Betting on Market Anomalies:

Can portfolios based on volatility, skewness and kurtosis generate alphas?

ABSTRACT

This paper evaluates volatility, skewness, and kurtosis based portfolio returns for the US market over the period of 1973-2015. The research shows that the volatility strategy brings strong performance over the period, while skewness and kurtosis strategies show relatively low returns. However, both volatility and higher moments exhibit improvements after performing double sorting strategy by controlling, firm-specific fundamental ratios such as leverage ratio and profitability.

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Student name: Suhrob Sharipov

Student number: 353116

Erasmus University Rotterdam

Erasmus School of Economics

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1. Introduction

Capital asset pricing model (CAPM) proposed by Sharpe (1964), Linter (1965) and Markowitz (1952) as a leading model has been useful throughout the time in the financial industry. However, predicting the power of CAPM on portfolio returns is low compared to other asset pricing models as it becomes very much reliant on the market factor. At the initial stage, the relative strength of CAPM was put under doubt by several authors. Due to controversial outcomes that CAPM has brought on explaining the equity returns, we observed the emergence of various factor anomalies that tried to help on predicting the stock returns. Those anomalies were introduced by Banz (1981), Reinganum (1981), Keim (1983) for detecting the size anomaly; Stattman (1980), Rosenberg, Reid and Lanstein (1985), Chan, Hamao and Lakonishok (1991) for detecting Book to Market; Basu (1983) of coming up with Price – Earning effect and finally Momentum effect explained by Jegadeesh and Titman (1993).

Fama and French (1992) model implies that book to market and size variables are perfect proxies for explaining portfolio returns. In the modern financial world, it is widely accepted that asset pricing model of the Fama and French (1992) has made a great contribution to the development of predicting returns. Firms widely use models derived from Fama and French in order to calculate the cost of capital, to measure the risk that a firm might have or to measure the portfolio manager's abnormal returns compared to a given level of risky strategy portfolio managers can take.

In addition to size and book to market proxies, we have observed the emergence of other additional asset pricing risk factors that are considered as helpful on predicting the portfolio returns. Harvey and Siddique (2000) stated that systematic skewness should be accepted as a risk factor and should claim for a risk premium of 3.6 percent annually. It is well acknowledged that investors have preferences over the mean and volatility of portfolio returns. But it is well evidenced that financial returns of portfolios do not follow a normal distribution. Thus it is not effective to measure the risk with mean and variance only. So, we need to introduce as a part of the asset pricing models skewness and if possible kurtosis factors in order to capture the return behavior that does not follow a normal distribution. Investors give preference to right skewed returns and show risk aversion to negatively skewed portfolios. Because left skewed portfolios are considered relatively riskier compared to normally distributed portfolios.

Furthermore, they should be exchanged against higher risk premium compared to right skewed portfolios that are considered as less risky. Harvey and Siddique (2000) claimed that the smallest market capitalization company returns and strategies based on momentum cannot be explained by CAPM. They also observed that these type of assets are the ones that mostly show skewness in the portfolio returns. Skewness is considered as the third moment, and it can be helpful if kurtosis is also checked as an additional risk factor in this research as a next higher moment.

It has been observed that relatively simple strategies can outperform market portfolios with higher returns at a lower risk. Blitz and Vliet (2007) showed that low volatility stocks can outperform high volatility stocks by testing the data for US, Japan, and European companies. They performed a research on a 3-year long-term volatility effect and found that low volatility stocks can bring high returns. They found that volatility effect is a separate effect after controlling for size, value and momentum factors. Possible explanations provided are leverage restrictions and investors behavioral bias attitude. Ang and Hodrick (2006) also mentioned that stocks with high sensitivities to innovations in aggregate volatility have low average returns. Karceski (2002) argued that investors have a tendency to outperform in bull markets and similarly underperform in bear markets due to irrational behavior. As a result, they tend to create a demand for high-beta or similarly high volatility stocks and consequently reducing their expected returns.

By performing this study, the aim is to test volatility, skewness and kurtosis based portfolios against the multifactor models that are available. Thus it will help to observe whether volatility and higher moments of the stock returns help to obtain alfa relative to benchmark portfolios. In this regard, Blitz and Vliet (2007) while performing the research for low volatility effect made a double sorted portfolio analysis and controlled for factors such as value, size and momentum. In this research, I control for firm specific fundamental variables and a stock liquidity variable via double sorting accordingly while making portfolio formations.

Research Question: Can volatility, skewness and kurtosis factors strategies improve while controlling for fundamental firm-specific variables?

The purpose of the research is to improve the trading strategies that are documented by Blitz and Vliet (2007) and Harvey and Siddique (2000). This research contributes to the prior literature in the following ways:

- Harvey and Siddique (2000) used the date for 1963-1993 and Blitz and Vliet (2007) used data for 1985-2006. In this research I used the data from 1973 to 2015.
- Blitz and Vliet (2007) shows the alfa results against the CAPM and Fama and French 3 factor model. In this results I checked alfa results against more multifactor models and they are introduced in the data and methodology section.
- In order to control the volatility effect Blitz and Vliet (2007) performed a double sorting on size, value, and momentum. In this research I used firm-specific fundamental variables and a liquidity variable in order to improve the single sorted portfolios. Specifically, as a firm-specific variable, I used profitability and leverage indicators in order to arrive at better performing portfolios.

At the initial stage, I check the existence of the volatility, skewness and kurtosis factors using the most recent data. Afterward, double sorting is implemented. It is also important to investigate whether stock volatility and higher moments can outperform against the factors such as market, size, book to market, investments, profitability, betting against the beta, quality minus junk and momentum.

The rest of the paper is structured in the following way. Section 2 provides some theoretical background on explaining the existence of higher returns on portfolios with low volatility and higher stock moments. Furthermore, this section helps on explaining how higher moments can enter into the asset pricing model as another factor. Section 3 elaborates on methodology and data that is used for empirical research purposes. Section 4 provides with the excess returns and outperformance results that are obtained from single sorted and double sorted portfolios. Section 5 provides a conclusion.

2. Theoretical framework.

In the modern portfolio theory, portfolios measurements are based on mean – variance analysis which is proposed by Markowitz (1952). If the asset pricing model follows the continuous time model then it follows a random walk process. Hence Ito's process formulates that in the continuous time model higher moments are irrelevant for making a decision on

portfolio formation as they bring marginally low impact to the model. As a result a portfolio manager achieves an optimal point with mean –variance analysis. On the other, hand if we take into account discrete time model then mean – variance analysis becomes useless as we observe return distribution becoming non-normal. Hence it raises the importance of skewness and kurtosis as a part of asset pricing model (Samuelson, 1970).

In financial theory, it was generally well accepted that high volatility and high beta stocks are considered as risky. However, it was found that low volatility portfolios bring better results compared to high volatility ones. Prior research gave several explanations for that, in particular, Baker and Bradley (2011) proposed that irrational behavior of investors towards risky assets and also limitations on arbitrage can explain why low volatility factor can show higher alfa.

2.1 Preference for lotteries.

Kahneman and Tversky (1979) proposed the idea of loss aversion as a part of finance theory, by challenging the main stream finance with behavioral thoughts. If a person is offered an opportunity to participate in a gamble, then he/she does not make proper evaluation accordingly. Will a person take a bet with a 50 percent probability of winning 1100 and similarly with a 50 percent probability of losing 1000? According to Kahneman and Tversky (1979), majority would try to abstain from the offered bet, despite the fact that expected return is positive. Based on that we can conclude that people show risk aversion, and in finance terms investors avoid stocks that are relatively volatile in order not to have a loss inherent to it. If we slightly change the betting offer as by shifting probabilities then accordingly results will change in to the opposite direction. In the second bet if we offer to investors an opportunity to win 5000 with 0.12 percent probability and to lose 1 with certainty then investors would take a bet which gives us an expected return of 5. This type of bet gives some indication about why people prefer to play lotteries that promise high returns with very low probabilities (Malcolm Baker, 2011). Hence, a higher payoff attracts agents for participation and increases willingness to take more risk irrationally.

The idea of taking bets where low probabilities prevail has some resemblance with skewness. This is mainly due to the fact that investors overweight the probability in the tail of return distribution, and thereby creating skewness and kurtosis (Barberis and Huang, 2005).

Similarly, it can be mentioned that it is due to large positive payoffs with low probabilities that are promised from the bet to agents which show a tendency of skewness, which also attracts agents. Based on that we can say that high returns with low probabilities of payoffs attract agents to go for gambling or taking extra risk. As a result of this tendency, we can observe that these group of stocks show high volatility due to uncertainty.

Mitton and Vorkink (2007) observed that investors sometimes hold undiversified portfolios which is against the idea of mean-variance analysis. If investors care less about the diversification then they should have an idiosyncratic skewness in the return distributions. As a possible explanation Mitton and Vorkink (2007) propose that investors deliberately do that in order to capture the extreme payoff, in other words investors chase skewed returns. Similarly, Simkowitz (1978) and Conine and Tamarkin (1981) detected that in the case of third-moment return distributions are taken into account then the research showed that investors gave preference for undiversified portfolios.

In general, diversification of portfolios brings benefits to portfolio managers. Firstly, diversification gives a reduction of the idiosyncratic risk in returns and secondly we the achieve reduction of desired level of skewness. Thus if we evaluate portfolios at the three moments mean – variance – skewness dimension and choose the efficient ones accordingly, then those portfolios will not become efficient in a mean – variance framework. In other words, efficient portfolio in three-dimensional framework may not be efficient in a two-dimensional framework.

Conine and Tamarkin (1981) in their research tried to investigate the portfolios with skewness and found that these portfolios mostly consisted of small company stocks. Kraus and Litzenberger (1976) suggested that co-skewness of an asset with the market performance is an important risk aspect for decision making and should be taken into account while making an asset allocation. The existence of risk premium for higher moments was observed, by constructing an asset pricing model that incorporates skewness and kurtosis of return distributions in investors' utility function (Kraus and Litzenberger, 1976). Similarly, earlier researchers suggested that idiosyncratic skewness should be priced based on investors' preference for assets with positively skewed return distributions.

Kumar (2009) showed that investor's preference for gambling and making investment decisions have common things with each other. Particularly, he showed that individual investors have a tendency to invest more in risky securities that have features of a lottery. He found resemblance of behavior of investors that possess excessively more open positions in stocks with lottery player's behavior who chase for higher expected return with low probability. Thus, we can observe that individual investors irrationally give preference for returns with skewed distributions. Investors by this behavior overweight the tails of a return distribution and value highly positively skewed securities (Nicholas Barberis, 2008).

2.2 Overconfidence

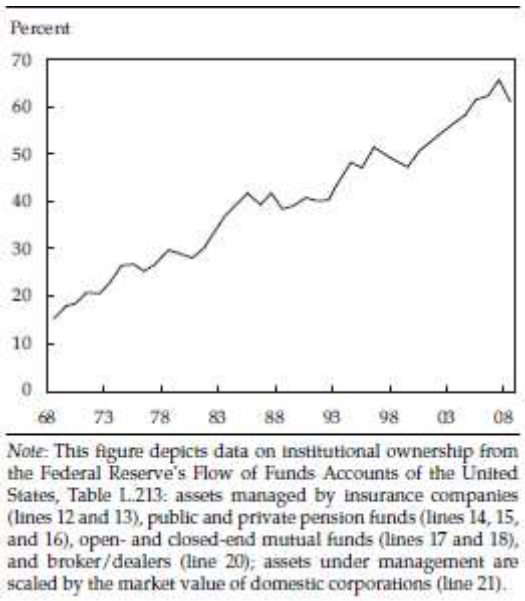
Due to overconfidence investors show preference for high volatility stocks and neglecting on the other hand low volatility stocks. Investors that consider themselves as pretty knowledgeable and experienced on picking up stocks have an inclination to invest heavily in stocks with high volatility and skewed returns by showing some tendency to take an extra risk due to overconfidence. Along with that, these biased investors think that largest winners of stocks can be found in a group of stocks that have aspects of high volatility and skewness (Cornell, 2009). As a result we observe systematically overpricing highly volatile and skewed portfolios.

Baker and Bradley (2011) mentioned that in the majority of cases demand for high volatility stocks is driven by optimist investors' behavior who act aggressively while making a security selection for the portfolio.

2.3 Arbitrage limitation on gaining from anomaly

Ownership of securities has increased by institutional investors several times over the last fifty years. Figure 1. Shows that it has reached 70 percent by reaching a constant growth level over the period.

Figure 1. Ownership of securities by Institutional Investors, 1968-2008



Note: This figure depicts data on institutional ownership from the Federal Reserve's Flow of Funds Accounts of the United States, Table L.213: assets managed by insurance companies (lines 12 and 13), public and private pension funds (lines 14, 15, and 16), open- and closed-end mutual funds (lines 17 and 18), and broker/dealers (line 20); assets under management are scaled by the market value of domestic corporations (line 21).

Source: Baker and Bradley (2011)

It is well acknowledged that institutional investors have enough resources in order to make a deep market research. So naturally a concern arises about why institutional investors do not take advantage from this anomaly where they can short high volatility stocks simply. The main reason is that high volatile stocks are the ones that are small stocks according to Baker and Bradley (2011). So it is relatively costly to short illiquid stock and thus borrowing costs are high enough in order to open short positions. However, institutional investors can still open long position for low volatility stocks together with shorting high volatility ones.

Another effect is related to benchmarking to index by institutional investors. According to US SEC rules all mutual funds have to choose a specific benchmark and need to show fund portfolio's performance relative to the benchmark. Mark and Kurt (2007) mentioned that hedge fund return distributions are skewed and do not confirm with mean - variance optimal point. Hence, hedge funds show a preference for assets with skewness. If we measure the performance of hedge funds with higher – moment optimization tools then portfolios showed relatively higher returns and Sharpe ratios, while considering kurtosis and skewness into the model. In addition, Brooks and Kat (2001) argued that hedge funds that are coming with high Sharpe ratio have a tendency to show high negative skewness and high kurtosis values. Hence, measurement of hedge fund portfolio returns can lead to overstatement, if it is based on mean – variance analysis. Furthermore, it can lead to suboptimal portfolio allocation.

2.4 Skewness in Asset Pricing Theory

Following sub-sections give some information about asset pricing models. In particular, they are introduced in order to integrate into the end the higher moments into the asset pricing models that are used in the empirical research. At the initial stage a derivation of CAPM is provided. Afterwards, higher moments as a part of asset pricing model is provided.

The traditional first moment order asset pricing model for holding a risky security can be described in the following way:

$$E = \left[\left(R_{i,t+1}\right)m_{t+1}\middle|\, \Omega_t\right] = 1 \qquad (1)$$

Where the total return of security *i* is given by$\left(1 + R_{i,t+1}\right)$, marginal rate of substitution is given by m_{t+1}, and Ω_t is defined as information available to agents at a time while making a decision. Finance theory says that, price of an asset should be derived from the sum of asset payoffs discounted with investor's marginal utility. Marginal rate of substitution captures the riskiness of the asset while pricing it. It captures investor's tradeoff between utility function in two periods and defined as a pricing kernel. Hence marginal rate of substitution captures risk preference of the investors towards the asset. Asset prices are mainly driven by the covariance of asset payoffs with consumption. Cochrane (2000) explained it in the following way:

"Other things equal, an asset that does badly in states of nature like a recession, in which the investor feels poor and is consuming little, is less desirable than an asset that does badly in states of nature like a boom in which the investor feels wealthy and is consuming a great deal. The former asset will sell for a lower price; its price will reflect a discount for its "riskiness", and this riskiness depends on a co-variance, not a variance"

In order to arrive at CAPM model, investor's utility function should be taken into account. Investor's utility function expressed as quadratic form or logarithmic form assures that the stochastic discount factor is linear. The assumption that marginal rate of substitution is linear can be expressed in the following way:

$$m_{t+1} = a_t + b_t f \qquad (2)$$

From this assumption, it is possible to arrive at CAPM based on following equations. Cochrane (2000) described it in the following way:

$$1 = E\left(m_{t+1}, R_{i,t+1}\right) = Cov_t\left(m_{t+1}, (R_{i,t+1}\right) + E_t\left(R_{i,t+1}\right)E_t[m_{t+1}] \quad (3)$$

$$E_t\left(R_{i,t+1}\right) = \left[\frac{1}{E_t(m_{t+1})} - \frac{Cov_t\left(m_{t+1},(R_{i,t+1}\right)}{E_t[m_{t+1}]}\right] \quad (4)$$

$$\text{E}[\delta \text{U`}(C_1)/\ \text{U`}(C_0)] = \text{E}[m_{t+1}] = 1/R_f \quad (5)$$

$$E_t\left(R_{i,t+1}\right) = \left[R_f - \frac{Cov\ \ \left(m_{t+1},(R_{i,t+1}\right)}{E_t[m_{t+1}]}\right] = \left[R_f - \frac{Cov\ \ \left(\text{U`}(C_1),(R_{i,t+1}\right)}{E_t[\text{U`}(C_1)]}\right] \quad (6)$$

Equation (4) implies that covariance is a negative between marginal utility of consumption and asset returns. It means that when consumption is high and asset returns are relatively high then investor claims a positive risk premium over the risk-free asset return. In other words, investors will be left with uncertainty and with some level risk exposure when it comes to future consumption. As a result, this uncertainty would incline investors to ask for a higher premium. This can be observed also by diminishing marginal utility as more consumption may not make investors happy, and this is not actually what investors want in the state of the world. Because, agents in terms of consumption would need to smooth the consumption across the state of the world. If they are not able to achieve it then they can ask for a higher premium. A similar effect can be observed when asset returns are low and consumption is low as it doesn't allow for consumption smoothing.

On the other hand, when consumption is low and asset returns are high so that asset returns have positive covariance with marginal utility of consumption then expected return will be lower. This means that investors risk exposure is reduced and uncertainty is lowered as it gives an opportunity to achieve a smooth consumption across the time period. So since risk exposure is reduced they can be satisfied with lower returns and a lower risk premium accordingly. Hence it gives more confidence for investors in terms of future consumptions. Based on what has been mentioned we can define the equation (6) as a risk premium being defined as a negative of covariance between asset return and marginal utility of consumption divided by expected marginal utility of consumption.

CAPM can be obtained in the following way. Since we need an asset that is negatively correlated with consumption and as an assumption we can define it as a market portfolio. Furthermore, it should be also negatively correlated with marginal utility of consumption or kernel.

$$\mathrm{U}`(C_1) = -k\, R_M, \qquad k > 0 \tag{7}$$

$$Cov\,[(\mathrm{U}`(C_1), (R_M)] = -k\, Cov[R_M, R_M] = -kVar[R_M] \tag{8}$$

$$Cov\,[(\mathrm{U}`(C_1), (R_i)] = -k\, Cov[R_M, R_i] \tag{9}$$

$$\frac{E[R_M]-R_f}{E[R_i]-R_f} = \frac{kVar[R_M]}{kCov[R_M,R_i]} \tag{10}$$

$$E[R_i] - R_f = \frac{Var[R_M]}{Cov[R_M,R_i]}\,(E[R_M] - R_f) \tag{11}$$

$$E[R_i] = R_f + \beta\,(E[R_M] - R_f) \tag{12}$$

If we define the risk premium assuming as a direct relationship to asset returns then we can re-write it in the following simply:

$$E_t[r_{i,t+1}] = \frac{Cov_t(r_{i,t+1}\ \ , r_{M,t+1})}{VAR_t[r_{M,t+1}]} E_t[r_{M,t+1}] \tag{13}$$

$$E_t[r_{i,t+1}] = B_{i,t} E_t[r_{M,t+1}] \tag{14}$$

While deriving the CAPM we made an assumption that marginal utility is linear in consumption. Furthermore, normality assumption is followed for derivation along with the negative relationship between consumption and asset returns. Derivation of CAPM is important for this research paper in order to shift the gears into the next level if we start relaxing the assumptions. So it helps to give some background for the theoretical framework coming next, when higher moments as a part of asset pricing model are provided.

In particular, we need to relax the assumption that distribution of asset returns is normal and nonlinear relationship exists between marginal utility of consumption and asset returns by introducing skewness into the asset pricing model.

In addition to the linear relationship, it is also possible to express marginal rate of substitution in terms of quadratic form of market returns. Then, marginal utility of consumption would take the following shape:

$$\mathrm{m} = a + bR_M + cR^2{}_M \tag{15}$$

Harvey and Siddique (2000) mentioned in the research that nonlinear marginal rate of substitution can lead to an asset pricing model where the expected return on a security can

be defined by its conditional covariance with both the market return and the square of the market return.

$$\mathrm{E}(R) = \lambda_1 Cov(R_i, R_M) + \lambda_2 Cov(R_i, R_M^2) \quad (16)$$

Where $\lambda_1 = \frac{VAr\{R_M^2\}E(R_M) - Skewness(R_M)E\{R_M^2\}}{Var(R_M)Var\{R_M^2\} - (Skewness(R_M)^2}$ (16a)

$$\lambda_2 = \frac{VAr\{(R_M)ER_M^2) - Skewness(R_M)E\{R_M^2\}}{Var(R_M)Var\{R_M^2\} - (Skewness(R_M)^2} \quad (16b)$$

$$\mathrm{E}[U(W)] = \mathrm{E}(U(\overline{W})) + \frac{1}{2}U''\overline{W}\,E[(W-\overline{W})^2] + \frac{1}{3}U'''\overline{W}\,E[(W-\overline{W})^3] + n(W) \quad (17)$$

Equation (16) can be written in the following way where A and B are functions of market variance and skewness:

$$\mathrm{E}(R) = A \cdot E(R_M) + B \cdot E(R^2{}_M) \quad (18)$$

A and B in equation (18) can be observed as similar to CAPM betas and can be seen as a model incorporating skewness to the asset pricing model

$$\mathrm{E(R)} = \beta_M R_{M,} + \beta_{skewness} R^2{}_M \quad (19)$$

While performing empirical testing, a non-linear multifactor model would be taken into account compared to linear Beta models. Hence nonlinear component would be added into multifactor model in the following way:

$$\mathrm{E(R)} = \beta_M E(R_M) + \beta_{skewness} E(S^- - S^+) \quad (20)$$

Where $S^- - S^+$ is due to the difference of negatively skewed portfolios and positively skewed portfolios accordingly. As mentioned earlier investors prefer positively skewed portfolios versus negative ones. Thus they consider negatively skewed portfolios as risky and try to avoid them. We should observe higher premium for negatively skewed portfolios compared to positively skewed portfolios. Hence it is possible to form a self-financing portfolio by going long for negatively skewed portfolios and shorting positive skewed portfolios.

3. Data and Methodology.

In this research paper, I tried to capture the outperformance of portfolios based on volatility, skewness, and kurtosis strategy portfolios. As mentioned earlier the motivation is to form portfolios as proposed by Blitz and Vliet (2007) on volatility and on skewness observed by Harvey and Siddique (2000). In addition, as a next higher moment, portfolios based on kurtosis strategy are also presented.

In order to perform the empirical research stock returns are sorted on volatility, skewness and kurtosis on 12 months and 36 months basis for single sorting, while for double sorting only for 12 months is used. Afterward, by rebalancing for each month ten portfolios are formed based on sorting methodology from low to high.

Blitz and Vliet (2007) also performed double sorting while making an empirical research on low volatility effect. They performed sorting on size, book to market and momentum factors in order to control those factors while arriving at volatility ranked portfolios. In this paper I performed same level double sorting of stocks based on company related ratios that touch upon fundamental aspects. So they are Dividend payout ratio, Total Debt to Equity, Cash flow to Total Debt, Gross profit margin, Price to Book, Research and Development to Sales, Bid – Ask Spread. The rationale behind it is to capture the leverage, profitability, liquidity effects and control them while making portfolio rankings. Along with B/M and size ratios, these ratios are considered as fundamental firm specific. Because leverage and profitability ratios are the ones that impact directly the net income of companies. Similarly, liquidity effect plays a deterministic role while getting the stock returns.

After forming portfolios based on volatility, skewness and kurtosis factors they are checked for outperformance – alfa measurements against multifactor models. Each sorted portfolio strategy is regressed against market (MKT), size (SML), value (HML), momentum (UMD), quality - minus - junk (QMJ), betting against beta (BAB) factors and also against 2 additional fama and French (2015) factors that are profitability (RMW) and investments (CMA). Based on the above mentioned factors, I check each strategy portfolios against the CAPM, Fama and French 3-factor model, Fama and French 3 factor model plus betting against beta (BAB), Fama and French 3 factor model plus momentum (UMD), Fama and French 3 factor model plus quality minus junk (QMJ), Fama and French 5 factor model. . It is essential to run a regression for each of the portfolio strategies in order to check whether portfolio returns are explained by

multifactor models or whether portfolio returns show outperformance against multifactor models.

During the research following models would be checked in order to get alfa – outperformance levels:

(1) $R_{iT} = a_{iT} + \beta_M(R_m - R_f) + \beta_{SMB} * SMB + \beta_{HML} * HML$

(2) $R_{iT} = a_{iT} + \beta_M(R_m - R_f) + \beta_{SMB} * SMB + \beta_{HML} * HML + \beta_{BAB} * BAB$

(3) $R_{iT} = a_{iT} + \beta_M(R_m - R_f) + \beta_{SMB} * SMB + \beta_{HML} * HML + \beta_{UMD} * UMD$

(4) $R_{iT} = a_{iT} + \beta_M(R_m - R_f) + \beta_{SMB} * SMB + \beta_{HML} * HML + \beta_{QMJ} * QMJ$

(5) $R_{iT} = a_{iT} + \beta_M(R_m - R_f) + \beta_{SMB} * SMB + \beta_{HML} * HML + \beta_{RMW} * RMW + \beta_{CMA} * CMA$

The data covers all common stocks that trade on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and NASDAQ. This research is based on data coming from CRSP which has monthly stock prices and stock returns for 1973-2015. Company related ratios that are used for double sorting methodology while making the portfolios are obtained from WRDS financial ratios section for 1973- 2015. The total amount of stocks is 19881. Model factors are obtained from Ken French[1] library and from Andea Frazzini[2] library based on US firms.

4. Empirical research

4.1 Single sorted portfolios

In this section the results of empirical researches are presented and analyzed. The major intention is to check the outperformance of single and double-sorted portfolios. In Table 1 excess returns of single sorted portfolios based on skewness, kurtosis and volatility strategies are presented. Rebalancing is performed every month based on the last 12 months and 36 months historical skewness, kurtosis, and volatility measurements. Excess return of portfolio is obtained as a difference of portfolio return and risk free rate. As can be mentioned self-

[1] http://mba.tuck.darthmouth.edu/pages/faculty/ken.french/data_library html
[2] http://www.econ.yale.edu/~af227/data_library.htm

financing portfolios for variance show monthly excess return of 2 percent for 12 months basis and 1.7 percent for 36 months basis portfolios with statistically significance level of 5 percent.

Table 1. Excess Returns

The table reports excess returns for the skewness kurtosis and variance portfolio strategies. The portfolios are constructed by basing the prior returns **of 36 months and 12 months** and ranked from low to high from D1 to D10. The returns in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. B30T30 and D1_10 are self-financing portfolios. D1_10 is formed by going long for D1 portfolio and shorting D10 portfolio. B30T30 is the excess returns of the bottom 30% (D+D2+D3) deciles minus the top 30% (D8+D9+D10) deciles. Excess return is measured by taking the difference between portfolio returns and risk free rate.

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D1_10	B30T30
Excess Return(skewness 36 month)	0,0008	0,0014	0,0014	0,0011	0,0002	0,0005	-0,0006	-0,0006	-0,0010	-0,0039	0,0047	0,0031
t-stat	0,1524	0,2748	0,2790	0,2176	0,0384	0,0941	-0,1029	-0,1063	-0,1926	-0,7128	1,8959	1,9065
Excess Return(skewness 12 month)	-0,0004	0,0006	0,0005	0,0002	0,0000	-0,0001	-0,0007	-0,0010	-0,0020	-0,0032	0,0028	0,0023
t-stat	-0,0834	0,1101	0,0997	0,0351	-0,0066	-0,0197	-0,1387	-0,1890	-0,3791	-0,6077	1,3860	1,7572
Excess Return (kurtosis 36 month)	0,0002	0,0011	0,0003	0,0000	0,0000	0,0006	0,0000	0,0002	-0,0011	-0,0019	0,0021	0,0015
t-stat	0,0334	0,2148	0,0570	0,0079	0,0038	0,1101	0,0009	0,0307	-0,2173	-0,3713	1,1876	1,2536
Excess Return (kurtosis 12 month)	0,0003	-0,0004	-0,0006	-0,0006	-0,0006	-0,0001	-0,0002	-0,0015	-0,0011	-0,0016	0,0020	0,0012
t-stat	0,0670	-0,0821	-0,1191	-0,1126	-0,1055	-0,0180	-0,0321	-0,2906	-0,2051	-0,3182	1,1971	1,1538
Excess Return (variance 36 month)	0,0039	0,0047	0,0043	0,0034	0,0026	0,0018	-0,0002	-0,0024	-0,0052	-0,0134	0,0173	0,0113
t-stat	1,4657	1,3784	1,0432	0,7321	0,5074	0,3173	-0,0329	-0,3574	-0,7229	-1,6367	**2,6094**	**2,3825**
Excess Return(Variance 12 month)	0,0045	0,0046	0,0044	0,0035	0,0025	0,0014	-0,0008	-0,0036	-0,0070	-0,0156	0,0201	0,0132
t-stat	1,7099	1,3249	1,0845	0,7648	0,4918	0,2479	-0,1392	-0,5492	-0,9676	-1,9280	**3,1187**	**2,8573**

However, portfolios formed on skewness and kurtosis show very low excess returns and with statistically insignificant values. Furthermore, self-financing portfolios do not show any outstanding results as it was expected by theory. Because according to the theory as mentioned earlier, investors prefer positive skewed portfolios and try to avoid negative skewed portfolios since they are conceived as relative risky assets. Therefore, Investors should claim higher risk premium for negatively skewed portfolios compared to positive skewed portfolios. It was expected that according to theory some positive premium to appear expressed as an excess return for going long with negative skewed portfolios and shorting positive skewed portfolios.

Table 2 presents the performance of volatility portfolios based on prior 36 months. It can be mentioned that at the initial stage D1 and D2 portfolio's abnormal returns are very low and insignificant. While high volatility portfolios show negative outperformance against the all multi factor models with statistical significance at five percent. Self-financing portfolios show high abnormal returns on a monthly basis. In particular, outperformance against the Fama and French five factor model shows the highest level indicating 3 percent on a monthly basis. The lowest outperformance result is against the Fama and French three factor model plus quality minus junk as 1.8 percent on a monthly basis. Furthermore, B30T30 show lower outperformance levels. In addition all self-financing portfolios are significant at five percent level with relatively higher outperformance results compared to other strategies.

Table 2. Volatility 36 months

The table reports abnormal returns for the volatility strategy according to CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). The volatility portfolios are constructed by basing the prior performance of **36** months. The data for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. B30T30 and D1_10 are self-financing portfolios. B30T30 is the abnormal returns of the bottom 30% (D+D2+D3) deciles minus the top 30% (D8+D9+D10) deciles. While D1_10 is the abnormal returns of the bottom 10 %(D1) deciles minus the top 10% (D10).

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D1_10	B30T30
CAPM Alpha	0,0005	0,0000	-0,0014	-0,0031	-0,0045	-0,0059	-0,0086	-0,0111	-0,0144	-0,0232	0,0237	0,0159
t-stat	0,9102	-0,0442	**-2,4897**	**-4,5446**	**-5,7774**	**-6,6138**	**-7,9232**	**-8,8628**	**-9,4524**	**-11,2203**	**11,2878**	**10,7279**
3FF Alpha	0,0001	-0,0006	-0,0023	-0,0042	-0,0057	-0,0074	-0,0102	-0,0130	-0,0167	-0,0260	0,0261	0,0176
t-stat	0,1513	-1,3349	**-5,0462**	**-8,2854**	**-10,6664**	**-13,4974**	**-16,0953**	**-17,2936**	**-18,6409**	**-19,4326**	**17,2657**	**16,8743**
5FF Alpha	0,0006	-0,0011	-0,0031	-0,0047	-0,0062	-0,0081	-0,0108	-0,0140	-0,0188	-0,0302	0,0308	0,0198
t-stat	0,6769	-1,6479	**-4,6096**	**-6,8717**	**-8,9542**	**-10,6050**	**-10,4455**	**-11,1964**	**-10,5799**	**-10,6616**	**10,4337**	**9,8933**
3FF + UMD Alpha	0,0001	-0,0007	-0,0025	-0,0041	-0,0057	-0,0074	-0,0102	-0,0127	-0,0162	-0,0251	0,0252	0,0170
t-stat	0,1189	-1,4919	**-5,2277**	**-7,9671**	**-10,4108**	**-13,1099**	**-15,6475**	**-16,5277**	**-17,5912**	**-18,3216**	**16,2597**	**15,8638**
3FF + BAB Alpha	-0,0023	-0,0029	-0,0042	-0,0056	-0,0069	-0,0081	-0,0105	-0,0124	-0,0151	-0,0230	0,0207	0,0137
t-stat	**-4,9459**	**-7,7454**	**-10,7506**	**-11,8685**	**-13,2911**	**-14,7408**	**-16,2760**	**-15,8972**	**-16,7979**	**-17,2066**	**14,8587**	**14,3439**
3FF + QMJ Alpha	-0,0010	-0,0024	-0,0039	-0,0051	-0,0063	-0,0071	-0,0086	-0,0105	-0,0122	-0,0192	0,0182	0,0115
t-stat	-1,5307	**-5,3610**	**-8,7382**	**-11,0755**	**-13,5296**	**-14,2476**	**-13,9788**	**-14,7310**	**-12,7754**	**-13,0375**	**11,2369**	**10,6225**

Table 3. Volatility 12 months

The table reports abnormal returns for the volatility strategy according to CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). The volatility portfolios are constructed by basing the prior performance of **12** months. The data for the factors are obtained from Ken French and Frazini library websites. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. B30T30 and D1_10 are self-financing portfolios. B30T30 is the abnormal returns of the bottom 30% (D+D2+D3) deciles minus the top 30% (D8+D9+D10) deciles. While D1_10 is the abnormal returns of the bottom 10 %(D1) deciles minus the top 10% (D10)

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D1_10	B30T30
CAPM Alpha	0,0009	-0,0005	-0,0017	-0,0033	-0,0050	-0,0068	-0,0097	-0,0129	-0,0170	-0,0259	0,0268	0,0182
t-stat	1,6081	-0,9888	**-2,7904**	**-4,9372**	**-6,5632**	**-7,4517**	**-9,4036**	**-10,3737**	**-11,3568**	**-12,8521**	**13,3273**	**12,7929**
3FF Alpha	0,0004	-0,0011	-0,0025	-0,0044	-0,0060	-0,0081	-0,0111	-0,0145	-0,0189	-0,0283	0,0287	0,0195
t-stat	0,7786	**-2,4186**	**-5,5481**	**-9,2911**	**-11,8155**	**-14,7122**	**-18,4082**	**-20,0726**	**-20,5211**	**-20,1744**	**18,2128**	**18,3859**
5FF Alpha	0,0005	-0,0013	-0,0030	-0,0049	-0,0064	-0,0090	-0,0122	-0,0157	-0,0214	-0,0351	0,0356	0,0228
t-stat	0,5732	-1,7355	**-4,4313**	**-7,3499**	**-8,8276**	**-10,2007**	**-11,9339**	**-11,5820**	**-12,0473**	**-12,5228**	**12,0744**	**11,5673**
3FF + UMD Alpha	0,0001	-0,0012	-0,0026	-0,0045	-0,0061	-0,0079	-0,0108	-0,0140	-0,0181	-0,0272	0,0273	0,0186
t-stat	0,1124	-2,5412	**-5,5449**	**-9,2246**	**-11,5743**	**-13,9148**	**-17,4645**	**-18,8997**	**-19,1600**	**-18,9359**	**16,9262**	**17,0790**
3FF + BAB Alpha	-0,0021	-0,0034	-0,0044	-0,0059	-0,0073	-0,0089	-0,0109	-0,0140	-0,0175	-0,0251	0,0230	0,0156
t-stat	**-5,1559**	**-8,9863**	**-11,6305**	**-13,5204**	**-14,6835**	**-15,6234**	**-17,2791**	**-18,4468**	**-18,3629**	**-17,8456**	**15,7690**	**15,8452**
3FF + QMJ Alpha	-0,0013	-0,0027	-0,0042	-0,0050	-0,0064	-0,0077	-0,0091	-0,0117	-0,0147	-0,0229	0,0216	0,0137
t-stat	**-2,2334**	**-5,5899**	**-9,3002**	**-10,8456**	**-12,8224**	**-13,7355**	**-15,0554**	**-15,3645**	**-15,1046**	**-15,3109**	**13,3943**	**12,6078**

Table 4 and Table 5 present the results for portfolios formed on 36 month and 12 month basis for skewness strategy portfolios. As it can be observed portfolios with low skewness are showing negative outperformance while portfolios with positive outperformance are showing very low positive outperformance against the multifactor models. Similarly, self – financing portfolios are not showing any outstanding outperformance. Self-financing monthly outperformance is 0.5 percent for CAPM and 0.7 percent for Fama and French three factor plus momentum model. In addition, the results show very high t statistics results. The results are more or less in line with the results found by Harvey and Siddique (2000), where skewness

as a systematic risk should claim for 3.6 percent of risk premium on annual basis. Most of the self – financing skewness portfolios show higher outperformance than 3.6 percent on an annual basis. In terms of best strategy for skewness based portfolios, it seems reasonable to short high positively skewed portfolios as it can bring higher than 1 percent of outperformance on a monthly basis.

Table 4. Skewness 36 months

The table reports abnormal returns for the skewness strategy according to CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). The skewness portfolios are constructed by basing the prior performance of **36** months. The data for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. B30T30 and D1_10 are self-financing portfolios. B30T30 is the abnormal returns of the bottom 30% (D+D2+D3) deciles minus the top 30% (D8+D9+D10) deciles. While D1_10 is the abnormal returns of the bottom 10 %(D1) deciles minus the top 10% (D10).

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D1_10	B30T30
CAPM Alpha	-0,0060	-0,0057	-0,0057	-0,0060	-0,0070	-0,0067	-0,0078	-0,0077	-0,0081	-0,0109	0,0049	0,0031
t-stat	**-6,4948**	**-7,2010**	**-7,2822**	**-7,3887**	**-8,3242**	**-7,9408**	**-8,6684**	**-8,1221**	**-7,7226**	**-8,8099**	**4,6869**	**4,5947**
3FF Alpha	-0,0071	-0,0070	-0,0069	-0,0073	-0,0084	-0,0080	-0,0094	-0,0093	-0,0098	-0,0127	0,0056	0,0036
t-stat	**-10,3203**	**-13,3587**	**-14,2617**	**-14,7381**	**-16,7321**	**-15,8468**	**-17,6521**	**-16,1390**	**-15,2872**	**-15,8326**	**5,6826**	**5,7406**
5FF Alpha	-0,0099	-0,0085	-0,0085	-0,0090	-0,0092	-0,0090	-0,0095	-0,0097	-0,0103	-0,0127	0,0028	0,0019
t-stat	**-7,9430**	**-9,3512**	**-10,3677**	**-11,1020**	**-11,5360**	**-11,7666**	**-11,7059**	**-10,6778**	**-9,2331**	**-9,0268**	1,6953	1,8348
3FF + UMD Alpha	-0,0057	-0,0061	-0,0065	-0,0072	-0,0081	-0,0081	-0,0095	-0,0095	-0,0104	-0,0134	0,0077	0,0050
t-stat	**-8,3265**	**-11,6594**	**-13,0970**	**-14,1657**	**-15,7986**	**-15,5245**	**-17,3658**	**-16,0148**	**-15,8660**	**-16,3147**	**7,8940**	**8,0354**
3FF + BAB Alpha	-0,0073	-0,0073	-0,0075	-0,0082	-0,0090	-0,0087	-0,0100	-0,0096	-0,0104	-0,0129	0,0056	0,0036
t-stat	**-10,4061**	**-13,9629**	**-15,6132**	**-16,4903**	**-17,8295**	**-16,9047**	**-18,6125**	**-16,5083**	**-15,7060**	**-15,4460**	**5,4792**	**5,5761**
3FF + QMJ Alpha	-0,0077	-0,0066	-0,0066	-0,0074	-0,0076	-0,0071	-0,0081	-0,0079	-0,0078	-0,0094	0,0017	0,0014
t-stat	**-11,1206**	**-12,7186**	**-13,5953**	**-15,2270**	**-15,5800**	**-14,6445**	**-15,5448**	**-13,7221**	**-11,7026**	**-11,4605**	1,6634	**2,1955**

Table 5. Skewness 12 months

The table reports abnormal returns for the skewness strategy according to CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). The skewness portfolios are constructed by basing the prior performance of **12** months. The data for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. B30T30 and D1_10 are self-financing portfolios. B30T30 is the abnormal returns of the bottom 30% (D+D2+D3) deciles minus the top 30% (D8+D9+D10) deciles. While D1_10 is the abnormal returns of the bottom 10 %(D1) deciles minus the top 10% (D10)

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D1_10	B30T30
CAPM Alpha	-0,0075	-0,0069	-0,0071	-0,0074	-0,0076	-0,0078	-0,0085	-0,0088	-0,0096	-0,0105	0,0031	0,0025
t-stat	-8,1114	-8,2659	-8,6804	-8,7775	-9,2087	-9,2369	-9,6122	-9,5954	-9,8529	-9,6523	3,6933	4,5918
3FF Alpha	-0,0084	-0,0081	-0,0082	-0,0086	-0,0089	-0,0091	-0,0098	-0,0103	-0,0110	-0,0121	0,0036	0,0029
t-stat	-13,1444	-16,2860	-16,4150	-17,6562	-18,0546	-17,7134	-19,2496	-18,8445	-18,2000	-17,1317	4,5313	5,5069
5FF Alpha	-0,0112	-0,0103	-0,0098	-0,0108	-0,0108	-0,0103	-0,0103	-0,0108	-0,0113	-0,0129	0,0017	0,0012
t-stat	-9,9427	-11,5753	-11,5011	-12,7968	-12,3832	-12,0064	-11,6180	-11,5236	-10,8230	-10,3696	1,3362	1,5363
3FF + UMD Alpha	-0,0076	-0,0075	-0,0078	-0,0086	-0,0088	-0,0089	-0,0095	-0,0101	-0,0111	-0,0124	0,0048	0,0035
t-stat	-11,6821	-14,8553	-15,2126	-17,0219	-17,3209	-16,9072	-18,1670	-17,9852	-17,7235	-17,1397	5,8841	6,6641
3FF + BAB Alpha	-0,0085	-0,0082	-0,0087	-0,0094	-0,0093	-0,0098	-0,0103	-0,0108	-0,0117	-0,0128	0,0044	0,0033
t-stat	-12,7320	-15,9086	-16,7755	-18,7592	-17,9617	-18,4533	-19,3588	-19,2231	-18,7412	-17,4537	5,2864	6,1588
3FF + QMJ Alpha	-0,0085	-0,0081	-0,0077	-0,0082	-0,0085	-0,0085	-0,0087	-0,0088	-0,0089	-0,0097	0,0011	0,0010
t-stat	-13,1115	-15,0606	-15,0796	-16,5870	-15,8275	-15,6771	-16,1488	-14,8599	-14,1319	-13,1472	1,4790	1,9415

Table 6 and Table 7 show outperformance results for kurtosis strategy portfolios formed on the prior 36 months and 12 months period. Even though there has been less evidence observed on kurtosis in prior researches, it makes sense to add it as a next higher moment to the asset pricing model. Hence, if we follow the same logic on detection of outperformance

then kurtosis table 6 and table 7 show almost same result as skewness. On a monthly basis outperformance results are close to zero. Self-financing portfolio based on Fama and French five factor model shows the highest outperformance relative to other self-financing portfolios.

According to the theory investors should prefer stock return distributions with fat tail that are also associated with higher kurtosis values. Hence, they give preference for extreme stock returns with higher probability of achievement. Similarly, investors are not willing to accept stocks with low kurtosis values as they promise extreme returns with low probability. As a result negative skewed portfolios should be considered as a risky asset and a risk premium should be offered for that. However outperformance of portfolios against the multifactor models are showing either close to zero or negative. It means that kurtosis strategy portfolios cannot claim for a risk premium if the outperformance is close to zero or negative.

Table 6. Kurtosis 36 months

The table reports abnormal returns for the kurtosis strategy according to CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). The kurtosis portfolios are constructed by basing the prior performance of **36** months. The data for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. B30T30 and D1_10 are self-financing portfolios. B30T30 is the abnormal returns of the bottom 30% (D+D2+D3) deciles minus the top 30% (D8+D9+D10) deciles. While D1_10 is the abnormal returns of the bottom 10 %(D1) deciles minus the top 10% (D10)

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D1_10	B30T30
CAPM Alpha	0,0002	0,0011	0,0003	0,0000	0,0000	0,0006	0,0000	0,0002	-0,0011	-0,0019	0,0021	0,0015
t-stat	-9,0425	-7,3121	-8,2326	-8,4027	-8,5101	-7,4987	-7,9493	-7,3645	-8,3707	-8,0595	2,2101	2,3298
3FF Alpha	-0,0083	-0,0074	-0,0083	-0,0086	-0,0086	-0,0081	-0,0084	-0,0084	-0,0094	-0,0103	0,0020	0,0013
t-stat	-17,2441	-14,3028	-16,4090	-17,0423	-16,7670	-15,8516	-16,0772	-14,9457	-16,1830	-15,3044	2,8432	2,8590
5FF Alpha	-0,0092	-0,0080	-0,0092	-0,0092	-0,0089	-0,0091	-0,0094	-0,0100	-0,0108	-0,0124	0,0032	0,0023
t-stat	-12,6094	-10,2008	-11,7768	-11,1732	-10,6661	-10,8691	-10,4331	-10,4041	-10,3577	-10,0173	2,7021	2,8761
3FF + UMD Alpha	-0,0084	-0,0074	-0,0085	-0,0085	-0,0084	-0,0078	-0,0083	-0,0081	-0,0092	-0,0099	0,0015	0,0010
t-stat	-16,9655	-13,8357	-16,2653	-16,3417	-15,9403	-14,8849	-15,4267	-14,0838	-15,3551	-14,3651	2,1027	2,0278
3FF + BAB Alpha	-0,0088	-0,0081	-0,0089	-0,0093	-0,0089	-0,0087	-0,0089	-0,0087	-0,0099	-0,0108	0,0020	0,0012
t-stat	-17,8695	-15,2559	-17,3754	-18,1974	-16,8130	-16,6805	-16,6263	-15,5125	-16,8913	-15,6832	2,8693	2,5117
3FF + QMJ Alpha	-0,0076	-0,0067	-0,0073	-0,0079	-0,0075	-0,0074	-0,0075	-0,0074	-0,0083	-0,0087	0,0010	0,0009
t-stat	-15,7327	-13,4680	-14,9008	-15,9888	-14,8420	-14,5607	-14,1893	-13,3158	-13,8620	-12,4359	1,4572	1,8709

Table 7. Kurtosis 12 months

The table reports abnormal returns for the kurtosis strategy according to CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). The kurtosis portfolios are constructed by basing the prior performance of **12** months. The data for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. B30T30 and D1_10 are self-financing portfolios. B30T30 is the abnormal returns of the bottom 30% (D+D2+D3) deciles minus the top 30% (D8+D9+D10) deciles. While D1_10 is the abnormal returns of the bottom 10 %(D1) deciles minus the top 10% (D10)

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D1_10	B30T30
CAPM Alpha	-0,0073	-0,0081	-0,0083	-0,0083	-0,0083	-0,0078	-0,0078	-0,0091	-0,0084	-0,0086	0,0013	0,0008
t-stat	-8,7902	-9,8593	-9,9140	-9,6903	-9,7572	-8,7843	-8,5323	-10,0207	-9,0517	-8,3946	2,0100	1,9485
3FF Alpha	-0,0084	-0,0093	-0,0095	-0,0095	-0,0095	-0,0091	-0,0092	-0,0104	-0,0097	-0,0100	0,0016	0,0010
t-stat	-15,6942	-17,7481	-19,7221	-18,1242	-17,9032	-18,2854	-18,1330	-19,5410	-17,2230	-16,0122	2,5053	2,4444
5FF Alpha	-0,0096	-0,0104	-0,0098	-0,0111	-0,0109	-0,0109	-0,0112	-0,0107	-0,0114	-0,0124	0,0028	0,0015
t-stat	-11,4276	-12,1120	-11,4320	-13,2063	-12,1253	-11,8056	-12,5456	-11,3542	-11,3671	-10,8675	3,1362	2,7537
3FF + UMD Alpha	-0,0082	-0,0089	-0,0094	-0,0093	-0,0092	-0,0088	-0,0091	-0,0100	-0,0097	-0,0099	0,0017	0,0010
t-stat	-14,8557	-16,5981	-18,9106	-17,2377	-16,9550	-17,1207	-17,3616	-18,2847	-16,6479	-15,4105	2,6379	2,5090
3FF + BAB Alpha	-0,0092	-0,0100	-0,0102	-0,0102	-0,0098	-0,0096	-0,0096	-0,0103	-0,0102	-0,0105	0,0013	0,0005
t-stat	-16,4947	-18,4027	-20,4842	-18,6289	-17,9017	-18,4139	-18,4733	-18,6753	-17,4446	-16,1652	1,9985	1,2969
3FF + QMJ Alpha	-0,0081	-0,0085	-0,0085	-0,0088	-0,0086	-0,0085	-0,0082	-0,0086	-0,0085	-0,0092	0,0010	0,0004
t-stat	-14,9556	-15,7967	-16,5742	-16,8331	-15,7899	-15,5968	-15,1867	-15,4219	-14,3621	-13,4922	1,6886	0,9345

4.2 Double sorted portfolios

In this section, results of double sorted portfolios are presented. Double sorting of portfolios is performed in order to control fundamental variables that can affect the portfolio outperformance values. Usually there are traditional key variables such as book to market, size in order to implement the double sorting portfolio strategies. However in this research, I used fundamental company related financial ratios that touch upon the fundamentals of the company.

In order to control for the profitability effect, I used Gross margin as it is a key variable in accounting. Furthermore, it is a pure profitability measurement of a company that is directly derived from the cost of goods sold. Debt coverage ratios are presented by cash to debt and debt to EBITDA. Firms that are not able to generate enough cash or profit in order to cover the debt would be risky. Thus, it is important to control this debt coverage ratio. Dividend payout ratio is an important measurement for investors who make a decision to invest in stocks. Investors prefer high dividend payout ratios and it will be helpful to control this effect while arriving at portfolios. Growth opportunity for the company is mainly impacted by the technological development of the company along with other variables. So, firms with advanced technologies should be able to grow faster. Keeping that in mind expenditures to R&D are deterministic for technological development and in order to control this effect while ranking the portfolios I used R&D to Sales measurement. Price to Book measurement is used in order to control for value.

4.3 Excess Returns of double sorted strategy portfolios

Appendix A presents results for excess returns by performing double sorting methodology. It is important to note that after implementing the double sorting excess returns of volatility

have been improved compared to single sorted portfolios. In a single sorted strategy, self-financing portfolio of volatility showed 1.73 percent for the strategy based on 36 month – rebalancing and 2.01 percent for the strategy based on 12 month - rebalancing.

The lower value of cash to debt sorting showed negative values from low to high volatility stocks. Because these are the stocks with high debt amount and low cash reserves. Furthermore, high value of volatility and low cash to debt showed an excess return of negative 3.2 percent. As a result self-financing low minus high volatility portfolio with low cash to debt shows 2.5 percent monthly excess returns.

Volatility and debt to EBITDA strategy portfolios show a little bit better result compared to earlier strategy. High volatility value and low debt to EBITDA shows excess return of negative 3.4 percent on a monthly basis. Investors that open short position for this strategy can achieve relatively high excess returns. In terms of self-financing strategies low minus high volatility and low debt to EBITDA shows an excess return of 2.7 percent monthly. It is important to note that remaining low minus high self-financing volatility strategies perform negatively.

Volatility and dividend payout ratio strategy portfolios show lower excess returns. Self – financing portfolio of low minus high volatility and low dividend payout ratio brings only 1.4 percent excess return on a monthly basis. Furthermore, this strategy brings inferior excess return results compared to single sorted volatility strategies.

Volatility and Gross margin strategy portfolios show the highest excess return among other volatility based double sorted strategies. Self-financing portfolio of low minus high volatility and low gross margin shows 3.04 percent monthly excess returns and low minus high volatility and 2nd low decile gross margin shows 1.5 percent excess returns. It is important to note that high gross margin portfolios perform better compared to low gross margin portfolios, while for self-financing portfolios it is other way around.

Volatility and Price to Book strategy performed better as well compared to single sorted portfolio strategy. High price to book and self-financing strategy of low minus high volatility strategy shows 2.73 percent monthly excess returns. Furthermore, high volatility and high gross margin strategy show (-3.3) percent returns. It is important to note that self-financing strategy of going long for low volatility and low price to book and going short for high volatility and high price to book strategy shows excess return of 3.82 percent on a monthly basis.

Volatility and R&D to sales strategy portfolios show relatively high excess returns compared to single sorted portfolios. Self-financing low minus high volatility and low R&D to sales strategy shows excess return of 2.23 percent monthly excess return. It is mainly as it was observed in a single sorted strategy, where high volatility portfolios show high negative returns. Furthermore, self – financing portfolio strategy of going long for low volatility and low R&D to sales and going short for high volatility and high R&D to sales shows 2.42 percent monthly excess return.

Volatility and Bid – Ask spread portfolio strategies do not show higher excess returns compared to other strategies related to volatility. Specifically, all self-financing strategies show relatively low excess returns compared to other strategies.

Double sorted portfolio strategies on the basis of higher moments show mixed excess return results. The majority of doubled sorted portfolios show either zero or negative excess returns, but some portfolios show improvements compared to single sorted portfolios.

Regarding the skewness some strategies show relatively high excess returns. Self-financing portfolio strategy of going long for high cash to debt and high skewness and going short for low cash to debt and high skewness show excess return of 2.26 percent. This is higher than what was observed on a single factor strategies. Furthermore, it can be observed that low cash to debt portfolio strategies show high negative returns, and it is better to short them compared to high cash to debt portfolios. It means that low cash to debt portfolios are considered as risky and companies do not have enough cash to cover the debt amounts.

Skewness and debt to EBITDA, Skewness and dividend payout ratios, Skewness and Gross margin, Skewness and R&D to Sales, Skewness and Bid-Ask spread strategy portfolios do not show any outstanding excess returns. However, Skewness and Price to Book portfolio strategies show higher excess returns. In particular, strategy of going long low Price to Book and low skewness and going short for high skewness and high price to book shows 2.21 monthly excess return. This is an improvement compared to single sorted skewness portfolios. It is important to note that high price to book portfolios show negative excess returns compared to low excess returns.

After performing a double sorting on kurtosis together with fundamental and liquidity variables, portfolios show mixed results, as some performed with higher excess returns while

others portfolios did not show any improvements. In particular, Kurtosis and Bid-Ask Spread, Kurtosis and R&D to sales, Kurtosis and Gross margin, Kurtosis and dividend payout ratios show almost same excess return as single sorted portfolios and didn't bring any improvements after the double sorting. Remaining kurtosis related double sorting portfolios showed relatively higher excess returns compared to single sorted portfolios.

Kurtosis and cash to debt strategy portfolios show better excess returns compared to single sorted portfolios. Self – financing portfolio of going long for high kurtosis and high cash to debt and going short for low cash to debt and high kurtosis show excess return of 2.25 percent on a monthly basis. Furthermore, it is important to note that low cash to debt values show negative excess returns compared to high cash to debt values.

Kurtosis and price to book portfolios show mixed results, but outcome is better compared to other kurtosis based portfolios. Specifically, self- financing strategy of going long low price to book and high kurtosis and going short for high price to book and high volatility shows excess return of 2.09 percent monthly. Furthermore, self-financing portfolio of going long low kurtosis and low price to book and going short high kurtosis and high price to book portfolio shows excess return of 2.12 percent monthly.

4.4 Outperformance of double sorted strategies

Appendix B provides with the outperformance results for double sorted strategies. After implementing the double sorted strategy on volatility and higher moments against the fundamental and liquidity variables, we can observe some improvements. In particular volatility related portfolio strategies show higher outperformance compared to single sorted strategies. On the other hand, higher moments related portfolios show mixed results as some showing improvements while others not showing any improvements compared to single sorted portfolios.

Volatility and cash to debt showed mixed results compared to single sorted volatility portfolios. In most of the portfolios low volatility portfolios show relatively negative outperformance results against multifactor models and high volatility portfolios show even more negative returns compared to single sorted portfolios. Hence, while making self-financing portfolios with going long for low volatility portfolios and going short with high volatility outperformance results were not relatively higher compared to single sorted

portfolios. But to be more specific, self – financing portfolio outperformance results against the multifactor models were in between 1.7 – 2.8 percent on a monthly basis. Outperformance results for low volatility self-financing strategies are relatively higher against all factor models except Fama and French three factor model plus quality minus junk.

Volatility and debt to EBITDA double sorted portfolios perform relatively well compared to single sorted strategies. Outperformance against all factor models is high except for Fama and French three factor model plus quality minus junk model. In particular, self – financing portfolio of going long for low Debt to EBITDA and low volatility and going short for high debt to EBITDA and high volatility shows outperformance values ranging from 2.65 percent to 3.06 against the multifactor models. The existence of outperformance with respect to low debt to EBITDA means that these category of stocks are considered less risky. Moreover, high volatility categories exhibit high negative values, and as a result by shorting them it became possible to achieve higher outperformance.

Portfolios sorted with respect to Volatility and Gross margin perform very well compared to all other single sorted and double sorted portfolios. For most of the strategies low gross margin and high volatility portfolios perform with high negative values. It means that these category of stocks are considered as risky and shorting them will give higher outperformance returns. Hence, this sorting will help to detect companies that show low profitability and with highly volatile stock performances. While observing the tables we can notice that outperformance results are in the range of 2 percent and 3.41 percent for all multifactor models. Outperformance against the Fama and French three factor model shows 3.37 percent on a monthly basis.

Volatility and Price to Book based double sorting also show higher outperformance against the multifactor models compared to single sorted portfolios. High price to book and high volatility stocks show very high negative outperformance against the multifactor models. If self-financing portfolios are with these stocks, then highest amount of outperformance can be achieved. Self-financing portfolio of going long for low volatility and low price to book and shorting for high volatility and high price to book shows relatively high compared to other self – financing portfolios. Outperformance of this strategy for CAPM is 4.24 percent, for Fama and French three factor model is 3.88 percent and for Fama and French there factor model plus momentum is 4.15 percent on a monthly basis.

Double sorting based on Volatility and Spread strategies and Volatility and R&D to Sales did not show any high results compared to single sorted portfolios. Thus, for volatility based strategies it is better to avoid them in the future researches.

Doubling sorting based higher moments showed better results compared single sorted portfolios. Specifically, most of the single sorted outperformance levels for self- financing skewness and kurtosis based strategies showed either very close to zero percent or negative results. However, due to double sorting some group higher moment stocks showed relatively higher outperformance. Sorting based on liquidity defined as bid ask spread didn't show any different result compared to single sorted portfolio.

Skewness and Cash to Debt based strategy portfolios showed outperformance results in between 1.5 – 2.4 percent on a monthly basis. Self-financing portfolio of going short for high kurtosis and low cash to debt and going long high show alfas for CAPM as 2.4 percent, for Fama and French three factor model as 2.3 percent and for Fama and French three factor model as 2.2 percent on a monthly basis. It is important to note that low cash to debt category shows highly negative outperformance results. Thus, creating a self-financing portfolio by shorting these category of stocks, investors can achieve higher outperformance results.

Skewness and Price to Book based double sorted portfolios helped in order to achieve higher outperformance results compared to single sorted portfolios. It can be observed on self-financing portfolios. In particular, self- financing portfolios of going long for low price to book and high skewness and going short for high skewness and high price to book shows monthly outperformance of 2.33 percent for CAPM and 2.23 percent Fama and French three factor model plus momentum. Furthermore, it can be mentioned that higher categories of price to book and skewness performed worse compared to lower categories. We can conclude that these category of stocks are considered relatively risky and shorting them within self-financing portfolios is advantageous.

Kurtosis and Cash to Debt based double sorted portfolios show better results across the low to high levels. Self-financing portfolio of going long for high cash to debt and high kurtosis and going short for low cash to debt and high kurtosis brings outperformance of 2.4 percent, against CAPM, 2.1 percent against the Fama and French five factor model and 2.3 percent the

Fama and French three factor model. It is important to note that results are slightly higher compared to skewness based on double sorted portfolios.

Kurtosis and Price to Book based double sorted portfolios also show better results compared to single sorted portfolios. Regarding the self – financing portfolios only higher outperformance levels are observed against CAPM and Fama and French three factor model with 2.2 percent and 2.3 percent respectively. This strategy shows cross sectional different values both for Kurtosis and Price to Book. Hence, it was helpful to get higher outperformance levels compared to single sorted portfolios.

5. Conclusion

According to obtained results we can conclude that volatility results can claim for higher outperformance against the multifactor models. Furthermore, it can be mentioned that double sorting portfolios bring improvement in terms of obtaining higher outperformance results. Thus we can mention that results are in line with the research by Blitz and Vliet (2007) on low volatility factors. Hence, portfolios formed on the basis of volatility factors can claim for higher outperformance results. As mentioned in theoretical framework this is mainly due to irrational behavior of investors that show higher preference for risky stocks. Investors get attracted by higher promised payoffs with low probabilities that are promised from stock investments. As a result of high level of uncertainty, due to low probabilities we observe these stocks showing high volatility. In particular this phenomenon is also due to overconfident investors who are likely to open positions for stock that show extreme returns with low probability. As a result we can observe high volatility stocks performing negatively and thus opening an opportunity for short-selling while forming a self-financing portfolio.

Results on higher moments have brought mixed results. In particular single sorted portfolios brought 0.4 percent outperformance for skewness and 0.2 percent outperformance for kurtosis on a monthly basis. On an annual basis it will be almost same results found by Harvey and Siddique (2000) on skewness. However, if we implement double sorting then the results are improved by higher amounts. In the theoretical framework it was proposed that due to non – normal distribution that stock returns show, we should be able to obtain higher premium. As the research shows, outperformance results were observed after implementing

double sorting strategy together with fundamental firm specific ratios while forming the portfolios.

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Appendix A

Excess Returns of double sorted portfolios

Table 8. Volatility and cash to debt (Excess Returns)

The table reports excess returns for double sorted portfolios on Volatility and fundamental variable as Cash to Debt. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	L	-0,0065	0,0039	0,0040	0,0054	0,0054	-0,0119
t-stat		-1,5701	1,3518	1,6027	1,9650	1,9200	-4,9286
Excess Return	2	-0,0115	0,0007	0,0038	0,0041	0,0045	-0,0160
t-stat		-1,9864	0,1892	1,0707	1,1395	1,2799	-4,4408
Excess Return	3	-0,0169	-0,0044	0,0017	0,0033	0,0044	-0,0214
t-stat		-2,5612	-0,9762	0,3961	0,7934	1,0522	-5,5957
Excess Return	4	-0,0233	-0,0100	-0,0021	0,0020	0,0008	-0,0241
t-stat		-3,0946	-1,7759	-0,3983	0,4127	0,1661	-6,0005
Excess Return	H	-0,0320	-0,0190	-0,0083	-0,0053	-0,0056	-0,0264
t-stat		-3,8304	-2,6457	-1,3121	-0,8815	-0,9364	-6,6118
Excess Return	L-H	0,0255	0,0075	-0,0086	-0,0179	-0,0264	-0,0009
t-stat		4,6713	2,5152	-3,0377	-5,7333	-6,6118	-0,2839

Table 9. Volatility and debt to EBITDA (Excess Returns)

The table reports excess returns for double sorted portfolios on Volatility and fundamental variable as Debt to EBITDA. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios

Excess Return	L	-0,0065	0,0051	0,0061	0,0047	0,0031	-0,0096
t-stat		-1,6507	1,7674	**2,1143**	1,9422	1,1077	**-3,2704**
Excess Return	2	-0,0113	0,0032	0,0046	0,0036	-0,0002	-0,0112
t-stat		**-2,0784**	0,8560	1,2572	1,0260	-0,0508	**-2,8044**
Excess Return	3	-0,0152	0,0026	0,0040	0,0031	-0,0038	-0,0113
t-stat		**-2,4089**	0,5533	0,9600	0,7170	-0,8328	**-2,8290**
Excess Return	4	-0,0240	-0,0026	0,0015	0,0003	-0,0094	-0,0146
t-stat		**-3,3116**	-0,4671	0,3157	0,0643	-1,6402	**-3,5451**
Excess Return	H	-0,0339	-0,0097	-0,0035	-0,0052	-0,0171	-0,0169
t-stat		**-4,0292**	-1,4125	-0,5858	-0,8769	**-2,5301**	**-4,1217**
Excess Return	L-H	0,0275	-0,0017	-0,0117	-0,0188	-0,0169	0,0106
t-stat		**4,7645**	-0,6028	**-4,1827**	**-4,9869**	**-4,1217**	**2,7078**

Table 10. Volatility and dividend payout ratio (Excess Returns)

The table reports excess returns for double sorted portfolios on Volatility and fundamental variable as Dividend payout ratio. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios

		L	2	3	4	H	L-H
Excess Return	L	0,0049	0,0047	0,0064	0,0050	0,0034	0,0015
t-stat		1,6107	1,5146	**2,2722**	1,9260	1,3957	0,8252
Excess Return	2	0,0022	0,0034	0,0033	0,0044	0,0034	-0,0012
t-stat		0,5555	0,8685	0,8596	1,2756	1,1358	-0,5889
Excess Return	3	0,0003	0,0003	0,0026	0,0036	0,0020	-0,0017
t-stat		0,0732	0,0593	0,5900	0,9278	0,5802	-0,7299
Excess Return	4	-0,0023	-0,0039	-0,0011	0,0028	0,0009	-0,0032
t-stat		-0,4332	-0,7301	-0,2115	0,6266	0,2213	-1,1975
Excess Return	H	-0,0093	-0,0098	-0,0066	-0,0011	-0,0030	-0,0063
t-stat		-1,4556	-1,5515	-1,0598	-0,2107	-0,5950	-2,0415
Excess Return	L-H	0,0142	0,0120	0,0070	-0,0012	-0,0063	0,0079
t-stat		**3,1497**	**3,3456**	**2,5135**	**-0,6752**	**-2,0415**	**2,8489**

Table 11. Volatility and Gross margin (Excess Returns)

The table reports excess returns for double sorted portfolios on Volatility and fundamental variable as Gross margin. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios

		L	2	3	4	H	L-H
Excess Return	L	0,0032	0,0040	0,0040	0,0048	0,0044	-0,0012
t-stat		1,0930	1,4517	1,4472	1,8632	1,6181	-0,9232
Excess Return	2	-0,0011	0,0023	0,0026	0,0037	0,0038	-0,0049
t-stat		-0,2644	0,6048	0,6739	1,0692	1,0976	**-2,7386**
Excess Return	3	-0,0058	0,0004	-0,0001	0,0024	0,0008	-0,0066
t-stat		-1,1508	0,0910	-0,0123	0,5671	0,1809	**-3,0493**
Excess Return	4	-0,0135	-0,0046	-0,0041	-0,0024	-0,0039	-0,0096
t-stat		**-2,1753**	-0,8586	-0,7566	-0,4613	-0,7039	**-3,7987**
Excess Return	H	-0,0272	-0,0164	-0,0128	-0,0122	-0,0137	-0,0135
t-stat		**-3,4656**	**-2,4836**	-1,8824	-1,7913	**-1,9810**	**-4,3222**
Excess Return	L-H	0,0304	0,0153	0,0070	-0,0013	-0,0135	0,0169
t-stat		**4,7199**	**4,0231**	**2,4277**	-0,5656	**-4,3222**	**3,1498**

Table 12. Volatility and PTB (Excess Returns)

The table reports excess returns for double sorted portfolios on Volatility and fundamental variable as Price to Book. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios

		L	2	3	4	H	L-H
Excess Return	L	0,0052	0,0054	0,0033	0,0028	0,0012	0,0040
t-stat		1,6640	**2,0821**	1,1951	0,9465	0,3705	1,5358
Excess Return	2	0,0035	0,0045	0,0029	0,0020	-0,0027	0,0061
t-stat		0,7954	1,2757	0,8105	0,5415	-0,5846	1,7583
Excess Return	3	0,0022	0,0032	0,0011	-0,0024	-0,0089	0,0111
t-stat		0,4185	0,7463	0,2553	-0,5283	-1,5799	**2,6943**
Excess Return	4	-0,0006	-0,0016	-0,0028	-0,0070	-0,0177	0,0171
t-stat		-0,1021	-0,3114	-0,5562	-1,2882	**-2,8104**	**4,0317**
Excess Return	H	-0,0057	-0,0082	-0,0121	-0,0192	-0,0330	0,0273
t-stat		-0,7774	-1,3125	-1,8904	**-2,8568**	**-4,5117**	**6,2567**
Excess Return	L-H	0,0109	0,0116	0,0143	0,0186	0,0273	0,0382
t-stat		**1,9756**	**3,5497**	**4,5837**	**5,0961**	**6,2567**	**6,3095**

Table 13. Volatility and R&D to sales (Excess Returns)

The table reports excess returns for double sorted portfolios on Volatility and fundamental variable as R&D to Sales. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios

		L	2	3	4	H	L-H
Excess Return	L	0,0040	0,0040	0,0043	0,0042	0,0039	0,0001
t-stat		1,5898	1,5482	1,6539	1,4802	1,0332	0,0339
Excess Return	2	0,0029	0,0022	0,0029	0,0027	0,0009	0,0020
t-stat		0,8289	0,6024	0,8405	0,7118	0,1672	0,5436
Excess Return	3	-0,0003	-0,0003	0,0003	0,0009	-0,0022	0,0019
t-stat		-0,0839	-0,0673	0,0700	0,1898	-0,3566	0,4664
Excess Return	4	-0,0056	-0,0046	-0,0051	-0,0046	-0,0094	0,0038
t-stat		-1,1221	-0,8971	-1,0033	-0,8695	-1,3285	0,9469
Excess Return	H	-0,0183	-0,0165	-0,0163	-0,0143	-0,0202	0,0019
t-stat		**-2,8222**	**-2,5889**	**-2,5544**	**-2,1317**	**-2,4597**	0,4886
Excess Return	L-H	0,0223	0,0194	0,0160	0,0088	0,0019	0,0242
t-stat		**4,3409**	**4,5732**	**4,5059**	**2,7868**	0,4886	**3,3453**

Table 14. Volatility and spread (Excess Returns)

The table reports excess returns for double sorted portfolios on Volatility and liquidity variable measured by Bid – Ask Spread. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	**2**	**3**	**4**	**H**	**L-H**
Excess Return	L	0,0009	0,0014	0,0031	0,0014	-0,0004	0,0016
t-stat		0,1961	0,3807	0,8321	0,4101	-0,1226	0,3914
Excess Return	2	-0,0032	-0,0004	-0,0007	0,0005	0,0006	-0,0039
t-stat		-0,4796	-0,0607	-0,1278	0,1195	0,1455	-0,7134
Excess Return	3	-0,0063	-0,0069	-0,0056	-0,0031	-0,0024	-0,0028
t-stat		-0,8213	-0,9965	-0,9426	-0,5641	-0,5022	-0,4223
Excess Return	4	-0,0086	-0,0083	-0,0070	-0,0072	-0,0072	-0,0013
t-stat		-0,9913	-1,0332	-0,9512	-1,1998	-1,2298	-0,1700
Excess Return	H	-0,0136	-0,0136	-0,0125	-0,0138	-0,0119	-0,0008
t-stat		-1,3963	-1,5804	-1,5502	-1,8037	-1,9158	-0,0942
Excess Return	L-H	0,0146	0,0107	0,0059	0,0060	-0,0008	0,0131
t-stat		1,8437	1,6359	0,8919	0,8337	-0,0942	**2,4024**

Table 15. Skewness and cash to debt (Excess Returns)

The table reports excess returns for double sorted portfolios on Kurtosis and fundamental variable as Cash to Debt. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	**2**	**3**	**4**	**H**	**L-H**
Excess Return	**L**	-0,0142	-0,0049	0,0004	0,0028	0,0028	-0,0170
t-stat		**-2,2277**	-0,9872	0,0853	0,6417	0,6359	**-5,0927**
Excess Return	**2**	-0,0154	-0,0048	0,0005	0,0028	0,0027	-0,0181
t-stat		**-2,4380**	-1,0441	0,1231	0,6553	0,6443	**-5,2655**
Excess Return	**3**	-0,0177	-0,0047	0,0002	0,0024	0,0025	-0,0203
t-stat		**-2,7947**	-1,0603	0,0409	0,5796	0,6014	**-5,7521**
Excess Return	**4**	-0,0200	-0,0058	-0,0008	0,0016	0,0016	-0,0216
t-stat		**-3,0700**	-1,3171	-0,1848	0,3932	0,3855	**-5,8249**
Excess Return	**H**	-0,0226	-0,0083	-0,0012	-0,0001	-0,0001	-0,0225
t-stat		**-3,4355**	-1,8533	-0,2831	-0,0187	-0,0277	**-6,3807**
Excess Return	**L-H**	0,0084	-0,0071	-0,0166	-0,0200	-0,0225	-0,0141
t-stat		**3,1759**	**-2,0937**	**-4,7394**	**-5,4432**	**-6,3807**	**-4,3389**

Table 16. Skewness and debt to EBITDA (Excess Returns)

The table reports excess returns for double sorted portfolios on Skewness and fundamental variable as Debt to EBITDA. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	**2**	**3**	**4**	**H**	**L-H**
Excess Return	L	-0,0155	0,0020	0,0032	0,0017	-0,0048	-0,0107
t-stat		-2,4318	0,4264	0,7296	0,3750	-0,9881	-2,8739
Excess Return	2	-0,0153	0,0013	0,0032	0,0021	-0,0041	-0,0112
t-stat		-2,5403	0,2821	0,7475	0,4868	-0,8943	-3,1955
Excess Return	3	-0,0175	-0,0002	0,0027	0,0016	-0,0049	-0,0126
t-stat		-2,8778	-0,0472	0,6608	0,3899	-1,1082	-3,5081
Excess Return	4	-0,0197	-0,0021	0,0028	0,0008	-0,0063	-0,0135
t-stat		-3,1651	-0,4521	0,6785	0,1975	-1,4016	-3,4998
Excess Return	H	-0,0227	-0,0024	0,0008	0,0004	-0,0072	-0,0154
t-stat		-3,5902	-0,5129	0,2029	0,0947	-1,6706	-4,1836
Excess Return	L-H	0,0072	-0,0129	-0,0183	-0,0201	-0,0154	-0,0082
t-stat		2,6357	-4,9836	-5,2996	-5,1546	-4,1836	-2,1856

Table 17. Skewness and dividend payout ratio (Excess Returns)

The table reports excess returns for double sorted portfolios on Skewness and fundamental variable as Dividend payout ratio. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	**2**	**3**	**4**	**H**	**L-H**
Excess Return	L	-0,0001	-0,0005	0,0011	0,0028	0,0020	-0,0021
t-stat		-0,0227	-0,1082	0,2493	0,6708	0,5124	-0,9493
Excess Return	2	-0,0009	0,0002	0,0011	0,0036	0,0019	-0,0027
t-stat		-0,1835	0,0476	0,2393	0,9066	0,5210	-1,2656
Excess Return	3	-0,0008	-0,0012	0,0005	0,0028	0,0015	-0,0023
t-stat		-0,1670	-0,2641	0,1131	0,7366	0,4405	-1,0810
Excess Return	4	-0,0011	-0,0009	0,0008	0,0028	0,0013	-0,0024
t-stat		-0,2363	-0,1927	0,1744	0,7647	0,3758	-1,0612
Excess Return	H	-0,0013	-0,0030	0,0011	0,0025	0,0001	-0,0014
t-stat		-0,2994	-0,6744	0,2514	0,7071	0,0225	-0,6083
Excess Return	L-H	0,0012	0,0022	-0,0019	-0,0036	-0,0014	-0,0002
t-stat		0,6299	1,1807	-1,1583	-2,0313	-0,6083	-0,0736

Table 18. Skewness and Gross margin (Excess Returns)

The table reports excess returns for double sorted portfolios on Skewness and fundamental variable as Gross margin. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	**L**	-0,0058	-0,0014	-0,0011	0,0009	-0,0002	-0,0056
t-stat		-1,1119	-0,3083	-0,2339	0,1967	-0,0488	**-2,3816**
Excess Return	**2**	-0,0062	-0,0010	0,0002	0,0000	0,0000	-0,0062
t-stat		-1,2816	-0,2248	0,0392	0,0039	-0,0048	**-3,1309**
Excess Return	**3**	-0,0076	-0,0016	-0,0017	0,0002	-0,0008	-0,0068
t-stat		-1,5865	-0,3755	-0,3898	0,0461	-0,1768	**-3,4670**
Excess Return	**4**	-0,0101	-0,0033	-0,0031	-0,0014	-0,0026	-0,0076
t-stat		**-2,0152**	-0,7515	-0,6809	-0,3195	-0,6031	**-3,5977**
Excess Return	**H**	-0,0143	-0,0067	-0,0047	-0,0033	-0,0049	-0,0094
t-stat		**-2,6535**	-1,5031	-1,0030	-0,7866	-1,1158	**-4,1182**
Excess Return	**L-H**	0,0085	0,0005	-0,0029	-0,0068	-0,0094	-0,0009
t-stat		**3,1484**	0,2973	-1,7657	**-3,4873**	-4,1182	-0,3447

Table 19. Skewness and PTB (Excess Returns)

The table reports excess returns for double sorted portfolios on Skewness and fundamental variable as Price to Book. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	**L**	0,0005	0,0017	-0,0005	-0,0022	-0,0069	0,0074
t-stat		0,0962	0,3893	-0,1135	-0,4664	-1,3623	**1,9577**
Excess Return	**2**	0,0008	0,0015	0,0001	-0,0026	-0,0074	0,0082
t-stat		0,1566	0,3422	0,0301	-0,5804	-1,5363	**2,2471**
Excess Return	**3**	0,0016	0,0004	-0,0003	-0,0043	-0,0106	0,0122
t-stat		0,3185	0,1002	-0,0800	-0,9910	**-2,0847**	**3,5116**
Excess Return	**4**	0,0013	0,0001	-0,0026	-0,0057	-0,0155	0,0168
t-stat		0,2768	0,0264	-0,6368	-1,2682	**-2,8070**	**4,3895**
Excess Return	**H**	0,0002	-0,0004	-0,0043	-0,0090	-0,0207	0,0209
t-stat		0,0483	-0,0866	-1,0224	**-1,9357**	**-3,4613**	**5,1898**
Excess Return	**L-H**	0,0003	0,0012	0,0059	0,0103	0,0209	0,0212
t-stat		0,1306	0,5262	**2,6511**	**3,7436**	**5,1898**	**4,9389**

Table 20. Skew and R&D Sale (Excess Returns)

The table reports excess returns for double sorted portfolios on Skewness and fundamental variable as R&D to Sales. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	L	-0,0021	-0,0027	-0,0012	-0,0004	-0,0015	-0,0006
t-stat		-0,4547	-0,5933	-0,2606	-0,0916	-0,2525	-0,1596
Excess Return	2	-0,0016	-0,0018	-0,0007	-0,0009	-0,0023	0,0007
t-stat		-0,3823	-0,4092	-0,1636	-0,2109	-0,3816	0,1927
Excess Return	3	-0,0024	-0,0022	-0,0023	-0,0013	-0,0043	0,0019
t-stat		-0,5904	-0,5321	-0,5799	-0,3039	-0,7390	0,5488
Excess Return	4	-0,0043	-0,0028	-0,0040	-0,0027	-0,0076	0,0033
t-stat		-1,0684	-0,6798	-0,9657	-0,6188	-1,2152	0,8479
Excess Return	H	-0,0068	-0,0056	-0,0056	-0,0056	-0,0112	0,0045
t-stat		-1,6180	-1,3606	-1,3357	-1,2001	-1,7381	1,1439
Excess Return	L-H	0,0047	0,0040	0,0032	0,0014	0,0045	0,0092
t-stat		**2,3216**	**2,3532**	**2,1525**	0,6701	1,1439	**2,1064**

Table 21. Skewness and spread (Excess Returns)

The table reports excess returns for double sorted portfolios on Skewness and liquidity variable measured as Bid – Ask spread. The liquidity variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	L	-0,0035	-0,0073	-0,0038	-0,0019	-0,0038	0,0008
t-stat		-0,4838	-1,1488	-0,6478	-0,3392	-0,7718	0,1324
Excess Return	2	-0,0051	-0,0058	-0,0023	-0,0029	-0,0040	-0,0008
t-stat		-0,7316	-0,8373	-0,3533	-0,5390	-0,8656	-0,1317
Excess Return	3	-0,0052	-0,0036	-0,0064	-0,0055	-0,0038	-0,0004
t-stat		-0,6444	-0,5309	-1,1093	-1,0523	-0,7417	-0,0596
Excess Return	4	-0,0088	-0,0045	-0,0060	-0,0059	-0,0040	-0,0046
t-stat		-1,1727	-0,6478	-0,9444	-1,0661	-0,7324	-0,6374
Excess Return	H	-0,0081	-0,0055	-0,0050	-0,0054	-0,0067	-0,0010
t-stat		-1,0614	-0,8273	-0,8277	-0,9507	-1,4140	-0,1441
Excess Return	L-H	0,0047	0,0008	-0,0001	-0,0032	-0,0010	0,0035
t-stat		0,7957	0,1469	-0,0097	-0,4965	-0,1441	0,5415

Table 22. Kurtosis and cash to debt (Excess Returns)

The table reports excess returns for double sorted portfolios on Kurtosis and fundamental variable as Cash to Debt. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	L	-0,0142	-0,0049	0,0004	0,0028	0,0028	-0,0170
t-stat		**-2,2277**	-0,9872	0,0853	0,6417	0,6359	**-5,0927**
Excess Return	2	-0,0154	-0,0048	0,0005	0,0028	0,0027	-0,0181
t-stat		**-2,4380**	-1,0441	0,1231	0,6553	0,6443	**-5,2655**
Excess Return	3	-0,0177	-0,0047	0,0002	0,0024	0,0025	-0,0203
t-stat		**-2,7947**	-1,0603	0,0409	0,5796	0,6014	**-5,7521**
Excess Return	4	-0,0200	-0,0058	-0,0008	0,0016	0,0016	-0,0216
t-stat		**-3,0700**	-1,3171	-0,1848	0,3932	0,3855	**-5,8249**
Excess Return	H	-0,0226	-0,0083	-0,0012	-0,0001	-0,0001	-0,0225
t-stat		**-3,4355**	-1,8533	-0,2831	-0,0187	-0,0277	**-6,3807**
Excess Return	L-H	0,0084	-0,0071	-0,0166	-0,0200	-0,0225	-0,0141
t-stat		**3,1759**	**-2,0937**	**-4,7394**	**-5,4432**	**-6,3807**	**-4,3389**

Table 23. Kurtosis and debt to EBITDA (Excess Returns)

The table reports excess returns for double sorted portfolios on Kurtosis and fundamental variable as debt to EBITDA. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	L	-0,0155	0,0020	0,0032	0,0017	-0,0048	-0,0107
t-stat		-2,4318	0,4264	0,7296	0,3750	-0,9881	-2,8739
Excess Return	2	-0,0153	0,0013	0,0032	0,0021	-0,0041	-0,0112
t-stat		**-2,5403**	0,2821	0,7475	0,4868	-0,8943	**-3,1955**
Excess Return	3	-0,0175	-0,0002	0,0027	0,0016	-0,0049	-0,0126
t-stat		**-2,8778**	-0,0472	0,6608	0,3899	-1,1082	**-3,5081**
Excess Return	4	-0,0197	-0,0021	0,0028	0,0008	-0,0063	-0,0135
t-stat		**-3,1651**	-0,4521	0,6785	0,1975	-1,4016	**-3,4998**
Excess Return	H	-0,0227	-0,0024	0,0008	0,0004	-0,0072	-0,0154
t-stat		**-3,5902**	-0,5129	0,2029	0,0947	-1,6706	**-4,1836**
Excess Return	L-H	0,0072	-0,0129	-0,0183	-0,0201	-0,0154	-0,0082
t-stat		**2,6357**	**-4,9836**	**-5,2996**	**-5,1546**	**-4,1836**	**-2,1856**

Table 24. Kurtosis and Dividend payout ratio (Excess Returns)

The table reports excess returns for double sorted portfolios on Kurtosis and fundamental variable as Dividend payout ratio. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

Excess Return	L	-0,0001	-0,0005	0,0011	0,0028	0,0020	-0,0021
t-stat		-0,0227	-0,1082	0,2493	0,6708	0,5124	-0,9493
Excess Return	2	-0,0009	0,0002	0,0011	0,0036	0,0019	-0,0027
t-stat		-0,1835	0,0476	0,2393	0,9066	0,5210	-1,2656
Excess Return	3	-0,0008	-0,0012	0,0005	0,0028	0,0015	-0,0023
t-stat		-0,1670	-0,2641	0,1131	0,7366	0,4405	-1,0810
Excess Return	4	-0,0011	-0,0009	0,0008	0,0028	0,0013	-0,0024
t-stat		-0,2363	-0,1927	0,1744	0,7647	0,3758	-1,0612
Excess Return	H	-0,0013	-0,0030	0,0011	0,0025	0,0001	-0,0014
t-stat		-0,2994	-0,6744	0,2514	0,7071	0,0225	-0,6083
Excess Return	L-H	0,0012	0,0022	-0,0019	-0,0036	-0,0014	-0,0002
t-stat		0,6299	1,1807	-1,1583	-2,0313	-0,6083	-0,0736

Table 25. Kurt and Gross Margin (Excess Returns)

The table reports excess returns for double sorted portfolios on Kurtosis and fundamental variable as Gross Margin. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	**2**	**3**	**4**	**H**	**L-H**
Excess Return	**L**	-0,0058	-0,0014	-0,0011	0,0009	-0,0002	-0,0056
t-stat		-1,1119	-0,3083	-0,2339	0,1967	-0,0488	-2,3816
Excess Return	**2**	-0,0062	-0,0010	0,0002	0,0000	0,0000	-0,0062
t-stat		-1,2816	-0,2248	0,0392	0,0039	-0,0048	-3,1309
Excess Return	**3**	-0,0076	-0,0016	-0,0017	0,0002	-0,0008	-0,0068
t-stat		-1,5865	-0,3755	-0,3898	0,0461	-0,1768	-3,4670
Excess Return	**4**	-0,0101	-0,0033	-0,0031	-0,0014	-0,0026	-0,0076
t-stat		-2,0152	-0,7515	-0,6809	-0,3195	-0,6031	-3,5977
Excess Return	**H**	-0,0143	-0,0067	-0,0047	-0,0033	-0,0049	-0,0094
t-stat		-2,6535	-1,5031	-1,0030	-0,7866	-1,1158	-4,1182
Excess Return	**L-H**	0,0085	0,0005	-0,0029	-0,0068	-0,0094	-0,0009
t-stat		3,1484	0,2973	-1,7657	-3,4873	-4,1182	-0,3447

Table 26. Kurtosis and PTB (Excess Returns)

The table reports excess returns for double sorted portfolios on Kurtosis and fundamental variable as Price to Book. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	**2**	**3**	**4**	**H**	**L-H**
Excess Return	L	0,0005	0,0017	-0,0005	-0,0022	-0,0069	0,0074
t-stat		0,0962	0,3893	-0,1135	-0,4664	-1,3623	**1,9577**
Excess Return	2	0,0008	0,0015	0,0001	-0,0026	-0,0074	0,0082
t-stat		0,1566	0,3422	0,0301	-0,5804	-1,5363	**2,2471**
Excess Return	3	0,0016	0,0004	-0,0003	-0,0043	-0,0106	0,0122
t-stat		0,3185	0,1002	-0,0800	-0,9910	**-2,0847**	**3,5116**
Excess Return	4	0,0013	0,0001	-0,0026	-0,0057	-0,0155	0,0168
t-stat		0,2768	0,0264	-0,6368	-1,2682	**-2,8070**	**4,3895**
Excess Return	H	0,0002	-0,0004	-0,0043	-0,0090	-0,0207	0,0209
t-stat		0,0483	-0,0866	-1,0224	-1,9357	**-3,4613**	**5,1898**
Excess Return	L-H	0,0003	0,0012	0,0059	0,0103	0,0209	0,0212
t-stat		0,1306	0,5262	**2,6511**	**3,7436**	**5,1898**	**4,9389**

Table 27. Kurtosis and R&D to Sales (Excess Returns)

The table reports excess returns for double sorted portfolios on Kurtosis and fundamental variable as R&D to Sales. The Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	**L**	-0,0021	-0,0027	-0,0012	-0,0004	-0,0015	-0,0006
t-stat		-0,4547	-0,5933	-0,2606	-0,0916	-0,2525	-0,1596
Excess Return	**2**	-0,0016	-0,0018	-0,0007	-0,0009	-0,0023	0,0007
t-stat		-0,3823	-0,4092	-0,1636	-0,2109	-0,3816	0,1927
Excess Return	**3**	-0,0024	-0,0022	-0,0023	-0,0013	-0,0043	0,0019
t-stat		-0,5904	-0,5321	-0,5799	-0,3039	-0,7390	0,5488
Excess Return	**4**	-0,0043	-0,0028	-0,0040	-0,0027	-0,0076	0,0033
t-stat		-1,0684	-0,6798	-0,9657	-0,6188	-1,2152	0,8479
Excess Return	**H**	-0,0068	-0,0056	-0,0056	-0,0056	-0,0112	0,0045
t-stat		-1,6180	-1,3606	-1,3357	-1,2001	-1,7381	1,1439
Excess Return	**L-H**	0,0047	0,0040	0,0032	0,0014	0,0045	0,0092
t-stat		2,3216	2,3532	2,1525	0,6701	1,1439	2,1064

Table 28. Kurtosis and Spread (Excess Returns)

The table reports excess returns for double sorted portfolios on Kurtosis and liquidity variable measured as bid-ask spread. The liquidity variable is expressed horizontally and Kurtosis is expressed vertically. The double sorted portfolios are constructed based on the prior stock performance of **36** months. The excess returns are in percentage, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold. Portfolios are divided into five categories from low to high. Self- financing portfolios are formed by going long for low value portfolios and going short for high value portfolios.

		L	2	3	4	H	L-H
Excess Return	**L**	-0,0035	-0,0073	-0,0038	-0,0019	-0,0038	0,0008
t-stat		-0,4838	-1,1488	-0,6478	-0,3392	-0,7718	0,1324
Excess Return	**2**	-0,0051	-0,0058	-0,0023	-0,0029	-0,0040	-0,0008
t-stat		-0,7316	-0,8373	-0,3533	-0,5390	-0,8656	-0,1317
Excess Return	**3**	-0,0052	-0,0036	-0,0064	-0,0055	-0,0038	-0,0004
t-stat		-0,6444	-0,5309	-1,1093	-1,0523	-0,7417	-0,0596
Excess Return	**4**	-0,0088	-0,0045	-0,0060	-0,0059	-0,0040	-0,0046
t-stat		-1,1727	-0,6478	-0,9444	-1,0661	-0,7324	-0,6374
Excess Return	**H**	-0,0081	-0,0055	-0,0050	-0,0054	-0,0067	-0,0010
t-stat		-1,0614	-0,8273	-0,8277	-0,9507	-1,4140	-0,1441
Excess Return	**L-H**	0,0047	0,0008	-0,0001	-0,0032	-0,0010	0,0035
t-stat		0,7957	0,1469	-0,0097	-0,4965	-0,1441	0,5415

Appendix B. Outperformance results based on double sorted portfolios

Table 29. Volatility and cash to debt (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as Cash to Debt and Volatility. Fundamental variable is expressed horizontally and Volatility is expressed vertically. Outperformance – alfa measurements for Cash to debt and Volatility strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	-0,0109	0,0010	0,0015	0,0022	0,0021	-0,0131	*5FF Alpha*	L	-0,0141	-0,0011	-0,0009	-0,0024	-0,0025	-0,0116	*3FF + BAB Alpha*	L	-0,0141	-0,0035	-0,0024	-0,0011	-0,0008	-0,0133
t-stat		**-7,4028**	0,8729	1,5098	**2,7160**	**2,6553**	**-9,3415**	*t-stat*		**-8,8486**	**-0,8252**	**-0,9464**	**-3,3728**	**-3,5425**	**-6,7946**	*t-stat*		**-13,9110**	**-4,0267**	**-3,0973**	-1,8428	-1,3849	**-10,5229**
CAPM Alpha	2	-0,0175	-0,0031	-0,0003	-0,0001	0,0004	-0,0179	*5FF Alpha*	2	-0,0189	-0,0056	-0,0056	-0,0065	-0,0050	-0,0138	*3FF + BAB Alpha*	2	-0,0189	-0,0080	-0,0045	-0,0036	-0,0026	-0,0163
t-stat		**-7,7437**	**-2,3034**	-0,3129	-0,1131	0,3973	**-8,7300**	*t-stat*		**-8,4035**	**-3,8121**	**-6,1989**	**-7,9068**	**-6,2322**	**-5,9200**	*t-stat*		**-12,5607**	**-8,0190**	**-7,0707**	**-5,0342**	**-3,8838**	**-9,3578**
CAPM Alpha	3	-0,0234	-0,0093	-0,0032	-0,0016	-0,0005	-0,0229	*5FF Alpha*	3	-0,0243	-0,0120	-0,0091	-0,0073	-0,0044	-0,0198	*3FF + BAB Alpha*	3	-0,0245	-0,0139	-0,0078	-0,0055	-0,0027	-0,0218
t-stat		**-8,5213**	**-5,6732**	**-2,3912**	-1,2762	-0,4176	**-10,1828**	*t-stat*		**-8,7139**	**-7,8378**	**-8,9236**	**-7,9360**	**-4,8679**	**-7,0251**	*t-stat*		**-12,6091**	**-13,1034**	**-10,4647**	**-7,7780**	**-4,1118**	**-10,6712**
CAPM Alpha	4	-0,0303	-0,0157	-0,0078	-0,0034	-0,0048	-0,0255	*5FF Alpha*	4	-0,0304	-0,0184	-0,0140	-0,0083	-0,0077	-0,0227	*3FF + BAB Alpha*	4	-0,0310	-0,0195	-0,0125	-0,0071	-0,0059	-0,0251
t-stat		**-9,3378**	**-7,2990**	**-4,4624**	**-2,2229**	**-3,2574**	**-10,7075**	*t-stat*		**-9,1174**	**-9,0350**	**-10,7356**	**-6,7240**	**-7,3964**	**-7,2130**	*t-stat*		**-13,4380**	**-14,4459**	**-14,0587**	**-8,4731**	**-7,5506**	**-11,4652**
CAPM Alpha	H	-0,0394	-0,0259	-0,0149	-0,0119	-0,0122	-0,0273	*5FF Alpha*	H	-0,0386	-0,0288	-0,0181	-0,0139	-0,0122	-0,0263	*3FF + BAB Alpha*	H	-0,0380	-0,0282	-0,0182	-0,0144	-0,0117	-0,0263
t-stat		**-10,2913**	**-8,5788**	**-6,2178**	**-5,6405**	**-5,8362**	**-11,2074**	*t-stat*		**-9,0890**	**-9,0699**	**-8,5642**	**-7,7407**	**-7,7867**	**-7,5586**	*t-stat*		**-12,7175**	**-13,2489**	**-12,7451**	**-11,9826**	**-9,4612**	**-11,0666**
CAPM Alpha	L-H	0,0285	0,0084	-0,0085	-0,0184	-0,0273	0,0012	*5FF Alpha*	L-H	0,0245	0,0099	-0,0061	-0,0165	-0,0263	-0,0019	*3FF + BAB Alpha*	L-H	0,0239	0,0093	-0,0063	-0,0166	-0,0263	-0,0024
t-stat		**9,2511**	**4,7617**	**-4,8461**	**-9,6152**	**-11,2074**	0,7577	*t-stat*		**6,3948**	**3,8824**	**-2,5944**	**-6,4137**	**-7,5586**	-0,9997	*t-stat*		**9,0237**	**5,5461**	**-3,7780**	**-9,1386**	**-11,0666**	-1,7443
		L	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**
3FF Alpha	L	-0,0129	-0,0014	-0,0009	0,0002	0,0007	-0,0136	*3FF + UMD Alpha*	L	-0,0126	-0,0016	-0,0011	0,0001	0,0003	-0,0129	*3FF + QMJ Alpha*	L	-0,0110	-0,0045	-0,0031	-0,0029	-0,0028	-0,0082
t-stat		**-12,6123**	-1,4867	-1,1000	0,3661	1,0408	**-11,0203**	*t-stat*		**-12,0428**	-1,5979	-1,2794	0,0980	0,4074	**-10,2650**	*t-stat*		**-10,4348**	**-4,7354**	**-3,7348**	**-5,2672**	**-5,3728**	**-7,6175**
3FF Alpha	2	-0,0187	-0,0063	-0,0030	-0,0024	-0,0012	-0,0175	*3FF + UMD Alpha*	2	-0,0185	-0,0062	-0,0029	-0,0025	-0,0016	-0,0169	*3FF + QMJ Alpha*	2	-0,0134	-0,0095	-0,0057	-0,0055	-0,0041	-0,0093
t-stat		**-12,6620**	**-5,9697**	**-4,2378**	**-3,2504**	-1,6300	**-10,1082**	*t-stat*		**-12,2447**	**-5,8002**	**-3,9569**	**-3,2015**	**-2,1787**	**-9,5546**	*t-stat*		**-9,6779**	**-9,2290**	**-8,7694**	**-8,3261**	**-6,3675**	**-6,4288**
3FF Alpha	3	-0,0245	-0,0127	-0,0063	-0,0043	-0,0020	-0,0224	*3FF + UMD Alpha*	3	-0,0244	-0,0123	-0,0062	-0,0042	-0,0023	-0,0221	*3FF + QMJ Alpha*	3	-0,0167	-0,0141	-0,0082	-0,0067	-0,0033	-0,0134
t-stat		**-12,8466**	**-11,7598**	**-7,7719**	**-5,6624**	**-3,0846**	**-11,1703**	*t-stat*		**-12,5411**	**-11,1987**	**-7,4861**	**-5,4809**	**-3,4736**	**-10,7647**	*t-stat*		**-9,7560**	**-12,4888**	**-9,9739**	**-9,3883**	**-4,8324**	**-7,7639**
3FF Alpha	4	-0,0316	-0,0191	-0,0115	-0,0062	-0,0060	-0,0256	*3FF + UMD Alpha*	4	-0,0305	-0,0185	-0,0111	-0,0062	-0,0062	-0,0243	*3FF + QMJ Alpha*	4	-0,0223	-0,0174	-0,0117	-0,0072	-0,0053	-0,0170
t-stat		**-13,9587**	**-14,3929**	**-12,7489**	**-7,3344**	**-7,8064**	**-11,9311**	*t-stat*		**-13,2314**	**-13,6491**	**-12,0947**	**-7,0892**	**-7,8888**	**-11,1570**	*t-stat*		**-10,9943**	**-12,5402**	**-12,2330**	**-8,0614**	**-6,5258**	**-8,7543**
3FF Alpha	H	-0,0401	-0,0294	-0,0186	-0,0145	-0,0128	-0,0273	*3FF + UMD Alpha*	H	-0,0386	-0,0275	-0,0173	-0,0138	-0,0126	-0,0260	*3FF + QMJ Alpha*	H	-0,0272	-0,0216	-0,0146	-0,0114	-0,0083	-0,0189
t-stat		**-13,5103**	**-13,9832**	**-13,2391**	**-12,3199**	**-10,3527**	**-11,6532**	*t-stat*		**-12,7841**	**-13,0326**	**-12,2929**	**-11,5364**	**-9,9248**	**-10,9395**	*t-stat*		**-10,4840**	**-11,0579**	**-10,5721**	**-9,7122**	**-7,1681**	**-8,6071**
3FF Alpha	L-H	0,0272	0,0107	-0,0059	-0,0171	-0,0273	-0,0001	*3FF + UMD Alpha*	L-H	0,0260	0,0090	-0,0071	-0,0167	-0,0260	0,0000	*3FF + QMJ Alpha*	L-H	0,0162	0,0082	-0,0020	-0,0109	-0,0189	-0,0027
t-stat		**10,0443**	**6,4153**	**-3,6061**	**-9,5893**	**-11,6532**	-0,0664	*t-stat*		**9,4318**	**5,4111**	**-4,3185**	**-9,1654**	**-10,9395**	-0,0175	*t-stat*		**6,6463**	**4,6849**	**-1,2194**	**-6,4515**	**-8,6071**	-1,8538

Table 30. Volatility and debt to EBITDA (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as Debt to Ebitda and Volatility. Fundamental variable is expressed horizontally and Volatility is expressed vertically. Outperformance – alfa measurements for Debt to Ebitda and Volatility strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	-0,0105	0,0017	0,0028	0,0022	0,0004	-0,0109	*5FF Alpha*	L	-0,0132	-0,0023	-0,0015	-0,0011	-0,0020	-0,0112	*3FF + BAB Alpha*	L	-0,0133	-0,0012	-0,0007	-0,0014	-0,0040	-0,0093
t-stat		**-6,9156**	**2,0979**	**3,2102**	**2,3695**	0,3327	**-6,4357**	*t-stat*		**-7,6703**	**-3,1792**	**-1,9566**	-1,2556	-1,6247	**-5,4495**	*t-stat*		**-11,1254**	**-2,1134**	-1,1421	**-2,0341**	**-4,5296**	**-5,9871**
CAPM Alpha	2	-0,0167	-0,0013	0,0003	-0,0004	-0,0041	-0,0126	*5FF Alpha*	2	-0,0183	-0,0046	-0,0046	-0,0062	-0,0067	-0,0116	*3FF + BAB Alpha*	2	-0,0178	-0,0033	-0,0034	-0,0046	-0,0092	-0,0086
t-stat		**-7,3542**	-1,3103	0,3106	-0,3872	**-3,0202**	**-5,3271**	*t-stat*		**-7,8418**	**-5,0959**	**-5,9273**	**-7,7358**	**-4,8387**	**-4,2566**	*t-stat*		**-10,6540**	**-5,2501**	**-4,8412**	**-7,0000**	**-9,9414**	**-4,2841**
CAPM Alpha	3	-0,0213	-0,0028	-0,0009	-0,0017	-0,0086	-0,0127	*5FF Alpha*	3	-0,0235	-0,0048	-0,0063	-0,0074	-0,0130	-0,0104	*3FF + BAB Alpha*	3	-0,0224	-0,0034	-0,0046	-0,0064	-0,0144	-0,0080
t-stat		**-8,1545**	**-2,1557**	-0,7060	-1,2186	**-5,0016**	**-5,2998**	*t-stat*		**-8,5166**	**-4,5844**	**-7,3288**	**-8,2515**	**-9,5444**	**-3,6282**	*t-stat*		**-11,4054**	**-4,6511**	**-6,4235**	**-8,3756**	**-14,9704**	**-3,7187**
CAPM Alpha	4	-0,0306	-0,0088	-0,0039	-0,0053	-0,0153	-0,0153	*5FF Alpha*	4	-0,0336	-0,0102	-0,0088	-0,0108	-0,0197	-0,0139	*3FF + BAB Alpha*	4	-0,0315	-0,0081	-0,0073	-0,0103	-0,0210	-0,0105
t-stat		**-9,4845**	**-4,8020**	**-2,6602**	**-3,1057**	**-6,9582**	**-6,0686**	*t-stat*		**-9,5602**	**-7,4433**	**-8,3584**	**-8,8631**	**-11,3805**	**-4,6042**	*t-stat*		**-12,5268**	**-7,9122**	**-9,0957**	**-11,4901**	**-17,0298**	**-4,5030**
CAPM Alpha	H	-0,0411	-0,0167	-0,0101	-0,0116	-0,0236	-0,0175	*5FF Alpha*	H	-0,0417	-0,0158	-0,0114	-0,0159	-0,0259	-0,0158	*3FF + BAB Alpha*	H	-0,0398	-0,0149	-0,0117	-0,0161	-0,0280	-0,0117
t-stat		**-10,3767**	**-6,3448**	**-5,2251**	**-5,5214**	**-8,4573**	**-6,9646**	*t-stat*		**-9,3327**	**-6,9000**	**-7,7267**	**-9,2881**	**-9,3728**	**-5,1138**	*t-stat*		**-12,7307**	**-8,8838**	**-11,1787**	**-13,8206**	**-15,3156**	**-5,1825**
CAPM Alpha	L-H	0,0306	0,0000	-0,0112	-0,0189	-0,0175	0,0131	*5FF Alpha*	L-H	0,0285	-0,0025	-0,0121	-0,0177	-0,0158	0,0127	*3FF + BAB Alpha*	L-H	0,0265	-0,0029	-0,0107	-0,0154	-0,0117	0,0148
t-stat		**9,4619**	0,0282	**-6,5608**	**-8,1684**	**-6,9646**	**6,2698**	*t-stat*		**7,1323**	-1,3012	**-5,1764**	**-5,9560**	**-5,1138**	**5,2244**	*t-stat*		**9,5626**	**-2,1061**	**-6,0686**	**-6,8429**	**-5,1825**	**8,5355**
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	L	-0,0122	0,0002	0,0009	-0,0001	-0,0023	-0,0099	*3FF + UMD Alpha*	L	-0,0122	-0,0001	0,0006	-0,0003	-0,0023	-0,0099	*3FF + QMJ Alpha*	L	-0,0102	-0,0033	-0,0030	-0,0023	-0,0044	-0,0058
t-stat		**-10,1584**	0,3261	1,2223	-0,1111	**-2,3467**	**-6,5085**	*t-stat*		**-9,9271**	-0,1703	0,7477	-0,3797	**-2,3558**	**-6,3212**	*t-stat*		**-8,2091**	**-6,2198**	**-5,2690**	**-3,1572**	**-4,5467**	**-3,8121**
3FF Alpha	2	-0,0179	-0,0025	-0,0019	-0,0034	-0,0074	-0,0104	*3FF + UMD Alpha*	2	-0,0176	-0,0027	-0,0021	-0,0032	-0,0071	-0,0104	*3FF + QMJ Alpha*	2	-0,0121	-0,0038	-0,0055	-0,0063	-0,0102	-0,0019
t-stat		**-10,9063**	**-3,8430**	**-2,4990**	**-4,8396**	**-7,4353**	**-5,1913**	*t-stat*		**-10,4752**	**-4,1131**	**-2,7344**	**-4,4460**	**-6,9952**	**-5,0581**	*t-stat*		**-7,8300**	**-5,8843**	**-8,5361**	**-10,0833**	**-10,2770**	-1,0714
3FF Alpha	3	-0,0225	-0,0033	-0,0033	-0,0052	-0,0129	-0,0097	*3FF + UMD Alpha*	3	-0,0218	-0,0035	-0,0036	-0,0051	-0,0125	-0,0093	*3FF + QMJ Alpha*	3	-0,0151	-0,0028	-0,0059	-0,0080	-0,0148	-0,0003
t-stat		**-11,7125**	**-4,6819**	**-4,4163**	**-6,4085**	**-12,8070**	**-4,5071**	*t-stat*		**-11,1331**	**-4,8057**	**-4,7221**	**-6,1776**	**-12,1962**	**-4,2645**	*t-stat*		**-8,5738**	**-3,6739**	**-8,2106**	**-10,5161**	**-14,3899**	-0,1733
3FF Alpha	4	-0,0321	-0,0089	-0,0063	-0,0090	-0,0202	-0,0119	*3FF + UMD Alpha*	4	-0,0307	-0,0090	-0,0065	-0,0088	-0,0190	-0,0117	*3FF + QMJ Alpha*	4	-0,0217	-0,0057	-0,0076	-0,0105	-0,0197	-0,0020
t-stat		**-12,9887**	**-8,7295**	**-7,7480**	**-9,7641**	**-16,4293**	**-5,1659**	*t-stat*		**-12,2444**	**-8,5983**	**-7,8316**	**-9,3146**	**-15,4612**	**-4,9599**	*t-stat*		**-9,9010**	**-5,7575**	**-8,9931**	**-10,8938**	**-15,1265**	-0,9997
3FF Alpha	H	-0,0423	-0,0166	-0,0117	-0,0151	-0,0284	-0,0138	*3FF + UMD Alpha*	H	-0,0404	-0,0159	-0,0118	-0,0150	-0,0265	-0,0139	*3FF + QMJ Alpha*	H	-0,0288	-0,0091	-0,0095	-0,0138	-0,0230	-0,0057
t-stat		**-13,5695**	**-9,8313**	**-11,4044**	**-13,0256**	**-15,8365**	**-6,0911**	*t-stat*		**-12,7794**	**-9,2265**	**-11,3271**	**-12,6046**	**-14,8227**	**-5,9986**	*t-stat*		**-10,5516**	**-6,2315**	**-9,0801**	**-11,3328**	**-13,1439**	**-2,6928**
3FF Alpha	L-H	0,0301	-0,0013	-0,0108	-0,0169	-0,0138	0,0163	*3FF + UMD Alpha*	L-H	0,0282	-0,0017	-0,0100	-0,0157	-0,0139	0,0143	*3FF + QMJ Alpha*	L-H	0,0186	-0,0030	-0,0057	-0,0079	-0,0057	0,0129
t-stat		**10,5988**	-0,8956	**-6,2773**	**-7,5703**	**-6,0911**	**9,4084**	*t-stat*		**9,8113**	**-1,1545**	**-5,6808**	**-6,9221**	**-5,9986**	**8,3318**	*t-stat*		**7,2685**	**-1,9992**	**-3,3675**	**-3,9106**	**-2,6928**	**7,2484**

Table 31. Volatility and dividend payout ratio (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable Dividend payout ratio and Volatility. Fundamental variable is expressed horizontally and Volatility is expressed vertically. Outperformance – alfa measurements for Dividend payout ratio and Volatility strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	0,0016	0,0014	0,0034	0,0022	0,0011	0,0005	*5FF Alpha*	L	-0,0019	-0,0014	-0,0004	-0,0012	-0,0020	0,0001	*3FF + BAB Alpha*	L	-0,0027	-0,0030	-0,0004	-0,0017	-0,0025	-0,0002
t-stat		1,5110	1,2377	**3,3370**	**2,4028**	1,0320	0,5030	*t-stat*		-1,8143	-1,2299	-0,3107	-1,2925	**-2,0981**	0,0791	*t-stat*		**-4,0233**	**-3,9587**	-0,5189	-2,6095	**-2,9275**	-0,2222
CAPM Alpha	2	-0,0022	-0,0010	-0,0011	0,0004	0,0001	-0,0023	*5FF Alpha*	2	-0,0067	-0,0049	-0,0051	-0,0046	-0,0050	-0,0016	*3FF + BAB Alpha*	2	-0,0064	-0,0052	-0,0051	-0,0032	-0,0035	-0,0029
t-stat		-1,7125	-0,7734	-1,0090	0,3851	0,0883	**-2,1381**	*t-stat*		**-5,6493**	**-4,7255**	**-5,4849**	**-4,9568**	**-5,5886**	-1,2934	*t-stat*		**-7,7198**	**-6,8128**	**-7,2271**	**-4,4464**	**-4,7153**	**-3,0466**
CAPM Alpha	3	-0,0049	-0,0049	-0,0025	-0,0009	-0,0019	-0,0031	*5FF Alpha*	3	-0,0091	-0,0087	-0,0070	-0,0057	-0,0078	-0,0013	*3FF + BAB Alpha*	3	-0,0086	-0,0087	-0,0060	-0,0043	-0,0058	-0,0028
t-stat		**-3,1938**	**-3,2384**	-1,8162	-0,8342	-1,5738	**-2,4063**	*t-stat*		**-7,8544**	**-7,3666**	**-6,5917**	**-5,6319**	**-7,6279**	-0,9083	*t-stat*		**-9,7469**	**-10,2551**	**-8,0288**	**-5,3758**	**-6,6900**	**-2,6363**
CAPM Alpha	4	-0,0083	-0,0099	-0,0071	-0,0024	-0,0036	-0,0047	*5FF Alpha*	4	-0,0101	-0,0140	-0,0115	-0,0065	-0,0097	-0,0004	*3FF + BAB Alpha*	4	-0,0111	-0,0130	-0,0100	-0,0056	-0,0079	-0,0032
t-stat		**-4,5429**	**-5,5827**	**-4,2762**	-1,8040	**-2,6351**	**-3,0868**	*t-stat*		**-7,2889**	**-10,1863**	**-9,2609**	**-6,5421**	**-8,5752**	-0,2020	*t-stat*		**-10,9791**	**-13,5368**	**-11,2044**	**-6,7417**	**-9,0995**	**-2,5599**
CAPM Alpha	H	-0,0160	-0,0165	-0,0135	-0,0071	-0,0085	-0,0075	*5FF Alpha*	H	-0,0163	-0,0168	-0,0129	-0,0096	-0,0130	-0,0033	*3FF + BAB Alpha*	H	-0,0173	-0,0176	-0,0152	-0,0092	-0,0130	-0,0044
t-stat		**-6,8687**	**-7,2251**	**-6,2564**	**-4,3490**	**-4,8777**	**-4,1743**	*t-stat*		**-8,0849**	**-8,7095**	**-7,3837**	**-7,1012**	**-9,9879**	-1,5588	*t-stat*		**-11,8168**	**-12,6398**	**-12,0072**	**-9,7087**	**-13,4720**	**-2,7721**
CAPM Alpha	L-H	0,0176	0,0143	0,0085	-0,0011	-0,0075	0,0101	*5FF Alpha*	L-H	0,0144	0,0102	0,0039	-0,0005	-0,0033	0,0111	*3FF + BAB Alpha*	L-H	0,0147	0,0112	0,0066	-0,0019	-0,0044	0,0103
t-stat		**7,7606**	**7,3008**	**5,4944**	-1,0223	**-4,1743**	**7,3164**	*t-stat*		**6,2664**	**4,8627**	2,1238	-0,3089	-1,5588	**7,3156**	*t-stat*		**8,4161**	**6,9623**	**4,5619**	-1,7100	**-2,7721**	**9,5148**
		L	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**
3FF Alpha	L	-0,0006	-0,0008	0,0014	0,0002	-0,0011	0,0005	*3FF + UMD A*	L	-0,0011	-0,0011	0,0010	-0,0003	-0,0011	0,0001	*3FF + QMJ Alpha*	L	-0,0039	-0,0042	-0,0020	-0,0032	-0,0034	-0,0005
t-stat		-0,8009	-0,8570	1,5447	0,2225	-1,2713	0,4921	*t-stat*		-1,2861	-1,1994	1,0541	-0,3201	-1,2639	0,0880	*t-stat*		**-5,3198**	**-5,0940**	**-2,4538**	**-4,6735**	**-3,8324**	-0,4868
3FF Alpha	2	-0,0046	-0,0034	-0,0033	-0,0018	-0,0024	-0,0022	*3FF + UMD A*	2	-0,0051	-0,0037	-0,0035	-0,0021	-0,0024	-0,0026	*3FF + QMJ Alpha*	2	-0,0076	-0,0063	-0,0066	-0,0054	-0,0052	-0,0023
t-stat		**-4,9508**	**-3,8999**	**-4,1951**	**-2,3379**	**-3,0085**	**-2,3404**	*t-stat*		**-5,3839**	**-4,1464**	**-4,3024**	**-2,6792**	**-3,0203**	**-2,7313**	*t-stat*		**-8,4888**	**-7,5504**	**-9,1906**	**-8,1048**	**-7,2005**	**-2,2995**
3FF Alpha	3	-0,0072	-0,0074	-0,0046	-0,0031	-0,0046	-0,0025	*3FF + UMD A*	3	-0,0077	-0,0076	-0,0049	-0,0033	-0,0046	-0,0031	*3FF + QMJ Alpha*	3	-0,0095	-0,0090	-0,0068	-0,0067	-0,0083	-0,0012
t-stat		**-7,7125**	**-8,3951**	**-5,7136**	**-3,7594**	**-5,1879**	**-2,4232**	*t-stat*		**-8,1694**	**-8,3583**	**-5,9641**	**-3,9089**	**-5,0516**	**-2,9110**	*t-stat*		**-10,1731**	**-9,9094**	**-8,4630**	**-9,0273**	**-10,2342**	-1,1175
3FF Alpha	4	-0,0103	-0,0121	-0,0092	-0,0050	-0,0071	-0,0032	*3FF + UMD A*	4	-0,0105	-0,0126	-0,0093	-0,0052	-0,0070	-0,0036	*3FF + QMJ Alpha*	4	-0,0105	-0,0122	-0,0094	-0,0076	-0,0095	-0,0010
t-stat		**-10,2822**	**-12,4654**	**-10,2750**	**-6,0241**	**-8,1628**	**-2,6467**	*t-stat*		**-10,2510**	**-12,7347**	**-10,1964**	**-6,1944**	**-7,8156**	**-2,8718**	*t-stat*		**-9,7917**	**-11,8781**	**-9,9175**	**-9,5302**	**-10,9256**	-0,7774
3FF Alpha	H	-0,0177	-0,0179	-0,0151	-0,0095	-0,0126	-0,0051	*3FF + UMD A*	H	-0,0175	-0,0181	-0,0153	-0,0092	-0,0120	-0,0055	*3FF + QMJ Alpha*	H	-0,0139	-0,0147	-0,0118	-0,0096	-0,0133	-0,0006
t-stat		**-12,2900**	**-13,0913**	**-12,2161**	**-10,2131**	**-13,2673**	**-3,2995**	*t-stat*		**-11,8538**	**-12,9554**	**-12,0851**	**-9,7026**	**-12,4722**	**-3,4458**	*t-stat*		**-9,6842**	**-10,6327**	**-9,5760**	**-9,7558**	**-13,2847**	-0,3836
3FF Alpha	L-H	0,0171	0,0133	0,0080	-0,0008	-0,0051	0,0119	*3FF + UMD A*	L-H	0,0164	0,0130	0,0076	-0,0013	-0,0055	0,0110	*3FF + QMJ Alpha*	L-H	0,0100	0,0071	0,0023	-0,0008	-0,0006	0,0094
t-stat		**9,5017**	**8,0759**	**5,5065**	-0,7421	**-3,2995**	**10,5957**	*t-stat*		**8,9593**	**7,7383**	**5,1451**	-1,1554	**-3,4458**	**9,6693**	*t-stat*		**6,1236**	**4,6698**	1,7388	-0,6821	-0,3836	**8,2488**

Table 32. Volatility and Gross margin (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as Gross margin and Volatility. Fundamental variable is expressed horizontally and Volatility is expressed vertically. Outperformance – alfa measurements for Gross margin and Volatility strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	-0,0001	0,0009	0,0009	0,0021	0,0014	-0,0015	*5FF Alpha*	L	-0,0054	-0,0035	-0,0033	-0,0013	-0,0009	-0,0045	*3FF + BAB Alpha*	L	-0,0040	-0,0029	-0,0028	-0,0017	-0,0019	-0,0022
t-stat		-0,1071	1,0245	1,0133	**2,1935**	1,5336	-1,8849	*t-stat*		**-6,5209**	**-4,6610**	**-4,2322**	-1,2129	-0,8643	**-4,2175**	*t-stat*		**-7,3245**	**-4,9335**	**-4,6672**	**-2,3237**	**-2,4536**	**-2,8252**
CAPM Alpha	2	-0,0056	-0,0020	-0,0018	-0,0002	-0,0003	-0,0054	*5FF Alpha*	2	-0,0120	-0,0081	-0,0080	-0,0048	-0,0033	-0,0086	*3FF + BAB Alpha*	2	-0,0103	-0,0064	-0,0058	-0,0043	-0,0035	-0,0068
t-stat		**-4,2009**	-1,6936	-1,6408	-0,1746	-0,2632	**-4,9585**	*t-stat*		**-10,7111**	**-9,3813**	**-8,7358**	**-4,4118**	**-3,1810**	**-6,7140**	*t-stat*		**-13,5608**	**-8,8524**	**-8,1970**	**-5,5365**	**-4,5285**	**-7,2635**
CAPM Alpha	3	-0,0113	-0,0046	-0,0051	-0,0025	-0,0044	-0,0069	*5FF Alpha*	3	-0,0165	-0,0107	-0,0110	-0,0068	-0,0044	-0,0121	*3FF + BAB Alpha*	3	-0,0151	-0,0092	-0,0092	-0,0058	-0,0065	-0,0086
t-stat		**-6,1611**	**-3,1309**	**-3,6824**	**-1,9565**	**-3,4733**	**-5,1121**	*t-stat*		**-10,0591**	**-10,3976**	**-10,2818**	**-6,5310**	**-4,0071**	**-6,7886**	*t-stat*		**-14,0532**	**-12,3903**	**-12,3782**	**-8,1876**	**-8,0102**	**-6,9158**
CAPM Alpha	4	-0,0198	-0,0103	-0,0100	-0,0081	-0,0101	-0,0097	*5FF Alpha*	4	-0,0241	-0,0159	-0,0145	-0,0103	-0,0086	-0,0155	*3FF + BAB Alpha*	4	-0,0224	-0,0148	-0,0134	-0,0103	-0,0106	-0,0118
t-stat		**-8,1242**	**-5,3983**	**-5,3756**	**-4,8329**	**-5,7365**	**-6,2154**	*t-stat*		**-9,8208**	**-10,2973**	**-10,1589**	**-7,8703**	**-5,9996**	**-7,3438**	*t-stat*		**-13,3238**	**-14,8000**	**-14,2881**	**-11,5152**	**-9,7589**	**-7,8725**
CAPM Alpha	H	-0,0342	-0,0230	-0,0197	-0,0192	-0,0206	-0,0136	*5FF Alpha*	H	-0,0358	-0,0271	-0,0214	-0,0200	-0,0162	-0,0196	*3FF + BAB Alpha*	H	-0,0347	-0,0262	-0,0215	-0,0197	-0,0199	-0,0148
t-stat		**-9,6377**	**-8,7209**	**-7,4341**	**-7,3560**	**-7,4446**	**-7,0703**	*t-stat*		**-9,5485**	**-9,9482**	**-8,1957**	**-8,3478**	**-6,4817**	**-7,0230**	*t-stat*		**-13,2130**	**-14,7452**	**-12,5408**	**-11,8762**	**-10,3481**	**-7,6464**
CAPM Alpha	L-H	0,0341	0,0174	0,0085	-0,0006	-0,0136	0,0205	*5FF Alpha*	L-H	0,0303	0,0151	0,0048	-0,0040	-0,0196	0,0107	*3FF + BAB Alpha*	L-H	0,0307	0,0160	0,0064	-0,0027	-0,0148	0,0159
t-stat		**9,5684**	**8,1299**	**5,2331**	-0,4384	**-7,0703**	**7,2265**	*t-stat*		**7,5759**	**5,4497**	**2,1225**	-1,9863	**-7,0230**	**3,9096**	*t-stat*		**10,7349**	**8,6171**	**4,3758**	**-1,9469**	**-7,6464**	**7,3835**
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	L	-0,0027	-0,0014	-0,0015	0,0000	-0,0001	-0,0026	*3FF + UMD Alpha*	L	-0,0027	-0,0016	-0,0015	-0,0002	-0,0004	-0,0024	*3FF + QMJ Alpha*	L	-0,0049	-0,0042	-0,0041	-0,0028	-0,0038	-0,0011
t-stat		**-4,3560**	**-2,1880**	**-2,2260**	-0,0572	-0,1453	**-3,4092**	*t-stat*		**-4,2816**	**-2,3541**	**-2,2256**	-0,2756	-0,4219	**-3,0457**	*t-stat*		**-8,3249**	**-7,2048**	**-6,9519**	**-3,6498**	**-5,0219**	-1,4519
3FF Alpha	2	-0,0090	-0,0050	-0,0045	-0,0027	-0,0017	-0,0073	*3FF + UMD Alpha*	2	-0,0088	-0,0049	-0,0045	-0,0028	-0,0020	-0,0068	*3FF + QMJ Alpha*	2	-0,0100	-0,0079	-0,0073	-0,0064	-0,0049	-0,0051
t-stat		**-11,2365**	**-6,3840**	**-5,9612**	**-3,1280**	**-2,0046**	**-7,8885**	*t-stat*		**-10,7844**	**-6,1009**	**-5,8575**	**-3,1938**	**-2,2910**	**-7,2645**	*t-stat*		**-11,9808**	**-10,9727**	**-10,3334**	**-8,5526**	**-6,1617**	**-5,4768**
3FF Alpha	3	-0,0145	-0,0079	-0,0079	-0,0048	-0,0056	-0,0088	*3FF + UMD Alpha*	3	-0,0138	-0,0077	-0,0077	-0,0051	-0,0061	-0,0076	*3FF + QMJ Alpha*	3	-0,0123	-0,0099	-0,0096	-0,0069	-0,0062	-0,0061
t-stat		**-13,5928**	**-10,0024**	**-10,0545**	**-6,4120**	**-6,8668**	**-7,2346**	*t-stat*		**-12,7728**	**-9,4882**	**-9,6070**	**-6,7724**	**-7,3676**	**-6,2554**	*t-stat*		**-11,2685**	**-12,4052**	**-12,0124**	**-9,5179**	**-7,0821**	**-4,9217**
3FF Alpha	4	-0,0224	-0,0138	-0,0130	-0,0100	-0,0107	-0,0118	*3FF + UMD Alpha*	4	-0,0216	-0,0134	-0,0126	-0,0099	-0,0112	-0,0104	*3FF + QMJ Alpha*	4	-0,0163	-0,0135	-0,0119	-0,0092	-0,0081	-0,0082
t-stat		**-13,5880**	**-13,8174**	**-14,0142**	**-11,3165**	**-10,0239**	**-7,9755**	*t-stat*		**-12,8640**	**-13,1365**	**-13,3460**	**-10,9635**	**-10,3550**	**-7,0299**	*t-stat*		**-10,6395**	**-12,7088**	**-12,2545**	**-9,8803**	**-7,5402**	**-5,5452**
3FF Alpha	H	-0,0364	-0,0264	-0,0221	-0,0207	-0,0215	-0,0149	*3FF + UMD Alpha*	H	-0,0349	-0,0249	-0,0211	-0,0199	-0,0211	-0,0138	*3FF + QMJ Alpha*	H	-0,0249	-0,0212	-0,0160	-0,0144	-0,0136	-0,0113
t-stat		**-13,9810**	**-15,1270**	**-13,1062**	**-12,5951**	**-11,1759**	**-7,8887**	*t-stat*		**-13,1884**	**-14,2072**	**-12,3348**	**-11,8786**	**-10,7258**	**-7,1775**	*t-stat*		**-11,0279**	**-12,4254**	**-10,1362**	**-9,5302**	**-7,8951**	**-5,8024**
3FF Alpha	L-H	0,0337	0,0174	0,0076	-0,0017	-0,0149	0,0188	*3FF + UMD Alpha*	L-H	0,0321	0,0161	0,0073	-0,0017	-0,0138	0,0184	*3FF + QMJ Alpha*	L-H	0,0200	0,0112	0,0037	-0,0019	-0,0113	0,0087
t-stat		**11,6755**	**9,4254**	**5,2261**	-1,2407	**-7,8887**	**8,4822**	*t-stat*		**10,9531**	**8,6413**	**4,9167**	-1,2267	**-7,1775**	**8,1094**	*t-stat*		**8,3159**	**6,3516**	**2,5575**	-1,3272	**-5,8024**	**4,6124**

Table 33. Volatility and PTB (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as Price to Book and Volatility. Fundamental variable is expressed horizontally and Volatility is expressed vertically. Outperformance – alfa measurements for Price to Book and Volatility strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H
CAPM Alpha	L	0,0022	0,0028	0,0004	-0,0006	-0,0027	0,0050
t-stat		1,6791	**2,7053**	0,3599	-0,6504	**-3,2276**	**3,2671**
CAPM Alpha	2	-0,0008	0,0007	-0,0012	-0,0024	-0,0080	0,0072
t-stat		-0,4639	0,5376	-1,0610	**-2,3823**	**-6,1320**	**3,4095**
CAPM Alpha	3	-0,0029	-0,0014	-0,0038	-0,0077	-0,0151	0,0122
t-stat		-1,3317	-0,9764	**-2,9324**	**-6,0624**	**-7,9743**	**4,9498**
CAPM Alpha	4	-0,0063	-0,0070	-0,0084	-0,0131	-0,0244	0,0180
t-stat		**-2,4682**	**-4,0244**	**-5,2398**	**-7,5639**	**-10,4552**	**6,9841**
CAPM Alpha	H	-0,0122	-0,0145	-0,0188	-0,0262	-0,0401	0,0279
t-stat		**-3,5806**	**-6,0575**	**-7,7218**	**-10,2219**	**-13,1411**	**10,4468**
CAPM Alpha	L-H	0,0145	0,0137	0,0159	0,0198	0,0279	0,0424
t-stat		**4,8484**	**7,7298**	**9,0062**	**9,1222**	**10,4468**	**13,3119**

		L	2	3	4	H	L-H
5FF Alpha	L	-0,0036	-0,0002	-0,0026	-0,0047	-0,0052	0,0016
t-stat		**-2,6007**	-0,1824	**-2,7418**	**-5,0939**	**-6,4790**	1,0544
5FF Alpha	2	-0,0073	-0,0049	-0,0066	-0,0067	-0,0072	-0,0001
t-stat		**-4,3344**	**-5,1492**	**-7,1629**	**-7,4363**	**-5,1582**	-0,0389
5FF Alpha	3	-0,0090	-0,0076	-0,0086	-0,0114	-0,0137	0,0048
t-stat		**-4,2525**	**-7,3082**	**-9,4935**	**-10,4228**	**-7,9935**	1,6185
5FF Alpha	4	-0,0115	-0,0127	-0,0127	-0,0146	-0,0228	0,0113
t-stat		**-3,9962**	**-8,8760**	**-11,1317**	**-11,1134**	**-10,7800**	**3,3161**
5FF Alpha	H	-0,0162	-0,0158	-0,0196	-0,0254	-0,0407	0,0245
t-stat		**-3,8962**	**-6,4193**	**-8,7486**	**-10,9144**	**-14,1675**	**6,4548**
5FF Alpha	L-H	0,0127	0,0085	0,0106	0,0140	0,0245	0,0372
t-stat		**3,1178**	**3,7927**	**4,8982**	**5,2564**	**6,4548**	**11,3813**

		L	2	3	4	H	L-H
3FF + BAB Alpha	L	-0,0025	-0,0014	-0,0037	-0,0038	-0,0043	0,0018
t-stat		**-2,7719**	-1,9365	**-5,1948**	**-5,0825**	**-5,5944**	1,5028
3FF + BAB Alpha	2	-0,0065	-0,0040	-0,0053	-0,0053	-0,0083	0,0018
t-stat		**-6,0557**	**-5,7272**	**-7,1235**	**-6,6069**	**-8,4909**	1,0831
3FF + BAB Alpha	3	-0,0084	-0,0063	-0,0081	-0,0102	-0,0149	0,0065
t-stat		**-6,3783**	**-8,2930**	**-10,8054**	**-12,9405**	**-11,1547**	**3,1740**
3FF + BAB Alpha	4	-0,0114	-0,0114	-0,0119	-0,0147	-0,0242	0,0128
t-stat		**-6,3898**	**-12,2963**	**-15,1101**	**-15,3358**	**-14,4067**	**5,5090**
3FF + BAB Alpha	H	-0,0157	-0,0168	-0,0206	-0,0261	-0,0391	0,0234
t-stat		**-6,1271**	**-10,8063**	**-13,8445**	**-15,3741**	**-17,2328**	**9,4435**
3FF + BAB Alpha	L-H	0,0132	0,0103	0,0122	0,0147	0,0234	0,0366
t-stat		**5,2033**	**6,9246**	**8,1230**	**7,8880**	**9,4435**	**14,1742**

		L	2	3	4	H	L-H
3FF Alpha	L	-0,0013	0,0001	-0,0020	-0,0021	-0,0026	0,0013
t-stat		-1,4120	0,1501	**-2,4627**	**-2,5201**	**-3,0351**	1,0823
3FF Alpha	2	-0,0054	-0,0028	-0,0038	-0,0038	-0,0071	0,0017
t-stat		**-5,0398**	**-3,7891**	**-4,6955**	**-4,4679**	**-7,1839**	1,0455
3FF Alpha	3	-0,0079	-0,0052	-0,0067	-0,0089	-0,0141	0,0063
t-stat		**-6,0682**	**-6,6267**	**-8,3636**	**-10,9450**	**-10,7368**	**3,1406**
3FF Alpha	4	-0,0112	-0,0107	-0,0111	-0,0142	-0,0242	0,0130
t-stat		**-6,4143**	**-11,5742**	**-13,9804**	**-14,9824**	**-14,6836**	**5,6879**
3FF Alpha	H	-0,0170	-0,0174	-0,0209	-0,0266	-0,0401	0,0231
t-stat		**-6,7211**	**-11,3859**	**-14,3279**	**-15,9465**	**-17,9443**	**9,5213**
3FF Alpha	L-H	0,0157	0,0120	0,0130	0,0154	0,0231	0,0388
t-stat		**6,1483**	**7,9406**	**8,7896**	**8,3865**	**9,5213**	**15,0341**

		L	2	3	4	H	L-H
3FF + UMD Alpha	L	-0,0001	0,0002	-0,0027	-0,0029	-0,0039	0,0038
t-stat		-0,0747	0,3068	**-3,2680**	**-3,3818**	**-4,7341**	**3,5775**
3FF + UMD Alpha	2	-0,0036	-0,0022	-0,0040	-0,0048	-0,0098	0,0062
t-stat		**-3,5093**	**-2,9524**	**-4,8892**	**-5,6479**	**-11,7543**	**4,6365**
3FF + UMD Alpha	3	-0,0054	-0,0044	-0,0070	-0,0104	-0,0170	0,0116
t-stat		**-4,4525**	**-5,5604**	**-8,6543**	**-13,4233**	**-14,2673**	**6,9697**
3FF + UMD Alpha	4	-0,0076	-0,0098	-0,0110	-0,0156	-0,0264	0,0188
t-stat		**-4,7547**	**-10,5983**	**-13,4715**	**-17,0035**	**-16,4021**	**9,6383**
3FF + UMD Alpha	H	-0,0126	-0,0154	-0,0202	-0,0268	-0,0415	0,0290
t-stat		**-5,2494**	**-10,2692**	**-13,5775**	**-15,6908**	**-18,3395**	**13,6336**
3FF + UMD Alpha	L-H	0,0125	0,0118	0,0148	0,0192	0,0290	0,0415
t-stat		**4,9759**	**7,6632**	**10,0559**	**11,3617**	**13,6336**	**16,1121**

		L	2	3	4	H	L-H
3FF + QMJ Alpha	L	-0,0028	-0,0022	-0,0049	-0,0058	-0,0066	0,0038
t-stat		**-2,9424**	**-2,8646**	**-6,5645**	**-7,9383**	**-9,3042**	**3,1502**
3FF + QMJ Alpha	2	-0,0060	-0,0055	-0,0072	-0,0073	-0,0074	0,0013
t-stat		**-5,2937**	**-7,9643**	**-10,0926**	**-9,3617**	**-6,9939**	0,7677
3FF + QMJ Alpha	3	-0,0072	-0,0073	-0,0091	-0,0104	-0,0114	0,0041
t-stat		**-5,2636**	**-9,2772**	**-11,7815**	**-12,4009**	**-8,4494**	**1,9635**
3FF + QMJ Alpha	4	-0,0084	-0,0111	-0,0116	-0,0128	-0,0181	0,0098
t-stat		**-4,6320**	**-11,3896**	**-13,7807**	**-12,9826**	**-11,8233**	**4,1030**
3FF + QMJ Alpha	H	-0,0096	-0,0131	-0,0162	-0,0198	-0,0305	0,0208
t-stat		**-3,8896**	**-8,6629**	**-11,5324**	**-13,2088**	**-15,5411**	**8,1339**
3FF + QMJ Alpha	L-H	0,0068	0,0070	0,0090	0,0114	0,0208	0,0276
t-stat		**2,8310**	**4,8479**	**6,1013**	**6,1040**	**8,1339**	**12,2236**

Table 34. Volatility and R&D to sales (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as R&D to Sales and Volatility. Fundamental variable is expressed horizontally and Volatility is expressed vertically. Outperformance – alfa measurements for R&D to Sales and Volatility strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H				L	2	3	4	H	L-H				L	2	3	4	H	L-H
CAPM Alpha	L	0,0013	0,0012	0,0015	0,0009	-0,0005	0,0018	*5FF Alpha*	L	-0,0014	-0,0015	-0,0016	-0,0032	-0,0023	0,0009	*3FF + BAB Alpha*	L	-0,0027	-0,0027	-0,0024	-0,0023	-0,0002	-0,0025
t-stat		1,4519	1,3318	1,6343	1,1037	-0,3968	1,2184	*t-stat*		-1,5455	-1,6906	-1,8825	**-3,9047**	**-1,9813**	0,5669	*t-stat*		**-4,3588**	**-4,2457**	**-3,9841**	**-3,8880**	-0,2211	**-2,1004**
CAPM Alpha	2	-0,0011	-0,0019	-0,0010	-0,0017	-0,0048	0,0037	*5FF Alpha*	2	-0,0057	-0,0065	-0,0057	-0,0066	-0,0055	-0,0001	*3FF + BAB Alpha*	2	-0,0053	-0,0065	-0,0053	-0,0053	-0,0033	-0,0020
t-stat		-0,9812	-1,6383	-0,9338	-1,5584	**-2,4920**	1,7369	*t-stat*		**-5,8500**	**-6,6729**	**-6,2546**	**-6,8373**	**-3,3612**	-0,0657	*t-stat*		**-7,6104**	**-9,0248**	**-7,6546**	**-7,4856**	**-2,5881**	-1,2360
CAPM Alpha	3	-0,0050	-0,0051	-0,0044	-0,0043	-0,0087	0,0037	*5FF Alpha*	3	-0,0098	-0,0096	-0,0097	-0,0088	-0,0104	0,0006	*3FF + BAB Alpha*	3	-0,0095	-0,0100	-0,0091	-0,0077	-0,0071	-0,0024
t-stat		**-3,8170**	**-3,7177**	**-3,1900**	**-3,0889**	**-3,8120**	1,6002	*t-stat*		**-10,0177**	**-10,1823**	**-9,7057**	**-7,9995**	**-5,1434**	0,2565	*t-stat*		**-12,3360**	**-13,6299**	**-12,0466**	**-10,5419**	**-4,6471**	-1,2938
CAPM Alpha	4	-0,0110	-0,0102	-0,0107	-0,0104	-0,0165	0,0056	*5FF Alpha*	4	-0,0152	-0,0156	-0,0155	-0,0123	-0,0179	0,0027	*3FF + BAB Alpha*	4	-0,0157	-0,0152	-0,0156	-0,0131	-0,0153	-0,0003
t-stat		**-6,2621**	**-5,6604**	**-5,9794**	**-5,8943**	**-5,9238**	**2,3818**	*t-stat*		**-10,6293**	**-11,1128**	**-11,3944**	**-8,5827**	**-7,0766**	1,0906	*t-stat*		**-16,0479**	**-15,5745**	**-16,2144**	**-13,8195**	**-8,2250**	-0,1748
CAPM Alpha	H	-0,0248	-0,0229	-0,0227	-0,0212	-0,0277	0,0030	*5FF Alpha*	H	-0,0284	-0,0257	-0,0270	-0,0210	-0,0267	-0,0016	*3FF + BAB Alpha*	H	-0,0285	-0,0266	-0,0270	-0,0226	-0,0258	-0,0027
t-stat		**-9,4902**	**-8,9477**	**-8,7710**	**-8,0358**	**-7,6749**	1,2817	*t-stat*		**-10,8444**	**-9,5262**	**-9,9357**	**-8,7402**	**-7,2370**	-0,5886	*t-stat*		**-16,0000**	**-15,1567**	**-15,3706**	**-13,2216**	**-9,9137**	-1,3695
CAPM Alpha	L-H	0,0261	0,0218	0,0177	0,0102	0,0030	0,0291	*5FF Alpha*	L-H	0,0270	0,0200	0,0172	0,0058	-0,0016	0,0253	*3FF + BAB Alpha*	L-H	0,0258	0,0212	0,0176	0,0070	-0,0027	0,0231
t-stat		**9,8976**	**9,2188**	**8,6454**	**5,6273**	1,2817	**7,5698**	*t-stat*		**9,0744**	**6,7024**	**6,3072**	**2,6579**	-0,5886	**6,2425**	*t-stat*		**12,3490**	**10,5655**	**9,5617**	**4,3776**	-1,3695	**8,0003**
		L	2	3	4	H	L-H				L	2	3	4	H	L-H				L	2	3	4	H	L-H
3FF Alpha	L	-0,0009	-0,0010	-0,0008	-0,0012	-0,0009	-0,0001	*3FF + UMD Alpha*	L	-0,0013	-0,0012	-0,0010	-0,0010	-0,0007	-0,0006	*3FF + QMJ Alpha*	L	-0,0039	-0,0039	-0,0036	-0,0035	0,0013	-0,0052
t-stat		-1,2881	-1,2952	-1,0804	-1,8296	-0,9535	-0,0567	*t-stat*		-1,7804	-1,6124	-1,3415	-1,4435	-0,7817	-0,4515	*t-stat*		**-5,9639**	**-5,8609**	**-5,6764**	**-5,7779**	1,4002	**-4,4331**
3FF Alpha	2	-0,0037	-0,0047	-0,0037	-0,0042	-0,0046	0,0009	*3FF + UMD Alpha*	2	-0,0038	-0,0048	-0,0038	-0,0040	-0,0047	0,0009	*3FF + QMJ Alpha*	2	-0,0068	-0,0080	-0,0070	-0,0065	0,0000	-0,0068
t-stat		**-4,7360**	**-5,8595**	**-4,7412**	**-5,6402**	**-3,5779**	0,4959	*t-stat*		**-4,6954**	**-5,8383**	**-4,7768**	**-5,2636**	**-3,5530**	0,4958	*t-stat*		**-9,5537**	**-11,0476**	**-10,1586**	**-8,9748**	-0,0147	**-4,4219**
3FF Alpha	3	-0,0081	-0,0082	-0,0077	-0,0070	-0,0086	0,0006	*3FF + UMD Alpha*	3	-0,0080	-0,0082	-0,0075	-0,0066	-0,0087	0,0008	*3FF + QMJ Alpha*	3	-0,0101	-0,0111	-0,0100	-0,0076	-0,0026	-0,0075
t-stat		**-9,8178**	**-9,9439**	**-9,5803**	**-9,4934**	**-5,6349**	0,2987	*t-stat*		**-9,4899**	**-9,6992**	**-9,1984**	**-8,8133**	**-5,5753**	0,3904	*t-stat*		**-12,3588**	**-14,1613**	**-12,6278**	**-9,7479**	-1,8844	**-4,3122**
3FF Alpha	4	-0,0143	-0,0139	-0,0144	-0,0129	-0,0169	0,0026	*3FF + UMD Alpha*	4	-0,0141	-0,0134	-0,0141	-0,0123	-0,0163	0,0022	*3FF + QMJ Alpha*	4	-0,0148	-0,0142	-0,0147	-0,0112	-0,0090	-0,0058
t-stat		**-14,1796**	**-13,7572**	**-14,5479**	**-13,8344**	**-9,0658**	1,2573	*t-stat*		**-13,7226**	**-13,0982**	**-14,0019**	**-13,0541**	**-8,5918**	1,0400	*t-stat*		**-13,8806**	**-13,2631**	**-14,0284**	**-11,6663**	**-5,4791**	**-3,1453**
3FF Alpha	H	-0,0283	-0,0263	-0,0266	-0,0234	-0,0279	-0,0004	*3FF + UMD Alpha*	H	-0,0274	-0,0251	-0,0255	-0,0225	-0,0265	-0,0008	*3FF + QMJ Alpha*	H	-0,0231	-0,0214	-0,0217	-0,0168	-0,0166	-0,0065
t-stat		**-16,2278**	**-15,3083**	**-15,4466**	**-13,8654**	**-10,7533**	-0,2180	*t-stat*		**-15,4293**	**-14,4403**	**-14,6036**	**-13,1001**	**-10,0597**	-0,4069	*t-stat*		**-13,5447**	**-12,6492**	**-12,7910**	**-10,9080**	**-7,3314**	**-3,2475**
3FF Alpha	L-H	0,0274	0,0226	0,0186	0,0091	-0,0004	0,0269	*3FF + UMD Alpha*	L-H	0,0261	0,0213	0,0176	0,0083	-0,0008	0,0252	*3FF + QMJ Alpha*	L-H	0,0192	0,0146	0,0116	0,0020	-0,0065	0,0127
t-stat		**13,1652**	**11,3309**	**10,2429**	**5,5564**	-0,2180	**9,0883**	*t-stat*		**12,3557**	**10,5545**	**9,5261**	**4,9835**	-0,4069	**8,3748**	*t-stat*		**10,1339**	**8,0981**	**6,9676**	1,3940	**-3,2475**	**5,1856**

Table 35. Volatility and spread (Outperformance)

The table reports abnormal returns for double sorted portfolios based on liquidity variable as Bid - Ask Spread and Volatility. Liquidity variable is expressed horizontally and Volatility is expressed vertically. Outperformance – alfa measurements for Bid – Ask Spread and Volatility strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	-0,0041	-0,0026	-0,0007	-0,0021	-0,0032	-0,0009	*5FF Alpha*	L	-0,0055	-0,0042	-0,0035	-0,0021	-0,0032	-0,0025	*3FF + BAB Alpha*	L	-0,0079	-0,0070	-0,0039	-0,0057	-0,0053	-0,0026
t-stat		**-2,9932**	**-2,2927**	-0,6137	-1,9008	**-2,8354**	-0,5708	*t-stat*		**-2,1885**	**-2,2397**	**-2,2194**	-1,5119	**-2,0243**	-0,9770	*t-stat*		**-6,5908**	**-6,8709**	**-3,4715**	**-5,8493**	**-4,9389**	-1,7626
CAPM Alpha	2	-0,0104	-0,0066	-0,0061	-0,0043	-0,0039	-0,0070	*5FF Alpha*	2	-0,0119	-0,0083	-0,0075	-0,0040	-0,0024	-0,0088	*3FF + BAB Alpha*	2	-0,0140	-0,0116	-0,0108	-0,0095	-0,0081	-0,0061
t-stat		**-5,1370**	**-3,7400**	**-3,8146**	**-2,9521**	**-2,6645**	**-3,1348**	*t-stat*		**-3,5255**	**-3,2586**	**-2,9882**	-1,9409	-1,2966	**-2,2562**	*t-stat*		**-8,1725**	**-7,7915**	**-7,9857**	**-7,3326**	**-5,7686**	**-2,8400**
CAPM Alpha	3	-0,0139	-0,0141	-0,0126	-0,0095	-0,0078	-0,0054	*5FF Alpha*	3	-0,0171	-0,0166	-0,0145	-0,0117	-0,0064	-0,0116	*3FF + BAB Alpha*	3	-0,0179	-0,0186	-0,0168	-0,0142	-0,0106	-0,0066
t-stat		**-5,4796**	**-6,4442**	**-7,1439**	**-5,3925**	**-5,1057**	-1,9454	*t-stat*		**-4,1677**	**-5,0941**	**-5,6715**	**-5,1979**	**-3,4840**	**-2,6596**	*t-stat*		**-8,3245**	**-10,0834**	**-11,0479**	**-9,6199**	**-7,4851**	**-2,5158**
CAPM Alpha	4	-0,0172	-0,0161	-0,0147	-0,0139	-0,0129	-0,0049	*5FF Alpha*	4	-0,0108	-0,0242	-0,0206	-0,0148	-0,0100	-0,0010	*3FF + BAB Alpha*	4	-0,0197	-0,0214	-0,0202	-0,0185	-0,0160	-0,0039
t-stat		**-6,0080**	**-6,1107**	**-6,3648**	**-7,4560**	**-6,3733**	-1,5608	*t-stat*		-1,9034	**-5,6097**	**-5,0414**	**-5,6516**	**-3,7877**	-0,1740	*t-stat*		**-7,6890**	**-9,2887**	**-9,9143**	**-10,9582**	**-8,0350**	-1,2897
CAPM Alpha	H	-0,0227	-0,0218	-0,0205	-0,0218	-0,0177	-0,0043	*5FF Alpha*	H	-0,0174	-0,0221	-0,0217	-0,0213	-0,0176	0,0002	*3FF + BAB Alpha*	H	-0,0259	-0,0272	-0,0258	-0,0255	-0,0212	-0,0042
t-stat		**-6,8166**	**-7,6604**	**-7,9149**	**-8,9275**	**-8,3676**	-1,2185	*t-stat*		**-2,7416**	**-4,1874**	**-5,0170**	**-5,4194**	**-4,8613**	0,0256	*t-stat*		**-8,8584**	**-10,8549**	**-11,5211**	**-11,8629**	**-10,2980**	-1,2384
CAPM Alpha	L-H	0,0186	0,0118	0,0063	0,0052	-0,0043	0,0138	*5FF Alpha*	L-H	0,0119	0,0112	0,0048	0,0106	0,0002	0,0121	*3FF + BAB Alpha*	L-H	0,0180	0,0135	0,0077	0,0066	-0,0042	0,0134
t-stat		**5,8687**	**4,2811**	**2,2687**	1,7044	-1,2185	**5,9765**	*t-stat*		1,8638	1,9106	0,9213	1,6896	0,0256	**2,8397**	*t-stat*		**5,8776**	**4,7914**	**2,7348**	**2,1323**	-1,2384	**5,6144**
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	L	-0,0055	-0,0035	-0,0013	-0,0028	-0,0034	-0,0021	*3FF + UMD Alpha*	L	-0,0046	-0,0040	-0,0017	-0,0033	-0,0033	-0,0012	*3FF + QMJ Alpha*	L	-0,0071	-0,0048	-0,0049	-0,0035	-0,0038	-0,0034
t-stat		**-4,5161**	**-3,3480**	-1,1598	**-2,7205**	**-3,0242**	-1,4242	*t-stat*		-3,6623	-3,6917	-1,4822	-3,2058	-2,9047	-0,8079	*t-stat*		**-4,6556**	**-3,5586**	**-3,5206**	**-3,0448**	**-3,0254**	-1,9222
3FF Alpha	2	-0,0127	-0,0083	-0,0074	-0,0053	-0,0045	-0,0082	*3FF + UMD Alpha*	2	-0,0122	-0,0085	-0,0074	-0,0059	-0,0047	-0,0073	*3FF + QMJ Alpha*	2	-0,0111	-0,0082	-0,0085	-0,0068	-0,0055	-0,0057
t-stat		**-7,4740**	**-5,5869**	**-5,1942**	**-3,8324**	**-3,1925**	**-3,9424**	*t-stat*		-6,9582	-5,5516	-5,0161	-4,1577	-3,2501	-3,4109	*t-stat*		**-5,0438**	**-4,6652**	**-4,8634**	**-4,7179**	**-3,5617**	**-2,0928**
3FF Alpha	3	-0,0166	-0,0161	-0,0140	-0,0106	-0,0086	-0,0074	*3FF + UMD Alpha*	3	-0,0158	-0,0162	-0,0136	-0,0112	-0,0086	-0,0065	*3FF + QMJ Alpha*	3	-0,0166	-0,0156	-0,0135	-0,0115	-0,0072	-0,0083
t-stat		**-7,7157**	**-8,5445**	**-8,8256**	**-6,7244**	**-5,7793**	**-2,8463**	*t-stat*		-7,1232	-8,3624	-8,3270	-6,8850	-5,6541	-2,4237	*t-stat*		**-6,5232**	**-6,9584**	**-7,2462**	**-7,1131**	**-4,5166**	**-2,8475**
3FF Alpha	4	-0,0198	-0,0180	-0,0168	-0,0152	-0,0134	-0,0066	*3FF + UMD Alpha*	4	-0,0187	-0,0192	-0,0165	-0,0162	-0,0148	-0,0040	*3FF + QMJ Alpha*	4	-0,0133	-0,0162	-0,0151	-0,0142	-0,0085	-0,0053
t-stat		**-7,9010**	**-7,6954**	**-8,1713**	**-8,8350**	**-6,6826**	**-2,2350**	*t-stat*		**-7,2422**	**-7,9751**	**-7,8159**	**-9,1454**	**-7,2127**	-1,3137	*t-stat*		**-4,0885**	**-5,6901**	**-5,9710**	**-6,7837**	**-4,5777**	-1,4663
3FF Alpha	H	-0,0263	-0,0248	-0,0230	-0,0236	-0,0190	-0,0067	*3FF + UMD Alpha*	H	-0,0249	-0,0258	-0,0230	-0,0240	-0,0212	-0,0031	*3FF + QMJ Alpha*	H	**-0,0206**	**-0,0204**	**-0,0233**	**-0,0217**	**-0,0146**	-0,0050
t-stat		**-9,3924**	**-10,2809**	**-10,2937**	**-10,8046**	**-9,3807**	**-2,0507**	*t-stat*		**-8,6689**	**-10,4184**	**-10,0113**	**-10,6942**	**-10,2786**	-0,9211	*t-stat*		**-5,8114**	**-6,5071**	**-8,4050**	**-8,0509**	**-6,3394**	-1,2446
3FF Alpha	L-H	0,0208	0,0125	0,0061	0,0045	-0,0067	0,0137	*3FF + UMD Alpha*	L-H	0,0204	0,0142	0,0071	0,0062	-0,0031	0,0169	*3FF + QMJ Alpha*	L-H	0,0136	0,0100	0,0062	0,0095	-0,0050	0,0076
t-stat		**7,0266**	**4,5620**	**2,1857**	1,4723	**-2,0507**	**5,9052**	*t-stat*		**6,6866**	**5,0424**	**2,4533**	**1,9732**	-0,9211	**7,2112**	*t-stat*		**3,7775**	**2,8096**	1,8836	**2,4607**	-1,2446	**2,8109**

Table 36. Skewness and cash to debt (Outperformance)

The table reports abnormal returns for double sorted portfolios based on Cash to Debt fundamental variable and Skewness. Fundamental variable is expressed horizontally and Skewness is expressed vertically. Outperformance – alfa measurements for Cash to debt and Skewness strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H				L	2	3	4	H	L-H				L	2	3	4	H	L-H
CAPM Alpha	L	-0,0206	-0,0102	-0,0047	-0,0024	-0,0024	-0,0182		*5FF Alpha*	L	-0,0224	-0,0155	-0,0106	-0,0075	-0,0060	-0,0164	*3FF+BAB Alpha*	L	-0,0219	-0,0143	-0,0087	-0,0052	-0,0036	-0,0184
t-stat		-8,0734	-5,7074	-3,3384	-1,9222	-2,0766	-9,1263		*t-stat*		-7,9282	-7,9488	-8,2839	-7,1448	-6,0861	-5,9340	*t-stat*		-11,9308	-11,6840	-10,0926	-6,8203	-5,0787	-9,9145
CAPM Alpha	2	-0,0218	-0,0099	-0,0043	-0,0022	-0,0023	-0,0195		*5FF Alpha*	2	-0,0246	-0,0136	-0,0099	-0,0084	-0,0064	-0,0182	*3FF+BAB Alpha*	2	-0,0229	-0,0137	-0,0083	-0,0055	-0,0038	-0,0191
t-stat		-8,7952	-6,3717	-3,3323	-1,9366	-2,0563	-9,6252		*t-stat*		-9,2107	-8,5039	-9,7481	-9,3949	-6,8595	-6,7083	*t-stat*		-12,9224	-13,4142	-11,6852	-7,9416	-5,7072	-10,1659
CAPM Alpha	3	-0,0240	-0,0096	-0,0046	-0,0024	-0,0024	-0,0215		*5FF Alpha*	3	-0,0245	-0,0124	-0,0101	-0,0077	-0,0069	-0,0176	*3FF+BAB Alpha*	3	-0,0248	-0,0139	-0,0089	-0,0056	-0,0043	-0,0205
t-stat		-9,2015	-6,1690	-3,5637	-2,0875	-2,1579	-10,2882		*t-stat*		-9,1979	-8,2854	-9,9846	-8,5209	-7,8789	-6,8140	*t-stat*		-13,3133	-14,8810	-13,0809	-8,1629	-6,5449	-10,7700
CAPM Alpha	4	-0,0262	-0,0104	-0,0054	-0,0031	-0,0031	-0,0231		*5FF Alpha*	4	-0,0268	-0,0116	-0,0088	-0,0074	-0,0061	-0,0207	*3FF+BAB Alpha*	4	-0,0275	-0,0146	-0,0097	-0,0068	-0,0051	-0,0223
t-stat		-9,4407	-6,1968	-4,1155	-2,6691	-2,6615	-10,6012		*t-stat*		-9,2994	-7,4738	-8,9857	-8,1881	-6,8582	-7,4581	*t-stat*		-13,7033	-13,7364	-13,9261	-10,7886	-7,8145	-11,2844
CAPM Alpha	H	-0,0286	-0,0127	-0,0056	-0,0046	-0,0046	-0,0240		*5FF Alpha*	H	-0,0278	-0,0125	-0,0083	-0,0075	-0,0065	-0,0213	*3FF+BAB Alpha*	H	-0,0292	-0,0165	-0,0097	-0,0086	-0,0068	-0,0223
t-stat		-9,7283	-6,9945	-3,8677	-3,2961	-3,2515	-11,6477		*t-stat*		-9,2723	-6,9922	-6,8311	-6,4371	-5,7621	-8,3178	*t-stat*		-13,4317	-13,2290	-12,2907	-11,6595	-8,2399	-11,9290
CAPM Alpha	L-H	0,0080	-0,0091	-0,0184	-0,0216	-0,0240	-0,0160		*5FF Alpha*	L-H	0,0054	-0,0120	-0,0162	-0,0193	-0,0213	-0,0159	*3FF+BAB Alpha*	L-H	0,0072	-0,0065	-0,0151	-0,0189	-0,0223	-0,0151
t-stat		4,9320	-4,8450	-9,2987	-10,1847	-11,6477	-8,9180		*t-stat*		2,2336	-4,3613	-6,8182	-7,5809	-8,3178	-6,1886	*t-stat*		4,3590	-3,6388	-8,8197	-9,9974	-11,9290	-8,8813
		L	2	3	4	H	L-H				L	2	3	4	H	L-H				L	2	3	4	H	L-H
3FF Alpha	L	-0,0223	-0,0139	-0,0082	-0,0049	-0,0036	-0,0187		*3FF+UMD Alpha*	L	-0,0203	-0,0118	-0,0070	-0,0040	-0,0029	-0,0175	*3FF+QMJ Alpha*	L	-0,0157	-0,0135	-0,0088	-0,0061	-0,0045	-0,0111
t-stat		-12,3381	-11,5845	-9,5807	-6,4206	-5,1536	-10,2911		*t-stat*		-11,3203	-10,3800	-8,3830	-5,2864	-4,1442	-9,5036	*t-stat*		-9,3104	-10,6252	-9,7838	-7,8553	-6,2665	-6,8810
3FF Alpha	2	-0,0232	-0,0132	-0,0074	-0,0048	-0,0035	-0,0196		*3FF+UMD Alpha*	2	-0,0223	-0,0122	-0,0068	-0,0044	-0,0034	-0,0188	*3FF+QMJ Alpha*	2	-0,0168	-0,0132	-0,0087	-0,0066	-0,0046	-0,0123
t-stat		-13,3122	-13,0912	-10,1465	-6,7760	-5,3635	-10,6306		*t-stat*		-12,5771	-12,0778	-9,2192	-6,0751	-5,0772	-10,0091	*t-stat*		-10,3570	-12,3441	-11,5635	-9,4042	-6,6343	-7,3335
3FF Alpha	3	-0,0250	-0,0127	-0,0077	-0,0047	-0,0036	-0,0214		*3FF+UMD Alpha*	3	-0,0247	-0,0124	-0,0075	-0,0047	-0,0039	-0,0208	*3FF+QMJ Alpha*	3	-0,0175	-0,0129	-0,0086	-0,0065	-0,0045	-0,0130
t-stat		-13,6946	-13,2663	-10,5594	-6,8356	-5,4450	-11,4014		*t-stat*		-13,2264	-12,7249	-10,0987	-6,6037	-5,7381	-10,8648	*t-stat*		-10,7013	-12,7268	-11,3609	-9,4390	-6,4582	-8,0452
3FF Alpha	4	-0,0275	-0,0134	-0,0085	-0,0056	-0,0045	-0,0230		*3FF+UMD Alpha*	4	-0,0277	-0,0136	-0,0086	-0,0059	-0,0052	-0,0224	*3FF+QMJ Alpha*	4	-0,0198	-0,0133	-0,0095	-0,0070	-0,0052	-0,0147
t-stat		-14,0261	-12,4834	-11,5105	-8,3888	-6,8946	-11,8273		*t-stat*		-13,7685	-12,3499	-11,3679	-8,6491	-7,9601	-11,2959	*t-stat*		-11,0818	-11,6742	-12,2407	-10,1486	-7,4216	-8,5736
3FF Alpha	H	-0,0296	-0,0155	-0,0085	-0,0071	-0,0061	-0,0235		*3FF+UMD Alpha*	H	-0,0295	-0,0160	-0,0087	-0,0076	-0,0070	-0,0225	*3FF+QMJ Alpha*	H	-0,0206	-0,0139	-0,0077	-0,0075	-0,0051	-0,0155
t-stat		-13,8991	-12,5235	-10,2661	-8,9668	-7,2996	-12,6855		*t-stat*		-13,5343	-12,6451	-10,3660	-9,4347	-8,4879	-11,9342	*t-stat*		-10,9260	-10,7574	-8,8836	-8,8680	-5,8363	-9,5414
3FF Alpha	L-H	0,0073	-0,0077	-0,0165	-0,0204	-0,0235	-0,0162		*3FF+UMD Alpha*	L-H	0,0092	-0,0063	-0,0159	-0,0200	-0,0225	-0,0133	*3FF+QMJ Alpha*	L-H	0,0049	-0,0029	-0,0098	-0,0124	-0,0155	-0,0106
t-stat		4,5289	-4,3328	-9,6711	-10,8334	-12,6855	-9,6021		*t-stat*		5,6824	-3,5242	-9,1487	-10,4087	-11,9342	-8,3027	*t-stat*		2,9082	-1,6475	-6,2976	-7,4463	-9,5414	-6,5647

Table 37. Skew and debt to EBITDA (Outperformance)

The table reports abnormal returns for double sorted portfolios based on Debt to EBITDA fundamental variable and Skewness. Fundamental variable is expressed horizontally and Skewness is expressed vertically. Outperformance – alfa measurements for Debt to EBITDA and Skewness strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	**L**	-0,0216	-0,0036	-0,0020	-0,0033	-0,0099	-0,0117	*5FF Alpha*	**L**	-0,0234	-0,0054	-0,0067	-0,0097	-0,0155	-0,0080	*3FF + BAB Alpha*	**L**	-0,0225	-0,0040	-0,0045	-0,0075	-0,0149	-0,0076
t-stat		-8,0626	-2,6521	-1,7204	-2,3476	-5,5321	-5,2067	*t-stat*		-7,3056	-4,4927	-7,0601	-7,8157	-9,2624	-2,8125	*t-stat*		-10,4963	-5,0696	-6,0706	-8,4608	-13,7489	-3,7085
CAPM Alpha	**2**	-0,0212	-0,0041	-0,0019	-0,0028	-0,0090	-0,0122	*5FF Alpha*	**2**	-0,0253	-0,0069	-0,0073	-0,0091	-0,0135	-0,0118	*3FF + BAB Alpha*	**2**	-0,0224	-0,0045	-0,0050	-0,0069	-0,0141	-0,0083
t-stat		-8,6947	-3,3886	-1,6397	-2,1243	-5,5648	-5,8029	*t-stat*		-9,5816	-6,7133	-8,7144	-9,3013	-9,8639	-4,6774	*t-stat*		-12,1955	-6,4791	-6,8125	-9,0545	-15,1040	-4,4242
CAPM Alpha	**3**	-0,0233	-0,0056	-0,0021	-0,0031	-0,0096	-0,0137	*5FF Alpha*	**3**	-0,0256	-0,0083	-0,0065	-0,0082	-0,0135	-0,0121	*3FF + BAB Alpha*	**3**	-0,0243	-0,0062	-0,0054	-0,0074	-0,0149	-0,0094
t-stat		-9,0094	-4,3067	-1,8972	-2,3944	-6,0211	-6,3365	*t-stat*		-9,4830	-7,7894	-7,4341	-9,1764	-9,5558	-4,9968	*t-stat*		-12,5245	-8,3486	-8,3407	-10,9313	-16,4555	-5,0044
CAPM Alpha	**4**	-0,0255	-0,0073	-0,0020	-0,0037	-0,0110	-0,0145	*5FF Alpha*	**4**	-0,0272	-0,0086	-0,0057	-0,0080	-0,0124	-0,0147	*3FF + BAB Alpha*	**4**	-0,0262	-0,0080	-0,0055	-0,0084	-0,0162	-0,0100
t-stat		-9,3675	-5,2103	-1,6295	-2,8949	-6,6952	-6,2669	*t-stat*		-9,4112	-7,7539	-6,0842	-9,1560	-9,6770	-5,4218	*t-stat*		-12,4538	-10,3039	-7,7810	-12,8005	-18,0298	-4,7688
CAPM Alpha	**H**	-0,0282	-0,0073	-0,0038	-0,0039	-0,0116	-0,0167	*5FF Alpha*	**H**	-0,0286	-0,0085	-0,0064	-0,0066	-0,0124	-0,0162	*3FF + BAB Alpha*	**H**	-0,0291	-0,0082	-0,0073	-0,0086	-0,0165	-0,0127
t-stat		-9,7622	-4,1666	-2,7970	-2,7837	-6,7159	-7,5575	*t-stat*		-9,4821	-5,2878	-6,2767	-6,1501	-7,9272	-6,1621	*t-stat*		-13,2564	-7,3203	-10,5140	-12,1255	-15,5548	-6,4995
CAPM Alpha	**L-H**	0,0067	-0,0139	-0,0195	-0,0216	-0,0167	-0,0100	*5FF Alpha*	**L-H**	0,0051	-0,0168	-0,0192	-0,0206	-0,0162	-0,0111	*3FF + BAB Alpha*	**L-H**	0,0066	-0,0141	-0,0170	-0,0176	-0,0127	-0,0060
t-stat		3,9975	-9,2226	-9,4929	-9,4170	-7,5575	-4,6044	*t-stat*		2,0785	-7,3910	-7,4957	-7,7798	-6,1621	-3,7380	*t-stat*		3,8788	-9,3197	-8,8121	-8,5296	-6,4995	-2,9616
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	**L**	-0,0230	-0,0042	-0,0040	-0,0068	-0,0143	-0,0087	*3FF + UMD Alpha*	**L**	-0,0206	-0,0035	-0,0036	-0,0060	-0,0123	-0,0083	*3FF + QMJ Alpha*	**L**	-0,0157	-0,0039	-0,0059	-0,0084	-0,0144	-0,0012
t-stat		-10,9404	-5,3930	-5,4079	-7,7502	-13,3440	-4,3081	*t-stat*		-9,8686	-4,5117	-4,8210	-6,7684	-12,2547	-3,9971	*t-stat*		-7,8771	-4,7924	-7,9656	-9,2917	-12,6760	-0,6545
3FF Alpha	**2**	-0,0228	-0,0048	-0,0040	-0,0060	-0,0132	-0,0096	*3FF + UMD Alpha*	**2**	-0,0214	-0,0044	-0,0040	-0,0054	-0,0120	-0,0094	*3FF + QMJ Alpha*	**2**	-0,0162	-0,0044	-0,0066	-0,0079	-0,0138	-0,0024
t-stat		-12,6730	-6,9868	-5,3524	-7,6740	-14,1191	-5,1628	*t-stat*		-11,8012	-6,3100	-5,2534	-6,8494	-13,0595	-4,9424	*t-stat*		-9,6595	-6,1125	-9,2064	-10,1320	-13,9090	-1,4137
3FF Alpha	**3**	-0,0246	-0,0061	-0,0042	-0,0061	-0,0136	-0,0110	*3FF + UMD Alpha*	**3**	-0,0237	-0,0064	-0,0044	-0,0061	-0,0132	-0,0105	*3FF + QMJ Alpha*	**3**	-0,0171	-0,0051	-0,0063	-0,0082	-0,0139	-0,0032
t-stat		-12,9497	-8,4816	-6,1648	-8,4427	-14,5143	-5,8758	*t-stat*		-12,2396	-8,6615	-6,2035	-8,1833	-13,8009	-5,4849	*t-stat*		-9,8999	-6,7914	-9,3347	-11,3805	-14,0350	-1,9214
3FF Alpha	**4**	-0,0267	-0,0080	-0,0042	-0,0069	-0,0147	-0,0119	*3FF + UMD Alpha*	**4**	-0,0269	-0,0084	-0,0050	-0,0073	-0,0146	-0,0123	*3FF + QMJ Alpha*	**4**	-0,0182	-0,0065	-0,0061	-0,0084	-0,0156	-0,0027
t-stat		-12,9118	-10,5443	-5,4556	-9,4576	-15,6296	-5,6666	*t-stat*		-12,7529	-10,8405	-6,5735	-9,8139	-15,1621	-5,7218	*t-stat*		-9,8311	-8,3839	-8,0006	-11,3699	-15,6692	-1,4548
3FF Alpha	**H**	-0,0295	-0,0080	-0,0059	-0,0070	-0,0152	-0,0143	*3FF + UMD Alpha*	**H**	-0,0298	-0,0085	-0,0066	-0,0077	-0,0152	-0,0146	*3FF + QMJ Alpha*	**H**	-0,0206	-0,0046	-0,0066	-0,0079	-0,0144	-0,0062
t-stat		-13,6697	-7,2228	-8,0133	-8,7507	-13,9932	-7,3518	*t-stat*		-13,5120	-7,5614	-8,8782	-9,5540	-13,7008	-7,3360	*t-stat*		-10,6713	-4,3110	-8,4280	-9,5064	-12,5674	-3,5720
3FF Alpha	**L-H**	0,0064	-0,0149	-0,0187	-0,0197	-0,0143	-0,0079	*3FF + UMD Alpha*	**L-H**	0,0092	-0,0130	-0,0171	-0,0193	-0,0146	-0,0054	*3FF + QMJ Alpha*	**L-H**	0,0049	-0,0115	-0,0106	-0,0103	-0,0062	-0,0013
t-stat		3,8395	-9,9260	-9,6709	-9,4767	-7,3518	-3,8603	*t-stat*		5,7585	-8,7987	-8,7787	-9,0768	-7,3360	-2,6761	*t-stat*		2,7903	-7,5937	-6,1609	-5,7841	-3,5720	-0,6449

Table 38. Skewness and dividend payout ratio (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as Dividend payout ratio and Skewness. Fundamental variable is expressed horizontally and Skewness is expressed vertically. Outperformance – alfa measurements for Cash to debt and Skewness strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	**L**	-0,0056	-0,0060	-0,0042	-0,0021	-0,0023	-0,0033	*5FF Alpha*	**L**	-0,0087	-0,0108	-0,0090	-0,0067	-0,0084	-0,0002	*3FF + BAB Alpha*	**L**	-0,0084	-0,0091	-0,0073	-0,0049	-0,0063	-0,0021
t-stat		**-3,7405**	**-4,0698**	**-3,1276**	-1,7894	-1,7057	-2,6616	*t-stat*		**-7,2127**	**-8,8118**	**-7,0576**	**-5,6527**	**-6,4047**	-0,1575	*t-stat*		**-9,5252**	**-10,1520**	**-8,0545**	**-5,6753**	**-6,8887**	**-1,9280**
CAPM Alpha	**2**	-0,0063	-0,0052	-0,0042	-0,0011	-0,0022	-0,0041	*5FF Alpha*	**2**	-0,0104	-0,0099	-0,0087	-0,0054	-0,0073	-0,0031	*3FF + BAB Alpha*	**2**	-0,0092	-0,0083	-0,0071	-0,0043	-0,0061	-0,0031
t-stat		**-4,4299**	**-3,7149**	**-3,3554**	-0,9920	-1,8733	-3,4584	*t-stat*		**-8,6469**	**-8,6621**	**-8,2821**	**-5,7442**	**-7,3573**	**-2,2144**	*t-stat*		**-10,7940**	**-10,0513**	**-9,8215**	**-5,6729**	**-7,7720**	**-3,0352**
CAPM Alpha	**3**	-0,0059	-0,0063	-0,0046	-0,0017	-0,0024	-0,0035	*5FF Alpha*	**3**	-0,0085	-0,0094	-0,0078	-0,0064	-0,0082	-0,0003	*3FF + BAB Alpha*	**3**	-0,0089	-0,0095	-0,0074	-0,0050	-0,0063	-0,0026
t-stat		**-4,1576**	**-4,4235**	**-3,6386**	-1,6521	**-2,1905**	**-3,0339**	*t-stat*		**-8,0216**	**-7,5149**	**-7,0959**	**-7,2246**	**-9,9490**	-0,2478	*t-stat*		**-11,8613**	**-11,7081**	**-10,0330**	**-7,0812**	**-8,8291**	**-2,8011**
CAPM Alpha	**4**	-0,0062	-0,0059	-0,0042	-0,0015	-0,0025	-0,0037	*5FF Alpha*	**4**	-0,0080	-0,0074	-0,0063	-0,0051	-0,0075	-0,0005	*3FF + BAB Alpha*	**4**	-0,0099	-0,0095	-0,0076	-0,0049	-0,0066	-0,0033
t-stat		**-4,0073**	**-3,8023**	**-3,0759**	-1,3713	**-2,2108**	**-2,9678**	*t-stat*		**-6,2761**	**-6,0180**	**-5,6979**	**-5,6010**	**-8,1314**	-0,3754	*t-stat*		**-11,5816**	**-11,4002**	**-10,3823**	**-6,7491**	**-8,9656**	**-3,2270**
CAPM Alpha	**H**	-0,0060	-0,0077	-0,0036	-0,0015	-0,0034	-0,0026	*5FF Alpha*	**H**	-0,0084	-0,0083	-0,0052	-0,0040	-0,0061	-0,0024	*3FF + BAB Alpha*	**H**	-0,0098	-0,0112	-0,0073	-0,0050	-0,0073	-0,0025
t-stat		**-3,6803**	**-4,6367**	**-2,3344**	-1,3504	**-2,9952**	**-1,9655**	*t-stat*		**-5,8473**	**-5,6772**	**-3,8763**	**-4,4136**	**-6,2972**	-1,4834	*t-stat*		**-10,1802**	**-11,0532**	**-8,3207**	**-7,5573**	**-9,8187**	**-2,1934**
CAPM Alpha	**L-H**	0,0004	0,0014	-0,0024	-0,0047	-0,0026	-0,0022	*5FF Alpha*	**L-H**	-0,0002	-0,0021	-0,0034	-0,0040	-0,0024	-0,0026	*3FF + BAB Alpha*	**L-H**	0,0014	0,0020	-0,0016	-0,0048	-0,0025	-0,0011
t-stat		0,3527	1,3419	**-2,4598**	**-4,7125**	**-1,9655**	-1,7921	*t-stat*		-0,1460	-1,3933	**-2,4849**	**-3,0580**	-1,4834	-1,8090	*t-stat*		1,2064	1,8300	-1,6326	**-5,2837**	**-2,1934**	-1,0673
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	**L**	-0,0076	-0,0082	-0,0063	-0,0044	-0,0057	-0,0019	*3FF + UMD Alpha*	**L**	-0,0072	-0,0076	-0,0057	-0,0039	-0,0048	-0,0024	*3FF + QMJ Alpha*	**L**	-0,0089	-0,0099	-0,0082	-0,0069	-0,0079	-0,0011
t-stat		**-8,6080**	**-9,1297**	**-6,9413**	**-5,2539**	**-6,1698**	-1,8669	*t-stat*		**-7,9999**	**-8,4042**	**-6,1985**	**-4,5833**	**-5,1854**	**-2,2996**	*t-stat*		**-9,7454**	**-10,7801**	**-8,8952**	**-8,3903**	**-8,5559**	-0,9639
3FF Alpha	**2**	-0,0083	-0,0073	-0,0062	-0,0034	-0,0052	-0,0031	*3FF + UMD Alpha*	**2**	-0,0082	-0,0072	-0,0060	-0,0034	-0,0049	-0,0033	*3FF + QMJ Alpha*	**2**	-0,0095	-0,0088	-0,0076	-0,0062	-0,0078	-0,0017
t-stat		**-9,6684**	**-8,5741**	**-8,3899**	**-4,4871**	**-6,4861**	**-3,1391**	*t-stat*		**-9,3184**	**-8,2762**	**-8,0374**	**-4,3250**	**-6,0358**	**-3,2096**	*t-stat*		**-10,5601**	**-10,0999**	**-10,0796**	**-8,8458**	**-10,1244**	-1,6258
3FF Alpha	**3**	-0,0079	-0,0082	-0,0064	-0,0040	-0,0052	-0,0027	*3FF + UMD Alpha*	**3**	-0,0082	-0,0086	-0,0065	-0,0040	-0,0053	-0,0029	*3FF + QMJ Alpha*	**3**	-0,0090	-0,0095	-0,0077	-0,0068	-0,0079	-0,0012
t-stat		**-10,1715**	**-9,6909**	**-8,4376**	**-5,4885**	**-7,0113**	**-2,9205**	*t-stat*		**-10,2847**	**-9,9599**	**-8,4508**	**-5,3830**	**-6,9220**	**-3,0727**	*t-stat*		**-11,1524**	**-10,6640**	**-9,7558**	**-10,2925**	**-11,0967**	-1,2497
3FF Alpha	**4**	-0,0084	-0,0081	-0,0062	-0,0037	-0,0055	-0,0029	*3FF + UMD Alpha*	**4**	-0,0092	-0,0088	-0,0069	-0,0045	-0,0055	-0,0037	*3FF + QMJ Alpha*	**4**	-0,0095	-0,0086	-0,0072	-0,0068	-0,0081	-0,0014
t-stat		**-9,4043**	**-9,1466**	**-7,9445**	**-4,8759**	**-7,1968**	**-2,9528**	*t-stat*		**-10,2367**	**-9,9382**	**-8,7338**	**-5,8187**	**-7,1015**	**-3,6541**	*t-stat*		**-10,0772**	**-9,1854**	**-8,7543**	**-9,6660**	**-11,0495**	-1,3811
3FF Alpha	**H**	-0,0082	-0,0098	-0,0058	-0,0037	-0,0062	-0,0020	*3FF + UMD Alpha*	**H**	-0,0091	-0,0108	-0,0069	-0,0044	-0,0066	-0,0025	*3FF + QMJ Alpha*	**H**	-0,0083	-0,0096	-0,0058	-0,0057	-0,0080	-0,0003
t-stat		**-8,0806**	**-9,4440**	**-6,1479**	**-5,1435**	**-8,0886**	-1,7526	*t-stat*		**-8,8954**	**-10,2897**	**-7,4283**	**-6,1145**	**-8,4339**	**-2,1493**	*t-stat*		**-7,7279**	**-8,7017**	**-5,8038**	**-8,0043**	**-10,3484**	-0,2577
3FF Alpha	**L-H**	0,0006	0,0015	-0,0021	-0,0047	-0,0020	-0,0014	*3FF + UMD Alpha*	**L-H**	0,0019	0,0026	-0,0013	-0,0048	-0,0025	-0,0006	*3FF + QMJ Alpha*	**L-H**	-0,0007	0,0001	-0,0033	-0,0038	-0,0003	-0,0010
t-stat		0,5054	1,4151	**-2,1977**	**-5,2776**	-1,7526	-1,3474	*t-stat*		1,6404	**2,3851**	-1,3040	**-5,2545**	**-2,1493**	-0,5925	*t-stat*		-0,5429	0,1147	**-3,1849**	-4,0099	-0,2577	-0,8600

Table 39. Skewness and Gross margin (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as Gross margin and Skewness. Fundamental variable is expressed horizontally and Skewness is expressed vertically. Outperformance – alfa measurements for Gross margin and Skewness strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	**L**	-0,0114	-0,0067	-0,0064	-0,0042	-0,0056	-0,0058	*5FF Alpha*	**L**	-0,0176	-0,0130	-0,0125	-0,0084	-0,0065	-0,0110	*3FF + BAB Alpha*	**L**	-0,0150	-0,0105	-0,0097	-0,0068	-0,0071	-0,0080
t-stat		**-5,9367**	**-4,3325**	**-4,5654**	**-3,2102**	**-4,3268**	**-4,0086**	*t-stat*		**-8,4061**	**-9,5613**	**-10,2182**	**-6,4887**	**-4,9970**	**-5,4062**	*t-stat*		**-11,3817**	**-11,6087**	**-11,4551**	**-8,0125**	**-7,9096**	**-5,8494**
CAPM Alpha	**2**	-0,0116	-0,0061	-0,0050	-0,0050	-0,0054	-0,0063	*5FF Alpha*	**2**	-0,0187	-0,0125	-0,0107	-0,0090	-0,0069	-0,0117	*3FF + BAB Alpha*	**2**	-0,0154	-0,0101	-0,0083	-0,0076	-0,0067	-0,0087
t-stat		**-7,1156**	**-4,3306**	**-3,8380**	**-4,1792**	**-4,6570**	**-5,1166**	*t-stat*		**-12,0720**	**-11,5068**	**-10,4826**	**-8,4128**	**-6,7126**	**-7,4332**	*t-stat*		**-15,2781**	**-13,1345**	**-11,4822**	**-10,8862**	**-8,8408**	**-7,9597**
CAPM Alpha	**3**	-0,0127	-0,0066	-0,0067	-0,0047	-0,0059	-0,0069	*5FF Alpha*	**3**	-0,0173	-0,0121	-0,0123	-0,0085	-0,0063	-0,0110	*3FF + BAB Alpha*	**3**	-0,0161	-0,0107	-0,0102	-0,0075	-0,0077	-0,0083
t-stat		**-7,6141**	**-4,7177**	**-5,0351**	**-3,8125**	**-4,9247**	**-5,6783**	*t-stat*		**-11,2244**	**-10,2506**	**-11,9626**	**-8,3327**	**-5,8746**	**-6,8980**	*t-stat*		**-15,9013**	**-13,9263**	**-14,8688**	**-10,8983**	**-10,1169**	**-7,3131**
CAPM Alpha	**4**	-0,0154	-0,0081	-0,0081	-0,0061	-0,0074	-0,0079	*5FF Alpha*	**4**	-0,0187	-0,0123	-0,0111	-0,0091	-0,0064	-0,0123	*3FF + BAB Alpha*	**4**	-0,0185	-0,0124	-0,0116	-0,0092	-0,0091	-0,0094
t-stat		**-8,0924**	**-5,4274**	**-5,5793**	**-4,6363**	**-5,8733**	**-6,1499**	*t-stat*		**-10,2615**	**-11,5769**	**-9,5949**	**-8,1844**	**-6,0453**	**-6,9978**	*t-stat*		**-14,7421**	**-16,3789**	**-14,9498**	**-12,7534**	**-11,4342**	**-7,5673**
CAPM Alpha	**H**	-0,0195	-0,0115	-0,0095	-0,0077	-0,0096	-0,0099	*5FF Alpha*	**H**	-0,0215	-0,0152	-0,0116	-0,0084	-0,0073	-0,0141	*3FF + BAB Alpha*	**H**	-0,0214	-0,0156	-0,0129	-0,0107	-0,0119	-0,0096
t-stat		**-8,5846**	**-6,9647**	**-5,3616**	**-4,9659**	**-6,0299**	**-7,1117**	*t-stat*		**-9,8471**	**-9,8925**	**-6,9801**	**-6,0560**	**-4,9986**	**-8,0412**	*t-stat*		**-13,5991**	**-15,9385**	**-11,9310**	**-11,3334**	**-10,8781**	**-7,1783**
CAPM Alpha	**L-H**	0,0081	-0,0001	-0,0032	-0,0076	-0,0099	-0,0018	*5FF Alpha*	**L-H**	0,0039	-0,0035	-0,0057	-0,0103	-0,0141	-0,0103	*3FF + BAB Alpha*	**L-H**	0,0064	0,0003	-0,0032	-0,0078	-0,0096	-0,0032
t-stat		**4,9079**	-0,1405	**-3,2084**	**-6,6483**	**-7,1117**	-1,1193	*t-stat*		1,7246	**-2,2943**	**-3,7345**	**-6,0467**	**-8,0412**	**-4,5187**	*t-stat*		**4,0235**	**0,2653**	**-3,1166**	**-6,6575**	**-7,1783**	**-2,0536**
		L	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**
3FF Alpha	**L**	-0,0150	-0,0101	-0,0092	-0,0064	-0,0068	-0,0082	*3FF + UMD Alpha*	**L**	-0,0128	-0,0087	-0,0079	-0,0055	-0,0062	-0,0066	*3FF + QMJ Alpha*	**L**	-0,0124	-0,0104	-0,0102	-0,0074	-0,0066	-0,0057
t-stat		**-11,5843**	**-11,3092**	**-11,0378**	**-7,7008**	**-7,7487**	**-6,1345**	*t-stat*		**-10,3825**	**-10,1269**	**-9,8419**	**-6,6714**	**-6,9490**	**-5,0101**	*t-stat*		-9,3447	-11,0869	-11,5604	-8,4681	-7,1234	-4,1774
3FF Alpha	**2**	-0,0149	-0,0092	-0,0076	-0,0070	-0,0062	-0,0087	*3FF + UMD Alpha*	**2**	-0,0137	-0,0086	-0,0071	-0,0065	-0,0061	-0,0076	*3FF + QMJ Alpha*	**2**	-0,0132	-0,0104	-0,0087	-0,0078	-0,0066	-0,0067
t-stat		**-15,0593**	**-11,8289**	**-10,5463**	**-10,1005**	**-8,2735**	**-8,1612**	*t-stat*		**-14,0212**	**-10,9125**	**-9,6857**	**-9,2592**	**-7,9753**	**-7,1460**	*t-stat*		-12,9179	-12,8551	-11,4968	-10,5921	-8,2509	-6,0959
3FF Alpha	**3**	-0,0155	-0,0094	-0,0094	-0,0068	-0,0069	-0,0085	*3FF + UMD Alpha*	**3**	-0,0151	-0,0092	-0,0093	-0,0065	-0,0073	-0,0079	*3FF + QMJ Alpha*	**3**	-0,0131	-0,0104	-0,0096	-0,0076	-0,0072	-0,0058
t-stat		**-15,5015**	**-11,6578**	**-13,4108**	**-9,6312**	**-9,0130**	**-7,6408**	*t-stat*		**-14,8442**	**-11,0868**	**-12,9167**	**-9,0643**	**-9,2494**	**-6,9364**	*t-stat*		-12,9998	-12,2875	-12,9704	-10,3471	-8,8679	-5,1929
3FF Alpha	**4**	-0,0178	-0,0113	-0,0107	-0,0083	-0,0086	-0,0092	*3FF + UMD Alpha*	**4**	-0,0182	-0,0115	-0,0107	-0,0087	-0,0093	-0,0088	*3FF + QMJ Alpha*	**4**	-0,0139	-0,0120	-0,0107	-0,0087	-0,0076	-0,0063
t-stat		**-14,3792**	**-14,3514**	**-13,4954**	**-11,2139**	**-10,8477**	**-7,6045**	*t-stat*		**-14,3710**	**-14,2145**	**-13,2411**	**-11,6269**	**-11,8089**	**-7,1284**	*t-stat*		-11,6007	-14,3692	-12,7908	-11,1058	-9,1313	-5,1703
3FF Alpha	**H**	-0,0215	-0,0143	-0,0120	-0,0096	-0,0111	-0,0104	*3FF + UMD Alpha*	**H**	-0,0217	-0,0144	-0,0125	-0,0106	-0,0119	-0,0098	*3FF + QMJ Alpha*	**H**	-0,0158	-0,0133	-0,0097	-0,0082	-0,0086	-0,0072
t-stat		**-13,9497**	**-14,2475**	**-11,1301**	**-9,9709**	**-10,2678**	**-7,8931**	*t-stat*		**-13,7511**	**-14,0327**	**-11,3842**	**-11,0300**	**-10,9259**	**-7,2787**	*t-stat*		-11,0239	-12,6060	-8,8162	-8,1280	-7,8659	-5,4004
3FF Alpha	**L-H**	0,0066	-0,0006	-0,0035	-0,0082	-0,0104	-0,0039	*3FF + UMD Alpha*	**L-H**	0,0089	0,0007	-0,0026	-0,0076	-0,0098	-0,0008	*3FF + QMJ Alpha*	**L-H**	0,0034	0,0001	-0,0034	-0,0057	-0,0072	-0,0038
t-stat		**4,2030**	**-0,5815**	**-3,4815**	**-7,1578**	**-7,8931**	**-2,5504**	*t-stat*		**5,9311**	**0,7282**	**-2,6124**	**-6,5046**	**-7,2787**	**-0,5998**	*t-stat*		2,1356	0,0981	-3,2074	-4,9118	-5,4004	-2,3344

Table 40. Skewness and PTB (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as Price to Book and Skewness. Fundamental variable is expressed horizontally and Skewness is expressed vertically. Outperformance – alfa measurements for Price to Book and Skewness strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H
CAPM Alpha	**L**	-0,0047	-0,0031	-0,0057	-0,0076	-0,0128	0,0082
t-stat		**-2,0112**	**-2,1709**	**-4,3294**	**-6,2705**	**-9,5944**	**3,5545**
CAPM Alpha	**2**	-0,0043	-0,0034	-0,0048	-0,0080	-0,0130	0,0088
t-stat		**-1,9523**	**-2,3639**	**-3,9136**	**-7,0547**	**-9,7838**	**3,9224**
CAPM Alpha	**3**	-0,0034	-0,0041	-0,0052	-0,0095	-0,0164	0,0130
t-stat		-1,6401	**-2,9761**	**-4,1183**	**-8,2236**	**-10,5124**	**6,1870**
CAPM Alpha	**4**	-0,0033	-0,0044	-0,0072	-0,0109	-0,0213	0,0180
t-stat		-1,6244	**-3,1579**	**-5,8365**	**-8,3760**	**-10,6037**	**7,8365**
CAPM Alpha	**H**	-0,0042	-0,0046	-0,0088	-0,0140	-0,0266	0,0223
t-stat		**-1,9451**	**-3,0465**	**-5,7788**	**-8,5128**	**-10,9256**	**9,3237**
CAPM Alpha	**L-H**	-0,0004	0,0003	0,0054	0,0107	0,0223	0,0219
t-stat		-0,3225	0,2530	**4,0115**	**6,2912**	**9,3237**	**8,3392**

		L	2	3	4	H	L-H
5FF Alpha	**L**	-0,0116	-0,0089	-0,0106	-0,0105	-0,0138	0,0022
t-stat		**-4,3642**	**-8,1430**	**-9,8340**	**-9,9131**	**-11,3524**	0,7460
5FF Alpha	**2**	-0,0117	-0,0090	-0,0098	-0,0115	-0,0145	0,0028
t-stat		**-4,9928**	**-7,3434**	**-10,6077**	**-12,5385**	**-11,6852**	0,9921
5FF Alpha	**3**	-0,0100	-0,0080	-0,0099	-0,0128	-0,0170	0,0070
t-stat		**-4,8621**	**-7,3781**	**-10,5412**	**-14,2784**	**-11,1838**	**2,6380**
5FF Alpha	**4**	-0,0069	-0,0075	-0,0104	-0,0132	-0,0200	0,0131
t-stat		**-3,2679**	**-7,0445**	**-11,9183**	**-11,6094**	**-10,2193**	**4,7165**
5FF Alpha	**H**	-0,0075	-0,0077	-0,0095	-0,0148	-0,0243	0,0168
t-stat		**-3,2334**	**-5,6960**	**-7,2288**	**-10,0688**	**-10,0956**	**5,6605**
5FF Alpha	**L-H**	-0,0040	-0,0040	-0,0005	0,0079	0,0168	0,0128
t-stat		**-2,0475**	**-2,0559**	**-0,2267**	**3,5915**	**5,6605**	**3,7397**

		L	2	3	4	H	L-H
3FF + BAB Alpha	**L**	-0,0090	-0,0072	-0,0090	-0,0096	-0,0127	0,0037
t-stat		**-5,5828**	**-9,5327**	**-11,5335**	**-11,7868**	**-13,3831**	**1,9462**
3FF + BAB Alpha	**2**	-0,0091	-0,0075	-0,0084	-0,0100	-0,0130	0,0039
t-stat		**-6,3704**	**-9,3042**	**-11,5279**	**-13,7084**	**-14,1753**	**2,1540**
3FF + BAB Alpha	**3**	-0,0083	-0,0082	-0,0088	-0,0116	-0,0169	0,0086
t-stat		**-6,4911**	**-11,1273**	**-13,1544**	**-17,7168**	**-15,1503**	**4,9089**
3FF + BAB Alpha	**4**	-0,0087	-0,0083	-0,0108	-0,0129	-0,0216	0,0129
t-stat		**-6,4453**	**-11,5420**	**-17,3849**	**-15,8550**	**-14,3613**	**6,3537**
3FF + BAB Alpha	**H**	-0,0093	-0,0088	-0,0126	-0,0160	-0,0264	0,0170
t-stat		**-6,2292**	**-10,2300**	**-14,9551**	**-15,5521**	**-14,1601**	**7,9151**
3FF + BAB Alpha	**L-H**	0,0004	-0,0004	0,0043	0,0073	0,0170	0,0174
t-stat		0,2781	-0,3006	**3,3831**	**4,8238**	**7,9151**	**7,4383**

		L	2	3	4	H	L-H
3FF Alpha	**L**	-0,0095	-0,0065	-0,0083	-0,0088	-0,0123	0,0028
t-stat		**-6,0138**	**-8,6218**	**-10,6538**	**-10,7007**	**-13,1996**	1,4955
3FF Alpha	**2**	-0,0091	-0,0069	-0,0074	-0,0092	-0,0124	0,0033
t-stat		**-6,5106**	**-8,6639**	**-9,9388**	**-12,5844**	**-13,6114**	1,8370
3FF Alpha	**3**	-0,0079	-0,0074	-0,0079	-0,0107	-0,0160	0,0081
t-stat		**-6,2916**	**-9,8026**	**-11,4125**	**-15,7058**	**-14,2862**	**4,6659**
3FF Alpha	**4**	-0,0077	-0,0077	-0,0097	-0,0121	-0,0211	0,0133
t-stat		**-5,7456**	**-10,6594**	**-14,5935**	**-14,5914**	**-14,2190**	**6,6892**
3FF Alpha	**H**	-0,0084	-0,0076	-0,0112	-0,0150	-0,0263	0,0179
t-stat		**-5,6713**	**-8,6116**	**-12,5918**	**-14,4562**	**-14,3998**	**8,4359**
3FF Alpha	**L-H**	-0,0011	-0,0016	0,0033	0,0073	0,0179	0,0168
t-stat		-0,8106	-1,2564	**2,5862**	**4,8959**	**8,4359**	**7,3071**

		L	2	3	4	H	L-H
3FF + UMD Alpha	**L**	-0,0055	-0,0054	-0,0077	-0,0092	-0,0134	0,0079
t-stat		**-4,0606**	**-7,3538**	**-9,7985**	**-10,9873**	**-14,4813**	**5,0521**
3FF + UMD Alpha	**2**	-0,0060	-0,0058	-0,0073	-0,0097	-0,0142	0,0082
t-stat		**-4,7527**	**-7,4304**	**-9,5469**	**-13,1394**	**-16,7200**	**5,6459**
3FF + UMD Alpha	**3**	-0,0054	-0,0064	-0,0079	-0,0117	-0,0181	0,0127
t-stat		**-4,6377**	**-8,6755**	**-11,0913**	**-18,0499**	**-17,3624**	**8,8700**
3FF + UMD Alpha	**4**	-0,0058	-0,0067	-0,0101	-0,0133	-0,0240	0,0181
t-stat		**-4,4527**	**-9,5327**	**-15,0237**	**-16,5841**	**-17,4481**	**10,3822**
3FF + UMD Alpha	**H**	-0,0066	-0,0073	-0,0119	-0,0165	-0,0289	0,0223
t-stat		**-4,5028**	**-8,0893**	**-13,3049**	**-16,3753**	**-16,2605**	**11,5332**
3FF + UMD Alpha	**L-H**	0,0011	0,0013	0,0065	0,0107	0,0223	0,0234
t-stat		0,8646	1,2138	**6,0814**	**8,0624**	**11,5332**	**12,7147**

		L	2	3	4	H	L-H
3FF + QMJ Alpha	**L**	-0,0071	-0,0078	-0,0098	-0,0100	-0,0119	0,0049
t-stat		**-4,3004**	**-9,9400**	**-12,1199**	**-11,6287**	**-12,0544**	**2,4562**
3FF + QMJ Alpha	**2**	-0,0074	-0,0078	-0,0091	-0,0104	-0,0117	0,0043
t-stat		**-5,0536**	**-9,3426**	**-12,1066**	**-13,7273**	**-12,1610**	**2,2679**
3FF + QMJ Alpha	**3**	-0,0068	-0,0082	-0,0091	-0,0112	-0,0141	0,0073
t-stat		**-5,1075**	**-10,4878**	**-12,6557**	**-15,6378**	**-12,1708**	**3,9980**
3FF + QMJ Alpha	**4**	-0,0065	-0,0080	-0,0107	-0,0117	-0,0169	0,0104
t-stat		**-4,6157**	**-10,5436**	**-15,5110**	**-13,3835**	**-11,5646**	**5,0058**
3FF + QMJ Alpha	**H**	-0,0065	-0,0074	-0,0104	-0,0128	-0,0192	0,0127
t-stat		**-4,1865**	**-7,8631**	**-11,1375**	**-12,1186**	**-11,4958**	**5,9704**
3FF + QMJ Alpha	**L-H**	-0,0006	-0,0001	0,0037	0,0063	0,0127	0,0122
t-stat		-0,3965	-0,0647	**2,7330**	**4,0114**	**5,9704**	**5,1727**

Table 41. Skew and R&D to Sales (Outperformance)

The table reports abnormal returns for double sorted portfolios based on fundamental variable as R&D to Sales and Skewness. Fundamental variable is expressed horizontally and Skewness is expressed vertically. Outperformance – alfa measurements for R&D to Sales and Skewness strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	-0,0072	-0,0077	-0,0062	-0,0058	-0,0079	0,0008	*5FF Alpha*	L	-0,0131	-0,0131	-0,0116	-0,0097	-0,0089	-0,0042	*3FF + BAB Alpha*	L	-0,0113	-0,0120	-0,0103	-0,0087	-0,0061	-0,0052
t-stat		**-4,8660**	**-5,1932**	**-4,1060**	**-4,2796**	**-3,6916**	0,3854	*t-stat*		**-9,7223**	**-9,0409**	**-7,8184**	**-8,0180**	**-4,1444**	-1,8572	*t-stat*		**-12,3633**	**-12,7875**	**-10,5727**	**-10,6255**	**-4,1417**	**-3,1108**
CAPM Alpha	2	-0,0063	-0,0067	-0,0056	-0,0061	-0,0086	0,0022	*5FF Alpha*	2	-0,0112	-0,0115	-0,0115	-0,0109	-0,0108	-0,0005	*3FF + BAB Alpha*	2	-0,0104	-0,0111	-0,0099	-0,0089	-0,0074	-0,0030
t-stat		**-5,0648**	**-4,9891**	**-4,0917**	**-4,6238**	**-4,1137**	1,1313	*t-stat*		**-10,4947**	**-10,6979**	**-10,7637**	**-9,7263**	**-5,5818**	-0,2146	*t-stat*		**-14,3734**	**-14,1567**	**-12,9154**	**-11,2900**	**-5,3146**	-1,8964
CAPM Alpha	3	-0,0071	-0,0069	-0,0069	-0,0064	-0,0105	0,0034	*5FF Alpha*	3	-0,0115	-0,0114	-0,0124	-0,0099	-0,0120	0,0006	*3FF + BAB Alpha*	3	-0,0114	-0,0115	-0,0113	-0,0091	-0,0091	-0,0023
t-stat		**-5,4469**	**-5,0503**	**-5,2614**	**-4,9839**	**-4,9807**	1,7302	*t-stat*		**-11,1299**	**-10,0288**	**-12,2250**	**-8,9543**	**-6,3271**	0,2791	*t-stat*		**-16,3960**	**-15,1408**	**-15,9202**	**-12,4050**	**-6,3838**	-1,4388
CAPM Alpha	4	-0,0087	-0,0074	-0,0085	-0,0077	-0,0139	0,0052	*5FF Alpha*	4	-0,0111	-0,0107	-0,0111	-0,0098	-0,0146	0,0034	*3FF + BAB Alpha*	4	-0,0132	-0,0120	-0,0131	-0,0110	-0,0127	-0,0005
t-stat		**-6,3101**	**-5,1836**	**-6,1333**	**-5,4331**	**-5,7271**	**2,3762**	*t-stat*		**-10,5794**	**-9,7595**	**-10,8017**	**-8,5283**	**-6,5996**	1,5602	*t-stat*		**-17,2148**	**-15,8520**	**-17,7779**	**-14,4304**	**-7,6104**	-0,2632
CAPM Alpha	H	-0,0110	-0,0100	-0,0100	-0,0106	-0,0172	0,0061	*5FF Alpha*	H	-0,0134	-0,0120	-0,0127	-0,0116	-0,0166	0,0032	*3FF + BAB Alpha*	H	-0,0151	-0,0142	-0,0146	-0,0134	-0,0162	0,0011
t-stat		**-6,8108**	**-6,5763**	**-6,3084**	**-6,0974**	**-6,0248**	**2,6910**	*t-stat*		**-8,9126**	**-8,8690**	**-8,9623**	**-7,4126**	**-6,0866**	1,3009	*t-stat*		**-14,8599**	**-15,4072**	**-15,9274**	**-12,6748**	**-7,9166**	0,5477
CAPM Alpha	L-H	0,0039	0,0037	0,0029	0,0019	0,0061	0,0100	*5FF Alpha*	L-H	0,0003	0,0008	0,0012	0,0004	0,0032	0,0035	*3FF + BAB Alpha*	L-H	0,0039	0,0037	0,0032	0,0002	0,0011	0,0049
t-stat		**3,2681**	**3,4994**	**3,2168**	1,5719	**2,6910**	**3,7727**	*t-stat*		0,1664	0,5776	0,9667	0,2953	1,3009	1,2423	*t-stat*		**3,2272**	**3,5797**	**3,5101**	0,1791	0,5477	**2,1783**
		L	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**
3FF Alpha	L	-0,0104	-0,0111	-0,0095	-0,0084	-0,0079	-0,0025	*3FF + UMD Alpha*	L	-0,0094	-0,0096	-0,0082	-0,0072	-0,0065	-0,0028	*3FF + QMJ Alpha*	L	-0,0112	-0,0118	-0,0100	-0,0088	-0,0026	-0,0086
t-stat		**-11,4175**	**-11,7183**	**-9,8153**	**-10,4768**	**-5,2753**	-1,4342	*t-stat*		**-10,3517**	**-10,5419**	**-8,6146**	**-9,2682**	**-4,3441**	**-1,5809**	*t-stat*		**-11,6526**	**-11,8792**	**-9,7254**	**-10,3324**	-1,8556	**-5,2262**
3FF Alpha	2	-0,0092	-0,0098	-0,0089	-0,0085	-0,0088	-0,0004	*3FF + UMD Alpha*	2	-0,0089	-0,0092	-0,0084	-0,0075	-0,0083	-0,0007	*3FF + QMJ Alpha*	2	-0,0104	-0,0115	-0,0105	-0,0089	-0,0038	-0,0066
t-stat		**-11,9954**	**-11,9017**	**-11,1936**	**-10,9576**	**-6,2908**	-0,2194	*t-stat*		**-11,3803**	**-11,0528**	**-10,3914**	**-9,8567**	**-5,7609**	-0,3821	*t-stat*		**-13,0493**	**-13,6157**	**-12,8988**	**-10,9048**	**-2,8873**	**-4,2000**
3FF Alpha	3	-0,0099	-0,0100	-0,0098	-0,0086	-0,0106	0,0007	*3FF + UMD Alpha*	3	-0,0097	-0,0099	-0,0099	-0,0082	-0,0101	0,0005	*3FF + QMJ Alpha*	3	-0,0112	-0,0116	-0,0110	-0,0081	-0,0049	-0,0063
t-stat		**-12,7696**	**-12,1471**	**-12,6689**	**-11,9339**	**-7,3268**	0,3927	*t-stat*		**-12,2392**	**-11,7922**	**-12,4427**	**-11,1975**	**-6,8916**	0,2644	*t-stat*		**-13,9957**	**-13,7511**	**-13,5956**	**-10,5940**	**-3,7170**	**-4,1105**
3FF Alpha	4	-0,0118	-0,0104	-0,0117	-0,0101	-0,0141	0,0023	*3FF + UMD Alpha*	4	-0,0121	-0,0109	-0,0120	-0,0102	-0,0142	0,0021	*3FF + QMJ Alpha*	4	-0,0127	-0,0116	-0,0127	-0,0098	-0,0071	-0,0056
t-stat		**-14,3648**	**-12,5416**	**-14,7053**	**-12,9967**	**-8,4437**	1,2470	*t-stat*		**-14,5382**	**-12,8130**	**-14,8926**	**-12,8060**	**-8,3359**	1,1023	*t-stat*		**-14,7893**	**-13,3954**	**-15,3492**	**-11,9403**	**-4,8017**	**-3,4051**
3FF Alpha	H	-0,0139	-0,0126	-0,0131	-0,0129	-0,0173	0,0035	*3FF + UMD Alpha*	H	-0,0143	-0,0131	-0,0134	-0,0131	-0,0178	0,0034	*3FF + QMJ Alpha*	H	-0,0131	-0,0120	-0,0127	-0,0099	-0,0086	-0,0045
t-stat		**-13,2866**	**-13,0591**	**-13,4502**	**-12,3759**	**-8,5725**	1,7698	*t-stat*		**-13,4950**	**-13,3334**	**-13,5506**	**-12,3009**	**-8,5922**	1,7053	*t-stat*		**-11,8938**	**-11,7318**	**-12,3527**	**-9,6412**	**-4,8485**	**-2,5445**
3FF Alpha	L-H	0,0034	0,0034	0,0032	0,0011	0,0035	0,0069	*3FF + UMD Alpha*	L-H	0,0050	0,0042	0,0037	0,0010	0,0034	0,0084	*3FF + QMJ Alpha*	L-H	0,0019	0,0016	0,0015	-0,0029	-0,0045	-0,0026
t-stat		**2,8933**	**3,3620**	**3,5715**	0,9994	1,7698	**3,0468**	*t-stat*		**4,2673**	**4,0975**	**4,1502**	**0,8417**	1,7053	**3,6557**	*t-stat*		1,5192	1,5173	1,6520	**-2,7100**	**-2,5445**	-1,3059

Table 42. Skewness and spread (Outperformance)

The table reports abnormal returns for double sorted portfolios based on liquidity variable as Bid – Ask Spread and Skewness. Fundamental variable is expressed horizontally and Skewness is expressed vertically. Outperformance – alfa measurements for Bid- Ask Spread and Skewness strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H				L	2	3	4	H	L-H				L	2	3	4	H	L-H
CAPM Alpha	L	-0,0110	-0,0136	-0,0098	-0,0075	-0,0088	-0,0019		*5FF Alpha*	L	-0,0141	-0,0220	-0,0130	-0,0084	-0,0104	-0,0033		*3FF + BAB Alpha*	L	-0,0143	-0,0178	-0,0133	-0,0107	-0,0115	-0,0026
t-stat		**-4,8912**	**-6,7618**	**-5,4097**	**-4,2141**	**-5,6563**	-0,7416		*t-stat*		**-3,4286**	**-5,4858**	**-4,0494**	**-3,2721**	**-4,3176**	-0,7391		*t-stat*		**-7,4470**	**-9,8423**	**-8,2496**	**-6,5448**	**-7,6814**	-1,0899
CAPM Alpha	2	-0,0121	-0,0126	-0,0092	-0,0089	-0,0093	-0,0029		*5FF Alpha*	2	-0,0127	-0,0175	-0,0135	-0,0120	-0,0104	-0,0024		*3FF + BAB Alpha*	2	-0,0156	-0,0181	-0,0152	-0,0138	-0,0130	-0,0023
t-stat		**-5,3335**	**-5,6732**	**-4,4546**	**-5,3171**	**-6,5608**	-1,1676		*t-stat*		**-3,0770**	**-5,2434**	**-3,7421**	**-4,7895**	**-4,7444**	-0,5361		*t-stat*		**-7,9877**	**-9,3066**	**-8,3871**	**-9,0546**	**-9,7944**	-0,9855
CAPM Alpha	3	-0,0129	-0,0103	-0,0130	-0,0117	-0,0090	-0,0033		*5FF Alpha*	3	-0,0114	-0,0121	-0,0157	-0,0120	-0,0066	-0,0055		*3FF + BAB Alpha*	3	-0,0173	-0,0157	-0,0171	-0,0160	-0,0122	-0,0044
t-stat		**-4,7925**	**-4,5806**	**-7,4210**	**-7,2300**	**-5,3755**	-1,1535		*t-stat*		**-2,3413**	**-3,1385**	**-5,2296**	**-5,1819**	**-2,4001**	-0,9938		*t-stat*		**-7,0052**	**-7,9749**	**-10,7535**	**-11,4620**	**-7,7817**	-1,5671
CAPM Alpha	4	-0,0163	-0,0112	-0,0127	-0,0118	-0,0083	-0,0082		*5FF Alpha*	4	-0,0152	-0,0100	-0,0143	-0,0115	-0,0053	-0,0102		*3FF + BAB Alpha*	4	-0,0194	-0,0165	-0,0174	-0,0159	-0,0122	-0,0069
t-stat		**-6,6066**	**-4,9993**	**-6,3464**	**-6,5942**	**-4,1083**	-2,8010		*t-stat*		**-3,3201**	**-2,8619**	**-4,5214**	**-4,6723**	**-2,0199**	**-1,9932**		*t-stat*		**-8,9709**	**-8,5165**	**-10,1367**	**-10,0658**	**-6,0193**	**-2,4840**
CAPM Alpha	H	-0,0154	-0,0122	-0,0111	-0,0110	-0,0109	-0,0044		*5FF Alpha*	H	-0,0105	-0,0114	-0,0133	-0,0093	-0,0082	-0,0028		*3FF + BAB Alpha*	H	-0,0190	-0,0171	-0,0156	-0,0164	-0,0130	-0,0063
t-stat		**-6,0524**	**-5,7615**	**-5,6843**	**-5,6493**	**-6,4284**	-1,5444		*t-stat*		**-2,2986**	**-3,3443**	**-4,4132**	**-3,5101**	**-3,1188**	-0,5453		*t-stat*		**-8,5197**	**-9,2542**	**-8,9489**	**-9,9728**	**-7,7799**	**-2,3069**
CAPM Alpha	L-H	0,0044	0,0007	-0,0018	-0,0054	-0,0044	-0,0002		*5FF Alpha*	L-H	-0,0035	-0,0006	0,0018	-0,0059	-0,0028	-0,0064		*3FF + BAB Alpha*	L-H	0,0048	0,0020	-0,0016	-0,0027	-0,0063	-0,0016
t-stat		1,7821	0,3118	-0,6627	**-1,9575**	-1,5444	-0,0581		*t-stat*		-0,6454	-0,1165	0,3476	-1,1179	-0,5453	-1,4478		*t-stat*		1,8966	0,8640	-0,5731	-1,0040	**-2,3069**	-0,6268
		L	**2**	**3**	**4**	**H**	**L-H**				**L**	**2**	**3**	**4**	**H**	**L-H**				**L**	**2**	**3**	**4**	**H**	**L-H**
3FF Alpha	L	-0,0135	-0,0154	-0,0114	-0,0085	-0,0097	-0,0036		*3FF + UMD Alpha*	L	-0,0117	-0,0156	-0,0098	-0,0081	-0,0091	-0,0023		*3FF + QMJ Alpha*	L	-0,0116	-0,0159	-0,0122	-0,0101	-0,0080	-0,0035
t-stat		**-7,2443**	**-8,6396**	**-6,9078**	**-5,0441**	**-6,3513**	-1,5750		*t-stat*		**-6,1613**	**-8,5111**	**-5,8284**	**-4,6564**	**-5,8447**	-0,9632		*t-stat*		**-4,7982**	**-6,5235**	**-5,9107**	**-5,0614**	**-5,2474**	-1,2778
3FF Alpha	2	-0,0144	-0,0145	-0,0110	-0,0098	-0,0100	-0,0040		*3FF + UMD Alpha*	2	-0,0131	-0,0151	-0,0108	-0,0104	-0,0111	-0,0015		*3FF + QMJ Alpha*	2	-0,0151	-0,0148	-0,0123	-0,0119	-0,0099	-0,0046
t-stat		**-7,4273**	**-7,3948**	**-6,0145**	**-6,1442**	**-7,3378**	-1,7454		*t-stat*		**-6,6035**	**-7,4674**	**-5,7788**	**-6,3685**	**-7,9615**	-0,6540		*t-stat*		**-6,1130**	**-6,4030**	**-5,2960**	**-6,5978**	**-6,1050**	-1,6057
3FF Alpha	3	-0,0155	-0,0120	-0,0143	-0,0127	-0,0100	-0,0048		*3FF + UMD Alpha*	3	-0,0148	-0,0129	-0,0144	-0,0140	-0,0111	-0,0030		*3FF + QMJ Alpha*	3	-0,0107	-0,0107	-0,0158	-0,0119	-0,0084	-0,0011
t-stat		**-6,4340**	**-5,9113**	**-9,0859**	**-8,4560**	**-6,2570**	-1,7403		*t-stat*		**-5,9774**	**-6,1562**	**-8,9005**	**-9,1417**	**-6,8071**	-1,0485		*t-stat*		**-3,7086**	**-4,3919**	**-7,5972**	**-7,0636**	**-4,5504**	-0,3160
3FF Alpha	4	-0,0190	-0,0132	-0,0143	-0,0133	-0,0087	-0,0101		*3FF + UMD Alpha*	4	-0,0186	-0,0139	-0,0149	-0,0131	-0,0099	-0,0083		*3FF + QMJ Alpha*	4	-0,0173	-0,0129	-0,0143	-0,0132	-0,0056	-0,0118
t-stat		**-8,9705**	**-6,9367**	**-7,8874**	**-8,1754**	**-4,3075**	**-3,6935**		*t-stat*		**-8,5289**	**-7,0597**	**-8,0302**	**-7,8073**	**-4,8018**	**-2,9588**		*t-stat*		**-6,4979**	**-5,5729**	**-6,4416**	**-7,0242**	**-3,0513**	**-3,7638**
3FF Alpha	H	-0,0182	-0,0144	-0,0128	-0,0126	-0,0115	-0,0068		*3FF + UMD Alpha*	H	-0,0174	-0,0151	-0,0136	-0,0140	-0,0127	-0,0046		*3FF + QMJ Alpha*	H	-0,0148	-0,0111	-0,0129	-0,0099	-0,0082	-0,0068
t-stat		**-8,4487**	**-7,8733**	**-7,3539**	**-7,4695**	**-6,8465**	**-2,5471**		*t-stat*		**-7,8318**	**-8,0159**	**-7,5587**	**-8,1409**	**-7,4075**	-1,7058		*t-stat*		**-5,5379**	**-4,9474**	**-6,3777**	**-5,5451**	**-4,5267**	**-2,1367**
3FF Alpha	L-H	0,0047	0,0006	-0,0026	-0,0062	-0,0068	-0,0022		*3FF + UMD Alpha*	L-H	0,0057	0,0028	-0,0012	-0,0042	-0,0046	0,0009		*3FF + QMJ Alpha*	L-H	0,0033	-0,0029	0,0023	-0,0075	-0,0068	-0,0039
t-stat		**1,9131**	0,2753	-0,9539	**-2,2853**	**-2,5471**	-0,9069		*t-stat*		**2,2202**	1,1704	-0,4263	-1,5095	-1,7058	0,3655		*t-stat*		1,0353	-0,9939	0,7028	**-2,3331**	**-2,1367**	-1,3904

Table 43. Kurtosis and cash to debt (Outperformance)

The table reports abnormal returns for double sorted portfolios based on Cash to Debt fundamental variable and Kurtosis. Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. Outperformance – alfa measurements for Cash to debt and Kurtosis strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazzini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	**L**	-0,0206	-0,0102	-0,0047	-0,0024	-0,0024	-0,0182	*5FF Alpha*	**L**	-0,0224	-0,0155	-0,0106	-0,0075	-0,0060	-0,0164	3FF + BAB Alpha	**L**	-0,022	-0,014	-0,0087	-0,0052	-0,0036	-0,0184
t-stat		**-8,0734**	**-5,7074**	**-3,3384**	-1,9222	**-2,0766**	**-9,1263**	*t-stat*		**-7,9282**	**-7,9488**	**-8,2839**	**-7,1448**	**-6,0861**	**-5,9340**	t-stat		-11,9308	-11,684	-10,0926	-6,8203	-5,0787	-9,9145
CAPM Alpha	**2**	-0,0218	-0,0099	-0,0043	-0,0022	-0,0023	-0,0195	*5FF Alpha*	**2**	-0,0246	-0,0136	-0,0099	-0,0084	-0,0064	-0,0182	3FF + BAB Alpha	**2**	-0,023	-0,014	-0,0083	-0,0055	-0,0038	-0,0191
t-stat		**-8,7952**	**-6,3717**	**-3,3323**	-1,9366	**-2,0563**	**-9,6252**	*t-stat*		**-9,2107**	**-8,5039**	**-9,7481**	**-9,3949**	**-6,8595**	**-6,7083**	t-stat		-12,9224	-13,4142	-11,6852	-7,9416	-5,7072	-10,1659
CAPM Alpha	**3**	-0,0240	-0,0096	-0,0046	-0,0024	-0,0024	-0,0215	*5FF Alpha*	**3**	-0,0245	-0,0124	-0,0101	-0,0077	-0,0069	-0,0176	3FF + BAB Alpha	**3**	-0,025	-0,014	-0,0089	-0,0056	-0,0043	-0,0205
t-stat		**-9,2015**	**-6,1690**	**-3,5637**	**-2,0875**	**-2,1579**	**-10,2882**	*t-stat*		**-9,1979**	**-8,2854**	**-9,9846**	**-8,5209**	**-7,8789**	**-6,8140**	t-stat		-13,3133	-14,881	-13,0809	-8,1629	-6,5449	-10,77
CAPM Alpha	**4**	-0,0262	-0,0104	-0,0054	-0,0031	-0,0031	-0,0231	*5FF Alpha*	**4**	-0,0268	-0,0116	-0,0088	-0,0074	-0,0061	-0,0207	3FF + BAB Alpha	**4**	-0,028	-0,015	-0,0097	-0,0068	-0,0051	-0,0223
t-stat		**-9,4407**	**-6,1968**	**-4,1155**	**-2,6691**	**-2,6615**	**-10,6012**	*t-stat*		**-9,2994**	**-7,4738**	**-8,9857**	**-8,1881**	**-6,8582**	**-7,4581**	t-stat		-13,7033	-13,7364	-13,9261	-10,7886	-7,8145	-11,2844
CAPM Alpha	**H**	-0,0286	-0,0127	-0,0056	-0,0046	-0,0046	-0,0240	*5FF Alpha*	**H**	-0,0278	-0,0125	-0,0083	-0,0075	-0,0065	-0,0213	3FF + BAB Alpha	**H**	-0,029	-0,017	-0,0097	-0,0086	-0,0068	-0,0223
t-stat		**-9,7283**	**-6,9945**	**-3,8677**	**-3,2961**	**-3,2515**	**-11,6477**	*t-stat*		**-9,2723**	**-6,9922**	**-6,8311**	**-6,4371**	**-5,7621**	**-8,3178**	t-stat		-13,4317	-13,229	-12,2907	-11,6595	-8,2399	-11,929
CAPM Alpha	**L-H**	0,0080	-0,0091	-0,0184	-0,0216	-0,0240	-0,0160	*5FF Alpha*	**L-H**	0,0054	-0,0120	-0,0162	-0,0193	-0,0213	-0,0159	3FF + BAB Alpha	**L-H**	0,0072	-0,007	-0,0151	-0,0189	-0,0223	-0,0151
t-stat		**4,9320**	**-4,8450**	**-9,2987**	**-10,1847**	**-11,6477**	**-8,9180**	*t-stat*		**2,2336**	**-4,3613**	**-6,8182**	**-7,5809**	**-8,3178**	**-6,1886**	t-stat		4,359	-3,6388	-8,8197	-9,9974	-11,929	-8,8813
		L	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**			**L**	**2**	**3**	**4**	**H**	**L-H**
3FF Alpha	**L**	-0,0223	-0,0139	-0,0082	-0,0049	-0,0036	-0,0187	*3FF + UMD Alpha*	**L**	-0,0203	-0,0118	-0,0070	-0,0040	-0,0029	-0,0175	3FF + QMJ Alpha	**L**	-0,016	-0,014	-0,0088	-0,0061	-0,0045	-0,0111
t-stat		**-12,3381**	**-11,5845**	**-9,5807**	**-6,4206**	**-5,1536**	**-10,2911**	*t-stat*		**-11,3203**	**-10,3800**	**-8,3830**	**-5,2864**	**-4,1442**	**-9,5036**	t-stat		-9,3104	-10,6252	-9,7838	-7,8553	-6,2665	-6,881
3FF Alpha	**2**	-0,0232	-0,0132	-0,0074	-0,0048	-0,0035	-0,0196	*3FF + UMD Alpha*	**2**	-0,0223	-0,0122	-0,0068	-0,0044	-0,0034	-0,0188	3FF + QMJ Alpha	**2**	-0,017	-0,013	-0,0087	-0,0066	-0,0046	-0,0123
t-stat		**-13,3122**	**-13,0912**	**-10,1465**	**-6,7760**	**-5,3635**	**-10,6306**	*t-stat*		**-12,5771**	**-12,0778**	**-9,2192**	**-6,0751**	**-5,0772**	**-10,0091**	t-stat		-10,357	-12,3441	-11,5635	-9,4042	-6,6343	-7,3335
3FF Alpha	**3**	-0,0250	-0,0127	-0,0077	-0,0047	-0,0036	-0,0214	*3FF + UMD Alpha*	**3**	-0,0247	-0,0124	-0,0075	-0,0047	-0,0039	-0,0208	3FF + QMJ Alpha	**3**	-0,018	-0,013	-0,0086	-0,0065	-0,0045	-0,013
t-stat		**-13,6946**	**-13,2663**	**-10,5594**	**-6,8356**	**-5,4450**	**-11,4014**	*t-stat*		**-13,2264**	**-12,7249**	**-10,0987**	**-6,6037**	**-5,7381**	**-10,8648**	t-stat		-10,7013	-12,7268	-11,3609	-9,439	-6,4582	-8,0452
3FF Alpha	**4**	-0,0275	-0,0134	-0,0085	-0,0056	-0,0045	-0,0230	*3FF + UMD Alpha*	**4**	-0,0277	-0,0136	-0,0086	-0,0059	-0,0052	-0,0224	3FF + QMJ Alpha	**4**	-0,02	-0,013	-0,0095	-0,007	-0,0052	-0,0147
t-stat		**-14,0261**	**-12,4834**	**-11,5105**	**-8,3888**	**-6,8946**	**-11,8273**	*t-stat*		**-13,7685**	**-12,3499**	**-11,3679**	**-8,6491**	**-7,9601**	**-11,2959**	t-stat		-11,0818	-11,6742	-12,2407	-10,1486	-7,4216	-8,5736
3FF Alpha	**H**	-0,0296	-0,0155	-0,0085	-0,0071	-0,0061	-0,0235	*3FF + UMD Alpha*	**H**	-0,0295	-0,0160	-0,0087	-0,0076	-0,0070	-0,0225	3FF + QMJ Alpha	**H**	-0,021	-0,014	-0,0077	-0,0075	-0,0051	-0,0155
t-stat		**-13,8991**	**-12,5235**	**-10,2661**	**-8,9668**	**-7,2996**	**-12,6855**	*t-stat*		**-13,5343**	**-12,6451**	**-10,3660**	**-9,4347**	**-8,4879**	**-11,9342**	t-stat		-10,926	-10,7574	-8,8836	-8,868	-5,8363	-9,5414
3FF Alpha	**L-H**	0,0073	-0,0077	-0,0165	-0,0204	-0,0235	-0,0162	*3FF + UMD Alpha*	**L-H**	0,0092	-0,0063	-0,0159	-0,0200	-0,0225	-0,0133	3FF + QMJ Alpha	**L-H**	0,0049	-0,003	-0,0098	-0,0124	-0,0155	-0,0106
t-stat		**4,5289**	**-4,3328**	**-9,6711**	**-10,8334**	**-12,6855**	**-9,6021**	*t-stat*		**5,6824**	**-3,5242**	**-9,1487**	**-10,4087**	**-11,9342**	**-8,3027**	t-stat		2,9082	-1,6475	-6,2976	-7,4463	-9,5414	-6,5647

Table 44. Kurtosis and Debt to EBITDA (Outperformance)

The table reports abnormal returns for double sorted portfolios based on Debt to EBITDA fundamental variable and Kurtosis. Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. Outperformance – alfa measurements for Cash to debt and Kurtosis strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazzini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	**L**	-0,0216	-0,0036	-0,0020	-0,0033	-0,0099	-0,0117	*5FF Alpha*	**L**	-0,0234	-0,0054	-0,0067	-0,0097	-0,0155	-0,0080	*3FF + BAB Alpha*	**L**	-0,0225	-0,0040	-0,0045	-0,0075	-0,0149	-0,0076
t-stat		**-8,0626**	**-2,6521**	-1,7204	**-2,3476**	**-5,5321**	**-5,2067**	*t-stat*		**-7,3056**	**-4,4927**	**-7,0601**	**-7,8157**	**-9,2624**	**-2,8125**	*t-stat*		**-10,4963**	**-5,0696**	**-6,0706**	**-8,4608**	**-13,7489**	**-3,7085**
CAPM Alpha	**2**	-0,0212	-0,0041	**-0,0019**	-0,0028	-0,0090	-0,0122	*5FF Alpha*	**2**	-0,0253	-0,0069	-0,0073	-0,0091	-0,0135	-0,0118	*3FF + BAB Alpha*	**2**	-0,0224	-0,0045	-0,0050	-0,0069	-0,0141	-0,0083
t-stat		**-8,6947**	**-3,3886**	-1,6397	**-2,1243**	**-5,5648**	**-5,8029**	*t-stat*		**-9,5816**	**-6,7133**	**-8,7144**	**-9,3013**	**-9,8639**	**-4,6774**	*t-stat*		**-12,1955**	**-6,4791**	**-6,8125**	**-9,0545**	**-15,1040**	**-4,4242**
CAPM Alpha	**3**	-0,0233	-0,0056	-0,0021	-0,0031	-0,0096	-0,0137	*5FF Alpha*	**3**	-0,0256	-0,0083	-0,0065	-0,0082	-0,0135	-0,0121	*3FF + BAB Alpha*	**3**	-0,0243	-0,0062	-0,0054	-0,0074	-0,0149	-0,0094
t-stat		**-9,0094**	**-4,3067**	-1,8972	**-2,3944**	**-6,0211**	**-6,3365**	*t-stat*		**-9,4830**	**-7,7894**	**-7,4341**	**-9,1764**	**-9,5558**	**-4,9968**	*t-stat*		**-12,5245**	**-8,3486**	**-8,3407**	**-10,9313**	**-16,4555**	**-5,0044**
CAPM Alpha	**4**	-0,0255	-0,0073	-0,0020	-0,0037	-0,0110	-0,0145	*5FF Alpha*	**4**	-0,0272	-0,0086	-0,0057	-0,0080	-0,0124	-0,0147	*3FF + BAB Alpha*	**4**	-0,0262	-0,0080	-0,0055	-0,0084	-0,0162	-0,0100
t-stat		**-9,3675**	**-5,2103**	-1,6295	**-2,8949**	**-6,6952**	**-6,2669**	*t-stat*		**-9,4112**	**-7,7539**	**-6,0842**	**-9,1560**	**-9,6770**	**-5,4218**	*t-stat*		**-12,4538**	**-10,3039**	**-7,7810**	**-12,8005**	**-18,0298**	**-4,7688**
CAPM Alpha	**H**	-0,0282	-0,0073	-0,0038	-0,0039	-0,0116	-0,0167	*5FF Alpha*	**H**	-0,0286	-0,0085	-0,0064	-0,0066	-0,0124	-0,0162	*3FF + BAB Alpha*	**H**	-0,0291	-0,0082	-0,0073	-0,0086	-0,0165	-0,0127
t-stat		**-9,7622**	**-4,1666**	**-2,7970**	**-2,7837**	**-6,7159**	**-7,5575**	*t-stat*		**-9,4821**	**-5,2878**	**-6,2767**	**-6,1501**	**-7,9272**	**-6,1621**	*t-stat*		**-13,2564**	**-7,3203**	**-10,5140**	**-12,1255**	**-15,5548**	**-6,4995**
CAPM Alpha	**L-H**	0,0067	-0,0139	-0,0195	-0,0216	-0,0167	-0,0100	*5FF Alpha*	**L-H**	0,0051	-0,0168	-0,0192	-0,0206	-0,0162	-0,0111	*3FF + BAB Alpha*	**L-H**	0,0066	-0,0141	-0,0170	-0,0176	-0,0127	-0,0060
t-stat		**3,9975**	**-9,2226**	**-9,4929**	**-9,4170**	**-7,5575**	**-4,6044**	*t-stat*		**2,0785**	**-7,3910**	**-7,4957**	**-7,7798**	**-6,1621**	**-3,7380**	*t-stat*		**3,8788**	**-9,3197**	**-8,8121**	**-8,5296**	**-6,4995**	**-2,9616**
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	**L**	-0,0230	-0,0042	-0,0040	-0,0068	-0,0143	-0,0087	*3FF + UMD Alpha*	**L**	-0,0206	-0,0035	-0,0036	-0,0060	-0,0123	-0,0083	*3FF + QMJ Alpha*	**L**	-0,0157	-0,0039	-0,0059	-0,0084	-0,0144	-0,0012
t-stat		**-10,9404**	**-5,3930**	**-5,4079**	**-7,7502**	**-13,3440**	**-4,3081**	*t-stat*		**-9,8686**	**-4,5117**	**-4,8210**	**-6,7684**	**-12,2547**	**-3,9971**	*t-stat*		**-7,8771**	**-4,7924**	**-7,9656**	**-9,2917**	**-12,6760**	-0,6545
3FF Alpha	**2**	-0,0228	-0,0048	-0,0040	-0,0060	-0,0132	-0,0096	*3FF + UMD Alpha*	**2**	-0,0214	-0,0044	-0,0040	-0,0054	-0,0120	-0,0094	*3FF + QMJ Alpha*	**2**	-0,0162	-0,0044	-0,0066	-0,0079	-0,0138	-0,0024
t-stat		**-12,6730**	**-6,9868**	**-5,3524**	**-7,6740**	**-14,1191**	**-5,1628**	*t-stat*		**-11,8012**	**-6,3100**	**-5,2534**	**-6,8494**	**-13,0595**	**-4,9424**	*t-stat*		**-9,6595**	**-6,1125**	**-9,2064**	**-10,1320**	**-13,9090**	-1,4137
3FF Alpha	**3**	-0,0246	-0,0061	-0,0042	-0,0061	-0,0136	-0,0110	*3FF + UMD Alpha*	**3**	-0,0237	-0,0064	-0,0044	-0,0061	-0,0132	-0,0105	*3FF + QMJ Alpha*	**3**	-0,0171	-0,0051	-0,0063	-0,0082	-0,0139	-0,0032
t-stat		**-12,9497**	**-8,4816**	**-6,1648**	**-8,4427**	**-14,5143**	**-5,8758**	*t-stat*		**-12,2396**	**-8,6615**	**-6,2035**	**-8,1833**	**-13,8009**	**-5,4849**	*t-stat*		**-9,8999**	**-6,7914**	**-9,3347**	**-11,3805**	**-14,0350**	-1,9214
3FF Alpha	**4**	-0,0267	-0,0080	-0,0042	-0,0069	-0,0147	-0,0119	*3FF + UMD Alpha*	**4**	-0,0269	-0,0084	-0,0050	-0,0073	-0,0146	-0,0123	*3FF + QMJ Alpha*	**4**	-0,0182	-0,0065	-0,0061	-0,0084	-0,0156	-0,0027
t-stat		**-12,9118**	**-10,5443**	**-5,4556**	**-9,4576**	**-15,6296**	**-5,6666**	*t-stat*		**-12,7529**	**-10,8405**	**-6,5735**	**-9,8139**	**-15,1621**	**-5,7218**	*t-stat*		**-9,8311**	**-8,3839**	**-8,0006**	**-11,3699**	**-15,6692**	-1,4548
3FF Alpha	**H**	-0,0295	-0,0080	-0,0059	-0,0070	-0,0152	-0,0143	*3FF + UMD Alpha*	**H**	-0,0298	-0,0085	-0,0066	-0,0077	-0,0152	-0,0146	*3FF + QMJ Alpha*	**H**	-0,0206	-0,0046	-0,0066	-0,0079	-0,0144	-0,0062
t-stat		**-13,6697**	**-7,2228**	**-8,0133**	**-8,7507**	**-13,9932**	**-7,3518**	*t-stat*		**-13,5120**	**-7,5614**	**-8,8782**	**-9,5540**	**-13,7008**	**-7,3360**	*t-stat*		**-10,6713**	**-4,3110**	**-8,4280**	**-9,5064**	**-12,5674**	**-3,5720**
3FF Alpha	**L-H**	0,0064	-0,0149	-0,0187	-0,0197	-0,0143	-0,0079	*3FF + UMD Alpha*	**L-H**	0,0092	-0,0130	-0,0171	-0,0193	-0,0146	-0,0054	*3FF + QMJ Alpha*	**L-H**	0,0049	-0,0115	-0,0106	-0,0103	-0,0062	-0,0013
t-stat		**3,8395**	**-9,9260**	**-9,6709**	**-9,4767**	**-7,3518**	**-3,8603**	*t-stat*		**5,7585**	**-8,7987**	**-8,7787**	**-9,0768**	**-7,3360**	**-2,6761**	*t-stat*		**2,7903**	**-7,5937**	**-6,1609**	**-5,7841**	**-3,5720**	-0,6449

Table 45. Kurtosis and Dividend payout ratio (Outperformance)

The table reports abnormal returns for double sorted portfolios based on Dividend payout ratio fundamental variable and Kurtosis. Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. Outperformance – alfa measurements for Dividend payout ratio and Kurtosis strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	-0,0056	-0,0060	-0,0042	-0,0021	-0,0023	-0,0033	*5FF Alpha*	L	-0,0087	-0,0108	-0,0090	-0,0067	-0,0084	-0,0002	*3FF + BAB Alp*	L	-0,0084	-0,0091	-0,0073	-0,0049	-0,0063	-0,0021
t-stat		**-3,7405**	**-4,0698**	**-3,1276**	-1,7894	-1,7057	**-2,6616**	*t-stat*		**-7,2127**	**-8,8118**	**-7,0576**	**-5,6527**	**-6,4047**	-0,1575	*t-stat*		**-9,5252**	**-10,1520**	**-8,0545**	**-5,6753**	**-6,8887**	**-1,9280**
CAPM Alpha	2	-0,0063	-0,0052	-0,0042	-0,0011	-0,0022	-0,0041	*5FF Alpha*	2	-0,0104	-0,0099	-0,0087	-0,0054	-0,0073	-0,0031	*3FF + BAB Alp*	2	-0,0092	-0,0083	-0,0071	-0,0043	-0,0061	-0,0031
t-stat		**-4,4299**	**-3,7149**	**-3,3554**	-0,9920	-1,8733	**-3,4584**	*t-stat*		**-8,6469**	**-8,6621**	**-8,2821**	**-5,7442**	**-7,3573**	**-2,2144**	*t-stat*		**-10,7940**	**-10,0513**	**-9,8215**	**-5,6729**	**-7,7720**	**-3,0352**
CAPM Alpha	3	-0,0059	-0,0063	-0,0046	-0,0017	-0,0024	-0,0035	*5FF Alpha*	3	-0,0085	-0,0094	-0,0078	-0,0064	-0,0082	-0,0003	*3FF + BAB Alp*	3	-0,0089	-0,0095	-0,0074	-0,0050	-0,0063	-0,0026
t-stat		**-4,1576**	**-4,4235**	**-3,6386**	-1,6521	**-2,1905**	**-3,0339**	*t-stat*		**-8,0216**	**-7,5149**	**-7,0959**	**-7,2246**	**-9,9490**	-0,2478	*t-stat*		**-11,8613**	**-11,7081**	**-10,0330**	**-7,0812**	**-8,8291**	**-2,8011**
CAPM Alpha	4	-0,0062	-0,0059	-0,0042	-0,0015	-0,0025	-0,0037	*5FF Alpha*	4	-0,0080	-0,0074	-0,0063	-0,0051	-0,0075	-0,0005	*3FF + BAB Alp*	4	-0,0099	-0,0095	-0,0076	-0,0049	-0,0066	-0,0033
t-stat		**-4,0073**	**-3,8023**	**-3,0759**	-1,3713	**-2,2108**	**-2,9678**	*t-stat*		**-6,2761**	**-6,0180**	**-5,6979**	**-5,6010**	**-8,1314**	-0,3754	*t-stat*		**-11,5816**	**-11,4002**	**-10,3823**	**-6,7491**	**-8,9656**	**-3,2270**
CAPM Alpha	H	-0,0060	-0,0077	-0,0036	-0,0015	-0,0034	-0,0026	*5FF Alpha*	H	-0,0084	-0,0083	-0,0052	-0,0040	-0,0061	-0,0024	*3FF + BAB Alp*	H	-0,0098	-0,0112	-0,0073	-0,0050	-0,0073	-0,0025
t-stat		**-3,6803**	**-4,6367**	**-2,3344**	-1,3504	**-2,9952**	**-1,9655**	*t-stat*		**-5,8473**	**-5,6772**	**-3,8763**	**-4,4136**	**-6,2972**	-1,4834	*t-stat*		**-10,1802**	**-11,0532**	**-8,3207**	**-7,5573**	**-9,8187**	**-2,1934**
CAPM Alpha	L-H	0,0004	0,0014	-0,0024	-0,0047	-0,0026	-0,0022	*5FF Alpha*	L-H	-0,0002	-0,0021	-0,0034	-0,0040	-0,0024	-0,0026	*3FF + BAB Alp*	L-H	0,0014	0,0020	-0,0016	-0,0048	-0,0025	-0,0011
t-stat		0,3527	1,3419	**-2,4598**	**-4,7125**	**-1,9655**	-1,7921	*t-stat*		-0,1460	-1,3933	**-2,4849**	**-3,0580**	-1,4834	-1,8090	*t-stat*		1,2064	1,8300	-1,6326	**-5,2837**	**-2,1934**	-1,0673
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	L	-0,0076	-0,0082	-0,0063	-0,0044	-0,0057	-0,0019	*3FF + UMD Al*	L	-0,0072	-0,0076	-0,0057	-0,0039	-0,0048	-0,0024	*3FF + QMJ Alp*	L	-0,0089	-0,0099	-0,0082	-0,0069	-0,0079	-0,0011
t-stat		**-8,6080**	**-9,1297**	**-6,9413**	**-5,2539**	**-6,1698**	**-1,8669**	*t-stat*		**-7,9999**	**-8,4042**	**-6,1985**	**-4,5833**	**-5,1854**	**-2,2996**	*t-stat*		**-9,7454**	**-10,7801**	**-8,8952**	**-8,3903**	**-8,5559**	-0,9639
3FF Alpha	2	-0,0083	-0,0073	-0,0062	-0,0034	-0,0052	-0,0031	*3FF + UMD Al*	2	-0,0082	-0,0072	-0,0060	-0,0034	-0,0049	-0,0033	*3FF + QMJ Alp*	2	-0,0095	-0,0088	-0,0076	-0,0062	-0,0078	-0,0017
t-stat		**-9,6684**	**-8,5741**	**-8,3899**	**-4,4871**	**-6,4861**	**-3,1391**	*t-stat*		**-9,3184**	**-8,2762**	**-8,0374**	**-4,3250**	**-6,0358**	**-3,2096**	*t-stat*		**-10,5601**	**-10,0999**	**-10,0796**	**-8,8458**	**-10,1244**	-1,6258
3FF Alpha	3	-0,0079	-0,0082	-0,0064	-0,0040	-0,0052	-0,0027	*3FF + UMD Al*	3	-0,0082	-0,0086	-0,0065	-0,0040	-0,0053	-0,0029	*3FF + QMJ Alp*	3	-0,0090	-0,0095	-0,0077	-0,0068	-0,0079	-0,0012
t-stat		**-10,1715**	**-9,6909**	**-8,4376**	**-5,4885**	**-7,0113**	**-2,9205**	*t-stat*		**-10,2847**	**-9,9599**	**-8,4508**	**-5,3830**	**-6,9220**	**-3,0727**	*t-stat*		**-11,1524**	**-10,6640**	**-9,7558**	**-10,2925**	**-11,0967**	-1,2497
3FF Alpha	4	-0,0084	-0,0081	-0,0062	-0,0037	-0,0055	-0,0029	*3FF + UMD Al*	4	-0,0092	-0,0088	-0,0069	-0,0045	-0,0055	-0,0037	*3FF + QMJ Alp*	4	-0,0095	-0,0086	-0,0072	-0,0068	-0,0081	-0,0014
t-stat		**-9,4043**	**-9,1466**	**-7,9445**	**-4,8759**	**-7,1968**	**-2,9528**	*t-stat*		**-10,2367**	**-9,9382**	**-8,7338**	**-5,8187**	**-7,1015**	**-3,6541**	*t-stat*		**-10,0772**	**-9,1854**	**-8,7543**	**-9,6660**	**-11,0495**	-1,3811
3FF Alpha	H	-0,0082	-0,0098	-0,0058	-0,0037	-0,0062	-0,0020	*3FF + UMD Al*	H	-0,0091	-0,0108	-0,0069	-0,0044	-0,0066	-0,0025	*3FF + QMJ Alp*	H	-0,0083	-0,0096	-0,0058	-0,0057	-0,0080	-0,0003
t-stat		**-8,0806**	**-9,4440**	**-6,1479**	**-5,1435**	**-8,0886**	-1,7526	*t-stat*		**-8,8954**	**-10,2897**	**-7,4283**	**-6,1145**	**-8,4339**	**-2,1493**	*t-stat*		**-7,7279**	**-8,7017**	**-5,8038**	**-8,0043**	**-10,3484**	-0,2577
3FF Alpha	L-H	0,0006	0,0015	-0,0021	-0,0047	-0,0020	-0,0014	*3FF + UMD Al*	L-H	0,0019	0,0026	-0,0013	-0,0048	-0,0025	-0,0006	*3FF + QMJ Alp*	L-H	-0,0007	0,0001	-0,0033	-0,0038	-0,0003	-0,0010
t-stat		0,5054	1,4151	**-2,1977**	**-5,2776**	-1,7526	-1,3474	*t-stat*		1,6404	**2,3851**	-1,3040	**-5,2545**	**-2,1493**	-0,5925	*t-stat*		-0,5429	0,1147	**-3,1849**	**-4,0099**	-0,2577	-0,8600

Table 46. Kurtosis and Gross Margin (Outperformance)

The table reports abnormal returns for double sorted portfolios based on Gross margin fundamental variable and Kurtosis. Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. Outperformance – alfa measurements for Gross margin and Kurtosis strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	**L**	-0,0114	-0,0067	-0,0064	-0,0042	-0,0056	-0,0058	*5FF Alpha*	**L**	-0,0176	-0,0130	-0,0125	-0,0084	-0,0065	-0,0110	*3FF + BAB Alpha*	**L**	-0,0150	-0,0105	-0,0097	-0,0068	-0,0071	-0,0080
t-stat		-5,9367	-4,3325	-4,5654	-3,2102	-4,3268	-4,0086	*t-stat*		-8,4061	-9,5613	-10,2182	-6,4887	-4,9970	-5,4062	*t-stat*		-11,3817	-11,6087	-11,4551	-8,0125	-7,9096	-5,8494
CAPM Alpha	**2**	-0,0116	-0,0061	-0,0050	-0,0050	-0,0054	-0,0063	*5FF Alpha*	**2**	-0,0187	-0,0125	-0,0107	-0,0090	-0,0069	-0,0117	*3FF + BAB Alpha*	**2**	-0,0154	-0,0101	-0,0083	-0,0076	-0,0067	-0,0087
t-stat		-7,1156	-4,3306	-3,8380	-4,1792	-4,6570	-5,1166	*t-stat*		-12,0720	-11,5068	-10,4826	-8,4128	-6,7126	-7,4332	*t-stat*		-15,2781	-13,1345	-11,4822	-10,8862	-8,8408	-7,9597
CAPM Alpha	**3**	-0,0127	-0,0066	-0,0067	-0,0047	-0,0059	-0,0069	*5FF Alpha*	**3**	-0,0173	-0,0121	-0,0123	-0,0085	-0,0063	-0,0110	*3FF + BAB Alpha*	**3**	-0,0161	-0,0107	-0,0102	-0,0075	-0,0077	-0,0083
t-stat		-7,6141	-4,7177	-5,0351	-3,8125	-4,9247	-5,6783	*t-stat*		-11,2244	-10,2506	-11,9626	-8,3327	-5,8746	-6,8980	*t-stat*		-15,9013	-13,9263	-14,8688	-10,8983	-10,1169	-7,3131
CAPM Alpha	**4**	-0,0154	-0,0081	-0,0081	-0,0061	-0,0074	-0,0079	*5FF Alpha*	**4**	-0,0187	-0,0123	-0,0111	-0,0091	-0,0064	-0,0123	*3FF + BAB Alpha*	**4**	-0,0185	-0,0124	-0,0116	-0,0092	-0,0091	-0,0094
t-stat		-8,0924	-5,4274	-5,5793	-4,6363	-5,8733	-6,1499	*t-stat*		-10,2615	-11,5769	-9,5949	-8,1844	-6,0453	-6,9978	*t-stat*		-14,7421	-16,3789	-14,9498	-12,7534	-11,4342	-7,5673
CAPM Alpha	**H**	-0,0195	-0,0115	-0,0095	-0,0077	-0,0096	-0,0099	*5FF Alpha*	**H**	-0,0215	-0,0152	-0,0116	-0,0084	-0,0073	-0,0141	*3FF + BAB Alpha*	**H**	-0,0214	-0,0156	-0,0129	-0,0107	-0,0119	-0,0096
t-stat		-8,5846	-6,9647	-5,3616	-4,9659	-6,0299	-7,1117	*t-stat*		-9,8471	-9,8925	-6,9801	-6,0560	-4,9986	-8,0412	*t-stat*		-13,5991	-15,9385	-11,9310	-11,3334	-10,8781	-7,1783
CAPM Alpha	**L-H**	0,0081	-0,0001	-0,0032	-0,0076	-0,0099	-0,0018	*5FF Alpha*	**L-H**	0,0039	-0,0035	-0,0057	-0,0103	-0,0141	-0,0103	*3FF + BAB Alpha*	**L-H**	0,0064	0,0003	-0,0032	-0,0078	-0,0096	-0,0032
t-stat		4,9079	-0,1405	-3,2084	-6,6483	-7,1117	-1,1193	*t-stat*		1,7246	-2,2943	-3,7345	-6,0467	-8,0412	-4,5187	*t-stat*		4,0235	0,2653	-3,1166	-6,6575	-7,1783	-2,0536
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	**L**	-0,0150	-0,0101	-0,0092	-0,0064	-0,0068	-0,0082	*3FF + UMD Alpha*	**L**	-0,0128	-0,0087	-0,0079	-0,0055	-0,0062	-0,0066	*3FF + QMJ Alpha*	**L**	-0,0124	-0,0104	-0,0102	-0,0074	-0,0066	-0,0057
t-stat		-11,5843	-11,3092	-11,0378	-7,7008	-7,7487	-6,1345	*t-stat*		-10,3825	-10,1269	-9,8419	-6,6714	-6,9490	-5,0101	*t-stat*		-9,3447	-11,0869	-11,5604	-8,4681	-7,1234	-4,1774
3FF Alpha	**2**	-0,0149	-0,0092	-0,0076	-0,0070	-0,0062	-0,0087	*3FF + UMD Alpha*	**2**	-0,0137	-0,0086	-0,0071	-0,0065	-0,0061	-0,0076	*3FF + QMJ Alpha*	**2**	-0,0132	-0,0104	-0,0087	-0,0078	-0,0066	-0,0067
t-stat		-15,0593	-11,8289	-10,5463	-10,1005	-8,2735	-8,1612	*t-stat*		-14,0212	-10,9125	-9,6857	-9,2592	-7,9753	-7,1460	*t-stat*		-12,9179	-12,8551	-11,4968	-10,5921	-8,2509	-6,0959
3FF Alpha	**3**	-0,0155	-0,0094	-0,0094	-0,0068	-0,0069	-0,0085	*3FF + UMD Alpha*	**3**	-0,0151	-0,0092	-0,0093	-0,0065	-0,0073	-0,0079	*3FF + QMJ Alpha*	**3**	-0,0131	-0,0104	-0,0096	-0,0076	-0,0072	-0,0058
t-stat		-15,5015	-11,6578	-13,4108	-9,6312	-9,0130	-7,6408	*t-stat*		-14,8442	-11,0868	-12,9167	-9,0643	-9,2494	-6,9364	*t-stat*		-12,9998	-12,2875	-12,9704	-10,3471	-8,8679	-5,1929
3FF Alpha	**4**	-0,0178	-0,0113	-0,0107	-0,0083	-0,0086	-0,0092	*3FF + UMD Alpha*	**4**	-0,0182	-0,0115	-0,0107	-0,0087	-0,0093	-0,0088	*3FF + QMJ Alpha*	**4**	-0,0139	-0,0120	-0,0107	-0,0087	-0,0076	-0,0063
t-stat		-14,3792	-14,3514	-13,4954	-11,2139	-10,8477	-7,6045	*t-stat*		-14,3710	-14,2145	-13,2411	-11,6269	-11,8089	-7,1284	*t-stat*		-11,6007	-14,3692	-12,7908	-11,1058	-9,1313	-5,1703
3FF Alpha	**H**	-0,0215	-0,0143	-0,0120	-0,0096	-0,0111	-0,0104	*3FF + UMD Alpha*	**H**	-0,0217	-0,0144	-0,0125	-0,0106	-0,0119	-0,0098	*3FF + QMJ Alpha*	**H**	-0,0158	-0,0133	-0,0097	-0,0082	-0,0086	-0,0072
t-stat		-13,9497	-14,2475	-11,1301	-9,9709	-10,2678	-7,8931	*t-stat*		-13,7511	-14,0327	-11,3842	-11,0300	-10,9259	-7,2787	*t-stat*		-11,0239	-12,6060	-9,8162	-8,1280	-7,8659	-5,4004
3FF Alpha	**L-H**	0,0066	-0,0006	-0,0035	-0,0082	-0,0104	-0,0039	*3FF + UMD Alpha*	**L-H**	0,0089	0,0007	-0,0026	-0,0076	-0,0098	-0,0008	*3FF + QMJ Alpha*	**L-H**	0,0034	0,0001	-0,0034	-0,0057	-0,0072	-0,0038
t-stat		4,2030	-0,5815	-3,4815	-7,1578	-7,8931	-2,5504	*t-stat*		5,9311	0,7282	-2,6124	-6,5046	-7,2787	-0,5998	*t-stat*		2,1356	0,0981	-3,2074	-4,9118	-5,4004	-2,3344

Table 47. Kurtosis and PTB (Outperformance)

The table reports abnormal returns for double sorted portfolios based on price to book fundamental variable and Kurtosis. Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. Outperformance – alfa measurements for price to book and Kurtosis strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	-0,0047	-0,0031	-0,0057	-0,0076	-0,0128	0,0082	*5FF Alpha*	L	-0,0116	-0,0089	-0,0106	-0,0105	-0,0138	0,0022	*3FF + BAB Alpha*	L	-0,0090	-0,0072	-0,0090	-0,0096	-0,0127	0,0037
t-stat		**-2,0112**	**-2,1709**	**-4,3294**	**-6,2705**	**-9,5944**	**3,5545**	*t-stat*		**-4,3642**	**-8,1430**	**-9,8340**	**-9,9131**	**-11,3524**	0,7460	*t-stat*		**-5,5828**	**-9,5327**	**-11,5335**	**-11,7868**	**-13,3831**	**1,9462**
CAPM Alpha	2	-0,0043	-0,0034	-0,0048	-0,0080	-0,0130	0,0088	*5FF Alpha*	2	-0,0117	-0,0090	-0,0098	-0,0115	-0,0145	0,0028	*3FF + BAB Alpha*	2	-0,0091	-0,0075	-0,0084	-0,0100	-0,0130	0,0039
t-stat		**-1,9523**	**-2,3639**	**-3,9136**	**-7,0547**	**-9,7838**	**3,9224**	*t-stat*		**-4,9928**	**-7,3434**	**-10,6077**	**-12,5385**	**-11,6852**	0,9921	*t-stat*		**-6,3704**	**-9,3042**	**-11,5279**	**-13,7084**	**-14,1753**	**2,1540**
CAPM Alpha	3	-0,0034	-0,0041	-0,0052	-0,0095	-0,0164	0,0130	*5FF Alpha*	3	-0,0100	-0,0080	-0,0099	-0,0128	-0,0170	0,0070	*3FF + BAB Alpha*	3	-0,0083	-0,0082	-0,0088	-0,0116	-0,0169	0,0086
t-stat		-1,6401	**-2,9761**	**-4,1183**	**-8,2236**	**-10,5124**	**6,1870**	*t-stat*		**-4,8621**	**-7,3781**	**-10,5412**	**-14,2784**	**-11,1838**	**2,6380**	*t-stat*		**-6,4911**	**-11,1273**	**-13,1544**	**-17,7168**	**-15,1503**	**4,9089**
CAPM Alpha	4	-0,0033	-0,0044	-0,0072	-0,0109	-0,0213	0,0180	*5FF Alpha*	4	-0,0069	-0,0075	-0,0104	-0,0132	-0,0200	0,0131	*3FF + BAB Alpha*	4	-0,0087	-0,0083	-0,0108	-0,0129	-0,0216	0,0129
t-stat		-1,6244	**-3,1579**	**-5,8365**	**-8,3760**	**-10,6037**	**7,8365**	*t-stat*		**-3,2679**	**-7,0445**	**-11,9183**	**-11,6094**	**-10,2193**	**4,7165**	*t-stat*		**-6,4453**	**-11,5420**	**-17,3849**	**-15,8550**	**-14,3613**	**6,3537**
CAPM Alpha	H	-0,0042	-0,0046	-0,0088	-0,0140	-0,0266	0,0223	*5FF Alpha*	H	-0,0075	-0,0077	-0,0095	-0,0148	-0,0243	0,0168	*3FF + BAB Alpha*	H	-0,0093	-0,0088	-0,0126	-0,0160	-0,0264	0,0170
t-stat		**-1,9451**	**-3,0465**	**-5,7788**	**-8,5128**	**-10,9256**	**9,3237**	*t-stat*		**-3,2334**	**-5,6960**	**-7,2288**	**-10,0688**	**-10,0956**	**5,6605**	*t-stat*		**-6,2292**	**-10,2300**	**-14,9551**	**-15,5521**	**-14,1601**	**7,9151**
CAPM Alpha	L-H	-0,0004	0,0003	0,0054	0,0107	0,0223	0,0219	*5FF Alpha*	L-H	-0,0040	-0,0040	-0,0005	0,0079	0,0168	0,0128	*3FF + BAB Alpha*	L-H	0,0004	-0,0004	0,0043	0,0073	0,0170	0,0174
t-stat		-0,3225	0,2530	**4,0115**	**6,2912**	**9,3237**	**8,3392**	*t-stat*		**-2,0475**	**-2,0559**	-0,2267	**3,5915**	**5,6605**	**3,7397**	*t-stat*		0,2781	-0,3006	**3,3831**	**4,8238**	**7,9151**	**7,4383**
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	L	-0,0095	-0,0065	-0,0083	-0,0088	-0,0123	0,0028	*3FF + UMD Alpha*	L	-0,0055	-0,0054	-0,0077	-0,0092	-0,0134	0,0079	*3FF + QMJ Alpha*	L	-0,0071	-0,0078	-0,0098	-0,0100	-0,0119	0,0049
t-stat		**-6,0138**	**-8,6218**	**-10,6538**	**-10,7007**	**-13,1996**	1,4955	*t-stat*		**-4,0606**	**-7,3538**	**-9,7985**	**-10,9873**	**-14,4813**	**5,0521**	*t-stat*		**-4,3004**	**-9,9400**	**-12,1199**	**-11,6287**	**-12,0544**	**2,4562**
3FF Alpha	2	-0,0091	-0,0069	-0,0074	-0,0092	-0,0124	0,0033	*3FF + UMD Alpha*	2	-0,0060	-0,0058	-0,0073	-0,0097	-0,0142	0,0082	*3FF + QMJ Alpha*	2	-0,0074	-0,0078	-0,0091	-0,0104	-0,0117	0,0043
t-stat		**-6,5106**	**-8,6639**	**-9,9388**	**-12,5844**	**-13,6114**	1,8370	*t-stat*		**-4,7527**	**-7,4304**	**-9,5469**	**-13,1394**	**-16,7200**	**5,6459**	*t-stat*		**-5,0536**	**-9,3426**	**-12,1066**	**-13,7273**	**-12,1610**	**2,2679**
3FF Alpha	3	-0,0079	-0,0074	-0,0079	-0,0107	-0,0160	0,0081	*3FF + UMD Alpha*	3	-0,0054	-0,0064	-0,0079	-0,0117	-0,0181	0,0127	*3FF + QMJ Alpha*	3	-0,0068	-0,0082	-0,0091	-0,0112	-0,0141	0,0073
t-stat		**-6,2916**	**-9,8026**	**-11,4125**	**-15,7058**	**-14,2862**	**4,6659**	*t-stat*		**-4,6377**	**-8,6755**	**-11,0913**	**-18,0499**	**-17,3624**	**8,8700**	*t-stat*		**-5,1075**	**-10,4878**	**-12,6557**	**-15,6378**	**-12,1708**	**3,9980**
3FF Alpha	4	-0,0077	-0,0077	-0,0097	-0,0121	-0,0211	0,0133	*3FF + UMD Alpha*	4	-0,0058	-0,0067	-0,0101	-0,0133	-0,0240	0,0181	*3FF + QMJ Alpha*	4	-0,0065	-0,0080	-0,0107	-0,0117	-0,0169	0,0104
t-stat		**-5,7456**	**-10,6594**	**-14,5935**	**-14,5914**	**-14,2190**	**6,6892**	*t-stat*		**-4,4527**	**-9,5327**	**-15,0237**	**-16,5841**	**-17,4481**	**10,3822**	*t-stat*		**-4,6157**	**-10,5436**	**-15,5110**	**-13,3835**	**-11,5646**	**5,0058**
3FF Alpha	H	-0,0084	-0,0076	-0,0112	-0,0150	-0,0263	0,0179	*3FF + UMD Alpha*	H	-0,0066	-0,0073	-0,0119	-0,0165	-0,0289	0,0223	*3FF + QMJ Alpha*	H	-0,0065	-0,0074	-0,0104	-0,0128	-0,0192	0,0127
t-stat		**-5,6713**	**-8,6116**	**-12,5918**	**-14,4562**	**-14,3998**	**8,4359**	*t-stat*		**-4,5028**	**-8,0893**	**-13,3049**	**-16,3753**	**-16,2605**	**11,5332**	*t-stat*		**-4,1865**	**-7,8631**	**-11,1375**	**-12,1186**	**-11,4958**	**5,9704**
3FF Alpha	L-H	-0,0011	-0,0016	0,0033	0,0073	0,0179	0,0168	*3FF + UMD Alpha*	L-H	0,0011	0,0013	0,0065	0,0107	0,0223	0,0234	*3FF + QMJ Alpha*	L-H	-0,0006	-0,0001	0,0037	0,0063	0,0127	0,0122
t-stat		-0,8106	-1,2564	**2,5862**	**4,8959**	**8,4359**	**7,3071**	*t-stat*		0,8646	1,2138	**6,0814**	**8,0624**	**11,5332**	**12,7147**	*t-stat*		-0,3965	-0,0647	**2,7330**	**4,0114**	**5,9704**	**5,1727**

Table 48. Kurtosis and R&D to Sales (Outperformance)

The table reports abnormal returns for double sorted portfolios based on R&D to Sale fundamental variable and Kurtosis. Fundamental variable is expressed horizontally and Kurtosis is expressed vertically. Outperformance – alfa measurements for R&D to Sale and Kurtosis strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	**L**	-0,0072	-0,0077	-0,0062	-0,0058	-0,0079	0,0008	*5FF Alpha*	**L**	-0,0131	-0,0131	-0,0116	-0,0097	-0,0089	-0,0042	*3FF + BAB Alpha*	**L**	-0,0113	-0,0120	-0,0103	-0,0087	-0,0061	-0,0052
t-stat		**-4,8660**	**-5,1932**	**-4,1060**	**-4,2796**	**-3,6916**	0,3854	*t-stat*		**-9,7223**	**-9,0409**	**-7,8184**	**-8,0180**	**-4,1444**	-1,8572	*t-stat*		**-12,3633**	**-12,7875**	**-10,5727**	**-10,6255**	**-4,1417**	**-3,1108**
CAPM Alpha	**2**	-0,0063	-0,0067	-0,0056	-0,0061	-0,0086	0,0022	*5FF Alpha*	**2**	-0,0112	-0,0115	-0,0115	-0,0109	-0,0108	-0,0005	*3FF + BAB Alpha*	**2**	-0,0104	-0,0111	-0,0099	-0,0089	-0,0074	-0,0030
t-stat		**-5,0648**	**-4,9891**	**-4,0917**	**-4,6238**	**-4,1137**	1,1313	*t-stat*		**-10,4947**	**-10,6979**	**-10,7637**	**-9,7263**	**-5,5818**	-0,2146	*t-stat*		**-14,3734**	**-14,1567**	**-12,9154**	**-11,2900**	**-5,3146**	-1,8964
CAPM Alpha	**3**	-0,0071	-0,0069	-0,0069	-0,0064	-0,0105	0,0034	*5FF Alpha*	**3**	-0,0115	-0,0114	-0,0124	-0,0099	-0,0120	0,0006	*3FF + BAB Alpha*	**3**	-0,0114	-0,0115	-0,0113	-0,0091	-0,0091	-0,0023
t-stat		**-5,4469**	**-5,0503**	**-5,2614**	**-4,9839**	**-4,9807**	1,7302	*t-stat*		**-11,1299**	**-10,0288**	**-12,2250**	**-8,9543**	**-6,3271**	0,2791	*t-stat*		**-16,3960**	**-15,1408**	**-15,9202**	**-12,4050**	**-6,3838**	-1,4388
CAPM Alpha	**4**	-0,0087	-0,0074	-0,0085	-0,0077	-0,0139	0,0052	*5FF Alpha*	**4**	-0,0111	-0,0107	-0,0111	-0,0098	-0,0146	0,0034	*3FF + BAB Alpha*	**4**	-0,0132	-0,0120	-0,0131	-0,0110	-0,0127	-0,0005
t-stat		**-6,3101**	**-5,1836**	**-6,1333**	**-5,4331**	**-5,7271**	**2,3762**	*t-stat*		**-10,5794**	**-9,7595**	**-10,8017**	**-8,5283**	**-6,5996**	1,5602	*t-stat*		**-17,2148**	**-15,8520**	**-17,7779**	**-14,4304**	**-7,6104**	-0,2632
CAPM Alpha	**H**	-0,0110	-0,0100	-0,0100	-0,0106	-0,0172	0,0061	*5FF Alpha*	**H**	-0,0134	-0,0120	-0,0127	-0,0116	-0,0166	0,0032	*3FF + BAB Alpha*	**H**	-0,0151	-0,0142	-0,0146	-0,0134	-0,0162	0,0011
t-stat		**-6,8108**	**-6,5763**	**-6,3084**	**-6,0974**	**-6,0248**	**2,6910**	*t-stat*		**-8,9126**	**-8,8690**	**-8,9623**	**-7,4126**	**-6,0866**	1,3009	*t-stat*		**-14,8599**	**-15,4072**	**-15,9274**	**-12,6748**	**-7,9166**	0,5477
CAPM Alpha	**L-H**	0,0039	0,0037	0,0029	0,0019	0,0061	0,0100	*5FF Alpha*	**L-H**	0,0003	0,0008	0,0012	0,0004	0,0032	0,0035	*3FF + BAB Alpha*	**L-H**	0,0039	0,0037	0,0032	0,0002	0,0011	0,0049
t-stat		**3,2681**	**3,4994**	**3,2168**	1,5719	**2,6910**	**3,7727**	*t-stat*		0,1664	0,5776	0,9667	0,2953	1,3009	1,2423	*t-stat*		**3,2272**	**3,5797**	**3,5101**	0,1791	0,5477	**2,1783**
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	**L**	-0,0104	-0,0111	-0,0095	-0,0084	-0,0079	-0,0025	*3FF + UMD Al*	**L**	-0,0094	-0,0096	-0,0082	-0,0072	-0,0065	-0,0028	*3FF + QMJ Alpha*	**L**	-0,0112	-0,0118	-0,0100	-0,0088	-0,0026	-0,0086
t-stat		**-11,4175**	**-11,7183**	**-9,8153**	**-10,4768**	**-5,2753**	-1,4342	*t-stat*		**-10,3517**	**-10,5419**	**-8,6146**	**-9,2682**	**-4,3441**	-1,5809	*t-stat*		**-11,6526**	**-11,8792**	**-9,7254**	**-10,3324**	-1,8556	**-5,2262**
3FF Alpha	**2**	-0,0092	-0,0098	-0,0089	-0,0085	-0,0088	-0,0004	*3FF + UMD Al*	**2**	-0,0089	-0,0092	-0,0084	-0,0075	-0,0083	-0,0007	*3FF + QMJ Alpha*	**2**	-0,0104	-0,0115	-0,0105	-0,0089	-0,0038	-0,0066
t-stat		**-11,9954**	**-11,9017**	**-11,1936**	**-10,9576**	**-6,2908**	-0,2194	*t-stat*		**-11,3803**	**-11,0528**	**-10,3914**	**-9,8567**	**-5,7609**	-0,3821	*t-stat*		**-13,0493**	**-13,6157**	**-12,8988**	**-10,9048**	**-2,8873**	**-4,2000**
3FF Alpha	**3**	-0,0099	-0,0100	-0,0098	-0,0086	-0,0106	0,0007	*3FF + UMD Al*	**3**	-0,0097	-0,0099	-0,0099	-0,0082	-0,0101	0,0005	*3FF + QMJ Alpha*	**3**	-0,0112	-0,0116	-0,0110	-0,0081	-0,0049	-0,0063
t-stat		**-12,7696**	**-12,1471**	**-12,6689**	**-11,9339**	**-7,3268**	0,3927	*t-stat*		**-12,2392**	**-11,7922**	**-12,4427**	**-11,1975**	**-6,8916**	0,2644	*t-stat*		**-13,9957**	**-13,7511**	**-13,5956**	**-10,5940**	**-3,7170**	**-4,1105**
3FF Alpha	**4**	-0,0118	-0,0104	-0,0117	-0,0101	-0,0141	0,0023	*3FF + UMD Al*	**4**	-0,0121	-0,0109	-0,0120	-0,0102	-0,0142	0,0021	*3FF + QMJ Alpha*	**4**	-0,0127	-0,0116	-0,0127	-0,0098	-0,0071	-0,0056
t-stat		**-14,3648**	**-12,5416**	**-14,7053**	**-12,9967**	**-8,4437**	1,2470	*t-stat*		**-14,5382**	**-12,8130**	**-14,8926**	**-12,8060**	**-8,3359**	1,1023	*t-stat*		**-14,7893**	**-13,3954**	**-15,3492**	**-11,9403**	**-4,8017**	**-3,4051**
3FF Alpha	**H**	-0,0139	-0,0126	-0,0131	-0,0129	-0,0173	0,0035	*3FF + UMD Al*	**H**	-0,0143	-0,0131	-0,0134	-0,0131	-0,0178	0,0034	*3FF + QMJ Alpha*	**H**	-0,0131	-0,0120	-0,0127	-0,0099	-0,0086	-0,0045
t-stat		**-13,2866**	**-13,0591**	**-13,4502**	**-12,3759**	**-8,5725**	1,7698	*t-stat*		**-13,4950**	**-13,3334**	**-13,5506**	**-12,3009**	**-8,5922**	1,7053	*t-stat*		**-11,8938**	**-11,7318**	**-12,3527**	**-9,6412**	**-4,8485**	**-2,5445**
3FF Alpha	**L-H**	0,0034	0,0034	0,0032	0,0011	0,0035	0,0069	*3FF + UMD Al*	**L-H**	0,0050	0,0042	0,0037	0,0010	0,0034	0,0084	*3FF + QMJ Alpha*	**L-H**	0,0019	0,0016	0,0015	-0,0029	-0,0045	-0,0026
t-stat		**2,8933**	**3,3620**	**3,5715**	0,9994	1,7698	**3,0468**	*t-stat*		**4,2673**	**4,0975**	**4,1502**	0,8417	1,7053	**3,6557**	*t-stat*		1,5192	1,5173	1,6520	**-2,7100**	**-2,5445**	-1,3059

Table 49. Kurtosis and Spread (Outperformance)

The table reports abnormal returns for double sorted portfolios based on bid – ask spread liquidity variable and Kurtosis. Spread Liquidity variable is expressed horizontally and Kurtosis is expressed vertically. Outperformance – alfa measurements for spread liquidity variable and Kurtosis strategy are presented by regressing against CAPM, Fama and French three factor model, Fama and French five factor model, Fama and French three factor model plus momentum(UMD), Fama and French three factor model plus betting against beta (BAB), Fama and French three factor model plus quality minus junk(QMJ). Portfolios are constructed by basing the prior performance of **36** months. The Explanatory variables for the factors are obtained from Ken French and Frazini library website. The alphas are in monthly percent, t-statistics are shown below the coefficient estimates, and 5% statistical significance is indicated in bold.

		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
CAPM Alpha	L	-0,0110	-0,0136	-0,0098	-0,0075	-0,0088	-0,0019	*5FF Alpha*	L	-0,0141	-0,0220	-0,0130	-0,0084	-0,0104	-0,0033	*3FF + BAB Alpha*	L	-0,0143	-0,0178	-0,0133	-0,0107	-0,0115	-0,0026
t-stat		-4,8912	-6,7618	-5,4097	-4,2141	-5,6563	-0,7406	t-stat		-3,4286	-5,4858	-4,0494	-3,2721	-4,3176	-0,7391	t-stat		-7,4470	-9,8423	-8,2496	-6,5448	-7,6814	-1,0899
CAPM Alpha	2	-0,0121	-0,0126	-0,0092	-0,0089	-0,0093	-0,0029	*5FF Alpha*	2	-0,0127	-0,0175	-0,0135	-0,0120	-0,0104	-0,0024	*3FF + BAB Alpha*	2	-0,0156	-0,0181	-0,0152	-0,0138	-0,0130	-0,0023
t-stat		-5,3335	-5,6732	-4,4546	-5,3171	-6,5608	-1,1676	t-stat		-3,0770	-5,2434	-3,7421	-4,7895	-4,7444	-0,5361	t-stat		-7,9877	-9,3066	-8,3871	-9,0546	-9,7944	-0,9855
CAPM Alpha	3	-0,0129	-0,0103	-0,0130	-0,0117	-0,0090	-0,0033	*5FF Alpha*	3	-0,0114	-0,0121	-0,0157	-0,0120	-0,0066	-0,0055	*3FF + BAB Alpha*	3	-0,0173	-0,0157	-0,0171	-0,0160	**-0,0122**	-0,0044
t-stat		-4,7925	-4,5806	-7,4210	-7,2300	-5,3755	-1,1535	t-stat		-2,3413	-3,1385	-5,2296	-5,1819	-2,4001	-0,9938	t-stat		-7,0052	-7,9749	-10,7535	-11,4620	-7,7817	-1,5671
CAPM Alpha	4	-0,0163	-0,0112	-0,0127	-0,0118	-0,0083	-0,0082	*5FF Alpha*	4	-0,0152	-0,0100	-0,0143	-0,0115	-0,0053	-0,0102	*3FF + BAB Alpha*	4	-0,0194	-0,0165	-0,0174	-0,0159	-0,0122	-0,0069
t-stat		-6,6066	-4,9993	-6,3464	-6,5942	-4,1083	-2,8010	t-stat		-3,3201	-2,8619	-4,5214	-4,6723	-2,0199	-1,9932	t-stat		-8,9709	-8,5165	-10,1367	-10,0658	-6,0193	-2,4840
CAPM Alpha	H	-0,0154	-0,0122	-0,0111	-0,0110	-0,0109	-0,0044	*5FF Alpha*	H	-0,0105	-0,0114	-0,0133	-0,0093	-0,0082	-0,0028	*3FF + BAB Alpha*	H	-0,0190	-0,0171	-0,0156	-0,0164	-0,0130	-0,0063
t-stat		-6,0524	-5,7615	-5,6843	-5,6493	-6,4284	-1,5444	t-stat		-2,2986	-3,3443	-4,4132	-3,5101	-3,1188	-0,5453	t-stat		-8,5197	-9,2542	-8,9489	-9,9728	-7,7799	-2,3069
CAPM Alpha	L-H	0,0044	0,0007	-0,0018	-0,0054	-0,0044	-0,0002	*5FF Alpha*	L-H	-0,0035	-0,0006	0,0018	-0,0059	-0,0028	-0,0064	*3FF + BAB Alpha*	L-H	0,0048	0,0020	-0,0016	-0,0027	-0,0063	-0,0016
t-stat		1,7821	0,3118	-0,6627	-1,9575	-1,5444	-0,0581	t-stat		-0,6454	-0,1165	0,3476	-1,1179	-0,5453	-1,4478	t-stat		1,8966	0,8640	-0,5731	-1,0040	-2,3069	-0,6268
		L	2	3	4	H	L-H			L	2	3	4	H	L-H			L	2	3	4	H	L-H
3FF Alpha	L	-0,0135	-0,0154	-0,0114	-0,0085	-0,0097	-0,0036	*3FF + UMD Alpha*	L	-0,0117	-0,0156	-0,0098	-0,0081	-0,0091	-0,0023	*3FF + QMJ Alpha*	L	-0,0116	-0,0159	-0,0122	-0,0101	-0,0080	-0,0035
t-stat		-7,2443	-8,6396	-6,9078	-5,0441	-6,3513	-1,5750	t-stat		-6,1613	-8,5111	-5,8284	-4,6564	-5,8447	-0,9632	t-stat		-4,7982	-6,5235	-5,9107	-5,0614	-5,2474	-1,2778
3FF Alpha	2	-0,0144	-0,0145	-0,0110	-0,0098	-0,0100	-0,0040	*3FF + UMD Alpha*	2	-0,0131	-0,0151	-0,0108	-0,0104	-0,0111	-0,0015	*3FF + QMJ Alpha*	2	-0,0151	-0,0148	-0,0123	-0,0119	-0,0099	-0,0046
t-stat		-7,4273	-7,3948	-6,0145	-6,1442	-7,3378	-1,7454	t-stat		-6,6035	-7,4674	-5,7788	-6,3685	-7,9615	-0,6540	t-stat		-6,1130	-6,4030	-5,2960	-6,5978	-6,1050	-1,6057
3FF Alpha	3	-0,0155	-0,0120	-0,0143	-0,0127	-0,0100	-0,0048	*3FF + UMD Alpha*	3	-0,0148	-0,0129	-0,0144	-0,0140	-0,0111	-0,0030	*3FF + QMJ Alpha*	3	-0,0107	-0,0107	-0,0158	-0,0119	-0,0084	-0,0011
t-stat		-6,4340	-5,9113	-9,0859	-8,4560	-6,2570	-1,7403	t-stat		-5,9774	-6,1562	-8,9005	-9,1417	-6,8071	-1,0465	t-stat		-3,7086	-4,3919	-7,5972	-7,0636	-4,5504	-0,3160
3FF Alpha	4	-0,0190	-0,0132	-0,0143	-0,0133	-0,0087	-0,0101	*3FF + UMD Alpha*	4	-0,0186	-0,0139	-0,0149	-0,0131	-0,0099	-0,0083	*3FF + QMJ Alpha*	4	-0,0173	-0,0129	-0,0143	-0,0132	-0,0056	-0,0118
t-stat		-8,9705	-6,9367	-7,8874	-8,1754	-4,3075	-3,6935	t-stat		-8,5289	-7,0597	-8,0302	-7,8073	-4,8018	-2,9588	t-stat		-6,4979	-5,5729	-6,4416	-7,0242	-3,0513	-3,7638
3FF Alpha	H	-0,0182	-0,0144	-0,0128	-0,0126	-0,0115	-0,0068	*3FF + UMD Alpha*	H	-0,0174	-0,0151	-0,0136	-0,0140	-0,0127	-0,0046	*3FF + QMJ Alpha*	H	-0,0148	-0,0111	-0,0129	-0,0099	-0,0082	-0,0068
t-stat		-8,4487	-7,8733	-7,3539	-7,4695	-6,8465	-2,5471	t-stat		-7,8318	-8,0159	-7,5587	-8,1409	-7,4075	-1,7058	t-stat		-5,5379	-4,9474	-6,3777	-5,5451	-4,5267	-2,1367
3FF Alpha	L-H	0,0047	0,0006	-0,0026	-0,0062	-0,0068	-0,0022	*3FF + UMD Alpha*	L-H	0,0057	0,0028	-0,0012	-0,0042	-0,0046	0,0009	*3FF + QMJ Alpha*	L-H	0,0033	-0,0029	0,0023	-0,0075	-0,0068	-0,0039
t-stat		1,9121	0,2753	-0,9539	-2,2853	-2,5471	-0,9069	t-stat		2,2202	1,1704	-0,4263	-1,5095	-1,7058	0,3655	t-stat		1,0353	-0,9939	0,7028	-2,3331	-2,1367	-1,3904