

Anomalies Enhanced: the Use of Higher Frequency Information

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Abstract

Many anomalies are based on low frequency, such as annual, data and ignore higher frequency information. In this paper, we provide simple strategies to incorporate higher frequency information, and find that there are significant economic gains of doing so. For 8 major anomalies, we find that the enhanced anomalies can yield twice average returns as before while with similar or lower risks. The results are robust to a number of controls.

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I Introduction

A fundamental problem in finance is to explain why different assets have different returns. Anomalies are those return patterns that cannot be explained by known theories. The study of anomalies not only helps to understand limitation of existing theories, but also serves as inspirations for developing new models. One common feature on many Anomalies is that they are formed based on low frequency information. For example, annual information are used to construct 8 of the major anomalies: the book-to-market ratio anomaly of Fama and French (1996, 2008), the operating profit of Fama and French (2014), the gross profitability of Novy-Marx (2013), the asset growth of Cooper, Gulen, and Schill (2008), the investment growth of Xing (2008), the net stock issue of Ritter (1991), the accrual examined in Sloan (1996), and the net operating assets of Hirshleifer (spell all the names out here) (2004), which are included in recent studies of (Fama and French, 2008; Stambaugh, Yu, and Yuan, 2012; ?). If an active portfolio manager trades on the anomalies, it is clear that he is likely to rebalanced the portfolios at a higher frequency, say monthly. The important question is how.

In this paper, we provide a simple strategy to incorporate the higher frequency performances of an anomaly to enhance the overall performance of the original low frequency anomaly. Specifically, in the long leg of any of the previous 8 annual anomalies, we rebalance the portfolio each month and hold only those stocks whose short-term performances are better than long-term performances, and short only those in the short leg whose short-term performances are worse than long-term performances. The idea is that if a stock's short-term performance is worse than its long-term performance, there may be unknown bad reasons and there is no reason for buying it. We use two approach to measure the short-term performances versus the long-term. The first is to compute, in each month, the expected returns based on the average returns over the past 50 and 200 days. When the short-term expected return based the 50-day data is greater than the long-term expected return based on, we buy or hold the stock if it is in the long leg of the anomaly. We short a stock in a similar fashion. The second approach is to measure the performances by the popular CAPM alpha. We compute the short- and long-term alphas in exactly the same way as before except the average returns are replaced by the average alphas. We will refer the approaches as MACD (for reasons apparent later) and ALPHA approaches, respectively.

Empirically, we find that the performances of the 8 anomalies are greatly enhanced by either of the two approaches: an average of over 100% increase in the returns. A composite portfolio that invests equally in the eight anomalies has a long-minus-short return of 0.64% per month (t-value = 8.58). Its Fama-French (1996) three-factor alpha is 0.60% per month (t-value = 9.25), and the Fama-French (2014) five-factor model alpha is 0.39% per month (t-value = 6.46). With the enhancement by MACD, the composite portfolio now earns 1.47% per month (t-value = 8.50), its three factor alpha is 1.61% per month (t-value = 10.6) and its five-factor alpha is 1.25% per month (t-value = 5.58). With the enhancement by ALPHA, the

It is natural to ask whether the proposed approach suffers from high trading costs since the portfolios now are rebalanced more frequently, thus it is important to track the portion of stocks that are brought in and drop out of the long leg and short leg in each month relative to the previous month. Our results show that, much of the rebalancing occurs in June, which is the time of applying fundamental analysis. The turnover rate can be as high as 100%. In other months of the year, the average turnover rate is around 15%. The relative inactive trading from the moving average enhanced anomalies, together with the large improvement of abnormal returns, should lead one to comfortably conclude that these new abnormal returns shall survive even after taking into account transaction costs. Moreover, we separate all stocks into groups of stocks that have high and low transaction costs as measured by the illiquidity measure of Amihud (2002). We find that abnormal returns are equally large in both groups. NEEDS MORE EXPLANATIONS HERE. Next, we examine the types of stocks that benefit the most from the moving average analysis. We expect moving average analysis contributes the most among stocks that have the most information uncertainty. We measure information uncertainty using idiosyncratic volatility, firm age and number of analyst following the stocks. Our results show that, among stocks that have high information uncertainty, moving average analysis improves the abnormal returns the most.

WHAT IS INFORMATION UNCERTAINTY???

We also test whether these abnormal returns are stronger in expansion periods or high sentiment periods. We find supporting evidences.

Our paper contributes in several dimensions. First, these popular anomalies rely on annual accounting data and assume annual rebalancing. If an investor adopts the approach

of value weighting in constructing her portfolios, she can rebalance each month by taking the monthly market capitalization into account. Nevertheless, this approach is still primarily based on fundamental analysis, and typically value weighted results are weaker than equal weighted results in anomalies. We propose to include moving average analysis, which seems to be less correlated with the fundamentals. Second, recent studies of Fama and French (2015) and Hou, Xue and Zhang (2015) argue that investment factor and profitability factor help greatly in terms of explaining anomalies, and together with the seminal three factors of Fama and French (1996), the anomalies may be not as large as we imagine. By introducing moving average analysis into these original anomalies, we show that anomalous returns remain large and these common factor models do not seem to capture the information in price moving averages, suggesting either some common factors are missing or we need to resort to behavioral factors. Third, the newly created portfolios are straightforward to construct and can be used as new sets of testing assets in the cross-sectional asset pricing tests. For long time, the 25 portfolios formed on size and book-to-market are the benchmark assets for testing an asset pricing model. Lewellen et al. (2012) argue that there is a factor structure in the 25 size-value portfolios and testing results based on those portfolios can be misleading. He suggests augmenting the testing assets with 30 industry portfolios. Dittmer (?) suggests basis portfolios. Our newly constructed portfolios raise the bar for asset pricing models.

The rest of the paper is organized as follows. Section II describes our data and methods to construct anomalies and the moving average filter but leave the detailed discussion of the anomalies to the appendix. Section III provides evidence for the performance improvement generated by the MA filter. Section IV analyzes the additional turnover generated by the monthly rebalance using the MA filter and examines the relation between performance improvement and liquidity of stocks. Section V explores the relation between performance improvement and stock information uncertainty. Section VI provides robustness tests in several dimensions. Section VII explore the information content of the MA filter. Section VIII concludes the paper.

II Data and Methodology

We consider eight well-documented popular anomalies largely following Fama and French (2008), and Stambaugh et al. (2012). These anomalies use annual accounting data and are relatively straightforward to calculate.

The first anomaly is the book-to-market ratio (BM) of Fama and French (1996, 2008). It is well known that firms with higher book-to-market ratio have higher returns in the future and these returns do not disappear after adjusting risk using the CAPM of Sharpe (1964) and Lintner (1965). The second anomaly is the operating profit (OP) of Fama and French (2014), who show that firms with higher operating profits have higher future returns. The third anomaly is the gross profitability (GP) of Novy-Marx (2013), who shows that firms with higher gross profit have higher future returns. The fourth anomaly is the asset growth (AG) of Cooper et al. (2008), Hou, Xue, and Zhang (2015), and Fama and French (2014), who show that firms with higher growth rates of asset have lower future return. The fifth anomaly is the investment growth (IK) of Xing (2008), who shows that firms with higher investment have lower future returns. The sixth anomaly is the net stock issue (NS) examined in Ritter (1991) and Loughran and Ritter (1995), and Fama and French (2008). Larger the net stock issue, lower the future returns. The seventh anomaly is the accrual (AC) examined in Sloan (1996) and Fama and French (2008). Larger the accrual, lower the future returns. The eighth anomaly is the net operating assets (NOA) of Hirshleifer et al. (2004). They show that firms with larger operating assets have lower future returns.

In June of each year t , we rank all stocks based on their accounting variables for the fiscal year ending in calendar year $t - 1$, excluding stocks with price less than \$5. All stocks are assigned into one of the deciles. We then construct the equal-weighted decile portfolios and further the spread portfolios, which take a long position on either Decile one or ten, whichever has the highest average return (Decile High) and take a short position on the other remaining extreme decile (Decile Low). The portfolios are rebalanced at the June of year $t + 1$. We delete stocks whose prices are less than five at the time of portfolio formation to avoid micro-structure issues. We provide details of anomaly variables in the appendix.

To construct the MA filter, we first construct the MAs on the last trading day of each

month. The MA in month m of lag L is defined as

$$MA_{jm}(L) = \frac{P_{j,d-L+1}^t + P_{j,d-L+2}^t + \cdots + P_{j,d-1}^t + P_{j,d}^t}{L}, \quad (1)$$

where P_{jd}^t is the closing price for stock j on the last trading day d of month m , and L is the lag length. The MA filter is constructed using two MAs, representing the short trend and long trend. We use MA(50) as the short trend signal and MA(200) as the long trend signal as these two are the most commonly used MAs. We will examine the robustness of our results to alternative MA specifications later. The MA filter works as follows. At the end of each month m , we compare the short trend signal with the long trend signal, i.e., MA(50)-MA(200), and drop the undesirable stocks from the two extreme deciles. More specifically, for Decile High (the long leg of the spread portfolio of the anomaly), we drop any stocks if the short trend signal is below the long trend signal, i.e., $MA_{jm}(50) - MA_{jm}(200) < 0$ for stocks j ; for Decile Low (the short leg), we drop any stocks if the short trend signal is above the long trend signal, i.e., $MA_{jm}(50) - MA_{jm}(200) < 0$ for stocks j . Intuitively, for both extreme deciles, we drop stocks whose trends begin to reverse and keep stocks whose trends continue. We then form the equal-weighted portfolios using the stocks left in the deciles and form the spread portfolios (High-Low).

III Improved Performance using the MA Filter

In this section, we present evidence that using the moving average (MA) filter greatly enhances the performance of the accounting-based anomalies. We first compare the average returns and Sharpe ratios of the original anomalies and the MA enhanced anomalies. Then we compare the risk-adjusted returns, and in particular we examine whether the new Fama-French five-factor model can explain the improved performance of the MA enhanced anomalies.

A Average return and Sharpe ratio

Table I presents the average returns, standard deviations and Sharpe ratios of the MA enhanced anomalies and contrasts with the corresponding original anomalies. Panel A reports the summary statistics for the eight accounting-based anomalies, book-to-market (BM), gross

profit (GP), operating profit (OP), asset growth (AG), investment growth (IK), net stock issue (NS), accrual (AC), and net operating asset (NOA). For each anomaly, we report for the short leg (*Low*), the long leg (*High*), and the spread portfolio (*High-Low*)¹. Consistent with previous literature (e.g. Fama and French, 2008), all anomalies have statistically significant average returns at least at 5% for the spread portfolios, which vary from 0.40% per month for the accrual (AC) anomaly to 1.02% per month for the net stock issue (NS) anomaly. The Sharpe ratios range from 0.10 for the operating profit (OP) anomaly to 0.31 for the net stock issue (NS) anomaly.

Panel B reports the summary statistics for the corresponding MA enhanced anomalies. The improvement is substantial across all the anomalies. The average returns of the spread portfolios range from 1.16% per month for BM anomaly to 1.75% per month for NS anomaly. The MA filter does in general increase the volatility of the anomalies but the increased volatility does not offset the large increase in the average return. As a result, the Sharpe ratios are much higher for all the anomalies, ranging from 0.21 for BM and OP anomalies to 0.33 for NS anomaly.

Finally, Panel C analyzes the difference between the MA enhanced anomalies and the corresponding original anomalies. For the long leg (*High*) and the spread portfolio (*High-Low*), the difference is the return spread between the MA enhanced and the original anomalies, whereas for the short leg (*Low*), the difference is the return spread between the original and the MA enhanced anomalies. Taking the return difference allows us to assess the statistical significance of the performance improvement. Indeed, all anomalies enjoy statistically (at 1%) significant increases in average returns for the spread portfolios, which vary from 0.57% per month for BM anomaly to 0.94% per month for AG anomaly. Of course different anomalies perform differently, and the MA filter may have different impact on the performance. The last column of Panel C reports the percentage increase in the average return relative to the original anomalies. The smallest improvement is about 71.6% for NS anomaly as the average return increases from 1.02% to 1.75%, an increase of 0.73% per month. This, of course, is due to large average return for the original anomaly. For most anomalies, the percentage increase is around 130%. The largest increase is 232.5% for AC anomaly, the average return increasing from 0.40% to 1.34% per month. In addition, the Sharpe ratios

¹For BM, GP, and OP anomalies, the long (short) leg is the 10th (1st) decile, while for AG, IK, NS, AC, and NOA anomalies, the long (short) leg is 1st (10th) decile.

of the differences of the spread portfolios are almost always similar to those of the original anomalies, which suggests that even measured by the Sharpe ratio, the performance increase is about 100%.

Where does the performance improvement come from? Examining the long and short leg separately in Panel C shows that the performance gains mostly come from the short leg. All the differences in the short leg are statistically significant at 1%, whereas many differences in the long leg are insignificant. It suggests that the MA filter enhances the performance of the anomalies mainly by successfully dropping stocks that are about to rebound. It is also worth noting that both the short and long legs have significant positive returns for the original anomalies, but the short legs are all insignificant for the MA enhanced anomalies as shown in Panel A and B.

Finally, we also report the performance improvement for a composite portfolio that invests equally into these eight anomalies. The average return of the spread portfolio is 0.64% and the Sharpe ratio is 0.36, higher than any of the anomalies because of much lower volatility. Similarly, we construct a composite portfolio for the MA enhanced anomalies, which yields an average return of 1.47% per month and a Sharpe ratio of 0.36. There is no apparent improvement in the Sharpe ratio because of much higher volatility. Nevertheless, the return difference between the spread portfolios is statistically significant and the percentage increase is 131.2% relative to the original composite portfolio.

B Risk-adjusted return

Table I provides convincing evidence for the performance improvement of the MA enhanced anomalies. However, the increased average return could be due to more risk-taking. It is possible that MA filter increases the risks of the anomalies. Therefore in this subsection, we examine risk-adjusted performance.

Table II reports the alphas of the anomalies with respect to the Fama and French (1996) three-factor model. Consistent with Stambaugh, Yu and Yuan (2012), we find that the alphas of the High-Low spread portfolios are large and significant for all anomalies (Panel A). The largest alpha is 0.97% with a t-value of 8.23 for the net stock issue (NS) anomaly, and the smallest alpha is 0.33% with a t-value of 2.41 for the value anomaly. In contrast to the average returns reported in Table I, the alphas are all significantly negative and large in

magnitude for the short legs, and small and mostly insignificant for the long legs. Therefore, much of the anomalous returns come from the short leg.

In contrast, both the short and long legs of the MA enhanced anomalies have significant alphas, but the short legs have much large negative alphas. Therefore, both the short and long legs contribute to the anomalous returns and the alphas of the spread portfolios are much larger than those for the original anomalies (Panel B). Panel C lists the differences in alpha for all the anomalies. The differences in the short leg are much larger than those in the long leg, indicating that the performance improvement mainly come from the short leg, consistent with Table I. However, unlike the results in Table I, the long leg also contributes significantly to the performance improvement. As a result, the increases in alpha are much larger than the increases in the average return reported in Table I. For example, for the BM anomaly, the percentage increase in alpha is $0.74/0.33 \times 100 = 224.2\%$ versus an increase of 0.57% in average return and 96.6% in percentage increase. Even for NS anomaly, the increase in alpha is 0.89% and the percentage increase is 91.75% versus an increase of 0.73% and a percentage increase of 71.6%. These two anomalies actually are the ones with the lowest increase in alpha - for all other anomalies, the MA filter increases the alphas by at least 1.0% per month. The last row reports the alphas of the composite portfolio, which shows similar results. The larger increases in alpha suggest that the MA filter in fact reduces the systematic risks, which is confirmed by the smaller betas (not reported), even though the MA filter increases the volatility relative to the original anomalies (Table I).

Fama and French (2015) recently propose two new factors, one related to the strength of profitability and the other related to the aggressiveness of investment², and argue that the five-factor model performs better than the three-factor model. Panel A of Table III presents the five-factor alphas for the original anomalies and the composite portfolio. Consistent with Hou et al. (2015), the alphas of the original anomalies become smaller for all anomalies and some become insignificant. Not surprisingly, the most significant reductions are from the short legs of the anomalies. On the other hand, even though some reductions in alpha are observed for the MA enhanced anomalies, the alphas are still very large (Panel B) and the increases in alpha relative to the original anomalies are only reduced by 10 to 20 basis points (Panel C). As a result, the percentage increases are actually higher. For example, for BM anomaly, the increase in alpha is three times; even NS anomaly now enjoys an increase of

²Hou et al. (2015) propose a similar model.

119.0%.

IV Turnover Rate and Liquidity

It is natural to ask whether the proposed approach suffers from high trading costs since the portfolios now are rebalanced monthly. We first compare the turnover rates of the original and the MA enhanced anomalies to get a sense of how much more turnover the MA filter causes. We then examine the performance for stocks with different liquidity.

Figuring out the exact transaction costs for any anomaly is often difficult because there is no consensus on how to estimate the transaction costs for individual stocks, and more importantly, the transaction costs depend very much on the type of investors. Institutional investors often enjoy much lower transaction costs than retail investors. In addition, the actual implementation of an anomaly is quite different from how academic papers construct it, presumably to minimize transaction costs. Therefore in this section, we will only focus on how much more turnovers are introduced by the MA filter.

Table IV reports the turnover rates. Panel A presents the turnover rates for the original anomalies, while Panel B for the MA enhanced anomalies. We compute the turnover rates for the rebalance month (e.g., June of each year) and the other months separately since the original anomalies are rebalanced annually. The turnover rate is computed as the average of the buy and sell turnover rates; the buy (sell) turnover rate is the ratio of the number of stocks bought (sold) to the total number of stocks before rebalance. Turnover rates in the rebalance month vary wide across the eight anomalies. Some anomalies, such as the gross profit anomaly, have relatively low turnover rate, 40.1% for the short leg and 32.1% for the long leg. Other anomalies have very high turnover rates. For example, the investment anomaly has about 100% turnover rate for both short and long legs. It is not surprising that there are virtually no turnovers in the other months since portfolios are balanced annually, while the very small turnover rates reflect the delisting of stocks and newly addition of stocks.

In Panel B, the turnover rates are slightly higher in the rebalance month for the MA enhanced anomalies. For example, for NOA anomaly, the turnover rates are 46.0% and 76.4%, respectively, for the short and long legs after MA filter, and are 38.0% and 73.3%, respectively, for the short and long legs without the MA filter. The extra turnovers mainly

reflect in the other months as each month the MA filter is applied. On average the extra turnover rate is 15%, which is low compared to the turnover rate in the rebalance month. The relative inactive trading from the MA enhanced anomalies, together with the large improvement of abnormal returns, should lead one to comfortably conclude that these new abnormal returns shall survive even after taking into account appropriate transaction costs.

Finally, the last column in Panel C reports the percentage of stocks retained after MA filter in the rebalance month. The number varies across anomalies, but on average, about 50% stocks are retained after the MA filter. Therefore about half of the stocks will change trend and thus are dropped from the portfolio. Note that this number simply shows the proportion of stocks that are held or sold short relative to the original anomaly, and it is different from the turnover rate since the latter concept compares positions of this month to those of the previous month. However, it tells us why the MA enhanced anomalies substantially outperform the original anomalies.

Another way to indirectly analyze the potential impact of transaction costs on the performance of the anomalies is to separate stocks into different groups by their liquidity and examine the performance of the anomalies for each liquidity group. We use three different liquidity measures, percentage of zero returns (%Zeros, Lesmond, Ogden, and Trzcinka, 1999), proportional bid-ask spread, and Amihud measure. Table V reports the performance as measured by the Fama-French 5-factor alphas of the anomalies with or without the MA filter for different levels of %Zeros. For each anomaly, in Decile High (Low), stocks are further divided into three groups by their levels of %Zeros, and then we form the long/short spread portfolio for each %Zeros group. By comparing the performance of the long/short spread portfolios under the three different levels of %Zeros, we can find out the contribution of liquidity to the abnormal performance of the anomalies. Panel A shows the results for the original anomalies. For almost all anomalies, the performance is strongest for stocks with the highest %Zeros, or the most illiquid stocks. Some anomalies such as BM and GP are only significant for the stocks with the highest %Zeros, while others have significance for the upper two levels (e.g., AG anomaly) or all levels (e.g., NOA anomaly) of the %Zeros. On the contrary, the MA enhanced anomalies (Panel B) almost always show the strongest performance with the most liquid stocks, which suggests that the performance improvement of the MA filter is likely not substantially affected by additional transaction costs. In addition, the Fama-French 5-factor alphas are significant in all three levels of the %Zeros. For example,

for NOA anomaly, the Fama-French 5-factor alpha is 2.15%, 1.78%, and 1.59% per month, respectively, for the three levels of the %Zeros from the lowest (most liquid) to the highest (most illiquid). Panel C shows the performance improvement for the three levels of %Zeros. Not surprisingly, the most liquid stocks often show the largest performance improvement. For example, again for NOA anomaly, the performance improvement is 1.16%, 0.80%, and 0.77% per month across the three levels of the %Zeros.

Table VI and VII report the results with the proportional bid-ask spread and Amihud measure, which are largely similar to the results reported in Table V. Specifically, the original anomalies often show the strongest performance for the most illiquid stock, whereas the MA enhanced anomalies often have the strongest performance for more liquid stocks, but have significant abnormal returns (Fama-French five-factor alphas) for all the three level of liquidity.

V Information Uncertainty

Han, Yang, and Zhou (2013) and Han, Zhu, and Zhou (2014) provide evidence that the performance of a simple moving average timing strategy and a trend factor constructed using moving average signals is stronger for stocks with higher information uncertainty. In this section, we examine whether the performance improvement due to MA filter is also positively related to information uncertainty.

Table VIII reports the results of using idiosyncratic volatility to proxy for information uncertainty. The higher the idiosyncratic volatility, the higher the information uncertainty. To gauge the impact of information uncertainty, we further sort stocks into three groups by their idiosyncratic volatility, similar to liquidity analysis in the previous section. We then form decile portfolios in each group to create 3×10 decile portfolios. Panel A provides the Fama-French five-factor alphas for the original anomalies. All anomalies except for BM, GP, and OP show stronger performance for more volatile (more uncertain) stocks. For example, the NOA anomaly yields the Fama-French five-factor alpha of 0.35%, 0.77%, and 1.27% per month, respectively, for the lowest, medium, and highest idiosyncratic volatility stocks, all of which are statistically significant. Panel B lists the Fama-French five-factor alpha for the corresponding MA enhanced anomalies. For almost all anomalies, performance is monotonically increasing with the level of idiosyncratic volatility (information uncertainty). For

example, the MA enhanced NOA anomaly yields the five-factor alpha of 0.88%, 1.65%, and 2.50% per month, respectively, for the lowest, medium, and highest idiosyncratic volatility (information uncertainty). Therefore, as shown in Panel C, the performance improvement relative to the original anomalies is also almost always monotonically increasing with the increase of the idiosyncratic volatility (information uncertainty). For example, the performance improvement for the NOA anomaly is 0.53%, 0.89%, and 1.23%, respectively, for the lowest, medium, and highest idiosyncratic volatility (information uncertainty).

Table IX reports similar results using firm age as the proxy for information uncertainty. The younger the firm, the higher the information uncertainty. In general, youngest firms have the strongest performance for both the original anomalies and MA enhanced anomalies. However, the performance of the MA enhanced anomalies are more responsive to the level of information uncertainty, and thus the younger the firms are, i.e., the higher the information uncertainty is, the higher the performance improvement is for the MA filter. For example, the NOA anomaly produces Fama-French five-factor alpha of 1.00%, 0.76%, and 0.61% per month, respectively, for the youngest firms to the oldest firms, while the MA enhanced NOA anomaly provides Fama-French five-factor alpha of 2.07%, 1.82%, and 0.98% per month, respectively, for the youngest firms to the oldest firms. Therefore, the performance improvement is 1.08%, 1.06%, and 0.36% per month, respectively, for the youngest firms to the oldest firms.

Finally, Table X reports the results using the number of analyst following as a proxy for information uncertainty. Firms covered by fewer analyst tend to have more information uncertainty. The results are again similar to the results using either idiosyncratic volatility or firm age and support the positive relation between the performance improvement and information uncertainty. For example, the Fama-French five-factor alphas of the original AG anomaly are 0.77%, 0.56%, and 0.05% per month, respectively, for firms with the fewest number of analyst following to firms with the highest number of analyst following. Similarly, the Fama-French five-factor alphas of the MA enhanced AG anomaly are 1.89%, 1.51%, and 0.84% per month, respectively, for firms with the fewest number of analyst following to firms with the highest number of analyst following. Thus the performance improvement due to MA filter is 1.13%, 0.95%, and 0.79% per month across the three groups of firms.

VI Robustness

In this section, we examine the robustness of the performance improvement caused by the MA filter along several dimensions. We first examine the performance improvement in different subperiods characterized by the different stages of the business cycle, different level of investors' sentiment, and different level of market volatility. We then examine whether or to what extent the performance improvement is robust to alternative specifications of the MA filter. We further explore whether the performance improvement is robust to value-weighting. Finally, we report results using the momentum filter.

A Business cycle, sentiment, and market volatility

Han et al. (2013) and Han et al. (2014) find that the performance of the moving average timing strategy or the trend factor is stronger in recession than in expansions. We examine whether the performance improvement caused by MA filter display similar pattern. we estimate the Fama-French five-factor alphas separately for recessions and expansions, which are identified by the NBER, and report the results in Table XI. Panel A reports the alphas of the original anomalies. It is of interest to note that all anomalies are only significant in expansion periods and are insignificant in recession periods, except for the OP anomaly, which has insignificant alphas in both periods. It is likely due to much higher volatility in recessions, but many of the anomalies also have negative albeit insignificant alphas.

Similarly, all MA enhanced anomalies are significant only in the expansion periods and insignificant in recession periods except for the BM anomaly, which has significantly negative alphas in recessions. Indeed, the alphas are even (insignificantly) smaller than those of the original anomalies in recessions. As a results, the performance improvement in expansions is stronger than that in the whole sample period reported in Table III. For example, the performance improvement for the AG anomaly is 0.95% per month for the whole sample period, but is 1.11% per month for expansions.

Smith, Wang, Wang, and Zychowicz (2014) find that during high sentiment periods, hedge funds using technical analysis perform better than those who do not use technical analysis. In Table XII, we examine the performance improvement of the MA filter during periods of high and low sentiment. In Panel A, all the original anomalies except for BM

perform better during periods of high sentiment. Although the majority of the anomalies are significant in both high and low sentiment periods, some such as investment and gross profit anomalies are significant only during high sentiment periods. In contrast, all the MA enhanced anomalies have significant abnormal returns in both high and low sentiment periods as shown in Panel B. In addition, all anomalies perform much better during high sentiment periods than low sentiment periods except for BM and AG, both of which perform better when sentiment is low. The performance improvement, however, is not consistently higher during the periods of high sentiment.

Finally, Table XIII reports the performance improvement of the MA filter during periods of high and low market volatility. In Panel A, except for BM and GP, the original anomalies do not seem to be affected by the market volatility. For example, for the composite portfolio of the anomalies, the Fama-French five-factor alpha is 0.43% per month when the market volatility is low and is 0.37% per month when the market volatility is high. In contrast, all but the GP anomaly have higher alphas when the market volatility is low than when the market volatility is high. As a result, for all anomalies, the performance improvement is much higher during the low volatility periods than during the high volatility periods.

B Alternative specifications

Thus far in the previous analysis, we use the cross of two MA signals, 50-day and 200-day to represent the short trend signal and long trend signal. We choose these two MAs because they are the most commonly used in practice. In this subsection, we explore the robustness of performance improvement by changing the specifications of two MA signals.

Table XIV provides the evidence of the robustness to alternative specifications of the two MA signals. First, we vary only the specification of the short trend signal from as short as 1 day to as long as 100 days. We then keep the short trend signal fixed and vary only the long trend signal from 100-day MA to 1000-day MA. Finally, we change both signals. In Table XIV, we only report the results for asset growth (AG) anomaly to save space, results for other anomalies are similar and available upon request. Panel A reports the Fama-French five-factor alphas for the original anomaly corresponding to different MA specification. Therefore, the alphas are virtually identical; the slight difference is due to the difference in the number of observations kept to match the different number of observations

of different MA filters. Panel B reports the alphas for the various MA enhanced AG anomaly and Panel C shows the performance improvement for the corresponding MA filters.

First of all, all the specifications produce significant Fama-French five-factor alphas that are significantly higher than the original AG anomaly. Secondly, when we vary the specification of the short trend signal, performance decreases as the MA window length decreases. In other words, MAs shorter than one month (20-day) yield reduced performance, but MAs from 20 days to 100 days produce virtually identical results. For example, when the short trend signal is as short as one day, the MA enhanced AG anomaly still yields a Fama-French five-factor alpha as high as 1.07% per month, while using MA(100) as the short trend signal yields 1.42% per month. On the other hand, when only varying the long trend signal, performance peaks when using 400-day MA and decreases as the MA window length decreases or increases. For example, with MA(400) as the long trend signal, the five-factor alpha is 1.53% per month for the MA enhanced AG anomaly, which is 1.05% per month above the original AG anomaly. When the long trend signal is as long as 800 days, the MA enhanced AG anomaly still yields a five-factor alpha of 0.96% per month, which is 0.48% per month above the original AG anomaly, 100% increase. Finally, when we shorten or lengthen the window lengths of both signals, performance decreases but the performance improvement is still highly significant and substantial. For example, using MA(100) and MA(400) as the short trend and long trend signals, respectively, produces a five-factor alpha of 1.38% per month, about three times of the original anomaly.

C Value-weighting

For the last robustness test we explore the performance improvement of value-weighted anomalies. Table XV delivers the robustness results. As shown in Panel A, not surprisingly the value-weighted anomalies yield smaller Fama-French five-factor alphas than the corresponding equal-weighted anomalies reported in Table III. More anomalies (four out of eight) are now insignificant. The composite portfolio of all anomalies is still significant, but the alpha is only 0.24% per month. In sharp contrast, all except for BM anomaly are still significant after MA filtering, and the magnitude of alphas is rather large, although not as large as those of the equal-weighted anomalies. As a result, in terms of percentage improvement, value-weighting seems to produce even higher performance increase. For example, the

original AG anomaly has an insignificant alpha of -0.17% per month, so the performance improvement is 1.06% per month, which is about 623% increase in performance.

D Momentum filter

In this subsection, we use momentum instead as the filter to select stocks each month and compare the performance with that of the MA filter. Specifically, for Decile High, we drop stocks in the bottom three deciles of momentum (past 12 month cumulative returns), and for Decile Low, we drop stocks in the top three deciles of momentum. Table XVI reports the Fama-French five-factor alphas of momentum enhanced anomalies. Panel B shows that except for the OP anomaly, all other anomalies experience significant five-factor alpha. Panel C shows the performance improvement relative to the original anomalies. The improvement in alpha ranges from 0.42% to 0.69% per month, which is always lower than the performance improvement generated by MA filter in Table III. For example, the highest improvement by the momentum filter is achieved for the accrual (AC) anomaly, about 0.69% per month, whereas the performance improvement for the AC anomaly is 0.92% per month by the MA filter.

VII Information Content of MA Filter

The MA filter uses only the market price information to select stocks. Presumably, there should be no significant differences between stocks kept in and stock dropped out of the extreme decile portfolios in firm fundamentals and other market characteristics. In this section, we explore whether the stocks deleted by the MA filter are different from the stocks remained in the portfolios.

Table XVII reports the Fama-MacBeth results using the accrual anomaly as an example, other anomalies yield similar and sometimes more significant results³. We use a dummy variable to denote the stocks dropped out of the extreme decile portfolios, and therefore the intercepts represent the summary statistics of stocks kept in the portfolios, and the coefficients on dummy variable represent the differences between stocks dropped and stocks kept. Panel A shows the differences in firm fundamental variables (accounting variables

³For example, for the BM anomaly, all but one market variable and all the accounting variables are significant for Decile High and only three accounting variables are insignificant for Decile Low.

used to construct the anomalies excluding accrual), and Panel B shows the differences in the firm market characteristics. In Panel A, out of the seven accounting variables, four of them have significant coefficients on the dummy variable. For Decile Low (Decile 10), the stocks dropped have higher book-to-market ratio, lower asset growth, lower net stock issue, and net operating asset. It seems consistent with that stocks dropped from Decile Low have higher returns because stocks with higher BM, lower AG, lower NS, and lower NOA tend to have higher returns. Similarly, for Decile High (Decile 1), the stocks dropped have lower book-to-market ratio, lower gross profitability, higher asset growth and net operating asset. Again, it seems consistent with that stocks dropped from Decile High have lower returns.

In Panel B, we observe similar patterns, but the differences are all highly significant as measured by the highly significant coefficients on the dummy variables. Stocks dropped from Decile Low have higher momentum returns, lower idiosyncratic volatility, and lower analyst forecast dispersion, are also more liquid (lower Amihud measure, proportional bid-ask spread, and %Zero, and higher trading volume). On the other hand, stocks dropped from Decile High lower momentum returns, higher idiosyncratic volatility, and higher analyst forecast dispersion, and are also less liquid (higher Amihud measure, proportional bid-ask spread, and %Zero, and lower trading volume). Again, these characteristics are consistent with that stocks dropped from Decile Low have higher returns and stocks dropped from Decile High have lower returns⁴.

VIII Conclusion

There should be numerous ways to improve current anomalies. For example, one can combine two anomalies, or focus on the shared component among various anomalies. In this paper, we propose a simple strategy to modify holdings on the long leg and short leg at each month. This strategy produces much larger alphas than the original anomaly. It is time to re-engineer common factor models.

⁴Future returns are positively related to momentum returns, but are negatively related to idiosyncratic volatility (Ang, Hodrick, Xing, and Zhang, 2006, 2009), and analyst earnings forecast dispersion (Diether, Malloy, and Scherbina, 2002). For liquidity measures, Although Amihud and Mendelson (1986) find a positive relation between the bid-ask spread and future returns, many subsequent studies find a negative relation. Examples are Eleswarapu and Reinganum (1993), Brennan and Subrahmanyam (1996), Chen and Kan (1996), and Easley, Hvidkjaer, and O'Hara (2002).

Appendices

A Construction of Anomalies

This appendix presents how we construct the eight accounting variable- based anomalies that we examine in the paper. In June of each year t , we rank all stocks based on their accounting variables for the fiscal year ending in calendar year $t-1$. All stocks are assigned into one of the quintiles. Monthly excess returns of each portfolio from July of year t to June of year $t+1$ are calculated as equal-weighted averages of excess returns of individual firms in each portfolio. The portfolios are rebalanced at the June of year $t+1$. We delete stocks whose prices are less than five at the time of portfolio formation. Variables definitions are as follows. 1. Book-to-market ratio (BM). Book equity is stockholders book equity, plus balance sheet deferred taxes (Compustat item ITCB) and investment tax credit (TXDB) if available, minus the book value of preferred stock. We employ tiered definitions largely consistent with those used by Davis, Fama, and French (2000), Novy-marx (2013) and Chen, Hou and Zhang (2014) to construct stockholders equity and book value of preferred stock. Stockholders equity is as given in Compustat (SEQ) if available, or else common equity (CEQ) plus the book value of preferred stock, or else total assets minus total liabilities (AT - LT). Book value of preferred stock is redemption value (PSTKRV) if available, or else liquidating value (PSTKL) if available, or else par value (PSTK). Book-to-market ratio at year $t-1$ is computed as book equity for the fiscal year ending in calendar year $t-1$ divided by the market capitalization at the end of December of $t-1$. Stocks with missing book values or negative book-values are deleted. 2. Gross Profit to Asset (GP). Following Novy-Marx (2013), we measure gross profits-to-assets at year $t-1$ as gross profit at year $t-1$ (Compustat item GP) divided by total assets at year $t-1$ (AT). 3. Operating Profit (OP). Following Fama and French (2015), we measure operating profit at year $t-1$ as year $t-1$ gross profit (Compustat item GP), minus selling, general, and administrative expenses (XSGA) if available, minus interest expense (XINT) if available, all divided by year $t-1$ book equity. Stocks with missing book value or negative book-value are deleted. 4. Asset Growth (AG). Following Cooper, Gulen and Schill (2008), we compute asset growth at year $t-1$ as total assets (AT) for the fiscal year ending in calendar year $t-1$ divided by total assets for the fiscal year ending in calendar year $t-2$, minus one. 5. Investments (IK). Following Xing (2008), we measure

investment growth for year $t-1$ as the growth rate in capital expenditure (CAPX) from the fiscal year ending in calendar year $t2$ to the fiscal year ending in $t1$. 6. Net Stock Issue (NS). Following Fama and French (2008), we compute net stock issue at year $t-1$, as the split-adjusted shares outstanding for fiscal year ending in calendar year $t-1$ divided by the split-adjusted shares outstanding for fiscal year ending in calendar year $t-2$, minus one. The split-adjusted shares outstanding are calculated as shares outstanding (CSHO) times the adjustment factor (AJEX). 7. Accrual (AC). Accruals at year $t-1$ are defined following Fama and French (2008), as the change in operating working capital per split-adjusted share from $t-2$ to $t-1$ divided by book equity per split-adjusted share at $t-1$. Operating working capital is computed as current assets (ACT) minus cash and short-term investments (CHE), minus, the difference of current liability (LCT) and debt in current liabilities (DLC) if available. 8. Net Operating Assets (NOA). Following Hirshleifer et al. (2004), we define net operating assets (NOA) at year $t-1$, as operating assets minus operating liabilities at year $t-1$ scaled by total assets at year $t-2$ (Compustat item AT). Operating assets are total assets (AT) minus cash and short-term investment (CHE). Operating liabilities are total assets minus debt included in current liabilities (item DLC, zero if missing), minus long-term debt (item DLTT, zero if missing), minus minority interests (item MIB, zero if missing), minus book value of preferred stocks as described in the definition of book equity (zero if missing), and minus common equity (CEQ).

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Table I
Performance Improvement by MA Filter

	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement			
Variable	Avg Ret	Std Dev	Sharpe	Avg Ret	Std Dev	Sharpe	Avg Ret	Std Dev	Sharpe	Increase
Book-To-Market										
Low	0.86*** (2.83)	7.23	0.06	0.43 (1.29)	7.89	-0.00	0.43*** (4.37)	2.36	0.18	50.0
High	1.45*** (5.74)	6.02	0.17	1.59*** (6.51)	5.81	0.20	0.14 (1.19)	2.77	0.05	9.66
High-Low	0.59*** (3.61)	3.90	0.15	1.16*** (4.98)	5.58	0.21	0.57*** (3.41)	4.00	0.14	96.6
Gross Profit										
Low	0.74*** (2.86)	6.24	0.05	0.10 (0.32)	7.32	-0.04	0.64*** (5.23)	2.93	0.22	86.5
High	1.42*** (5.28)	6.46	0.15	1.64*** (6.43)	6.15	0.20	0.22*** (2.44)	2.20	0.10	15.5
High-Low	0.68*** (5.10)	3.20	0.21	1.52*** (7.01)	5.22	0.29	0.86*** (4.99)	4.14	0.21	126.5
Operating Profit										
Low	0.83** (2.43)	8.18	0.05	0.23 (0.62)	8.73	-0.02	0.59*** (5.22)	2.71	0.22	71.1
High	1.25*** (4.69)	6.38	0.13	1.55*** (6.16)	6.00	0.19	0.29*** (2.82)	2.44	0.12	23.2
High-Low	0.42** (2.27)	4.40	0.10	1.30*** (5.11)	6.05	0.21	0.88*** (5.26)	4.00	0.22	209.5
Asset Growth										
Low	0.59* (1.85)	7.65	0.02	-0.23 (-0.66)	8.31	-0.08	0.81*** (8.57)	2.25	0.36	137.3
High	1.29*** (4.36)	7.09	0.12	1.39*** (4.98)	6.65	0.14	0.13 (1.07)	2.82	0.04	10.1
High-Low	0.70*** (5.75)	2.90	0.24	1.63*** (7.67)	5.07	0.32	0.94*** (5.39)	4.15	0.23	134.3

	Panel A: Original			Panel B: MA Enhanced			Panle C: Improvement			
Variable	Avg Ret	Std Dev	Sharpe	Avg Ret	Std Dev	Sharpe	Avg Ret	Std Dev	Sharpe	Increase
Investment										
Low	0.80*** (2.60)	7.31	0.05	0.14 (0.39)	8.21	-0.04	0.64*** (5.94)	2.57	0.25	80.0
High	1.37*** (4.88)	6.70	0.14	1.65*** (6.10)	6.46	0.19	0.28*** (2.56)	2.62	0.11	20.4
High-Low	0.57*** (5.68)	2.41	0.24	1.49*** (7.14)	4.95	0.30	0.92*** (5.29)	4.15	0.22	161.4
Net Stock Issue										
Low	0.58** (1.98)	7.01	0.02	-0.00 (-0.01)	7.78	-0.06	0.59*** (6.35)	2.20	0.27	101.7
High	1.61*** (6.86)	5.59	0.21	1.75*** (7.68)	5.43	0.24	0.14 (1.50)	2.23	0.06	8.70
High-Low	1.02*** (7.48)	3.27	0.31	1.75*** (7.87)	5.31	0.33	0.73*** (4.91)	3.53	0.21	71.6
Accrual										
Low	0.83*** (2.63)	7.52	0.05	0.19 (0.55)	8.06	-0.03	0.63*** (7.25)	2.06	0.30	75.9
High	1.23*** (4.18)	7.03	0.11	1.48*** (5.32)	6.63	0.16	0.30*** (2.51)	2.85	0.11	24.4
High-Low	0.40*** (4.22)	2.27	0.18	1.34*** (6.68)	4.76	0.28	0.93*** (5.55)	4.00	0.23	232.5
Net Operating Asset										
Low	0.61** (2.04)	7.18	0.03	-0.14 (-0.42)	7.89	-0.07	0.73*** (7.55)	2.29	0.32	119.7
High	1.33*** (5.47)	5.82	0.16	1.43*** (5.90)	5.75	0.17	0.15 (1.46)	2.40	0.06	11.3
High-Low	0.72*** (5.20)	3.31	0.22	1.64*** (7.03)	5.51	0.30	0.89*** (5.56)	3.79	0.23	123.6
Composite										
Low	0.73*** (2.46)	7.10	0.04	0.09 (0.27)	7.68	-0.04	0.63*** (8.55)	1.76	0.36	86.3
High	1.37*** (5.29)	6.18	0.15	1.56*** (6.52)	5.70	0.20	0.21*** (2.49)	1.98	0.10	15.3
High-Low	0.64*** (8.58)	1.77	0.36	1.47*** (8.50)	4.13	0.36	0.84*** (6.10)	3.28	0.26	131.2

Table II
Fama-French 3-Factor Alpha

Anomaly	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
	Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	-0.18** (-2.05)	0.16 (1.52)	0.33** (2.41)	-0.67*** (-4.60)	0.40*** (3.05)	1.07*** (5.19)	0.49*** (4.61)	0.25** (2.15)	0.74*** (4.21)
Gross Profit	-0.35*** (-3.38)	0.29*** (3.22)	0.64*** (4.44)	-1.01*** (-5.83)	0.63*** (6.55)	1.64*** (8.05)	0.65*** (5.01)	0.35*** (3.86)	1.00*** (5.86)
Operating Profit	-0.38*** (-2.76)	0.05 (0.55)	0.43** (2.36)	-1.02*** (-5.86)	0.50*** (4.54)	1.51*** (7.21)	0.64*** (5.78)	0.44*** (4.63)	1.08*** (7.07)
Asset Growth	-0.59*** (-4.95)	-0.02 (-0.17)	0.58*** (4.15)	-1.48*** (-8.88)	0.26** (2.04)	1.73*** (7.77)	0.88*** (9.62)	0.27*** (2.93)	1.16*** (7.83)
Investment	-0.39*** (-3.80)	0.14* (1.76)	0.52*** (5.28)	-1.10*** (-7.62)	0.53*** (4.85)	1.63*** (8.91)	0.71*** (6.98)	0.39*** (4.08)	1.11*** (6.98)
Net Stock Issue	-0.59*** (-6.02)	0.38*** (4.05)	0.97*** (8.23)	-1.22*** (-8.45)	0.64*** (5.32)	1.86*** (9.73)	0.63*** (6.84)	0.26*** (3.25)	0.89*** (6.50)
Accrual	-0.48*** (-4.15)	-0.01 (-0.09)	0.48*** (4.61)	-1.17*** (-7.95)	0.41*** (3.36)	1.58*** (8.24)	0.69*** (8.73)	0.42*** (3.99)	1.10*** (7.10)
Net Operating Asset	-0.67*** (-4.98)	0.19* (1.78)	0.86*** (5.25)	-1.48*** (-8.96)	0.44*** (3.38)	1.92*** (7.84)	0.81*** (8.51)	0.25*** (2.95)	1.06*** (7.07)
Composite	-0.45*** (-5.59)	0.15*** (2.45)	0.60*** (9.25)	-1.14*** (-9.14)	0.47*** (6.44)	1.61*** (10.6)	0.68*** (9.15)	0.33*** (4.66)	1.01*** (7.94)

Table III
Fama-French 5-Factor Alpha

Anomaly	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
	Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	-0.01 (-0.12)	0.18 (1.53)	0.19 (1.43)	-0.45*** (-2.60)	0.31** (2.14)	0.76*** (3.19)	0.44*** (3.54)	0.13 (0.86)	0.57*** (2.49)
Gross Profit	-0.05 (-0.42)	0.23** (2.18)	0.27** (2.18)	-0.61*** (-2.79)	0.54*** (5.36)	1.15*** (4.65)	0.56*** (3.62)	0.32*** (2.67)	0.88*** (3.80)
Operating Profit	0.01 (0.11)	-0.09 (-0.97)	-0.10 (-0.75)	-0.59*** (-2.93)	0.29*** (2.83)	0.89*** (3.85)	0.61*** (4.59)	0.38*** (3.32)	0.99*** (4.97)
Asset Growth	-0.39*** (-2.68)	0.07 (0.72)	0.47*** (3.47)	-1.19*** (-5.26)	0.23* (1.76)	1.42*** (4.67)	0.80*** (7.46)	0.15 (1.07)	0.95*** (4.30)
Investment	-0.21* (-1.79)	0.17* (1.90)	0.38*** (3.77)	-0.83*** (-4.15)	0.45*** (3.86)	1.28*** (4.86)	0.62*** (5.14)	0.28** (2.03)	0.90*** (3.94)
Net Stock Issue	-0.37*** (-2.90)	0.25*** (2.92)	0.63*** (5.32)	-0.95*** (-4.54)	0.43*** (3.93)	1.38*** (5.59)	0.57*** (5.14)	0.18* (1.91)	0.75*** (4.25)
Accrual	-0.41*** (-2.87)	0.08 (0.70)	0.49*** (4.83)	-1.02*** (-5.07)	0.39*** (2.96)	1.41*** (5.43)	0.61*** (6.42)	0.31** (2.12)	0.92*** (4.23)
Net Operating Asset	-0.55*** (-3.65)	0.26** (2.27)	0.80*** (4.82)	-1.25*** (-5.92)	0.44*** (3.03)	1.69*** (5.28)	0.70*** (6.67)	0.19 (1.40)	0.89*** (4.20)
Composite	-0.24** (-2.33)	0.15** (1.97)	0.39*** (6.46)	-0.87*** (-4.79)	0.38*** (4.79)	1.25*** (5.58)	0.61*** (6.37)	0.24** (2.24)	0.86*** (4.48)

Table IV
Turnover Rate

Anomaly	Decile	Panel A: Original		Panel B: MA Enhanced		
		Rebalance Month	Other Months	Rebalance Month	Other Months	Retained
Book-To-Market	Low	49.6	0.27	59.7	15.8	48.3
	High	59.1	0.39	69.6	13.5	59.9
Gross Profit	Low	40.1	0.36	61.5	17.0	45.7
	High	32.1	0.35	39.0	14.8	57.0
Operating Profit	Low	63.6	0.41	66.9	16.6	49.8
	High	45.7	0.32	53.4	14.7	57.4
Asset Growth	Low	87.6	0.41	99.3	16.0	55.7
	High	82.1	0.35	84.0	14.4	50.8
Investment	Low	100.2	0.37	108.0	14.8	56.4
	High	100.4	0.33	103.5	15.1	49.7
Net Stock Issue	Low	76.6	0.41	82.5	13.4	62.0
	High	84.9	0.29	88.9	15.7	48.5
Accrual	Low	91.2	0.43	102.8	14.4	56.1
	High	84.0	0.37	85.0	15.1	50.0
Net Operating Asset	Low	38.0	0.32	46.0	14.3	59.4
	High	73.3	0.34	76.4	15.1	49.3

Table V
%Zero

Anomaly	%Zero	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Low	0.12 (0.95)	0.11 (0.67)	-0.00 (-0.01)	-0.60*** (-2.78)	0.21 (0.76)	0.80** (2.43)	0.71*** (3.15)	0.09 (0.38)	0.81** (2.26)
	2	-0.11 (-0.85)	0.08 (0.46)	0.19 (1.03)	-0.69*** (-2.91)	0.39** (2.02)	1.08*** (3.59)	0.57*** (3.21)	0.32** (1.99)	0.89*** (3.34)
	High	-0.19 (-1.20)	0.37** (2.09)	0.56*** (2.99)	-0.27 (-1.16)	0.54*** (3.33)	0.81*** (2.80)	0.08 (0.64)	0.17 (0.95)	0.25 (1.00)
Gross Profit	Low	0.14 (0.88)	0.26** (2.17)	0.11 (0.62)	-0.67** (-2.15)	0.76*** (4.30)	1.43*** (4.13)	0.82*** (2.86)	0.50*** (3.29)	1.31*** (3.93)
	2	0.00 (0.01)	0.18 (1.40)	0.18 (0.97)	-0.77*** (-2.63)	0.64*** (4.16)	1.41*** (4.32)	0.77*** (3.35)	0.46*** (2.78)	1.23*** (4.02)
	High	-0.08 (-0.50)	0.28* (1.84)	0.36** (2.09)	-0.43 (-1.52)	0.54*** (4.05)	0.97*** (3.10)	0.35* (1.81)	0.25* (1.86)	0.60** (2.19)
Operating Profit	Low	0.08 (0.41)	-0.09 (-0.77)	-0.17 (-0.83)	-0.74** (-2.35)	0.35* (1.68)	1.09*** (3.08)	0.81*** (3.22)	0.45*** (2.46)	1.26*** (3.98)
	2	-0.11 (-0.55)	-0.15 (-1.24)	-0.03 (-0.15)	-0.66** (-1.94)	0.23* (1.81)	0.89** (2.42)	0.54*** (2.46)	0.38*** (2.52)	0.92*** (3.19)
	High	0.07 (0.40)	-0.21 (-1.49)	-0.29 (-1.50)	-0.35 (-1.33)	0.15 (0.92)	0.50 (1.58)	0.42** (2.21)	0.36** (2.09)	0.78*** (2.86)
Asset Growth	Low	-0.22 (-1.39)	-0.00 (-0.01)	0.22 (1.26)	-1.55*** (-5.52)	0.30 (1.47)	1.85*** (4.85)	1.33*** (6.34)	0.30* (1.69)	1.63*** (5.25)
	2	-0.62*** (-3.66)	-0.07 (-0.46)	0.55*** (3.09)	-1.50*** (-5.78)	-0.00 (-0.01)	1.50*** (4.07)	0.89*** (5.77)	0.07 (0.30)	0.95*** (3.06)
	High	-0.52*** (-2.50)	0.27 (1.50)	0.79*** (4.02)	-1.09*** (-3.86)	0.48*** (2.86)	1.57*** (4.82)	0.56*** (4.21)	0.22 (1.19)	0.78*** (3.10)

Anomaly	%Zero	Panel A: Original				Panel B: MA Enhanced				Panel C: Improvement			
		Low	High	High-Low		Low	High	High-Low		Low	High	High-Low	
Investment	Low	-0.14 (-0.93)	0.30** (2.19)	0.43*** (2.58)		-0.85*** (-3.21)	0.61*** (3.27)	1.46*** (4.21)		0.71*** (3.67)	0.31* (1.80)	1.02*** (3.32)	
	2	-0.35** (-2.32)	0.08 (0.54)	0.42*** (2.47)		-1.27*** (-4.96)	0.68*** (3.59)	1.95*** (5.71)		0.92*** (4.96)	0.61*** (3.16)	1.53*** (4.94)	
	High	-0.30* (-1.74)	0.09 (0.60)	0.39*** (2.58)		-0.74*** (-2.99)	0.16 (0.73)	0.90*** (2.58)		0.44*** (3.30)	0.07 (0.27)	0.51* (1.66)	
Net Stock Issue	Low	-0.26 (-1.35)	0.09 (0.71)	0.35 (1.55)		-1.32*** (-4.78)	0.29 (1.38)	1.60*** (4.13)		1.06*** (5.51)	0.19 (1.30)	1.25*** (4.48)	
	2	-0.49*** (-3.07)	0.36** (2.40)	0.84*** (5.46)		-0.93*** (-3.44)	0.54*** (2.92)	1.46*** (4.85)		0.44*** (2.53)	0.18 (1.20)	0.62*** (2.55)	
	High	-0.37** (-1.96)	0.35** (2.40)	0.71*** (4.21)		-0.72*** (-2.57)	0.49** (2.39)	1.20*** (3.37)		0.35** (2.17)	0.14 (0.61)	0.49 (1.60)	
Accrual	Low	-0.47*** (-2.79)	0.20 (1.19)	0.67*** (3.83)		-1.36*** (-5.21)	0.56*** (2.80)	1.92*** (5.64)		0.89*** (4.18)	0.36** (2.23)	1.25*** (4.38)	
	2	-0.57*** (-2.99)	-0.05 (-0.33)	0.52*** (3.40)		-1.24*** (-4.82)	0.41 (1.45)	1.64*** (3.96)		0.67*** (4.03)	0.45 (1.49)	1.12*** (2.97)	
	High	-0.49*** (-2.46)	0.18 (0.97)	0.67*** (4.45)		-0.76*** (-2.60)	0.46*** (2.59)	1.23*** (3.97)		0.27* (1.84)	0.29 (1.50)	0.56** (2.19)	
Net Operating Asset	Low	-0.67*** (-3.65)	0.31** (2.05)	0.99*** (3.95)		-1.63*** (-6.80)	0.52** (2.19)	2.15*** (5.43)		0.96*** (5.56)	0.21 (1.12)	1.16*** (4.13)	
	2	-0.73*** (-3.48)	0.25* (1.66)	0.98*** (4.47)		-1.48*** (-5.24)	0.30 (1.58)	1.78*** (4.35)		0.75*** (4.13)	0.05 (0.23)	0.80*** (2.71)	
	High	-0.54*** (-2.79)	0.28* (1.67)	0.82*** (4.31)		-1.03*** (-3.91)	0.57*** (2.78)	1.59*** (4.61)		0.49*** (3.57)	0.28** (1.94)	0.77*** (3.42)	

Table VI
Spread

Anomaly	Spread	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Low	0.56*** (3.73)	0.15 (0.93)	-0.41* (-1.76)	0.02 (0.11)	0.25 (1.27)	0.23 (0.73)	0.54*** (2.76)	0.10 (0.60)	0.64** (2.22)
	2	0.03 (0.20)	-0.06 (-0.26)	-0.09 (-0.38)	-0.53* (-1.63)	0.19 (0.76)	0.72* (1.81)	0.56** (2.39)	0.24 (1.02)	0.81** (2.09)
	High	-0.32 (-1.18)	0.24 (0.92)	0.56** (2.17)	-0.39 (-1.05)	0.27 (0.93)	0.66 (1.56)	0.07 (0.40)	0.03 (0.12)	0.10 (0.32)
Gross Profit	Low	0.22 (1.28)	0.36*** (3.05)	0.14 (0.64)	-0.73** (-2.24)	0.52*** (2.64)	1.25*** (3.15)	0.95*** (2.86)	0.16 (1.12)	1.11*** (2.80)
	2	-0.36 (-1.41)	0.17 (0.95)	0.53** (2.24)	-1.01*** (-2.68)	0.30* (1.74)	1.31*** (3.29)	0.65** (2.43)	0.12 (0.66)	0.77** (2.13)
	High	-0.34 (-1.03)	-0.12 (-0.46)	0.22 (0.81)	-0.78* (-1.71)	0.30 (1.29)	1.08** (2.22)	0.44* (1.74)	0.42 (1.62)	0.86** (2.13)
Operating Profit	Low	0.00 (0.03)	0.18 (1.45)	0.17 (0.92)	-0.98*** (-2.74)	0.31** (1.94)	1.29*** (3.19)	0.99*** (3.04)	0.13 (1.06)	1.12*** (2.85)
	2	-0.30 (-1.46)	-0.08 (-0.56)	0.22 (0.98)	-0.62* (-1.84)	0.20 (1.19)	0.81** (2.05)	0.31 (1.39)	0.28* (1.68)	0.59* (1.77)
	High	-0.32 (-0.94)	-0.11 (-0.46)	0.21 (0.78)	-0.79* (-1.82)	0.35** (2.25)	1.14*** (2.69)	0.47** (2.36)	0.46* (1.89)	0.92*** (2.92)
Asset Growth	Low	-0.09 (-0.64)	0.34** (2.34)	0.43** (2.35)	-1.06*** (-3.66)	0.45* (1.83)	1.51*** (3.37)	0.98*** (4.28)	0.10 (0.51)	1.08*** (2.99)
	2	-0.59** (-2.41)	-0.12 (-0.62)	0.47** (2.03)	-1.38*** (-3.98)	0.10 (0.42)	1.48*** (2.96)	0.79*** (4.42)	0.22 (0.73)	1.01*** (2.59)
	High	-0.90*** (-2.60)	-0.08 (-0.27)	0.82*** (2.92)	-1.39*** (-3.38)	-0.01 (-0.02)	1.38*** (3.08)	0.49*** (3.37)	0.07 (0.25)	0.56 (1.61)

Anomaly	Spread	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Investment	Low	0.14 (0.92)	0.31** (2.27)	0.17 (1.06)	-0.75*** (-2.73)	0.45 (1.53)	1.20*** (2.79)	0.89*** (3.64)	0.14 (0.55)	1.03*** (2.47)
	2	-0.52*** (-2.70)	-0.09 (-0.42)	0.43 (1.62)	-1.51*** (-4.72)	0.11 (0.45)	1.62*** (3.79)	0.99*** (4.39)	0.20 (0.79)	1.19*** (2.95)
	High	-0.40 (-1.35)	0.09 (0.39)	0.49** (2.30)	-0.79** (-2.25)	0.46*** (2.45)	1.25*** (3.23)	0.39*** (2.54)	0.37 (1.48)	0.76** (2.38)
Net Stock Issue	Low	-0.11 (-0.76)	0.04 (0.26)	0.15 (0.85)	-0.89*** (-2.95)	-0.07 (-0.30)	0.82** (2.33)	0.77*** (3.51)	-0.11 (-0.91)	0.67*** (2.47)
	2	-0.70*** (-3.48)	-0.10 (-0.45)	0.61** (2.43)	-1.07*** (-3.46)	0.01 (0.02)	1.07*** (2.61)	0.36** (1.93)	0.10 (0.49)	0.47 (1.44)
	High	-0.68** (-2.20)	0.24 (1.07)	0.92*** (3.36)	-1.27*** (-3.18)	0.15 (0.54)	1.42*** (3.08)	0.59*** (3.89)	-0.09 (-0.37)	0.50 (1.52)
Accrual	Low	-0.05 (-0.28)	0.39*** (2.51)	0.45** (2.04)	-0.74** (-2.27)	0.31 (1.35)	1.05*** (2.48)	0.68*** (3.39)	-0.09 (-0.47)	0.60** (2.03)
	2	-0.68*** (-2.89)	-0.23 (-1.16)	0.44** (2.25)	-1.16*** (-3.04)	0.05 (0.18)	1.21*** (2.68)	0.48** (2.02)	0.28 (0.97)	0.76* (1.84)
	High	-0.64** (-1.96)	-0.26 (-0.75)	0.38 (1.17)	-1.35*** (-3.45)	0.19 (0.78)	1.55*** (3.54)	0.71*** (3.84)	0.46 (1.50)	1.17*** (3.20)
Net Operating Asset	Low	-0.43** (-2.35)	0.46*** (3.19)	0.90*** (3.37)	-1.23*** (-4.47)	0.86*** (3.10)	2.09*** (4.36)	0.79*** (4.56)	0.40** (2.00)	1.19*** (4.12)
	2	-0.82*** (-3.38)	0.23 (1.21)	1.04*** (4.65)	-1.52*** (-4.66)	0.63** (2.40)	2.15*** (4.15)	0.71*** (4.33)	0.41 (1.34)	1.11*** (2.80)
	High	-0.88*** (-2.85)	0.06 (0.21)	0.93*** (3.14)	-1.41*** (-3.70)	0.15 (0.67)	1.57*** (3.56)	0.54*** (3.39)	0.10 (0.45)	0.63** (2.23)

Table VII
Amihud

Anomaly	Amihud	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Low	0.18* (1.71)	0.12 (0.72)	-0.06 (-0.32)	-0.33* (-1.67)	0.04 (0.15)	0.37 (1.08)	0.51*** (3.01)	-0.08 (-0.32)	0.43 (1.32)
	2	0.04 (0.34)	0.17 (1.01)	0.13 (0.65)	-0.59** (-2.35)	0.58*** (3.16)	1.17*** (4.21)	0.63*** (3.09)	0.41*** (2.55)	1.04*** (3.65)
	High	-0.33*** (-2.47)	0.12 (0.72)	0.45** (2.38)	-0.62*** (-2.88)	0.16 (0.83)	0.78*** (2.56)	0.29** (2.18)	0.04 (0.26)	0.33 (1.53)
Gross Profit	Low	0.26* (1.73)	0.23* (1.71)	-0.03 (-0.17)	-0.32 (-1.28)	0.48*** (2.71)	0.80*** (2.46)	0.58*** (2.76)	0.25* (1.63)	0.83*** (2.69)
	2	0.05 (0.30)	0.10 (0.76)	0.05 (0.30)	-0.44 (-1.62)	0.28** (1.99)	0.73** (2.32)	0.49*** (2.81)	0.18 (1.12)	0.67** (2.43)
	High	-0.38** (-2.33)	0.17 (1.16)	0.54*** (3.16)	-0.98*** (-3.71)	0.65*** (4.16)	1.63*** (5.43)	0.61*** (3.05)	0.48*** (3.20)	1.09*** (4.26)
Operating Profit	Low	0.21 (1.20)	-0.03 (-0.31)	-0.25 (-1.27)	-0.53* (-1.70)	0.12 (0.84)	0.64* (1.86)	0.74*** (3.31)	0.15 (1.16)	0.89*** (3.06)
	2	-0.01 (-0.08)	-0.22** (-2.00)	-0.21 (-1.09)	-0.50** (-1.98)	0.32 (1.23)	0.82** (2.21)	0.49** (2.43)	0.54** (1.98)	1.03*** (2.95)
	High	-0.25* (-1.79)	-0.26* (-1.84)	-0.01 (-0.06)	-0.60*** (-2.54)	0.29** (2.39)	0.90*** (3.28)	0.36** (2.18)	0.55*** (3.83)	0.91*** (3.96)
Asset Growth	Low	-0.31** (-1.92)	0.08 (0.57)	0.39** (2.06)	-1.35*** (-5.16)	0.15 (0.78)	1.50*** (4.26)	1.04*** (6.27)	0.07 (0.44)	1.11*** (4.32)
	2	-0.47*** (-2.62)	-0.09 (-0.64)	0.38** (2.01)	-1.16*** (-4.19)	0.06 (0.35)	1.22*** (3.05)	0.69*** (4.48)	0.15 (0.69)	0.84*** (2.62)
	High	-0.65*** (-3.70)	0.12 (0.81)	0.77*** (4.53)	-1.61*** (-6.46)	0.42** (2.43)	2.03*** (6.87)	0.96*** (6.58)	0.30** (1.95)	1.26*** (5.65)

Anomaly	Amihud	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Investment	Low	-0.18 (-1.16)	0.24* (1.79)	0.42*** (2.56)	-1.06*** (-3.77)	0.26 (1.26)	1.32*** (3.36)	0.88*** (4.87)	0.02 (0.09)	0.90*** (2.89)
	2	-0.21 (-1.34)	0.08 (0.59)	0.29* (1.67)	-0.79*** (-3.17)	0.49*** (2.62)	1.27*** (3.66)	0.58*** (3.09)	0.41** (2.09)	0.99*** (3.29)
	High	-0.35** (-2.31)	0.03 (0.23)	0.38*** (2.59)	-0.93*** (-4.23)	0.54*** (3.46)	1.47*** (5.64)	0.58*** (3.28)	0.51*** (3.10)	1.09*** (4.12)
Net Stock Issue	Low	-0.30** (-2.01)	0.14 (1.32)	0.44*** (2.73)	-0.87*** (-3.24)	0.14 (1.14)	1.01*** (3.24)	0.57*** (3.25)	-0.00 (-0.04)	0.56*** (2.44)
	2	-0.32** (-1.99)	0.27** (2.18)	0.58*** (3.38)	-0.96*** (-3.88)	0.49*** (3.02)	1.45*** (4.73)	0.64*** (4.19)	0.22* (1.77)	0.87*** (3.89)
	High	-0.58*** (-3.71)	0.21 (1.57)	0.79*** (4.78)	-1.25*** (-5.26)	0.49*** (3.17)	1.73*** (5.79)	0.67*** (3.72)	0.28** (1.98)	0.95*** (3.76)
Accrual	Low	-0.26* (-1.68)	0.00 (0.00)	0.26* (1.73)	-0.94*** (-3.78)	-0.03 (-0.17)	0.91*** (2.65)	0.68*** (3.90)	-0.04 (-0.17)	0.65** (2.05)
	2	-0.43*** (-2.48)	-0.01 (-0.04)	0.43*** (2.62)	-1.12*** (-4.19)	0.35** (1.96)	1.47*** (4.33)	0.69*** (3.93)	0.35* (1.87)	1.04*** (3.52)
	High	-0.72*** (-4.03)	-0.03 (-0.19)	0.69*** (4.84)	-1.31*** (-5.57)	0.36* (1.81)	1.67*** (5.76)	0.59*** (4.22)	0.39** (2.02)	0.98*** (3.89)
Net Operating Asset	Low	-0.52*** (-3.18)	0.32** (2.13)	0.84*** (3.89)	-1.47*** (-5.51)	0.41* (1.83)	1.88*** (4.74)	0.95*** (5.73)	0.09 (0.53)	1.04*** (3.86)
	2	-0.54*** (-3.00)	0.27* (1.71)	0.81*** (3.90)	-1.09*** (-4.24)	0.38* (1.78)	1.47*** (3.55)	0.55*** (3.26)	0.11 (0.51)	0.66** (2.14)
	High	-0.66*** (-3.84)	0.00 (0.02)	0.66*** (3.32)	-1.35*** (-6.21)	0.27 (1.21)	1.62*** (5.01)	0.69*** (6.13)	0.27* (1.68)	0.96*** (4.44)

Table VIII
Idio. Volatility

Anomaly	Idio. Volatility	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Low	0.10 (1.18)	0.38*** (2.85)	0.28* (1.79)	-0.32** (-2.10)	0.43*** (2.99)	0.75*** (3.46)	0.42*** (2.82)	0.05 (0.51)	0.46*** (2.50)
	2	0.24*** (2.58)	0.27** (2.08)	0.03 (0.21)	-0.12 (-0.65)	0.39 (1.56)	0.52 (1.62)	0.36** (2.27)	0.12 (0.46)	0.48 (1.47)
	High	-0.41** (-2.23)	-0.12 (-0.59)	0.29 (1.29)	-0.96*** (-3.11)	0.19 (0.97)	1.15*** (3.04)	0.54*** (2.88)	0.31 (1.57)	0.86*** (2.67)
Gross Profit	Low	-0.03 (-0.26)	0.33*** (3.68)	0.36** (2.34)	-0.22 (-1.14)	0.61*** (4.95)	0.83*** (3.36)	0.19 (1.20)	0.28*** (3.16)	0.47** (2.41)
	2	0.17 (1.16)	0.50*** (4.14)	0.33** (1.93)	-0.42 (-1.51)	0.67*** (4.45)	1.10*** (3.35)	0.59*** (2.83)	0.18 (1.15)	0.77*** (2.62)
	High	-0.24 (-1.15)	-0.12 (-0.71)	0.11 (0.58)	-1.15*** (-3.60)	0.38*** (2.62)	1.53*** (4.52)	0.92*** (3.84)	0.50*** (2.66)	1.42*** (4.12)
Operating Profit	Low	0.18* (1.79)	0.11 (1.27)	-0.07 (-0.58)	-0.34* (-1.76)	0.23* (1.88)	0.56*** (2.52)	0.52*** (3.22)	0.11 (1.17)	0.64*** (3.14)
	2	0.27** (1.96)	0.04 (0.36)	-0.24 (-1.49)	-0.18 (-0.79)	0.14 (1.04)	0.32 (1.17)	0.45*** (2.48)	0.11 (0.89)	0.56** (2.41)
	High	-0.46** (-2.12)	-0.44*** (-2.66)	0.02 (0.10)	-1.23*** (-3.79)	0.48*** (2.75)	1.71*** (4.86)	0.77*** (3.97)	0.92*** (3.96)	1.68*** (5.30)
Asset Growth	Low	-0.01 (-0.10)	0.10 (0.83)	0.11 (0.88)	-0.82*** (-4.25)	0.20 (1.45)	1.02*** (4.25)	0.81*** (5.46)	0.09 (0.97)	0.91*** (4.56)
	2	-0.27* (-1.79)	0.37*** (2.98)	0.63*** (3.67)	-1.11*** (-4.91)	0.43** (2.10)	1.54*** (4.09)	0.84*** (6.50)	0.07 (0.32)	0.90*** (3.18)
	High	-0.93*** (-3.80)	-0.24 (-1.21)	0.70*** (3.27)	-1.79*** (-5.25)	0.06 (0.26)	1.85*** (4.19)	0.85*** (5.60)	0.30 (1.16)	1.15*** (3.42)

Anomaly	Idio. Volatility	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Investment	Low	-0.08 (-0.84)	0.18* (1.82)	0.26*** (2.56)	-0.41** (-2.06)	0.30*** (2.50)	0.71*** (3.23)	0.34** (2.08)	0.11 (1.29)	0.45** (2.22)
	2	0.05 (0.29)	0.22** (2.24)	0.17 (1.04)	-0.62*** (-2.55)	0.47*** (3.00)	1.09*** (3.24)	0.67*** (4.27)	0.25* (1.62)	0.92*** (3.44)
	High	-0.66*** (-3.24)	0.10 (0.51)	0.76*** (3.86)	-1.50*** (-4.93)	0.62*** (2.80)	2.13*** (5.07)	0.84*** (5.04)	0.53** (1.95)	1.37*** (3.87)
Net Stock Issue	Low	-0.18 (-1.59)	0.21** (2.38)	0.39*** (3.43)	-0.48*** (-2.58)	0.28*** (2.50)	0.76*** (3.95)	0.31** (2.21)	0.07 (0.92)	0.38** (2.23)
	2	-0.13 (-0.92)	0.32*** (2.91)	0.45*** (2.70)	-0.86*** (-3.57)	0.42*** (2.83)	1.28*** (4.22)	0.72*** (4.70)	0.10 (0.95)	0.82*** (3.84)
	High	-0.85*** (-4.16)	0.16 (1.01)	1.01*** (5.02)	-1.53*** (-5.15)	0.47*** (2.65)	1.99*** (5.31)	0.68*** (4.30)	0.31 (1.45)	0.99*** (3.28)
Accrual	Low	-0.14 (-1.11)	0.05 (0.48)	0.19 (1.51)	-0.57*** (-3.19)	0.26* (1.72)	0.84*** (4.21)	0.43*** (3.50)	0.21* (1.65)	0.65*** (3.31)
	2	-0.22 (-1.32)	0.37*** (2.64)	0.59*** (3.45)	-0.71*** (-3.03)	0.44*** (2.82)	1.15*** (3.75)	0.48*** (3.65)	0.07 (0.43)	0.55** (2.24)
	High	-0.92*** (-4.38)	-0.28 (-1.36)	0.64*** (3.61)	-1.81*** (-5.64)	0.35 (1.36)	2.16*** (4.83)	0.90*** (4.72)	0.63** (2.26)	1.52*** (3.90)
Net Operating Asset	Low	-0.26** (-2.29)	0.08 (0.72)	0.35*** (2.61)	-0.68*** (-3.74)	0.20 (1.28)	0.88*** (3.66)	0.41*** (3.18)	0.12 (1.24)	0.53*** (2.97)
	2	-0.37** (-2.30)	0.40*** (3.14)	0.77*** (3.90)	-1.11*** (-4.86)	0.55** (2.42)	1.65*** (4.14)	0.73*** (4.24)	0.15 (0.78)	0.89*** (2.80)
	High	-1.07*** (-4.39)	0.20 (1.18)	1.27*** (5.11)	-1.97*** (-6.13)	0.53** (2.19)	2.50*** (5.15)	0.89*** (5.92)	0.33 (1.38)	1.23*** (3.82)

Table IX
Firm Age

Anomaly	Firm Age	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Low	0.04 (0.27)	0.05 (0.25)	0.01 (0.03)	-0.50* (-1.92)	0.21 (1.18)	0.71** (2.36)	0.54*** (3.37)	0.17 (1.34)	0.71*** (3.10)
	2	-0.06 (-0.59)	0.17 (1.11)	0.23 (1.33)	-0.38** (-1.92)	0.40** (2.04)	0.78*** (2.65)	0.32** (2.02)	0.23 (1.12)	0.54* (1.85)
	High	0.02 (0.15)	0.19 (1.32)	0.18 (0.89)	-0.33** (-2.08)	0.15 (0.85)	0.49* (1.90)	0.35*** (2.47)	-0.04 (-0.19)	0.31 (1.20)
Gross Profit	Low	-0.07 (-0.35)	0.23 (1.48)	0.30 (1.45)	-0.99*** (-2.80)	0.50*** (2.95)	1.49*** (3.92)	0.92*** (3.47)	0.27* (1.70)	1.18*** (3.47)
	2	-0.07 (-0.50)	0.34*** (2.46)	0.41** (2.27)	-0.80*** (-3.15)	0.65*** (4.73)	1.45*** (5.12)	0.73*** (3.74)	0.31** (2.37)	1.04*** (3.98)
	High	0.04 (0.28)	0.10 (0.90)	0.07 (0.41)	-0.19 (-0.80)	0.38*** (2.91)	0.58* (1.91)	0.23 (1.14)	0.28** (2.03)	0.51* (1.83)
Operating Profit	Low	0.05 (0.27)	-0.40*** (-2.95)	-0.45** (-2.41)	-1.07*** (-3.32)	0.16 (0.99)	1.23*** (3.56)	1.12*** (5.15)	0.56*** (3.36)	1.67*** (5.61)
	2	-0.10 (-0.65)	0.02 (0.17)	0.12 (0.67)	-0.52** (-2.15)	0.33*** (2.52)	0.85*** (3.01)	0.42** (2.30)	0.31** (2.28)	0.73*** (3.00)
	High	-0.07 (-0.44)	0.02 (0.17)	0.09 (0.54)	-0.25 (-0.89)	0.15 (1.11)	0.40 (1.26)	0.18 (1.03)	0.14 (1.04)	0.32 (1.28)
Asset Growth	Low	-0.53*** (-2.77)	0.11 (0.75)	0.64*** (2.96)	-1.44*** (-5.00)	0.13 (0.67)	1.57*** (4.23)	0.91*** (5.58)	0.02 (0.11)	0.93*** (3.32)
	2	-0.35** (-2.18)	0.00 (0.00)	0.35* (1.91)	-1.26*** (-5.21)	0.44** (2.25)	1.69*** (4.80)	0.91*** (6.45)	0.43** (2.31)	1.34*** (4.87)
	High	-0.43*** (-2.89)	-0.04 (-0.37)	0.39*** (2.61)	-1.00*** (-4.08)	0.03 (0.25)	1.03*** (3.43)	0.56*** (4.19)	0.08 (0.51)	0.64*** (2.66)

Anomaly	Firm Age	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Investment	Low	-0.37** (-2.00)	0.15 (1.14)	0.52*** (2.89)	-1.30*** (-4.48)	0.63*** (3.46)	1.93*** (5.32)	0.93*** (4.72)	0.48** (2.40)	1.41*** (4.90)
	2	-0.21 (-1.41)	0.22* (1.69)	0.42*** (2.78)	-0.74*** (-3.25)	0.43*** (2.75)	1.16*** (3.99)	0.53*** (3.41)	0.21 (1.30)	0.74*** (2.77)
	High	-0.20* (-1.79)	0.08 (0.77)	0.28** (2.25)	-0.66*** (-3.30)	0.23 (1.08)	0.90*** (2.72)	0.46*** (3.08)	0.15 (0.68)	0.61** (1.99)
Net Stock Issue	Low	-0.56*** (-3.20)	0.07 (0.53)	0.63*** (3.58)	-1.32*** (-5.26)	0.24 (1.58)	1.57*** (5.14)	0.76*** (5.15)	0.18 (1.30)	0.94*** (4.34)
	2	-0.36** (-2.21)	0.35*** (3.30)	0.71*** (4.22)	-1.02*** (-3.98)	0.47*** (2.95)	1.49*** (4.47)	0.66*** (3.96)	0.12 (0.89)	0.78*** (3.11)
	High	-0.30** (-2.20)	0.24*** (2.46)	0.54*** (4.01)	-0.54** (-2.30)	0.43*** (3.74)	0.97*** (3.74)	0.24 (1.57)	0.19* (1.78)	0.43** (2.14)
Accrual	Low	-0.42** (-2.27)	0.28 (1.61)	0.70*** (3.78)	-1.15*** (-4.15)	0.57*** (2.69)	1.72*** (4.65)	0.73*** (4.49)	0.29 (1.35)	1.02*** (3.33)
	2	-0.52*** (-2.87)	0.14 (0.81)	0.66*** (3.86)	-1.01*** (-4.11)	0.59*** (3.02)	1.60*** (5.25)	0.49*** (3.46)	0.45*** (2.63)	0.93*** (3.85)
	High	-0.28** (-1.94)	-0.13 (-0.96)	0.15 (1.19)	-0.97*** (-4.21)	-0.02 (-0.14)	0.95*** (3.56)	0.69*** (4.84)	0.11 (0.62)	0.79*** (3.13)
Net Operating Asset	Low	-0.64*** (-3.32)	0.36*** (2.82)	1.00*** (4.17)	-1.39*** (-5.11)	0.68*** (3.66)	2.07*** (5.13)	0.75*** (4.08)	0.33** (1.99)	1.08*** (3.94)
	2	-0.57*** (-3.04)	0.20 (1.11)	0.76*** (3.54)	-1.38*** (-5.69)	0.44** (2.06)	1.82*** (5.28)	0.81*** (6.01)	0.25 (1.60)	1.06*** (4.68)
	High	-0.49*** (-3.36)	0.12 (0.85)	0.61*** (3.30)	-0.88*** (-3.98)	0.09 (0.55)	0.98*** (3.03)	0.39*** (2.76)	-0.03 (-0.17)	0.36 (1.47)

Table X
Analyst Following

Anomaly	Analyst Following	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Low	-0.37** (-2.04)	0.29 (1.57)	0.66*** (3.26)	-0.96*** (-3.30)	0.40** (2.12)	1.36*** (3.87)	0.59*** (3.42)	0.11 (0.64)	0.70*** (2.48)
	2	0.07 (0.63)	0.17 (1.29)	0.10 (0.63)	-0.34* (-1.65)	0.37** (2.23)	0.71*** (2.61)	0.40*** (2.68)	0.20 (1.22)	0.60** (2.37)
	High	0.30** (2.31)	-0.09 (-0.65)	-0.39** (-1.97)	-0.00 (-0.01)	-0.04 (-0.28)	-0.04 (-0.14)	0.30* (1.89)	0.05 (0.26)	0.35 (1.20)
Gross Profit	Low	-0.40** (-1.94)	0.23 (1.56)	0.63*** (3.38)	-1.34*** (-3.87)	0.56*** (3.84)	1.89*** (5.40)	0.93*** (3.69)	0.33** (2.14)	1.26*** (3.85)
	2	0.01 (0.12)	0.24* (1.90)	0.23 (1.47)	-0.38* (-1.74)	0.56*** (4.22)	0.94*** (3.54)	0.39** (2.30)	0.32** (2.16)	0.71*** (2.67)
	High	0.31* (1.68)	0.22 (1.62)	-0.08 (-0.42)	-0.43 (-1.36)	0.32** (2.17)	0.76** (1.98)	0.74*** (2.89)	0.10 (0.75)	0.84*** (2.52)
Operating Profit	Low	-0.49** (-2.32)	-0.03 (-0.17)	0.47** (2.35)	-1.17*** (-3.60)	0.48*** (3.53)	1.65*** (4.48)	0.68*** (3.48)	0.50*** (2.71)	1.18*** (3.94)
	2	-0.01 (-0.04)	-0.06 (-0.52)	-0.05 (-0.27)	-0.54** (-2.29)	0.27** (2.03)	0.81*** (2.97)	0.53*** (3.21)	0.33*** (2.54)	0.86*** (3.68)
	High	0.19 (1.24)	-0.07 (-0.80)	-0.26* (-1.73)	-0.42 (-1.59)	-0.02 (-0.15)	0.40 (1.38)	0.61*** (3.30)	0.05 (0.42)	0.66*** (2.64)
Asset Growth	Low	-0.75*** (-3.08)	0.02 (0.09)	0.77*** (3.49)	-1.62*** (-5.35)	0.27 (1.54)	1.89*** (5.16)	0.87*** (7.15)	0.25 (1.27)	1.13*** (4.25)
	2	-0.49*** (-3.18)	0.07 (0.61)	0.56*** (3.22)	-1.26*** (-5.06)	0.26 (1.52)	1.51*** (4.37)	0.76*** (5.82)	0.19 (1.11)	0.95*** (3.71)
	High	-0.04 (-0.22)	0.01 (0.07)	0.05 (0.27)	-0.74*** (-2.74)	0.10 (0.50)	0.84** (2.14)	0.70*** (5.14)	0.09 (0.41)	0.79*** (2.65)

Anomaly	Analyst Following	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Investment	Low	-0.50*** (-2.88)	0.15 (0.88)	0.65*** (3.95)	-1.31*** (-5.02)	0.69*** (3.90)	2.00*** (6.05)	0.81*** (5.68)	0.54*** (2.69)	1.34*** (4.66)
	2	-0.26** (-1.96)	0.11 (1.01)	0.36*** (2.46)	-0.89*** (-4.11)	0.39*** (2.86)	1.28*** (4.65)	0.64*** (3.88)	0.28** (2.15)	0.92*** (3.91)
	High	0.04 (0.24)	0.07 (0.58)	0.03 (0.27)	-0.52* (-1.87)	0.16 (0.75)	0.67* (1.78)	0.56*** (3.52)	0.08 (0.36)	0.64** (1.94)
Net Stock Issue	Low	-0.80*** (-3.78)	0.43*** (2.55)	1.22*** (6.05)	-1.54*** (-4.82)	0.55*** (3.45)	2.09*** (5.92)	0.74*** (4.55)	0.12 (0.80)	0.87*** (3.48)
	2	-0.34*** (-2.62)	0.14 (1.55)	0.48*** (3.59)	-0.97*** (-4.56)	0.38*** (2.99)	1.35*** (5.09)	0.63*** (4.80)	0.24** (2.22)	0.87*** (4.37)
	High	-0.15 (-0.96)	0.17* (1.82)	0.31** (2.15)	-0.48* (-1.82)	0.16 (1.32)	0.64** (2.10)	0.33** (2.06)	-0.01 (-0.05)	0.33 (1.57)
Accrual	Low	-0.67*** (-2.87)	-0.03 (-0.14)	0.65*** (3.30)	-1.31*** (-4.18)	0.51** (2.26)	1.81*** (4.69)	0.63*** (4.20)	0.54** (2.33)	1.17*** (3.65)
	2	-0.47*** (-3.06)	0.06 (0.41)	0.53*** (3.65)	-0.95*** (-4.16)	0.36** (2.30)	1.31*** (4.52)	0.48*** (3.39)	0.30* (1.77)	0.78*** (3.05)
	High	-0.16 (-1.03)	0.04 (0.28)	0.20 (1.45)	-0.82*** (-3.08)	0.13 (0.84)	0.95*** (2.88)	0.65*** (4.52)	0.09 (0.53)	0.74*** (2.72)
Net Operating Asset	Low	-0.73*** (-3.26)	0.09 (0.54)	0.82*** (3.73)	-1.62*** (-5.96)	0.43*** (2.49)	2.05*** (5.91)	0.89*** (7.22)	0.34** (2.25)	1.24*** (5.57)
	2	-0.69*** (-4.86)	0.28** (2.18)	0.98*** (5.23)	-1.38*** (-6.30)	0.35** (2.00)	1.73*** (4.98)	0.69*** (5.33)	0.07 (0.46)	0.76*** (3.05)
	High	-0.25 (-1.40)	0.46*** (2.98)	0.71*** (2.96)	-0.88*** (-3.41)	0.59*** (2.66)	1.47*** (3.59)	0.64*** (4.78)	0.13 (0.76)	0.76*** (3.12)

Table XI
Business Cycles

Anomaly	Business Cycles	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Expansion	-0.10 (-1.21)	0.18 (1.58)	0.28** (2.25)	-0.60*** (-3.33)	0.43*** (2.99)	1.04*** (4.79)	0.50*** (3.57)	0.25* (1.84)	0.75*** (3.38)
	Recession	0.78*** (2.59)	0.21 (0.53)	-0.57 (-1.08)	0.68* (1.74)	-0.72 (-1.49)	-1.40** (-2.02)	0.10 (0.53)	-0.93 (-1.45)	-0.83 (-1.18)
Gross Profit	Expansion	-0.08 (-0.66)	0.14 (1.34)	0.23 (1.61)	-0.72*** (-2.97)	0.56*** (5.50)	1.28*** (4.71)	0.63*** (3.59)	0.42*** (3.57)	1.05*** (4.17)
	Recession	0.20 (0.73)	0.83*** (3.19)	0.63*** (2.64)	0.07 (0.18)	0.14 (0.34)	0.07 (0.13)	0.13 (0.76)	-0.70 (-1.51)	-0.57 (-1.11)
Operating Profit	Expansion	-0.07 (-0.48)	-0.17** (-2.09)	-0.10 (-0.74)	-0.76*** (-3.40)	0.21** (2.12)	0.97*** (3.94)	0.69*** (4.60)	0.38*** (3.75)	1.07*** (5.21)
	Recession	0.36 (1.35)	0.55 (1.60)	0.19 (0.53)	0.29 (0.95)	0.46 (1.42)	0.17 (0.30)	0.07 (0.47)	-0.09 (-0.16)	-0.02 (-0.03)
Asset Growth	Expansion	-0.51*** (-3.44)	0.06 (0.55)	0.57*** (4.20)	-1.42*** (-6.09)	0.26* (1.86)	1.68*** (5.27)	0.91*** (7.68)	0.20 (1.29)	1.11*** (4.69)
	Recession	0.45* (1.87)	0.15 (0.52)	-0.30 (-1.10)	0.27 (0.76)	-0.27 (-0.69)	-0.54 (-0.90)	0.18 (0.99)	-0.42 (-0.82)	-0.24 (-0.41)

Anomaly	Business Cycles	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Investment	Expansion	-0.30*** (-2.46)	0.14 (1.44)	0.44*** (4.23)	-1.00*** (-4.85)	0.50*** (5.16)	1.49*** (6.08)	0.70*** (5.22)	0.35*** (2.80)	1.06*** (4.68)
	Recession	0.34 (1.17)	0.33 (1.45)	-0.01 (-0.03)	0.20 (0.51)	-0.06 (-0.11)	-0.25 (-0.45)	0.14 (0.90)	-0.39 (-0.75)	-0.25 (-0.42)
Net Stock Issue	Expansion	-0.46*** (-3.41)	0.23*** (2.56)	0.70*** (5.43)	-1.15*** (-5.20)	0.48*** (4.18)	1.63*** (6.39)	0.68*** (5.67)	0.25*** (3.04)	0.94*** (5.35)
	Recession	0.15 (0.75)	0.56* (1.87)	0.40 (1.33)	0.23 (0.69)	0.00 (0.02)	-0.23 (-0.46)	-0.08 (-0.37)	-0.55 (-1.18)	-0.63 (-1.16)
Accrual	Expansion	-0.53*** (-3.58)	-0.00 (-0.00)	0.53*** (5.29)	-1.18*** (-5.58)	0.37*** (3.00)	1.55*** (6.00)	0.66*** (6.12)	0.37*** (2.58)	1.03*** (4.54)
	Recession	0.39 (1.01)	0.48** (2.01)	0.08 (0.22)	0.09 (0.21)	0.13 (0.21)	0.04 (0.04)	0.30** (2.15)	-0.35 (-0.51)	-0.05 (-0.06)
Net Operating Asset	Expansion	-0.64*** (-4.17)	0.24** (2.07)	0.88*** (5.06)	-1.42*** (-6.66)	0.54*** (3.52)	1.96*** (5.98)	0.78*** (7.06)	0.29** (2.20)	1.07*** (5.09)
	Recession	0.24 (0.69)	0.28 (0.96)	0.05 (0.11)	0.14 (0.31)	-0.37 (-0.88)	-0.51 (-0.68)	0.10 (0.49)	-0.66* (-1.76)	-0.56 (-1.12)
Composite	Expansion	-0.33*** (-3.11)	0.11 (1.43)	0.44*** (7.16)	-1.04*** (-5.50)	0.42*** (5.56)	1.45*** (6.46)	0.69*** (6.65)	0.32*** (3.07)	1.01*** (5.21)
	Recession	0.37* (1.79)	0.43* (1.83)	0.06 (0.33)	0.25 (0.84)	-0.13 (-0.37)	-0.32 (-0.56)	0.12 (0.75)	-0.50 (-1.06)	-0.39 (-0.71)

Table XII
Investor Sentiment

Anomaly	Investor Sentiment	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Low	-0.01 (-0.09)	0.34*** (2.57)	0.35** (2.23)	-0.40* (-1.79)	0.37 (1.51)	0.77** (2.17)	0.39** (2.20)	0.03 (0.11)	0.42 (1.23)
	High	0.02 (0.10)	-0.00 (-0.03)	-0.02 (-0.09)	-0.39 (-1.41)	0.22 (1.39)	0.61* (1.90)	0.40*** (2.47)	0.22 (1.46)	0.63** (2.21)
Gross Profit	Low	0.07 (0.58)	0.15 (1.26)	0.08 (0.47)	-0.22 (-1.00)	0.55*** (3.87)	0.77*** (3.00)	0.29* (1.68)	0.40** (2.32)	0.69*** (2.68)
	High	-0.19 (-0.88)	0.35** (1.97)	0.54*** (2.84)	-1.05*** (-2.88)	0.58*** (3.99)	1.63*** (4.24)	0.87*** (3.65)	0.23 (1.60)	1.10*** (3.14)
Operating Profit	Low	0.23* (1.66)	-0.00 (-0.02)	-0.24 (-1.25)	-0.38* (-1.89)	0.37** (2.33)	0.75*** (2.99)	0.61*** (3.33)	0.37** (2.05)	0.99*** (3.64)
	High	-0.22 (-1.06)	-0.14 (-1.32)	0.09 (0.43)	-0.78** (-2.27)	0.26* (1.89)	1.04*** (2.64)	0.56*** (3.12)	0.40*** (2.86)	0.96*** (3.47)
Asset Growth	Low	-0.18 (-1.34)	0.21* (1.84)	0.39*** (2.47)	-1.03*** (-4.40)	0.43** (2.36)	1.46*** (4.25)	0.85*** (6.14)	0.22 (1.37)	1.08*** (4.46)
	High	-0.61*** (-2.60)	-0.07 (-0.42)	0.54*** (2.72)	-1.31*** (-3.77)	-0.02 (-0.10)	1.29*** (2.88)	0.70*** (4.79)	0.06 (0.24)	0.75** (2.16)

Anomaly	Investor Sentiment	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Investment	Low	-0.01 (-0.11)	0.19** (2.14)	0.20 (1.29)	-0.62*** (-3.04)	0.43** (2.13)	1.05*** (3.42)	0.61*** (3.55)	0.24 (1.43)	0.85*** (3.20)
	High	-0.41** (-2.22)	0.16 (1.00)	0.57*** (4.73)	-1.01*** (-3.31)	0.48*** (3.07)	1.49*** (3.80)	0.61*** (3.97)	0.31 (1.41)	0.92*** (2.63)
Net Stock Issue	Low	-0.13 (-1.18)	0.27** (2.44)	0.41*** (2.84)	-0.83*** (-4.48)	0.45*** (2.62)	1.28*** (4.61)	0.69*** (5.52)	0.18 (1.15)	0.87*** (3.65)
	High	-0.60*** (-2.78)	0.24** (1.95)	0.84*** (4.75)	-1.03*** (-2.99)	0.43*** (3.29)	1.46*** (3.86)	0.43*** (2.58)	0.19* (1.69)	0.62*** (2.56)
Accrual	Low	-0.24 (-1.61)	0.29** (2.42)	0.53*** (3.72)	-0.96*** (-4.37)	0.47** (2.14)	1.43*** (4.16)	0.72*** (5.64)	0.18 (0.91)	0.89*** (3.27)
	High	-0.59*** (-2.54)	-0.09 (-0.45)	0.50*** (3.40)	-1.03*** (-3.17)	0.33** (2.19)	1.36*** (3.73)	0.44*** (3.38)	0.42** (1.97)	0.86*** (2.74)
Net Operating Asset	Low	-0.27* (-1.67)	0.41*** (2.72)	0.67*** (3.14)	-1.02*** (-4.18)	0.45** (2.30)	1.48*** (3.85)	0.76*** (5.36)	0.05 (0.36)	0.81*** (3.38)
	High	-0.86*** (-3.81)	0.14 (0.89)	1.00*** (4.07)	-1.43*** (-4.60)	0.41** (2.08)	1.84*** (4.04)	0.57*** (4.02)	0.26 (1.33)	0.84*** (2.76)
Composite	Low	-0.06 (-0.73)	0.25*** (3.11)	0.32*** (4.38)	-0.70*** (-4.24)	0.44*** (3.52)	1.13*** (4.68)	0.61*** (5.50)	0.21 (1.50)	0.82*** (3.78)
	High	-0.43** (-2.39)	0.07 (0.57)	0.50*** (5.01)	-1.00*** (-3.32)	0.33*** (3.43)	1.34*** (3.84)	0.57*** (4.06)	0.26* (1.64)	0.83*** (2.90)

Table XIII
Market Volatility

Anomaly	Market Volatility	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	Low	-0.23** (-2.42)	0.17 (1.42)	0.40*** (2.58)	-0.90*** (-5.25)	0.42*** (3.01)	1.33*** (6.25)	0.68*** (4.72)	0.26*** (2.56)	0.93*** (5.27)
	High	0.27** (2.04)	0.20 (1.16)	-0.07 (-0.35)	0.05 (0.21)	0.15 (0.68)	0.10 (0.27)	0.22 (1.32)	-0.05 (-0.20)	0.17 (0.50)
Gross Profit	Low	-0.10 (-0.83)	0.14 (1.31)	0.24 (1.25)	-0.55** (-2.32)	0.54*** (4.97)	1.09*** (3.66)	0.44*** (2.50)	0.41*** (4.69)	0.85*** (3.86)
	High	-0.01 (-0.08)	0.48*** (3.17)	0.49*** (2.97)	-0.62** (-2.07)	0.65*** (3.44)	1.27*** (3.56)	0.60*** (3.05)	0.17 (0.86)	0.78** (2.33)
Operating Profit	Low	-0.05 (-0.36)	-0.20** (-2.10)	-0.15 (-0.80)	-0.79*** (-3.60)	0.17 (1.36)	0.96*** (4.17)	0.74*** (3.52)	0.37*** (3.73)	1.11*** (4.85)
	High	0.16 (0.84)	0.13 (0.95)	-0.02 (-0.12)	-0.31 (-1.04)	0.42*** (2.50)	0.73** (2.04)	0.47*** (3.00)	0.29 (1.50)	0.75*** (2.66)
Asset Growth	Low	-0.47*** (-4.48)	0.05 (0.39)	0.51*** (3.75)	-1.44*** (-6.81)	0.18 (1.08)	1.62*** (5.70)	0.97*** (6.21)	0.14 (1.27)	1.11*** (5.34)
	High	-0.22 (-1.01)	0.20 (1.33)	0.42** (2.22)	-0.83*** (-2.68)	0.30* (1.78)	1.14*** (2.77)	0.61*** (4.77)	0.10 (0.45)	0.71** (2.28)

Anomaly	Market Volatility	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
		Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Investment	Low	-0.32*** (-2.51)	0.12 (1.32)	0.44*** (2.92)	-1.05*** (-5.17)	0.54*** (4.42)	1.59*** (7.07)	0.73*** (3.95)	0.42*** (4.36)	1.15*** (5.23)
	High	-0.04 (-0.22)	0.30** (2.24)	0.34*** (2.49)	-0.43 (-1.56)	0.43** (2.39)	0.86** (2.33)	0.39*** (2.91)	0.13 (0.61)	0.52* (1.69)
Net Stock Issue	Low	-0.32*** (-3.35)	0.25*** (2.49)	0.57*** (4.11)	-1.04*** (-6.21)	0.53*** (2.97)	1.56*** (5.96)	0.72*** (5.34)	0.27** (2.24)	1.00*** (4.64)
	High	-0.31 (-1.60)	0.36*** (2.82)	0.67*** (3.80)	-0.69** (-2.27)	0.39*** (2.67)	1.07*** (3.10)	0.38*** (2.50)	0.03 (0.18)	0.40* (1.67)
Accrual	Low	-0.44*** (-3.75)	0.05 (0.52)	0.49*** (3.53)	-1.12*** (-7.29)	0.44** (2.36)	1.56*** (5.85)	0.68*** (4.96)	0.38*** (2.60)	1.07*** (4.52)
	High	-0.20 (-0.95)	0.22 (1.36)	0.42*** (2.92)	-0.69** (-2.33)	0.35** (2.11)	1.03*** (2.75)	0.49*** (3.75)	0.13 (0.59)	0.62** (2.01)
Net Operating Asset	Low	-0.56*** (-4.88)	0.26* (1.63)	0.82*** (4.53)	-1.47*** (-8.49)	0.43** (2.27)	1.90*** (6.25)	0.91*** (6.12)	0.17* (1.84)	1.08*** (5.24)
	High	-0.41* (-1.86)	0.31** (2.16)	0.73*** (3.12)	-0.90*** (-3.04)	0.38** (2.01)	1.28*** (2.98)	0.49*** (3.68)	0.07 (0.35)	0.55** (1.96)
Composite	Low	-0.30*** (-4.28)	0.12* (1.82)	0.43*** (6.31)	-1.06*** (-8.45)	0.41*** (4.17)	1.45*** (8.39)	0.73*** (7.14)	0.31*** (4.19)	1.03*** (6.55)
	High	-0.09 (-0.59)	0.28** (2.43)	0.37*** (4.26)	-0.55** (-2.11)	0.38*** (3.12)	0.93*** (2.89)	0.45*** (3.75)	0.11 (0.61)	0.56** (2.06)

Table XIV
Alternative specifications of MA Filter

Anomaly	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
	Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
MA(1)-MA(200)	-0.39*** (-2.69)	0.10 (0.97)	0.49*** (3.70)	-1.05*** (-4.65)	0.02 (0.14)	1.07*** (3.29)	0.66*** (5.85)	-0.08 (-0.48)	0.59** (2.42)
MA(5)-MA(200)	-0.39*** (-2.68)	0.10 (1.03)	0.49*** (3.76)	-1.11*** (-4.82)	0.12 (0.83)	1.22*** (3.76)	0.72*** (6.32)	0.01 (0.09)	0.73*** (3.04)
MA(10)-MA(200)	-0.39*** (-2.68)	0.10 (1.03)	0.49*** (3.76)	-1.16*** (-5.05)	0.17 (1.25)	1.33*** (4.14)	0.77*** (6.79)	0.07 (0.44)	0.84*** (3.54)
MA(20)-MA(200)	-0.41*** (-2.83)	0.08 (0.82)	0.49*** (3.75)	-1.17*** (-5.22)	0.22* (1.69)	1.40*** (4.55)	0.77*** (7.20)	0.14 (0.95)	0.91*** (4.01)
MA(100)-MA(200)	-0.39*** (-2.69)	0.09 (0.85)	0.48*** (3.61)	-1.11*** (-4.85)	0.31*** (2.70)	1.42*** (4.95)	0.71*** (6.68)	0.23* (1.79)	0.94*** (4.56)
MA(50)-MA(100)	-0.41*** (-2.83)	0.08 (0.76)	0.49*** (3.69)	-0.89*** (-4.02)	0.19 (1.33)	1.08*** (3.55)	0.48*** (4.42)	0.11 (0.74)	0.60*** (2.60)
MA(50)-MA(400)	-0.39*** (-2.71)	0.09 (0.88)	0.48*** (3.65)	-1.21*** (-5.40)	0.32*** (2.47)	1.53*** (5.33)	0.82*** (7.55)	0.23* (1.65)	1.05*** (4.86)
MA(50)-MA(600)	-0.39*** (-2.71)	0.09 (0.88)	0.48*** (3.65)	-0.98*** (-4.60)	0.26** (2.07)	1.24*** (4.77)	0.59*** (5.71)	0.17 (1.36)	0.76*** (3.93)
MA(50)-MA(800)	-0.39*** (-2.71)	0.09 (0.88)	0.48*** (3.65)	-0.74*** (-3.66)	0.22* (1.86)	0.96*** (3.85)	0.35*** (4.21)	0.13 (1.05)	0.48*** (2.68)
MA(20)-MA(100)	-0.40*** (-2.70)	0.12 (1.13)	0.51*** (3.93)	-0.85*** (-3.85)	0.15 (1.06)	1.00*** (3.30)	0.46*** (4.40)	0.03 (0.20)	0.49** (2.18)
MA(100)-MA(400)	-0.39*** (-2.71)	0.09 (0.88)	0.48*** (3.65)	-1.10*** (-4.85)	0.27** (2.08)	1.38*** (4.89)	0.71*** (6.28)	0.18 (1.43)	0.89*** (4.34)
MA(200)-MA(1000)	-0.39*** (-2.71)	0.09 (0.88)	0.48*** (3.65)	-0.48*** (-2.83)	0.23 (1.59)	0.71*** (3.61)	0.09 (1.57)	0.14 (1.22)	0.23* (1.70)

Table XV
Value Weighted Fama-French 5-Factor Alpha

Anomaly	Panel A: Original			Panel B: MA Enhanced			Panel C: Improvement		
	Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	0.22** (2.40)	0.17 (1.35)	-0.06 (-0.31)	-0.31** (-2.13)	0.10 (0.44)	0.41 (1.55)	0.54*** (3.50)	-0.07 (-0.36)	0.46* (1.77)
Gross Profit	-0.04 (-0.35)	0.61*** (3.98)	0.65*** (3.71)	-0.18 (-0.88)	0.70*** (3.35)	0.88*** (2.65)	0.14 (0.78)	0.09 (0.90)	0.23 (1.01)
Operating Profit	0.31 (1.38)	0.02 (0.24)	-0.29 (-1.37)	-0.45** (-2.02)	0.10 (0.77)	0.55** (2.06)	0.76*** (3.38)	0.08 (0.74)	0.84*** (3.12)
Asset Growth	0.03 (0.27)	-0.13 (-0.93)	-0.17 (-0.87)	-0.97*** (-4.64)	-0.07 (-0.33)	0.89*** (2.80)	1.00*** (5.91)	0.06 (0.43)	1.06*** (4.25)
Investment	0.02 (0.14)	0.17 (1.52)	0.15 (1.01)	-0.74*** (-3.70)	0.32* (1.68)	1.06*** (3.32)	0.75*** (3.75)	0.16 (0.98)	0.91*** (2.92)
Net Stock Issue	-0.29*** (-2.60)	0.23** (2.27)	0.51*** (3.21)	-0.74*** (-3.46)	0.19 (1.26)	0.92*** (3.21)	0.45*** (2.85)	-0.04 (-0.37)	0.41** (2.10)
Accrual	-0.24* (-1.74)	0.33** (1.99)	0.58*** (3.01)	-1.10*** (-5.36)	0.38* (1.75)	1.49*** (4.83)	0.86*** (5.29)	0.05 (0.33)	0.91*** (3.71)
Net Operating Asset	-0.29** (-2.15)	0.27** (1.95)	0.56*** (2.75)	-1.13*** (-5.39)	0.31 (1.61)	1.44*** (4.71)	0.84*** (4.97)	0.04 (0.28)	0.88*** (3.60)
Composite	-0.03 (-0.39)	0.21*** (2.82)	0.24*** (3.44)	-0.70*** (-4.79)	0.24* (1.86)	0.96*** (4.19)	0.66*** (5.39)	0.05 (0.48)	0.71*** (3.61)

Table XVI
Momentum Filter

Anomaly	Panel A: Original			Panel B: MOM Enhanced			Panel C: Improvement		
	Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Book-To-Market	-0.01 (-0.15)	0.18 (1.49)	0.19 (1.41)	-0.32** (-2.30)	0.33*** (3.07)	0.65*** (3.83)	0.31*** (3.90)	0.15** (2.02)	0.45*** (3.35)
Gross Profit	-0.06 (-0.50)	0.23** (2.27)	0.29** (2.29)	-0.26 (-1.60)	0.46*** (5.99)	0.71*** (4.12)	0.20*** (2.49)	0.23*** (3.09)	0.42*** (3.07)
Operating Profit	0.00 (0.01)	-0.09 (-1.04)	-0.09 (-0.69)	-0.17 (-0.85)	0.16** (2.08)	0.33 (1.55)	0.17 (1.52)	0.25*** (3.43)	0.42*** (2.75)
Asset Growth	-0.39*** (-2.71)	0.09 (0.88)	0.48*** (3.65)	-0.75*** (-3.89)	0.21** (2.29)	0.96*** (4.23)	0.36*** (5.05)	0.12 (1.21)	0.48*** (3.15)
Investment	-0.21* (-1.76)	0.19** (2.12)	0.39*** (3.92)	-0.57*** (-2.84)	0.40*** (4.31)	0.97*** (4.16)	0.37*** (3.41)	0.21** (2.17)	0.58*** (3.13)
Net Stock Issue	-0.37*** (-2.90)	0.25*** (2.92)	0.63*** (5.32)	-0.74*** (-3.71)	0.48*** (4.94)	1.21*** (5.54)	0.36*** (3.89)	0.22*** (3.12)	0.58*** (3.87)
Accrual	-0.39*** (-2.80)	0.10 (0.85)	0.49*** (4.94)	-0.83*** (-4.25)	0.35*** (2.88)	1.18*** (5.24)	0.44*** (5.25)	0.25** (2.20)	0.69*** (3.81)
Net Operating Asset	-0.49*** (-3.28)	0.29*** (2.55)	0.78*** (4.77)	-0.94*** (-4.34)	0.47*** (3.12)	1.41*** (4.74)	0.45*** (4.55)	0.18* (1.70)	0.63*** (3.33)
Composite	-0.24** (-2.33)	0.15** (1.97)	0.39*** (6.45)	-0.57*** (-3.43)	0.36*** (5.32)	0.93*** (5.14)	0.33*** (4.33)	0.20*** (2.68)	0.53*** (3.62)

Table XVII
Summary Statistics of Stocks Dropped

Panel A: Accounting Variables							
	BM	GP	OP	AG	IK	NS	NOA
Decile Low							
Kept	0.584*** (22.22)	0.429*** (104.12)	0.519*** (6.39)	0.539*** (33.36)	2.710* (1.66)	0.150*** (9.25)	1.068*** (78.62)
Dummy	0.061*** (3.63)	0.005 (0.80)	-0.141 (-1.52)	-0.069*** (-4.93)	-1.745 (-1.07)	-0.032* (-1.96)	-0.061*** (-5.12)
Decile High							
Kept	0.815*** (24.46)	0.385*** (65.73)	-0.142* (-1.92)	0.101*** (11.43)	0.695*** (4.47)	0.060*** (3.89)	0.612*** (57.31)
Dummy	-0.077*** (-3.90)	-0.019*** (-2.93)	0.121 (1.57)	0.066*** (5.34)	0.384 (1.09)	0.005 (0.33)	0.051*** (4.82)

Panel B: Market Variables							
	$r_{t-13,t-2}$	IVol	Dispersion	Amihud	Spread	%Zero	Volume
Decile Low							
Kept	-0.151*** (-8.95)	3.195*** (45.81)	0.379*** (13.00)	13.35*** (16.80)	0.031*** (13.32)	0.276*** (27.93)	9.291*** (9.06)
Dummy	0.667*** (38.33)	-0.593*** (-14.10)	-0.218*** (-7.82)	-4.342*** (-7.50)	-0.011*** (-10.40)	-0.043*** (-8.28)	3.922*** (5.03)
Decile High							
Kept	0.565*** (18.57)	2.540*** (65.17)	0.210*** (15.76)	10.32*** (19.56)	0.020*** (13.23)	0.239*** (27.30)	15.13*** (5.55)
Dummy	-0.620*** (-31.07)	0.523*** (12.29)	0.214*** (6.51)	4.801*** (6.31)	0.010*** (10.23)	0.042*** (8.89)	-4.599** (-2.44)