosen companies to generate solid cash flows, and steadily increase their value. It is unlikely to be seen in companies that pay less attention to their competitiveness, market share expansion, and revenue growth.

In fact, growth in sales is an important strategic goal that can to be managed along different phases of the business cycle. Mascarenhas and Aaker (1989) find that "the impact of the business cycle on firm strategy has been neglected." The authors suggest that the impact of business cycle on sales also merits greater attention. Bromiley, et al. (2008) "Business cycle management (BCM) involves the application of a set of typically countercyclical prescriptive behaviors that, when applied in a timely way over the course of the business cycle, can improve the performance of an organization relative to rivals. For example, countercyclical advertising in a recession may help increase market share and build brand identity (Dhalla, 1980), countercyclical hiring during a recession may help build a lower-cost, higher-quality workforce (Greer, 1984)." The authors conclude that BCM behaviors related to staffing, production levels, supply chain management, acquisitions, capital expenditures, capital structure, finance, advertising and pricing may all influence organizational performance.

As far as my current quest for information determining investment portfolio returns and their variability is concerned, information relating to company business cycle management qualifies as yet another candidate variable, likely to feed into sales growth over time.

Research Question

This paper is a straight forward comparison of the bottom-line versus the top-line results as explanatory variables for the variability of portfolio returns. In fact, I ask a simple question: Are portfolio returns and their variability influenced more by changes in earnings, or by changes in sales? How is this variability influenced by examining the most recent numbers in comparison to longer term averages? Do results vary over time?

Methodology

The data set I use for this analysis are annual financial data of a portfolio of companies, reported for the last ten years, spanning from 2010 to 2020. These companies are members of the Dow Jones Industrial Average (DJIA). In this study, the DJIA is thus going to serve as my portfolio of reference. The Dow Jones Industrial average is an index consisting of thirty stocks.

Due to corporate / index inclusion/exclusion actions, I do not have the full data history for two of the thirty companies, namely DOW and WBA. I leave these two companies out of my analysis and continue with the remaining twenty-eight (28) companies in the Dow Jones Industrial Index. I deem this simplification insignificant for the purposes of my analysis.

Initially, I work the dataset assuming that all constituents have equal weights in the portfolio. The reason is that I would like to try and see results for any arbitrary portfolio. DJIA index members with the assumption of equal weights -$w_{i,E}$- is one such arbitrary portfolio.

$$r_p = \sum_{i=1}^{n} w_{i,E} r_i$$

However, equal weights not being the case with the DJIA, I recalibrate my model with the appropriate weights for the index as well. The DJIA is, in fact, a price-weighted index, where stocks with higher marker price will dominate. At the time of writing this article, some of the more influential index members are United Health, Apple Computers, and The Home Depot. Less weight would be applied to companies such as Cisco, Pfizer, Dow Chemical, or Wallgreens. I denote these price-weights as $w_{i,D}$.

$$r_p = \sum_{i=1}^{n} w_{i,D} r_i$$

My dataset consists of five years' worth of return data, calculated as continuous return. In addition, I use income statement information over the last ten years, and calculate growth rates for revenues and net income results for each member company of the DJIA index. I use annual values as well as a five-year compound annual growth rate in both my regression analysis, and my optimization exercise.

The endogenous variable is DJIA price return data. I look at the closing prices after the annual earnings announcement has been made. While most companies in the DJIA index report their annual earnings on December 31, there are a few that report at the end of January (HD, JNJ, WMT), May (NKE), June (MSFT, PG), and September (V). I adjust for these anomalies by reporting prices after the announcement, on annual basis. My raw price data reflect price points from 2015 to 2020. I calculate the annual continuously compounded price return for each company in the index. I also calculate each company's price compound annual growth rate over the last five years. This data set serves as my endogenous variable, i.e. my return data.

My exogenous variables have been collected from financial statements of the DJIA index member companies. I calculate the most recent year net earnings and sales revenue growth rates. I regard these as short-term variables. They convey the most recent occurrences in earnings and sales for each respective company and each year. I also look at long-term influences of sales and earnings on price return variability in the index. For this purpose, I use a five-year CAGR of both the bottom lines and the top lines of respective companies' income statements.

In this article, I study the influence of my explanatory variables on portfolio return variability. To that end, I perform R^2 optimization exercise, and a liner regression analysis for each of the last five years. I investigate my results further, by examining how they would hold over time.

1. Maximizing R^2 in a uni-variate regression

At first, I perform an analysis based on the simple linear regression model, attempting to explain price returns in a portfolio. Employing Excel Solver, I look for such weights for each of my four candidate explanatory variables as to construct a weighted average of short-term / long-term earnings/sales growth rates that would maximizeits R-squared. The R-square statistic reflects regressing the weighted average of growth rates on continuously compounded rates of return of DJIA index companies. I perform this analysis for annual results for each year in the span of the last five years (i.e. 2015 – 2020), as well as the last five-year annual averages.

Essentially, in this portion of my analysis, I have created a single variable out my four explanatory variables, with such weights that would maximize R^2, of the underlying uni-variate linear regression. R-square is a unit-less measure, which reflects the quality of the fit, with higher values showing a better fit. For all practical purposes, R-square reflects the contribution of the explanatory variable on the variability of the explained variable. In this study, it is the contribution of the weighted average of earnings/sales short/long growth rates in explaining the variation in index constituents' stock returns. Thus, in order to determine which of the four candidate variables the most important one is, we focus on the weights resulting from this optimization. The variable with the highest weight is likely to be the variable of most importance.

Equations for R^ Maximization:

$$r_{i,t} = \alpha + \beta X_{i,t} + \varepsilon_{i,t}$$

Where

$$X_{i,t} = \sum_{j=1}^{4} w_j X_{i,j,t}$$

2. Multivariate Linear Regression

Secondly, I also run a straight-forward multivariate regression using my four explanatory variables in the process. I expect some degree of multicollinearity, due to growth rate calculations using some of the same underlying raw data points. Once again, I measure the quality of the fit using R^2.

Equations for Multivariate Linear Regression:

$$r_{i,t} = \alpha + \sum_{j=1}^{4} \beta_j X_{i,j,t} + \varepsilon_{i,t}$$

Multivariate regression set-up in Matlab® for each data set t.

$$\begin{bmatrix} r_1 \\ \dots \\ r_{28} \end{bmatrix} = \begin{bmatrix} 1 & \cdots & x_{1,4} \\ \vdots & \ddots & \vdots \\ 1 & \cdots & x_{28,4} \end{bmatrix} \begin{bmatrix} \alpha \\ \dots \\ \beta_4 \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \dots \\ \varepsilon_{28} \end{bmatrix}$$

Analysis Of Results

1. TABLE #1: Maximizing R^2 in a uni-variate regression – *equal weight assumption in the portfolio*

Creating a weighted average of my portfolio members' long and short growth rates in both revenues and net income yields interesting results. Rolling through the most recent four years, I find that the most significant and unvarying result is the impact of most recent growth in the bottom line. In particular, it has zero impact on explaining variations in the index returns. While this paper is not disputing the role of changes in earnings on individual stock returns, it brings to the forefront the role of recent earnings on portfolio risk measures. In particular, it suggests that growth in revenues may have relatively more impact on portfolio return dispersion than short-term growth in earning does.

Considering a longer-term perspective; I also looked at long-term index returns. In particular, I calculated a five-year CAGR for price returns for the index. I then solved, once again, for such weights that would maximize the R-squared for the long-term portfolio returns. This time, I ended up with a rather significantly straight-forward result. The optimization exercise yielded a weight of a hundred percent applied on variable representing the long term (ie. five-year CAGR) growth in sales. It also returned a zero percent impact of earning's growth – both short and long term - and a zero percent impact of short-term (i.e. most recent) growth in revenues.

While the overall R-squared statistic cannot be considered highly significant in any of the scenarios, it has the highest explanatory power in the instance of analyzing the five-year CAGR in stock returns. The R-squared shows a high of 0.33 in this instance.

2. TABLE #2: Multivariate Linear Regression - *equal weight assumption in the portfolio*

Following up on the optimization results, I perform a detailed multi-variate regression of my four potential explanatory variables on the price returns of companies represented in the portfolio. These results suggest that the most significant impact comes from the second variable, the long-term growth in sales. Overtime, this variable has a consistently positive impact on the stock return variable. All other variables return betas that are oscillating around zero, at times showing positive, and other times slightly negative values.

Overall, the best fit is achieved when I regress the candidate explanatory variables on the five-year, i.e. long-run, annual growth rate in stock prices. This regression generates an R-squared of 0.47. The coefficients on short-term growth in earnings and sales are very close to zero. The same goes for the five-year CAGR in earnings. In fact, the only variable of substance is the long-term growth in sales. The relationship seems to be roughly a 1:1 with the long-term stock return. Please see the appendix for the precise regression results.

In the next segment of my analysis, I reflect on the fact that the Dow Jones Industrial Index is, in fact, a price-weighted index. That means that companies, whose stocks trade at relatively higher prices to others will have a greater weight on the overall index return. I re-run my optimization with the appropriate weight for the DJIA index for each time t.

3. TABLE #3: Maximizing R^2 in a uni-variate regression – *DJIA weight assumption in the portfolio*

In this instance, the results are confirming the earlier outcomes. However, the overall explanatory power is higher, on average at about twenty five percent. The optimal weight for the most recent year earnings growth is at zero percent for all measured years, as well as the long-run average. Thus, once again it reiterates earlier results suggesting that recent earnings numbers are not influencing the DJIA index stock return variability. The variable that seems to influence it in the long run is the five-year CAGR in revenues. However, at times we see a combination of long-term earnings growth and recent sales growth as relevant variables as well.

4. TABLE #4: Multivariate Linear Regression – *DJIA weight assumption in the portfolio*

Running the multivariate regression on a portfolio featuring the appropriate DJIA index weights, I see that the five-year compound annual growth rate in revenues serves as the only variable with consistent positive effect on price returns in the index. We also have a consistent negative effect of the most recent growth in sales. There is no discernable effect of the long-term growth in profits and a nil influence of the most recent growth in net earnings.

As soon as I run the analysis with the long-term growth in price returns of the DJIA index as the endogenous variable, applying the same multivariate regression, I get a noteworthy R-squared of seventy percent. We can, therefore,

conclude that this model explains quite well the index price return. The model shows large positive effect of the long-run growth in revenues, a negative effect of the recent growth in revenues, and a nil effect (or nearly so) of the recent, as well as long-term, rate of change in net profits.

Conclusion

This paper sets out to study the notion of earnings results being a leading factor in an investment decision process. In particular, it focuses on revenues as an alternate candidate variable. In order to present a comprehensive study, one must first consider what it is that makes an investment attractive. Is it high expected return? Does risk play a role? Do we hold individual securities in a portfolio, and if so, is it then the portfolio expected return and risk that we are ultimately interested in the most?

This paper argues, that it is, indeed, the portfolio risk and return characteristics that investors and portfolio managers deal with. On that note, I examined the role of changes in revenues versus the role of changes in earnings on portfolio return variability.

My analysis leads me to a three-fold conclusion. One, the most recent changes in earnings consistently do not explain annual portfolio return variability. Two, long-term growth in sales explains variability of portfolio price returns well. Especially so, if we look at long-term portfolio price return trends. Thirdly, the long-run influence of sales growth is positive with respect to long-term sales growth average and negative for immediate changes in sales. These results hold for the DJIA index.

One may argue that the DJIA index has a certain bias compared to the overall market indices such as the S&P 500. It may be so, given that the DJIA is an average of companies that are considered industrial. It has only a handful of member companies, and it is a price-weighted index. It is certainly worth-while to investigate similar relationships to those investigated in this study in a broader market index.

For portfolios similar in nature to the DJIA, I see a practical application of the above-presented results for portfolio management. I would suggest minimizing portfolio return variance by focusing on investment in companies with relatively high expected long-term sustainable sales growth rates. Sales sustainability depends on product attractiveness, ability to learn and adapt, and growth in the market share. At the same time, we like to maximize portfolio return as well. Overall, we are more likely to see outstanding portfolio results from investing in companies that are simultaneously cost-mindful, as well as revenue growth-pursuant.

APPENDIX

TABLE #1 Data set time - t	Optimal weight of most recent year top line growth rate – w1	Optimal weight of the five-year top line CAGR – w2	Optimal weight of most recent year bottom line growth rate - w3	Optimal weight of the five-year bottom line CAGR – w4	Optimal R^2, equal security weights in the portfolio
2016	0%	0%	0%	100%	0.10
2017	29%	58%	0%	13%	0.09
2018	0%	100%	0%	0%	0.21
2019	55%	43%	0%	2%	0.26
Five-year CAGR	0%	100%	0%	0%	0.33

TABLE #2 Data set time - t	β1 - most recent year top line growth rate	β2 - five-year top line CAGR	β3 - most recent year bottom line growth rate	β4 - five-year bottom line CAGR	R^2 equal security weights in the portfolio
2016	-0.01	0.55	0.10	-0.24	0.17
2017	-0.16	0.83	-0.01	0.19	0.12
2018	-0.39	1.97	-0.00	-0.30	0.32
2019	0.77	0.56	-0.00	0.03	0.29
Five-year CAGR	-0.02	1.02	0.00	-0.09	0.47

TABLE #3 Data set time - t	Optimal weight of most recent year top line growth rate – w1	Optimal weight of the five-year top line CAGR – w2	Optimal weight of most recent year bottom line growth rate - w3	Optimal weight of the five-year bottom line CAGR – w4	Optimal R^2, DIJA portfolio weights
2016	98%	0%	0%	2%	0.26
2017	43%	0%	0%	57%	0.26
2018	0%	100%	0%	0%	0.22
2019	0%	93%	0%	7%	0.27
Five-year CAGR	0%	100%	0%	0%	0.23

TABLE #4 Data set time - t	β1 - most recent year top line growth rate	β2 - five-year top line CAGR	β3 - most recent year bottom line growth rate	β4 - five-year bottom line CAGR	R^2 DIJA portfolio weights
2016	-0.72	1.30	0.26	-0.31	0.20
2017	-0.25	0.63	-0.03	1.35	0.30
2018	-0.71	1.61	-0.00	0.13	0.31
2019	-1.31	1.84	-0.00	0.30	0.33
Five-year CAGR	-0.68	1.69	-0.00	-0.04	0.70

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