Sell-Side Research: Do Analyst Recommendations Add Value for Investors?

Kevin Finnegan

Prof. Tortorice

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I. Introduction

Sell-side firms and brokerage houses hire analysts to research public companies and then ultimately sell their qualitative and quantitative results to buy-side clients. These recommendations are usually in the form of a buy, hold, or sell rating. Each analyst is given a specific sector, and within that, a certain number of stocks to follow. Thus, it is assumed that through such a small sample size, analysts are experts within their industries. The idealized goal is for investors to yield significant returns by adhering to the analysts' suggestions.

Based on the pre-existing literature in the field, this paper seeks to investigate and expand on the question of whether ratings are correlated with future returns for investors. Specifically, how are buy and sell rating effects different from each other and furthermore, whether these effects differ with the size of the company or varied forecast horizons.

The reason as to why this paper looks to investigate the short-term affects stems from the semi-strong form of the *Efficient Market Theory* holding for this experiment. The premise behind this theory is that the semi-strong form reflects all publicly available information in the stock price. Furthermore, assuming the *Small Stock Effect* also holds during this analysis, which states by nature smaller stocks yield greater returns than larger stocks, the magnitude of ratings for these large cap and small cap stocks will be investigated. Both concepts will be further explained in detail as it pertains to this paper's analysis. Due to the inefficiency for investors to rebalance their portfolios because of hefty trading costs, this paper seeks not to suggest investing strategies for buy-side clients, but rather to examine which stock price is more greatly impacted by the recommendation. As for how this paper looks to expand on the pre-existing literature and contribute towards this topic, it is suggested that this paper is the first to hone its analysis on the

newest available analyst recommendation data for the two indices and moreover, the first to look at the S&P600 index.

The way in which this analysis will be conducted is by first gathering the analyst recommendations for the S&P500 and S&P600 dating back two years. The companies with insufficient data will be removed from the dataset. This data will be measured as a percentage of how many analysts recommend a buy rating versus sell. Then the return data must be obtained that matches with the analyst ratings, which will be monthly prices of each stock. Finally, multiple regressions will be completed that look at the effect of the percentage of buy ratings, percentage of sell ratings, the size of the company, and the interaction of the rating and size of the company on the returns.

The end results show that analyst recommendations are correlated with stronger excess returns for small cap stocks, universally for sell ratings and for longer horizons for buy ratings. Contrastingly, there is no correlation with excess returns for large cap stocks, regardless of the analysts' rating. Initially the paper sought to determine whether recommendations lead to these abnormal returns, but as the paper progressed it became increasingly evident that instead the findings pointed towards analysts having information on these smaller stocks that the market had yet to price in. This is because as the time horizon increased during the analysis, going from one month returns to twelve-month returns, the results yielded much greater significance. Further proof is the consistent significance of small stocks throughout the analysis while large cap stocks did not demonstrate significant results. Ultimately, analysts are not picking stocks based on how risky they are or how well they have done in the past in order to generate the greatest returns, but instead analysts are predicting returns based on information they possess that the market do not have.

When controlling for risk factors, the same results still hold as seen when the analysis did not control for them. As the time horizons increased the results improved in statistical significance, emphasizing analysts' information about stocks is greater for long-term investments rather than short-term ones. The significance of small stocks and the lack-thereof for large stocks, in conjunction with the forecast horizon improvements, further prove that analysts' information has yet to be priced into the market in the long-run and more specifically, only for smaller stocks. By controlling for these risk factors yet not witnessing any change in the results, it points towards the idea that the stocks are not deemed risky within the framework of this paper as these risk factors would have reversed the statistical significance for the variables once included.

II. Literature Review

There have been mixed results when examining whether analyst recommendations are valuable strategies for buy-side firms to base their investing decisions around. As for research that favors long-run investing strategies, Barber et al. (2001), McNichols et al. (1997), and Michaely and Womack (2002) are a few authors who argue that there are positive long-run benefits of analyst recommendations for investors. McNichols finds that for analysts that cover the stock throughout the time frame selected during this analysis, the excess returns from analyst recommendations for investors is 4%. Similarly, between 1986-1996, Barber determines that portfolios constructed and held long-term have significant value for investors, with the effect being around the same percentage seen in McNichols at 3.97%. Lastly, Michaely and Womack estimate excess returns for each firm using an event study, which will be the foundation of this

paper's analysis. They, however, add a three-month extension period that monitors the returns outside of the short event study window to determine if the results remain significant. They find that, controlling for the market, investors earn significant abnormal profits with 7.8% increased returns when observing those additional three months. This paper aims at adding to this literature by using the most recent data to see if abnormal returns are found. Furthermore, what this paper includes that other papers have yet to address is the different time horizons and the difference in significance between them and also the buy and sell ratings separate from each other to obtain the difference between large and small cap effects on returns.

From an alternative perspective, the research conducted by Logue and Tuttle (1973), Kontio (2016), and again by Barber et al. (2003) find no significant returns in the long-run for investors when adhering to analyst recommendations. Logue and Tuttle articulate that despite the high costs of obtaining specified research from brokerage houses, there was no increased investment performance. Barber et al., who previously determined there were long-run abnormal returns by investing in accordance to analyst recommendations, later find that when observing a different time period, the abnormal returns disappear. This is because of new data obtained by Barber. Instead, those stocks whose rating was least favorable gained an abnormal return of 13.44%, while the most favorable ratings only gained returns of 7.06%. Thus, investors adhering to these analysts' recommendations would lose money relative to alternative investment strategies. Furthermore, in addition to the insignificant results found in the previous papers, it has also been articulated by Kontio that even if the results yielded positive returns for investors, the daily rebalancing and trading fees would lead to negative returns or insignificant results. Kontio (2016) states that none of the results were significant at a 10%, 5% or 1% level with frequent rebalancing and abnormal were not found. Interestingly, Michaely and Womack (2002) also

mention this fact in their analysis. Although they state investors gain an abnormal return from following analyst recommendations, they also announce after daily transaction costs, investors will find this strategy is not valuable for generating returns. It is important to understand that depending on time period, sample size, and data set, analyst recommendations can yield significant abnormal returns or not. These contradictory findings will be the premise behind this paper's analysis to determine whether, with the newest data available, if there are significant returns.

The differences between finding significant results or not from a long-run versus short-run perspective can be explained by the *Efficient Market Theory* (*EMT*), further studied by Jensen (1978). There are three strands to this theory: the weak, semi-strong, and strong form. The strong form of the *EMT* states that the share price reflects all relevant information and therefore fundamental or technical analysis cannot produce consistent risk-adjusted returns. The semi-strong form states that once information is released, the share price will quickly react accordingly, thus the stock's price reflects all public information available. Lastly, the weak form argues future stock returns are unpredictable with past returns.[1] When determining whether there are substantial short-run effects for investors within the scope of this analysis and the pre-existing research, the semi-strong form of the *EMT* will be tested. Ultimately, the strong form of the *EMT* does not hold when investigating the returns of analyst recommendations unless proving there are no gains for investors whatsoever and the weak form does not hold at all either.

Many researchers have examined the effects of returns of different sized companies. From the pre-existing literature that has delved into the small versus large cap effect, it can be

[1] Bodie, Zvi, et al. *Investments*. 10th ed., Mc-Graw-Hill Education, 2014.

gathered that smaller stocks inherently generate a greater return in comparison to larger stocks. The premise behind this stems from the *Small Stock Effect* (*SSE*), a term coined by Banz (1981). Banz determines that small cap stocks generate a greater risk-adjusted return in comparison to large cap stocks because of their greater volatility and investment risk. Additionally, Lustig and Leinbach (1983) build upon Banz's analysis by creating two different portfolios: one comprised of solely small market capitalization stocks and the other comprised of the largest capitalization stocks. They also find that even after adjusting for risk, small cap stocks yielded a greater return than large cap stocks by a cumulative abnormal return of 20.65%, in comparison to only 1.53%. It will be assumed for this paper that the *SSE* will hold.

In conjunction with the previous papers, but also expanding on the previous literature, Kontio (2016) and Desai et al. (2000) add analyst recommendations to the small cap analysis. Both examine the effect of stock returns on analyst recommendations between small and large companies. Kontio (2016) determines that analysts who recommend strong buys or strong sells for the different sized firms will see greater returns for the small cap companies over the large cap ones from anywhere between 4%-19%. Moreover, in the study done by Desai et al. (2000), they find that from "all-star" analyst recommendations, small stocks yield statistically significant returns at a 1% level. The way this paper's analysis differs from previously conducted research stems from how recommendations are determined. This paper looks at all recommendations during the specified period without particular qualifications. Contrastingly, Kontio uses buy and sell recommendations only if the percentage of each rating is above 50% and Desai et al. only picks renowned analysts and their recommendations. However, regardless of these differences in approaches, it is evident that different variations of the *SSE* have been conducted and adding the

effect of stock returns on analyst recommendations does not change the results that small cap companies yield greater returns than large cap companies.

One of the explanations as to why investors rely more heavily on sell-side analyst recommendations for smaller firms in comparison to larger ones is because of *rational inattention*. This concept states that the average human only has a finite level of mental capacity to absorb information. This idea relates to this paper's topic as investors only have so much time and energy to devote towards making informed investment decisions. There is more readily available information regarding the larger, more well-known stocks. Thus, the recommendations for large cap stocks have a less significant impact than small cap stocks because of investors' inability to research these companies in greater detail. This is confirmed by a study conducted by Klein and Bawa (1977). They determine the information available for smaller stocks is much less accessible and reliable in contrast to larger stocks and therefore, rely strongly on analyst recommendations. In a more recent context, which directly pertains to this paper's analysis, Loh (2010) examines *rational inattention* from investors with regards to stock recommendations. He finds that when recommendations are given for stocks that have less attention from investors, the observed price drift is nearly double in comparison to stocks that have more attention. Therefore, it can be understood that *rational inattention* is a strong reason as to why smaller stock returns exceed larger stock returns and further relates to the results within this paper as *rational inattention* allows analysts to have information about smaller stocks that the market is unaware of.

III. Data

There are multiple variables needed to accomplish the analysis outlined for this paper; they include analyst recommendations of buy and sell ratings, stock prices for each firm before and after the recommendation, market returns, the company's capitalization size, the momentum of each stock, and the book to market ratio for each firm. Despite the numerous variables, each is easily obtainable within the French-Fama online dataset, Factset, and Capital IQ database. Each variable will be observed at the end of each month spanning back to the most recent two years. The data will be recorded starting at for the month of July 2017 and ending for the month of July 2019.

Usually analyst recommendations are specific for each sell-side firm, so this paper will find the average rating for each company amongst all analysts during the specific time period. An average, measured in a percentage, will be created denoting the company as either a buy, hold or sell recommendation. This average recommendation is a similar process found in Barber's analysis. The time period for average analyst recommendations will be compiled at the end of each month stemming back two years. Thus, there will be 24 observations per company. Within Factset the recommendations will be taken from the S&P600, which is the small cap stock index, and the S&P500, which is the large cap stock index. Companies will be vetted based on availability of data. There will be 247 companies for the S&P500 and 248 companies for the S&P600. Consequently, when combining the 24 months and the indices' respective number of firms, there are 6,172 observations from the S&P500 and 6,200 observations from the S&P600 for a total of 12,372 observations.

Based on the stocks included from both the small cap index and the large cap index, further data can be obtained. Using the Capital IQ software, pricing data will be gathered in a similar fashion to how analyst recommendations were obtained. Each company within the dataset has monthly stock price data within Capital IQ dating back two years. Once this is downloaded, monthly return data can be calculated by finding the difference between sequential months. Furthermore, the momentum, beta, smb, and hml ratios needed for the analysis will be found within the French-Fama online database (Fama and French 2019).[2] The data will be downloaded with monthly intervals to mirror the time frame for the other data gathered and combined with the pre-existing dataset to complete the information necessary for the analysis.

IV. Models & Methods

This paper will run an OLS, multivariable regression model. The goal is to ultimately use a risk-adjusted return to accurately analyze whether analyst recommendations have a greater effect on small or large cap stocks within the identified industry. The initial step of the analysis will be to run a regression without any of the controlled risk factors. The purpose behind this is to determine whether analyst recommendations are correlated with higher than average returns. Later we will examine if analysts pick riskier stocks that should have higher expected returns than more stable stocks. Without the risk factors the regression will be:

$$\mathbf{Returns}_{i,t+1} = \beta_0 + \beta_1 * \mathbf{buy}_{i,t} + \beta_2 * \mathbf{small}_{i,t} + \beta_3 * \mathbf{buy\_small}_{i,t} + \beta_4 * \mathbf{sell}_{i,t} + \beta_5 * \mathbf{sell\_small}_{i,t} + \mathbf{u}_{i,t}$$

[2] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

The “Returns” variable represents the market return for each company in the dataset not adjusted for risk factors, which will be at a monthly rate. “Buy” is variable that takes on the value of the percentage of buy ratings amongst analysts. “Small” will be a dummy variable that takes on the value 1 if it is a firm in the S&P600 index and 0 otherwise. “Buy_small” is an interaction term that determines the additional effect of an increased buy rating for a company with a small capitalization value. “Sell” is a percentage of analysts who rated the stock negatively. Finally, “sell_small” is a second interaction term that analyzes the additional effect of an increased sell rating for a company with a small capitalization value. Both steps within this OLS, multivariate framework will be conducted three more times as touched upon. The purpose of including these extended return windows is to determine the significance of returns over an extended period, not just subsequent months. It is hypothesized that there will not be immediate responses from stocks based on analyst recommendations at the end of each month, as displayed by the initial regressions, but rather investors should see significant results from analyst recommendations after specific time periods after the recommendation is published. Thus, the longer the timeframe is from the analyst’s recommendation, the greater and significant the returns are.

It is understood that many exogenous variables can alter the direction or magnitude of stock returns, thus it is vital to control for risk factors that may alter these results. As inspired by Fama and French (1993), the common risk factors this paper will control for are company size factors, the correlation between the firm’s return and the market’s return, and lastly, a value factor, which is just the difference in ratios between high and low book-to-market firms. The beta is included to control for the systematic component of the firm’s stock price. The size of the firm is added because the characteristics of smaller stocks may be drastically different from the composition of larger firms (i.e. growth versus value stocks). Finally, the difference in book-to-

market ratios is included because it controls for investor preferences for that firm. Furthermore, an additional factor was added to the Fama-French model by Jegadeesh and Titman (1993), which was a stock's momentum. Momentum is the idea that analysts will recommend stocks based on the returns up to that point, meaning if the stock is rising, analysts will recommend buy. Thus, this paper will account for each of these four factors previously listed to yield the most accurate results.

The second step is to incorporate and control for the risk factors established by Fama and French and the *SSE* as stated by Banz to get a risk-adjusted return. This method is similarly conducted by Li (2005), who also controlled for these systematic risk factors to get a risk-free portfolio. The second aspect of the regression will then be to observe the effects of analyst recommendations on these returns in conjunction with the risk factors. By controlling for risk factors one can determine whether analysts picking riskier stocks truly generate the greatest returns for investors. If results demonstrate that the inclusion of risk factors made analysts forecasts no longer correlated with future returns, then it would imply that analysts were only choosing riskier stocks. Thus, the risk adjusted regression model is:

$$\mathbf{Returns}_{i,t+1} = \beta_0 + \beta_1 * \mathbf{mktfl}_{t+1} + \beta_2 * \mathbf{mom}_{t+1} + \beta_3 * \mathbf{hml}_{t+1} + \beta_4 * \mathbf{smb}_{t+1} + \beta_5 * \mathbf{buy}_{i,t} + \beta_6 * \mathbf{small}_{i,t} + \beta_7 * \mathbf{buy\_small}_{i,t} + \beta_8 * \mathbf{sell}_{i,t} + \beta_9 * \mathbf{sell\_small}_{i,t} + \mathbf{u}_{i,t}$$

The variables included in the first regression remain unchanged, except for the "Returns" variable, as this is now a risk-adjusted return at a monthly rate. "mktfl" is a synonym for the CAPM risk factor, or the market excess return. "Mom" is a variable for momentum that measures the rate of acceleration or the increased change of a stock's price. "hml" is the difference between companies with high book to market ratios and those with low book to market ratios, otherwise the difference between growth and value stocks. "smb" is the difference

in size between large stocks and small stocks. Lastly, “u” is the residual, or the remaining variable that explains the risk adjusted returns.

V. Results

When initially conducting the analysis to determine whether analyst recommendations do in fact have significant influence on returns between small and large cap companies, a foundation of summary statistics for the variables in the models must be constructed. Per TABLE 1 below, both SELL and BUY ratings are relatively split at around 50% for all stocks. However, the standard deviation is larger for BUY ratings, meaning that there is more variation in the percentage of stocks that are buy rated. With regards to the return data, the mean describes the average return for a stock at the end of the period specified. For example, the monthly return mean of 1.79 means that on average stock returns at the end of each month yield a 1.79% increase. The standard deviation states that returns can variate about a 94.97% increase or decrease, which is interesting because if this was a normal distribution, then most returns would be within two standard deviations of the mean. It is noted that as the frequency increases, from monthly return data to yearly return data, the mean, standard deviation, minimum and maximum all decrease. The difference in average return between a one-month timeframe and a twelve-month timeframe is a negative 94.8% decrease, the standard deviation falls by 96.3%, the minimum return decreases by 70.5% and the maximum return is reduced by 99.3%. Furthermore, it should be noted that the largest decrease occurs between the one-month and three-month windows, whereas the differences between the extended month analyses are much less. Both these points supplement the idea that stocks are noisy in the short-run, generating sporadic

returns, whereas as time elapses the stocks tend to become less noisy, leading to a decrease in each characteristic. This is a major finding throughout the rest of this paper's analysis.

TABLE 1

VARIABLES	Mean	Std Dev	Min	Max
BUY	0.49675	0.1329	0	71.57
SELL	0.53974	0.0955	0	100
Monthly Return	1.79673	94.9709	-58.15	9893.47
3Mo Return	0.40929	9.2658	-36.08	403.37
6Mo Return	0.25217	5.6063	-24.79	165.15
12Mo Return	0.09325	3.5192	-17.11	65.29

NO RISK FACTORS:

Transitioning to the bulk of the analysis, the first set of regressions is completed. This result includes regressing the monthly, three-month, six-month, and twelve-month returns on the buy, sell, small and interaction terms. Again, by excluding the risk factors at first it can be determined whether there are significant results on returns from just analyst recommendations. The table is divided into two parts, the left results being the effect of "BUY", "SELL", and "small" on stock returns for all companies, while the right-hand-side results separate the effects of the same variables on large and small cap stocks. The "BUY" and "SELL" coefficient for the left-hand-side can be interpreted as a 1% increase in the rating will lead to a monthly stock return of whatever the coefficient is, measured in a percentage. On the other hand, the "BUY" and "SELL" coefficients when looking at the differences in large and small cap stocks are interpreted as a 1% increase in the rating will lead to a monthly stock return of whatever the coefficient it,

but only for large cap stocks, measured as a percentage. For example, a 1% increase in buy ratings for large cap stocks generates a return of .002 percentage points for investors at the end of each month relative to small cap stocks. As seen in TABLE 2, when looking at one month ahead returns there is not one variable that displays statistical significance at the 1% and 5% levels level, though "sell_small" is significant at the 10% level. This lack of significance from a large cap stock and monthly perspective will be prevalent throughout the rest of the analysis as it suggests that analyst recommendations recorded at the end of each month do not have an immediate impact on returns for investors, yet the results for small cap stocks are significant and lead to interesting findings in the long-run.

When looking at a three-month window the results become more intriguing. The variable "sell_small" has statistical significance at the 1% level. The variable also demonstrates economic significance with a coefficient of -5.99. This can be interpreted as for a small cap stock that is issued a sell rating, investors can expect a return of negative .0593 percentage points ("SELL" + "sell_small"), relative to the average return for the sell rated large cap stocks, over a three-month time period when analyst recommending sell increases by 1%. This regression suggests that analysts only yield beneficial results over three months if they place a sell rating on a small company. Otherwise, their recommendations are not statistically meaningful for any rating on large cap stocks or buy ratings on small cap stocks.

From a six-month perspective, a result that is mostly consistent throughout the rest of the analyses, including the risk-adjusted returns, emerges. The variable "small" is statistically significant at a 5% level. However, the economic significance of this variable is extremely interesting. Economic theory suggests, as previously mentioned, that small cap stocks are expected to yield significantly greater returns than large cap stocks because of the risk associated

with these growth companies and the limited information available for investors – better known as the *SSE*. Thus, it can be expected that the coefficient for the "small" variable will be positive, meaning that an investor building their portfolio around small cap stocks should see positive percentage returns. However, as noted in TABLE 2 below, the coefficient is -.484, which can be interpreted as investors who invest in small cap companies will yield returns of negative .00484 percentage points lower over six months relative to large stocks. What can be inferred from this result is that small companies may not be as risky in nature, such that returns for these stocks are not necessarily positive for investors. Additionally, it is important to note that the "sell_small" variable remains statistically significant at the 1% level, but the economic significance decreases as the coefficient lowers slightly over six months in comparison to three.

Lastly, regarding the twelve-month perspective almost every variable is statistically significant at a 1% level, excluding "SELL". Again, as seen in the progression between the three month returns and the six month returns, the twelve month returns also see statistical significance for "sell_small", however the economic significance continues to decline slightly over time. Contrastingly, the economic significance for "small" increases between the six- and twelve-month window. Introduced within this regression analysis is the statistical significance of the "BUY" and "buy_small" variables. Interestingly, "BUY" has an opposite economic effect than one would expect. The coefficient suggests that an analyst recommending a buy for a large cap stock will return -.00759 percentage points over a twelve-month span when the percentage of buy ratings increases by 1%. Yet, when including the "buy_small" coefficient, it is interpreted as analyst recommendations of a buy rating for small companies will yield a positive return of .0001 percentage points when analyst recommendations increases by 1%. Thus, it can be observed that recommendations for small cap companies are much more significant than for

large cap companies, although buy ratings only result in small economic significance. Furthermore, the gradual improvement of results observed from a monthly analysis to a twelve-month analysis further proves the overarching idea that analysts have greater validity in their the ability to predict significant returns in the long-run, rather than the short-run, due to how noisy stocks are during a shorter period of time.

Throughout this paper's analysis it has been trying to determine whether the analyst recommendations effect returns for investors. However, an interesting question worth raising as the analysis continues to progress is whether analysts have the ability to forecast through their recommendations instead of their recommendations causing the market to react. By seeing the results improve as the window for when returns are measured, one can argue that analysts have information regarding these smaller stocks for longer horizons that the market is unaware of. The evidence to support this claim is based on the findings within this analysis as there are no significant returns for large cap stocks which can be inferred that majority of their information is already exhausted within the market's pricing of the stock, whereas small cap stocks, which are not as closely followed by investors, do see significant returns in the long-run.

TABLE 2

VARIABLES	Initial Return	3Mo Return	6Mo Return	12Mo Return	Initial Return	3Mo Return	6Mo Return	12Mo Return
BUY	0.038	0.023	0.000	-0.010	0.204	-0.320	-0.384	-0.759***
	(0.104)	(0.024)	(0.013)	(0.014)	(0.625)	(0.359)	(0.266)	(0.210)
SELL	-8.836	-4.291***	-2.925***	-1.830***	0.889	0.068	0.521	0.553
	(5.459)	(0.911)	(0.708)	(0.683)	(1.973)	(1.083)	(0.804)	(0.680)
small	1.697	-0.434**	-0.517***	-0.516***	2.454	-0.311	-0.484**	-0.735***
	(1.745)	(0.177)	(0.115)	(0.087)	(2.113)	(0.294)	(0.203)	(0.153)
buy_small					-0.156	0.353	0.393	0.763***
					(0.636)	(0.361)	(0.267)	(0.211)
sell_small					-12.904*	-5.990***	-4.765***	-3.763***
					(7.565)	(1.599)	(1.218)	(1.122)
Constant	1.377***	0.849***	0.671***	0.454***	0.792**	0.812***	0.707***	0.737***
	(0.276)	(0.078)	(0.058)	(0.051)	(0.389)	(0.222)	(0.161)	(0.128)
Observations	11,567	10,603	9,157	6,265	11,567	10,603	9,157	6,265
R-squared	0.000	0.003	0.005	0.007	0.000	0.003	0.006	0.011

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

CAPM RISK FACTOR:

The next step within the regression process is introducing the first risk factor: CAPM, or the systematic risk for stocks. When analyzing the regression for the monthly timeframe "sell_small" statistically significant, as seen in the previous regressions. With a coefficient of -12.99 it means that analysts that recommend a sell rating for a small firm will see a decline of .1174 percentage points, accounting for "SELL" at the end of each month, when analyst sell recommendations goes up by 1%. Therefore, the repeated idea that analysts struggle to influence returns in the short-run holds true. It is crucial to note, however, that despite the economic significance increasing in comparison to the previous regression, that the statistical significance is only at a 10% level, which for this analysis is not considered as considerably reliable results.

For the three-month window "sell_small" remains statistically significant, but now at a more reliable 1% level – in contrast to the previous regression done in this phase. In comparison to the three-month regression run without the CAPM risk factor included, these results yield greater economic significance as the coefficient is much larger in the negative direction at -6.72. It can now be interpreted that even controlling for the systematic risk of a stock, analysts who recommend selling small cap stocks will see returns at -.0559 percentage points, accounting for "SELL", over the three months when analyst sell ratings increase by 1%. Furthermore, it is important to note that the CAPM risk factor becomes statistically significant at the 1% level when this regression is run. Interestingly, it should be expected that once the CAPM risk factor is introduced there should be no statistical significance for these other variables. However, what is observed is the opposite – the statistical significance remains robust. What this means is that analysts are not just recommending high beta, or highly volatile, stocks, but rather stocks they have knowledge of generating returns in the future.

Moving onto the six-month window, the CAPM and "sell_small" variables remain statistically significant, with the latter variable seeing a slight reduction in its economic significance to -5.41. Similarly to the regression without the CAPM variable included, "small" is a statistically significant variable but with the coefficient in the opposite direction of what the *SSE* would imply – further proving that even with a risk factor controlled for, analysts who still recommend buying small stocks will see negative returns on investment. This result defends the idea that small stocks are not as inherently risky as anticipated. It should be noted that the significance is only at a 10% level, however. "SELL" is the final variable in the regression that is statistically significant but only at a 10% level. The coefficient of 1.28 can be interpreted as an analyst who recommends selling a large cap stock will yield positive returns of .0128 percentage

points over six months when buy ratings increase by 1%, which is not what would be generally expected. This further builds upon the idea that analysts do not have the ability to provide greater returns for large cap stocks in comparison to their smaller counterparts because of the readily available information for these better well-known companies.

As for the twelve-month regression with the CAPM risk factor, the pattern of the CAPM and "sell_small" variable remaining statistically significant and the latter seeing a smaller economic significance continues. There is only a relatively small increase to the "small" variable's economic significance when increasing the time period for the regression, otherwise it basically is the same as the prior regression. Interestingly, the "SELL" variable loses its significance when transitioning from the six to twelve-month window, but the "BUY" variable becomes statistically significant at the 1% level. The coefficient of -.571 indicates that an analyst that recommends a buy rating for large cap firms will yield negative returns of -.00571 percentage points over a twelve-month investment period when recommendations increase by 1%. This contrary to what is expected for these types of recommendations for large cap stocks. Furthermore, the "buy_small" variable is statistically significant at the 1% level, meaning that an analyst recommending a buy rating for a small cap stock will see returns of .0058 percentage points over twelve months. In conjunction with the "BUY" findings and the lack of significance of "SELL", the small cap buy result further exemplifies how analysts have the proven ability to provide value-added investment suggestions for smaller stocks and provide no investment suggestions for larger stocks because of the information they possess.

TABLE 3

VARIABLES	Initial Return	3Mo Return	6Mo Return	12Mo Return
CAPM	0.652	0.995***	1.000***	1.067***
	(0.498)	(0.058)	(0.059)	(0.067)
BUY	0.313	-0.005	-0.154	-0.571***
	(0.567)	(0.328)	(0.251)	(0.202)
SELL	1.259	1.133	1.290*	0.770
	(1.789)	(1.003)	(0.761)	(0.677)
small	2.496	-0.117	-0.330*	-0.629***
	(2.077)	(0.276)	(0.193)	(0.149)
buy_small	-0.223	0.057	0.161	0.575***
	(0.580)	(0.331)	(0.252)	(0.203)
sell_small	-12.994*	-6.720***	-5.406***	-3.912***
	(7.439)	(1.508)	(1.175)	(1.115)
Constant	0.137	-0.116	-0.071	0.109
	(0.612)	(0.212)	(0.160)	(0.131)
Observations	11,567	10,603	9,157	6,265
R-squared	0.001	0.054	0.046	0.044

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FAMA-FRENCH RISK FACTORS:

The second phase to the build-up regression is including the risk factors constructed by Fama and French, which include the CAPM risk factor previously analyzed in conjunction with

the risk factors of Small minus Big, or difference between value and growth companies, and High minus Low, or the difference in high book-to-market firms from low book-to-market firms. In the monthly regression, as observed with just the CAPM risk factor regression, the "sell_small" variable is statistically significant, but not at the threshold levels this paper's analysis relies on for valid results. Consistently, the monthly returns regression fails to offer evidence that suggests analyst recommendations are correlated with one-month returns, thus supporting the idea analyst recommendations influence long-run returns instead.

In the three-month time period, the "sell_small" variable is statistically significant at the 1% level; a common theme for the longer return data. Also consistent with an emerging pattern is the fact that the economic significance continues to increase as more risk factors are implemented into the regression. Now the analyst recommendation for selling a small cap stock yields a negative 7.18% return for investors when controlling for the Fama-French risk factors. Furthermore, it is important to note that when regressing the three risk factors on returns, the CAPM and SMB variables are statistically significant at the 1% level, while the HML variable is not. It is interesting to observe the HML risk factor is not significant as this infers that within this paper's analysis, the difference between high book-to-market and low book-to-market ratios may have a slight effect on controlling for risk on returns for companies. However, because the systematic risk of a firm, CAPM, and the difference in growth and value stocks, SMB, are statistically significant yet no effect is seen, it can be inferred that, on net, the risk factors have no influence on returns.

When looking at the six-month window for return data, not much changes from the three-month regression. The CAPM and SMB risk factors stay statistically significant while the HML does not and "sell_small" is statistically significant but its economic significance declines in

comparison to the prior regression – an obvious expectation based on previous observations. With the Fama-French risk factors being controlled, the six-month regression sees the "SELL" variable statistically significant at the 5% level. In addition, consistent with previous analyses, the coefficient shows that positive returns are generated from analyst recommendations of a sell rather than negative returns.

Finally, looking at the yearly return analysis, it shares many characteristics that were observed in the CAPM model results. Primarily with regards to that statement, the SELL coefficient ceases to be statistically significant whereas the BUY coefficient becomes significant at the 5% level. The idea that analysts are unable to provide investment returns for large cap stocks holds true again. "Sell_small" remains significant but, as expected, the economic significance decreases. Moreover, "buy_small" also sees statistically significant results at a 5% level, once again displaying the analysts' ability to add value from recommending buy to small stocks. A characteristic worth noting, that differs from the Fama-French regressions completed up until this point, is the fact that the "small" variable failed to be statistically significant until the final twelve-month investment horizon. What this means is that analysts, within the French-Fama framework, have no influence on returns for small stocks at a monthly, three-month, or six-month frequency. Another interesting observation stems from the three risk factors themselves. Up until this point only the CAPM and SMB variables were statistically significant, but within the yearly window the HML risk factor is as well. This reinforces the idea that analysts do not only pick risky stocks to generate returns as the risk factors demonstrate no effect on causing the analyst recommendation variables to become insignificant.

TABLE 4

VARIABLES	Initial Return	3Mo Return	6Mo Return	12Mo Return
CAPM	0.574	0.922***	0.887***	0.822***
	(0.496)	(0.057)	(0.056)	(0.088)
SMB	0.432***	0.479***	0.406***	0.353***
	(0.096)	(0.046)	(0.057)	(0.087)
HML	0.182	0.144	0.117	0.487**
	(0.308)	(0.088)	(0.113)	(0.211)
BUY	0.409	0.060	-0.080	-0.491**
	(0.587)	(0.334)	(0.257)	(0.204)
SELL	1.815	1.686*	1.664**	1.048
	(1.843)	(1.012)	(0.767)	(0.680)
small	2.571	-0.059	-0.278	-0.576***
	(2.029)	(0.274)	(0.192)	(0.148)
buy_small	-0.318	-0.010	0.088	0.493**
	(0.604)	(0.337)	(0.257)	(0.205)
sell_small	-13.478*	-7.178***	-5.674***	-4.121***
	(7.233)	(1.491)	(1.165)	(1.103)
Constant	0.385	0.126	0.135	0.675***
	(0.481)	(0.215)	(0.182)	(0.233)
Observations	11,567	10,603	9,157	6,265
R-squared	0.001	0.060	0.050	0.049

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ALL RISK FACTORS:

The final regression run to complete the build-up regression is to include the last risk factor to control for: momentum. For the monthly regression, which has been constant throughout all the prior regressions, the only variable that is statistically significant is "sell_small". The economic significance interestingly breaks the trend previously identified as the coefficient being much larger as the number of risk factors included in the regressions increase. Instead, when momentum is added, the coefficient for "sell_small" is roughly in line with the coefficient generated in the Fama-French regression. This is repeatedly seen for the

other three regressions conducted within the full risk factor framework. What this can imply is that momentum does not influence returns for selling small cap stocks.

Transitioning to the three-month regression, a similar result is observed. Again, the "sell_small" variable is statistically significant, and the economic significance drops as noticed in the previous risk factor regressions to again be roughly in line with the three-factor analysis. Furthermore, all four risk factors are statistically significant, further proving that despite their importance, these risk factors show no effect on analysts recommending sell for small firms as the results are still significant. This ultimately proves that the risk factors within this analysis suggest that the small stocks are not necessarily as risky as theory would suggest.

As for the six-month regression, again the four risk factors remain statistically significant. So does the "sell_small" variable, which experiences a reduction in economic significance – a characteristic consistent with expectations based on prior analysis. Furthermore, this model demonstrates the differences in returns between large and small stocks based on analyst recommendations as the "SELL" variable, at a 5% level of statistical significance, infers that an analyst who recommends sell for a large company will yield positive returns of .0158 percentage points over six months when analyst sell ratings increase by 1%. This return ultimately proves that analyst ratings have no correlation with returns for large cap stocks as all the risk factors are introduced.

Concluding with the twelve-month timeframe, as seen in all the momentum-included regressions, all four risk factors are statistically significant within a 5% to 1% level. Characteristics that continue to be consistent from prior risk factor models is how the "sell_small" variable is statistically significant and again drops in economic significance between the six-month and twelve-month regressions. The "buy_small" variable provides

positive economic results as its statistical significance suggests a positive return from recommendations of buy ratings on small companies. “Small” also becomes significant within this model, proving once again from the interpretation of the coefficient that the *SSE* does not hold for the long-run based on analyst recommendations. Furthermore, the “SELL” variable does not register as significant within this timeframe, whereas the “BUY” variable does. Ultimately, as interpreted in all the risk factor inclusive regressions, analyst recommendations are correlated with higher returns for small companies, regardless of whether the rating is a buy or sell and have no effect on returns for large cap companies, regardless of the rating as well.

TABLE 5

VARIABLES	Initial Return	3Mo Return	6Mo Return	12Mo Return
CAPM	0.437	0.927***	0.932***	0.881***
	(0.604)	(0.056)	(0.061)	(0.095)
SMB	0.349**	0.469***	0.477***	0.375***
	(0.151)	(0.045)	(0.066)	(0.087)
HML	-0.258	0.175**	0.216*	0.807***
	(0.632)	(0.087)	(0.125)	(0.244)
Momentum	-0.470	-0.213**	-0.165**	-0.227**
	(0.371)	(0.086)	(0.081)	(0.101)
BUY	0.046	-0.022	-0.109	-0.506**
	(0.721)	(0.337)	(0.257)	(0.205)
SELL	1.018	1.512	1.578**	1.013
	(2.103)	(1.014)	(0.767)	(0.680)
small	2.362	-0.104	-0.295	-0.585***
	(1.873)	(0.267)	(0.191)	(0.148)
buy_small	0.028	0.069	0.116	0.507**
	(0.742)	(0.340)	(0.258)	(0.205)
sell_small	-12.993*	-7.115***	-5.624***	-4.096***
	(6.881)	(1.481)	(1.163)	(1.103)
Constant	0.663	0.298	0.282	1.021***
	(0.649)	(0.230)	(0.197)	(0.268)
Observations	11,567	10,603	9,157	6,265
R-squared	0.001	0.061	0.051	0.049

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

VI. Conclusion

The overarching findings within this paper's analysis are relevant and can provide significant insight for investors seeking to outperform the market and obtain the greatest returns possible on their investment decisions. For starters, when looking at the effects of analyst recommendations between small and large cap stocks on the returns without controlling for risk factors, the results show that the analysts who recommend buy and sell ratings on small cap stocks will yield positive and negative returns, respectively. Moreover, when recommending investment decisions for large companies, regardless of whether the rating is a buy or sell, the returns were opposite of what was expected. What this means is that a sell recommendation for a large company yielded positive returns whereas a buy recommendation for a large cap stock yielded negative returns. Thus, the analysis points towards the idea that analysts, based on their plethora of knowledge regarding large cap stocks, cannot provide value-added investment suggestions as the market has the large cap stocks accurately priced. Alternatively, the concept of *rational inattention* surrounding small cap stocks provides evidence for the results within this analysis that analysts have a much greater influence on the returns for smaller stocks because of the additional knowledge they possess that the market does not have and is not pricing in.

As the regressions progressed through their typical cycles of the monthly, three-month, six-month, and yearly frequencies, more significant results were observed. It was important to note that regardless of the time period, the variable "sell_small" would always be statistically significant – meaning that no matter the investment horizon for investors, a negative return for small cap stocks rated sell were guaranteed. Secondly, the three-month window offered the least insight into the effects of analyst recommendations on returns as the only variable significant within those models would be the "sell_small" variable, just like the monthly regression.

However, once the six-month and twelve-month analyses were completed, more positive results accrued. For example, for the six-month regressions, it was typical to see “SELL” statistically significant in conjunction with “sell_small” and for the twelve-month regressions, every variable was statistically significant except for “SELL”. What this proves is that as time horizons progress, the idea that analysts are better at recommending small cap stocks rather than large cap ones becomes increasingly more prevalent.

Even with more risk factors included in the regression the effects of analyst recommendations on returns are still significant. This is vital to comprehend for this paper’s analysis. What this means is that without controlled risk factors, the goal was to determine whether analyst recommendations would yield greater than expected returns for investors. Then, once the risk factors were gradually implemented into the models, the significance of analyst recommendations were expected to diminish as more risk factors were controlled for. However, what instead occurred was that as the risk factors were slowly included into each regression, the models still generated statistically significant results from analyst recommendations. This trend suggests that the risk factors included in the models, when compared to the initial regression with no risk factors, have no effect on the returns generated from analyst recommendations and that analysts do not suggest risky stocks or look at past returns for their investors, but instead suggest information not priced into the market.

After completing this analysis, it is evident there are multiple ways to improve and expand upon this research. First, within the scope of this analysis solely, the sample size of the S&P500 and S&P600 is not completely comprehensive nor exhaustive. To improve upon this it would be suggested that all S&P500 and S&P600 companies are to be included. The one issue associated with that assertion, however, is that because of the demerging of companies and the

youth of many small cap stocks there is not necessarily enough ratings or returns data to fulfill all 1,100 companies. One way to fix this problem is to shorten the time frame of observation, say instead of two years to a year or less. Alternatively, different years could be selected rather than the most current. Suggestions to expand upon this paper's analysis is by looking at the returns based on analyst recommendations but changing the criteria. For example, this paper focused on the returns between small and large cap stocks. Instead, an analysis could be conducted that looks at specific sectors and the differences between those. This could be expanded to looking at the differences between growth and value sectors, or even industries that are very similar in nature.

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