Momentum and Credit Rating

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First draft: November 1, 2004

This Revision: September 1, 2005

We thank Narasimhan Jegadeesh and seminar participants at Emory University and the Washington Area Finance Association conference for helpful comments.

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Abstract

This paper establishes a strong link between momentum and firm credit rating. Momentum profitability is statistically significant and economically large among low-grade firms, but it is nonexistent among high-grade firms. The momentum payoffs documented in the literature are generated by low rated firms that account for less than four percent of the overall market capitalization of rated firms. For loser (winner) stocks in the low rating category, profit margins, sales growth, operating cash flows, and interest coverage decrease (increase) over the formation and holdings periods, while illiquidity and volatility increase (decrease). This operating performance of the winner and loser stocks is not anticipated by the market as evidenced by the earnings surprises and analyst forecast revisions. As the market observes the deteriorating (improving) conditions there is a pressure to sell (buy) losers (winners). Indeed, we show that institutional investors buy winners and sell losers during one year into the holding period. Such buying and selling activity accompanied with high illiquidity precipitates the gains among high credit-risk winners and losses among high credit-risk losers.

Introduction

Jegadeesh and Titman (1993) document the profitability of momentum strategies: buying past winners and selling past losers provide statistically significant and economically large payoffs. The empirical evidence on stock return momentum has been particularly intriguing for several reasons. Fama and French (1996) show that momentum profitability is the only CAPM-related anomaly unexplained by the Fama and French (1993) three-factor model. Moreover, Schwert (2003) demonstrates that the so-called financial market anomalies related to profit opportunities, including the size and value effects in the cross section of average return, as well as time-series predictability, typically disappear, reverse, or attenuate following their discovery. Momentum is an exception. In particular, Jegadeesh and Titman (2001) and Jegadeesh and Titman (2002) document the prominence of momentum profitability out-of-sample – in the period after the initial discovery of momentum. Also, Rouwenhorst (1998) finds momentum payoffs to be significantly positive in twelve other countries examined in his study. The robustness of momentum profits has generated a variety of explanations, both risk based and behavioral.[1]

In this paper, we provide a new and unexplored dimension in understanding the profitability of momentum strategies. In particular, we show that momentum profits are restricted to high credit risk firms, or firms with poor quality of outstanding debt, and are nonexistent for firms of high credit quality. We also explain the source of the momentum profits amongst the high credit-risk firms. Our empirical findings are based on a sample of 3,578 NYSE, AMEX, and NASDAQ firms rated by S&P over the July 1985-December 2003 period.[2] Our selected sample is representative enough in that rated and non-rated firms share similar characteristics in terms of (i) their stock return distribution, (ii) the momentum profits they generate, and (iii) their industry distribution among the 20 industries studied by Moskowitz and Grinblatt (1999).

We demonstrate that over formation periods of three, six, nine, and twelve months, the extreme loser as well as the extreme winner portfolios of Jegadeesh and Titman

[1]See, e.g., Barberis and Vishny (1998), Daniel, Hirshleifer, and Subrahmanyam (1998), Hong, Lim, and Stein (2000), Chordia and Shivakumar (2002), Grinblatt and Han (2002), Avramov and Chordia (2005), among others.

[2]We use the S&P Long-Term Domestic Issuer Credit Rating. Data on this variable is available on Compustat on a quarterly basis starting from the second quarter of 1985.

(1993) consist of stocks with the lowest and the next lowest credit rating, respectively. Specifically, the average rating of the entire sample of rated firms is BBB. The extreme loser portfolio has an average rating of approximately BB− and the extreme winner portfolio has an average rating of approximately BB+. The extreme loser and winner portfolios are the only non-investment grade portfolios.

Trading strategies that condition on credit rating and on the prior six-month return result in momentum payoffs that increase monotonically with the credit risk – they increase from an insignificant 0.27% per month for the best quality debt tercile to a significant 2.35% for the worst. Similarly, based on ten credit rating deciles and three momentum portfolios, momentum payoffs increase from insignificant 0.07% per month for the highest credit quality decile to a significant 2.04% for the worst. Our results are robust to adjusting by the industry (Moskowitz and Grinblatt (1999)), the size effect (Hong, Lim, and Stein (2000)), and upon risk adjusting the raw momentum payoffs by the Fama and French (1993) model as well as by the CAPM.

We also implement momentum strategies based on the prior six-month return for different samples of rated firms. We sequentially exclude the lowest rated firms. Strikingly, the significant profits to momentum strategies are derived from a sample of firms that accounts for less than four percent of the market capitalization of all rated firms and for about 22 percent of the total number of firms. More specifically, when we exclude firms with an overall S&P rating of D, C, CC, CCC−, CCC+, B−, B, B+ and BB− the usual momentum strategy payoffs from the remaining firms, which account for 96.6% of the market capitalization of all rated firms, become statistically insignificant.

Among the low rated firms, loser stocks are an important source of stock return continuation and the profitability of momentum strategies. Based on ten credit risk and three past return groups, the return differential between the lowest and highest credit risk loser firms averages 1.60% per month, whereas the return differential for the winner firms is, on average, only 0.37%.

In order to understand the source of momentum profits, we examine the operating and financial performance of the high credit risk loser and winner stocks. Over the formation and holding periods, the operating and financial performance of high credit risk losers deteriorates while that of the high credit risk winners improves. For the loser stocks, industry adjusted sales growth, profit margins, asset turnover, operating cash flows, and interest coverage decline sharply and are uniformly negative. On the other

hand, industry adjusted sales growth, profit margins, asset turnover, operating cash flows, and interest coverage improve substantially for the winner stocks.

One may argue that, given the decline (increase) in returns during the formation period, investors anticipate the future poor (good) operating performance of the loser (winner) stocks as of the formation date. However, we show that future performance is not anticipated by the market. First, analyst following is low (high) and the forecast dispersion is high (low) for the loser (winner) stocks. Moreover, monthly analyst forecast revisions are negative (positive) for the loser (winner) stocks. Finally, the earnings surprises, measured by actual minus forecasted earnings per share and by the standardized unexpected earnings, are negative (positive) for the loser (winner) stocks over the three quarterly earnings announcements after the formation date. Remarkably, the dispersion in analyst forecasts, forecast revisions, and the earnings surprises are, all, *much* stronger for the loser stocks, which may explain why losers play such a dominant role in generating the momentum payoffs.

Given that the future operating performance of the winner and loser stocks is not anticipated, the market reacts as information about the operating performance is revealed. We document that institutional investors sell (buy) the high credit risk loser (winner) stocks during the holding period. Given the high illiquidity amongst the low rated stocks, the price pressure due to institutional trades is likely to be higher.[3] This price pressure causes the continuation in returns of the winners and the losers. Moreover, institutional buying of winners and selling of losers reverses after a year into the holding period. This evidence is important because Jegadeesh and Titman (1993) have shown that the returns to buying winners and selling losers reverse after one year.

To summarize, this paper establishes a strong and previously unexplored link between momentum profitability and firm credit rating. Extreme winner and loser portfolios are predominantly composed of high credit risk stocks. Momentum profitability is statistically significant and economically large among low-grade firms, but it is nonexistent among high-grade firms. Once we exclude from the analysis the high credit risk firms, which account altogether for about four percent of market capitalization, the profitability of momentum strategies becomes statistically insignificant. Momentum amongst the high credit risk losers (winners) is explained by the unanticipated worsening (improving) operating and financial performance over the formation and holding periods accompa-

[3] **?** show that more illiquid a stock, the more downward sloping is the demand curve for such a stock.

nied by high illiquidity among losers (winners) during those periods.

A final question remains. Why are the momentum strategy profits confined to the high credit risk or the low rated firms? Possibly because, given the standard risk shifting arguments, the managers of these low rated firms have an incentive to undertake riskier projects. This is consistent with the fact that it is the low rated stocks that have high return volatility and high analyst forecast dispersion. Given the riskier projects, some of the low rated firms turn out to have extremely poor operating performance and others turn out to have extremely good operating performance. The momentum strategy profits arise as the market reacts to the information about the operating performance. The market may either be underreacting to information about the operating performance or, given the high return volatility of the low rated stocks, there may genuinely be considerable uncertainty about the performance of these firms. Either case will generate the momentum phenomenon. This is important because underreaction may point to investor cognitive biases while learning may be consistent with rational investor behavior.

The rest of the paper is organized as follows. The next section presents the data. Section 2 presents the results and section 3 examines the operating and financial performance of firms in search for an explanation for momentum profits. Section 4 concludes.

1 Data

We extract monthly returns on all NYSE, AMEX, and NASDAQ stocks listed on the CRSP database, subject to several selection criteria. First, stocks must have at least six consecutive monthly return observations. In addition, as in Jegadeesh and Titman (2001), we exclude stocks that, at the beginning of the holding period, are priced below $5 or have market capitalization that would place them in the bottom NYSE decile. This is done to ensure that the empirical findings are not driven by low priced and extremely illiquid stocks. The filtering procedure delivers a universe of 13,018 stocks. From this universe, we choose those stocks that are rated by Standard & Poor's, leaving us with 3,578 rated stocks over the July 1985 through December 2003 period. The beginning of our sample is determined by the first time firm ratings by Standard & Poor's become available on the COMPUSTAT tapes. This investment universe of 3,578 rated firms is the basis for our analysis of the relation between momentum profitability and the firm credit rating.

The S&P issuer rating used here is an essential component of our analysis. Note that Standard & Poor's assigns this rating to a firm, not a bond. As defined by S&P, prior to 1998, this issuer rating is based on the firm's most senior publicly traded debt. After 1998, this rating is based on the overall quality of the firm's outstanding debt, either public or private. That is, before 1998, the issuer rating represents a select subsample of company bonds, after 1998, it represents all company debt. This rating is available from COMPUSTAT on a quarterly basis starting in 1985. We transform the S&P ratings into conventional numerical scores. In particular, AAA takes on the value 1 and D takes on the value 22.[4] Thus, a higher numerical score corresponds to a lower credit rating or higher credit risk. Numerical ratings at or below 10 (BBB− or better) are considered investment-grade, and ratings of 11 or higher (BB+ or worse) are labelled high-yield or non-investment grade. The equally weighted average rating of the 3,578 firms in our sample is 8.83 (approximately BBB, the investment-grade threshold) and the median is 9 (BBB).

To make sure that our sample of stocks is representative, in Table 1 we compare rated and unrated firms. It is important to note that although the *total* number of rated firms is much smaller than that of unrated firms (there are 3,578 rated firms and 9,440 unrated firms, a ratio of 2.6 to 1), the *average per month* number of rated and unrated firms are considerably closer (1,639 rated firms and 2,246 unrated firms, a more appealing ratio of 1.4 to 1).

Panel A of Table 1 presents monthly returns for the loser portfolio (P1), the winner portfolio (P10), and the momentum strategy of buying the winner and selling the loser portfolio (P10−P1). Momentum portfolios are constructed in the usual way following Jegadeesh and Titman (1993). Specifically, at the beginning of each month in our sample period, we rank all eligible stocks on the basis of their cumulative return over the formation period, months $t-6$ to $t-1$. Note that we skip a month between the formation and holding periods (months $t+1$ to $t+6$). These stocks are then assigned to one of ten portfolios based on their prior six-month return. The monthly return for a K-month holding period is based on an equal-weighted average of portfolio returns from strategies implemented in the current month and the previous $K-1$ months. Specifically, the monthly return for the six-month holding period is based on an equal-

[4]The entire spectrum of ratings is as follows. AAA=1, AA+=2, AA=3, AA−=4, A+=5, A=6, A−=7, BBB+=8, BBB=9, BBB−=10, BB+=11, BB=12, BB−=13, B+=14, B=15, B−=16, CCC+=17, CCC=18, CCC−=19, CC=20, C=21, D=22.

weighted average of portfolio returns from last month's strategy and all strategies from up to five months prior to the last month.

The evidence in Panel A suggests similar momentum profitability among rated and unrated stocks. In particular, the momentum profit (P10−P1) averages 1.29% (t-stat=3.15) per month for rated firms and 1.43% (t-stat=3.41) for unrated firms. For both rated and unrated firms, momentum profits are prominent over expansionary periods, as well as in non-January months. Consistent with Jegadeesh and Titman (1993) and Chordia and Shivakumar (2002), momentum profits are negative in January.

Panel B of Table 1 presents the industry distribution of our sample of 3,578 Standard & Poor's rated firms relative to the overall sample of 13,018 NYSE, AMEX, and NASDAQ firms listed on CRSP. The twenty industries considered here are those analyzed by Moskowitz and Grinblatt (1999). The evidence shows that overall, the industry distributions of rated and unrated firms are similar, ruling out concerns that rated firms are concentrated in particular industries.

Panel C of Table 1 provides descriptive statistics for the distribution of raw monthly returns in the sample of rated and unrated firms. The moments of the stock return distribution, as well as the average alphas and market betas, are similar across the two categories. For instance, the average monthly stock return is 1.29% among rated firms and 1.25% among unrated firms during the period July 1985 to December 2003. The alpha (beta) of unrated firms is 0.32% (1.12), and 0.27% (1.07) among rated firms.

Overall, Table 1 confirms that our sample of rated firms in representative. Both rated and unrated firms produce similar momentum profits, they share similar industry distribution, and they have similar stock return distributions. Our analysis from now on concentrates only on the rated firms.

2 Results

2.1 Momentum portfolios over the formation period and the credit rating

To establish the first link between momentum trading strategies and credit risk, we examine the average numerical credit rating for each of the ten momentum portfolios over formation periods of three, six, nine, and twelve months. The results are presented in Table 2. The extreme loser portfolio (P1) is heavily tilted towards low rated firms, i.e., firms with the lowest quality debt. For example, using a formation period of six months, which is the focus of the momentum strategies in this paper, the average numerical rating of the loser portfolio is 13.06 (BB−), which is much above the average rating of 8.83 (BBB). The extreme winner portfolio (P10) also consists of high credit risk stocks, recording an average credit rating of 11.19 (BB+). The middle portfolio (P6) has the best numeric credit rating of 7.64 (BBB+). Indeed, the average credit rating forms a U-shape across the various momentum portfolios. This suggests that the momentum strategy of buying previous losers and selling pervious winners essentially takes long and short positions in firms with the highest credit risk.

We next study the link between the profitability of momentum strategies over the holding period and the firm's credit rating.

2.2 Momentum profitability and credit rating

Here we implement momentum strategies conditioning on both credit rating as well as cumulative six-month formation period returns. We first consider three credit rating groups and ten formation period return portfolios. We then study ten credit rating groups and three past six-month return portfolios. Credit-risk - past-return groups are formed on a sequential basis, sorting first on credit rating and then on past returns. For each month t, the low/high credit risk group (group 1 / group 3) contains the 30% best/worst rated stocks based on their S&P rating for this particular month. The stocks in each group are then divided into ten momentum portfolios based on their return over months $t-6$ to $t-1$. The ten credit risk groups are formed each month by dividing the sample of firms in that month into deciles based on the credit ratings. Each of

the resulting credit rating group is then divided into three momentum portfolios (P1, P2, P3) containing the worst 30%, middle 40%, and top 30% performers based on their past six-month returns.[5] The two sequential rankings generate 30 credit-risk-momentum portfolios.

Panel A of Table 3 presents the momentum profits corresponding to the three credit risk and ten momentum groups. Payoffs to momentum strategies strongly depend upon the credit rating. Focusing on the low (stocks with an average rating of 4.97 $\approx$ A+) and medium (rating of 8.5 $\approx$ BBB+) credit risk groups, the average payoff to the P10$-$P1 strategy is 0.27% (t-stat=0.88) and 0.75% (t-stat=2.12) per month, respectively. The payoff is much larger and is statistically and economically significant at 2.35% (t-stat=4.21) for the highest credit risk group (rating of 13.02 $\approx$ BB$-$). Momentum profits are highest in firms with the poorest quality of outstanding debt, as rated by S&P. This is a new finding that sheds light on the source of profitability of momentum strategies.

Momentum strategy payoffs in the non-January months are also insignificant for the lowest risk tercile. For the medium risk stocks the momentum payoffs are a significant 0.95% per month and for the high risk stocks the payoffs are 2.70% per month. The payoffs in January are negative albeit statistically insignificant. During recessions, the momentum strategy payoffs increase monotonically with credit risk but are statistically insignificant.[6]. On the other hand, during expansions, not only do the payoffs increase monotonically with credit risk, but they are a statistically and economically significant 2.30% per month for the poorest credit quality firms.

Panel B of Table 3 presents the results for ten credit risk and three momentum portfolios. Again, the evidence shows that momentum profits strongly depend on credit risk. Focusing on the lowest risk group (average rating 3.17 $\approx$ AA), the monthly momentum profit (P3$-$P1) is insignificant at 0.07%. Payoffs to momentum strategies increase *monotonically* among the credit rating groups. The highest momentum payoff of 2.04% (t-stat=4.63) per month is recorded for the highest credit risk group (average rating 14.52 $\approx$ B). Stocks rated as investment-grade display no momentum. Momentum profits become statistically significant only when the credit quality deteriorates to a rating of BBB$-$ or below (BBB or below for the non-January months). During economic

[5]Such three momentum portfolios have also been constructed by Hong, Lim, and Stein (2000)

[6]Recessionary and expansionary months are identified by NBER

expansions, it is once again only stocks rated BBB− or lower that exhibit significant momentum profits.

We also notice from Panel B of Table 3 that the difference in momentum profits across credit risk groups is driven primarily by loser stocks. The return differential between the loser portfolios (P1) for the lowest and highest credit risk firms averages 1.60% per month, whereas the winner portfolio for the highest credit risk firms earns, on average, only 0.37% more than its lowest credit counterpart.

Thus far, we have examined the relation between momentum profitability and credit risk via the performance of portfolio strategies based on double sorting, first by credit risk then by prior six-month return. We now turn to implementing the traditional momentum strategies, those based only on prior six-month return, but we consider different investment subsamples. In particular, we start with the entire sample of rated firms and then sequentially exclude firms with the highest credit risk (worst credit rating). This analysis will reveal the subsample of firms that accounts for the momentum profits.

Panel A of Table 4 reports the average payoffs from momentum strategies in each subsample as we progressively drop the worst rated firms. It also provides the percentage of market capitalization represented by each subsample, as well as the percentage of the total number of firms included in each subsample. These two measures are computed each month, and we report the time-series average. The payoffs to momentum strategies are insignificant at the 5% level when the investment sample contains stocks in the rating range AAA through BB. Remarkably, this sample accounts for 96.62% of the market capitalization of the rated firms and it contains 78.84% of the total number of the rated firms. In other words, the momentum profits are derived from a sample of firms that accounts for less than four percent of the total market capitalization of all rated firms or less than twenty-two percent of all rated firms.

In Panel B of Table 4, as we progressively drop the best rated firms, the momentum profits increase monotonically as only the worst rated firms remain in the sample. For a sample of stocks rated B or lower, the momentum profit amounts to 3.74% per month. More remarkably, there are only about 70 firms on average per month that are rated B or lower. These 70 firms comprise only 0.77% of the sample by market capitalization and 4.22% of the total number of firms.

2.3 Cross sectional analysis

Table 2 shows that, over the formation period, the extreme loser and winner portfolios contain a disproportionately large number of high credit risk firms. This evidence in itself may suffice to explain the high profitability of momentum strategies among the high credit risk stocks even when the intensity of stock return continuation over the holding period is identical across the credit risk groups. This section explicitly addresses the following question: *Does the intensity of stock return continuation over the holding period differ across the credit rating groups?* We examine the intensity of the return continuation by means of cross-section regressions of holding period on formation period momentum strategy returns for various formation and holding (both are denoted by K) periods. Specifically, the following cross-sectional regression is estimated each month

$$r_{(t+1:t+K),i} = a_{K,t} + b_{K,t} r_{(t-K:t-1),i} + e_{(t+1:t+K),i}, \tag{1}$$

where K represents three, six, nine, and twelve-month horizons and r is the return of the momentum strategy of buying P10 and selling P1.

Table 5 reports the time-series average of slope coefficients, $\overline{b_{K,t}}$, from the cross-sectional regressions. Given the overlap in formation periods, the t-statistics reported in parentheses use the Hansen and Hodrick (1980) adjusted standard errors. Notice that although the slope coefficient is positive and significant based on the all-inclusive sample of rated firms for $K \geq 6$ months, the slope coefficient is insignificant and is often even negative in the low credit risk group. There is no return continuation amongst the highly rated firms. In contrast, focusing on the high credit risk firms, the slope coefficient is significant and positive for every formation-holding period examined. The evidence also shows that the slope coefficient increases virtually monotonically moving from low credit risk to high credit risk stocks.

In sum, momentum profits are larger among high credit risk stocks for two reasons. First, over the formation period, the loser (winner) portfolio belonging to the high credit risk category displays the largest loss (gain). Second, the return continuation among high credit risk stocks is the strongest, which means that the high credit risk, loser (winner) stocks keep on losing (winning) over the holding period at a rate larger than that of loser (winner) stocks in the other credit quality groups.

2.4 Robustness checks

One potential explanation for our results could be industry related. Specifically, Moskowitz and Grinblatt (1999) document that industry momentum accounts for much of the individual stock return momentum. Hence, stronger momentum in lower rated stocks could be attributed to such stocks being concentrated in one particular industry that consistently exhibits higher momentum. However, we confirm that our findings are not driven by industry momentum. In particular, following Moskowitz and Grinblatt (1999), we compute industry-adjusted stock returns by subtracting from each stock return over the holding period the return of the corresponding industry over the same period. We then implement momentum strategies based on industry-adjusted returns, conditioned on credit rating and past return, as in Table 3. Even after such an industry adjustment (results are unreported but available upon request), we find a robust credit risk effect on the profitability of momentum strategies.

Another potential explanation for our findings could lie in the correlation between firm size and credit risk. In particular, Hong, Lim, and Stein (2000) find that momentum profits significantly decline with firm market capitalization. Since firm size is typically inversely related to credit risk, it follows that momentum profits should decline with improving credit ratings. As in the case of the industry adjustment, we implement momentum strategies on size-adjusted returns by subtracting the matched decile portfolio holding period return from the individual stock holding period return. Once again, we observe a robust credit rating effect (results are available upon request).

Thus far, we have examined raw payoffs to momentum strategies. A natural exercise would be to risk-adjust the momentum payoffs to ensure that the profitability of momentum strategies among high credit risk firms is not merely compensation for exposures to common sources of risk.

Table 6 presents results from regressing momentum payoffs for the various credit risk groups on the three Fama and French (1993) factors (Panel A) as well as on the market factor (Panel B). Both panels consider ten momentum portfolios and three credit rating groups. The table presents alphas and factor sensitivities.

Panel A of Table 6 documents that alpha (the risk-adjusted return) increases with the credit risk. The monthly alpha is 0.41% (t-stat=1.28), 1.02% (t-stat=2.85), and 2.53% (t-stat=4.47) for the low, middle, and high credit risk groups, respectively. In addition,

the factor sensitivities in all cases are either significantly negative or insignificant. If anything, the alphas are higher than the raw return payoffs in Table 3, suggesting that the loser stocks are riskier than the winner stocks and hence that the momentum strategy does not have positive exposure to systematic risk factors. This is uniformly true in the non-January months as well as during economic expansions. Moreover, the alpha for the high credit risk stocks is a significant 3.68% per month during recessions. The evidence strongly suggests that momentum profitability across high credit risk firms does not represent compensation for systematic risk, at least based on the Fama-French risk factors.

Panel B reports results when the CAPM is used to risk adjust the momentum payoffs. We show again that alpha increases with credit risk. The monthly alpha is 0.31% (t-stat=0.97), 0.86% (t-stat=2.44), and 2.55% (t-stat=4.60) in the low, middle, and high credit risk groups, respectively. Once again these alphas are higher than the raw return payoffs in Table 3. Market betas are always negative and often significant, suggesting, yet again, that loser stocks are riskier than winner stocks.

Overall, the evidence on the strong relation between momentum profitability and credit rating is robust to the various checks we have implemented, including adjusting for industry momentum, size momentum, and adjusting raw momentum payoffs for the market, as well as for the Fama-French risk factors. Given the robustness of our results, the remainder of the paper provides an explanation for the profitability of momentum based trading strategies amongst high credit risk stocks.

3 Understanding the source of momentum profitability

To understand the persistence of winners and losers across the various credit risk groups, we analyze a number of accounting ratios as well as several features of the stock returns and their trading, including volatility and liquidity, and we analyze institutional holdings. The accounting ratios, which reflect the financial strength of the firms in the loser and winner portfolios, are industry-adjusted and are the time-series averages of the cross-sectional median values. The industry adjustment involves subtracting the industry median from each firm's accounting ratio. We focus on the extreme winner

(P10) and loser (P1) portfolios for each of the three credit risk groups - low, medium, and high risk. Overall six portfolios are examined. The results are presented in Tables Table 7 through Table 10 in a sequence of panels. Except for Table 9 the results are presented starting from the formation period and going through the investment and holding periods – from month -6 through month $+17$. The formation period is over months $t = -6$ through $t = -1$, while the holding period begins in month $t = 1$. Our goal is to relate the return persistence among the high credit risk winner and loser stocks to their underlying performance. These stocks are the ones that generate statistically significant and economically large momentum profits.

3.1 Operating performance of the winner and loser stocks

We first examine the operating performance of the winner and loser stocks that are sorted across low, medium, and high credit risk. Panel A of Table 7 presents industry-adjusted sales growth. There are substantial differences among winners and losers and among low, medium, and high risk stocks. Focusing on the high credit risk group, the industry adjusted sales growth of losers deteriorates over the formation period from an average of 0.33% in month $t = -6$ to -0.29% in month $t = -1$. The sales growth continues to deteriorate over the holding period, reaching a low of -0.53% in month $t = 4$. The industry adjusted sales growth is uniformly negative through $t = +17$. Such deterioration in sales growth is observed over the formation period for the low and medium credit risk losers as well. However, subsequently there is little or no deterioration over the holding period.

The high credit risk winners display the opposite behavior. Sales growth for the high risk winners is large and positive over the formation, investment, and holding periods. The industry adjusted sales growth increases from 0.58% in month $t = -6$ to 0.83% in month $t = -1$ and it reaches a maximum of 0.85% in month $t = +3$. In sum, the high risk losers have negative industry-adjusted sales growth that deteriorates over the formation period and part of the holding period, while the high risk winners have positive industry-adjusted sales growth that improves over the formation period and remains high over the first four months of the formation period.

Panel B of Table 7 presents evidence that the industry-adjusted profit margin varies markedly across winner and loser stocks. Consider the high credit risk group. While

the industry-adjusted profit margin of both the winner and loser stocks is negative, the profit margin of the loser (winner) stocks deteriorates (improves) from −3.50% (−2.29%) at $t = -6$ to −6.50% (−1.29%) at $t = -1$. This deterioration (improvement) in loser (winner) stocks continues into the holding period reaching a minimum (maximum) of −8.30% (−0.67%) in month $t = +7$ ($t = +9$). Similar patterns are observed in low and medium risk stocks, although both the winners and the losers have a positive industry-adjusted profit margin in the low risk category, while in the medium risk group the losers (winners) have a negative (positive) profit margin. In the medium risk group, the loser (winner) stocks have a profit margin of −0.33% (0.27%) at $t = -6$, −1.30% (0.68%) at $t = -1$ and −1.63% (1.25%) at $t = +7$ ($t = +10$). Thus, there is a dramatic deterioration (improvement) in the profit margin of the loser (winner) stocks.

Panel C of Table 7 reports the industry adjusted net operating cash flows, defined as the sum of net income and depreciation divided by total book value of assets. The pattern of operating cash flows over time is remarkably similar to that of profit margin. In the high credit risk group the industry adjusted net cash flows of loser (winner) stocks decrease (increase) from −0.75% (−0.50%) to −1.14% (−0.22%) over the formation period and continues to deteriorate (improve) to −1.25% (−0.13%) at $t = +5$ ($t = +9$). This pattern of net cash flow deterioration in the loser stocks and the improvement in the winner stocks is discernable in the low and medium risk categories as well.

Panel D of Table 7 reports the industry adjusted interest coverage, defined as the ratio of earnings before interest and taxes (EBIT) to interest expense. The pattern of interest coverage over time is once again similar to that of the profit margin and the operating cash flows. In the high credit risk group, the industry-adjusted interest coverage for the loser (winner) stocks deteriorates (improves) from −1.43 (−1.22) to −2.05 (−0.90) over the formation period and continues to deteriorate (improve) to −2.32 (−0.54) at $t = +7$ ($t = +9$). Once again a similar pattern is observed in the low and medium risk categories as well.

Panel E of Table 7 presents the industry-adjusted total asset turnover, defined as the ratio of sales to book value of assets. Consider the medium risk group. The industry-adjusted asset turnover for the loser (winner) stocks deteriorates (improves) from 0.10% (0.47%) to −0.24% (0.65%) over the formation period and continues to deteriorate (improve) to −0.56% (0.72%) at $t = +6$ ($t = +9$).

We conclude that the operating performance, as measured by the industry-adjusted

sales growth, profit margin, and asset turnover, deteriorates over the formation period ($t = -6$ through $t = -1$) and part of the holding period (starting at $t = 1$) for the loser stocks. The winner stocks, on the other hand, show improvements in operating performance over the formation period and part of the holding period. The financial performance, as measured by interest coverage and net operating cash flows, also shows a similar deterioration (improvement) for loser (winner) stocks. Note also that the deterioration in operating and financial performance of the loser stocks and the improvement in winner stocks starts to reverse before twelve months of the holding period have elapsed. This is consistent with the empirical result documented by Jegadeesh and Titman (1993) that momentum strategy payoffs tend to reverse after a twelve month holding period.

Given the dramatic decline (increase) in stock prices over the formation period ($t = -6$ through $t = -1$) for the loser (winners) stocks, it can be argued that, as of the formation date, the market has already anticipated the deterioration (improvement) in the financial and operating performance of the firms. If the future performance is fully anticipated then we should not observe the payoffs to momentum strategies. In the next subsection we show that the future performance of loser and winner firms is not anticipated by the market as of the portfolio formation date.

3.2 Analyst revisions and earnings surprises

We use analyst coverage and revision data to study whether the future winner and loser portfolio firm performance is anticipated by investors as of the portfolio formation date. Analyst data is obtained from IBES. The results are presented in Table 8.

Panel A of Table 8 presents the time-series average of the median analyst coverage over the formation and holding periods. It is not surprising that the low risk firms are followed by the highest number of analysts and the high risk firms are followed by the fewest analysts. Moreover, within each risk category, the number of analysts following the loser (winner) stocks decreases (increases) over time. For instance, in the high risk category, the number of analysts following the loser (winner) stocks at $t = -6$ is 7.74 (6.07); at $t = -1$ these numbers are 7.58 (6.33); and by $t = +12$ the analyst following of the high risk (loser) winner stocks becomes 6.20 (7.33). In fact, the reported decrease in the number of analysts following the loser stocks may be understated because firms that are not followed are dropped from the sample.

Panel B of Table 8 presents the time-series average of the median forecast dispersion over the formation and holding periods. Forecast dispersion is the cross-sectional standard deviation in the monthly earnings per share forecasts of the current fiscal year earnings. The forecast dispersion is highest for the high risk losers and lowest for the low risk winners. Conditional on the credit rating, loser stocks have higher forecast dispersion than the winner stocks. Also, the forecast dispersion of the loser stocks increases during the formation and holding periods while that of the winner stocks decreases during the holding periods. For instance, in the high risk category, the forecast dispersion of the loser (winner) stocks at $t = -6$ is 11.07% (8.51%); at $t = -1$ these numbers are 13.66% (8.1%); and by $t = +12$ the forecast dispersion of the loser (winner) stocks becomes 12.67% (7.69%). Moreover, the reported forecast dispersion in the loser stocks may be understated because firms that are followed by only one analyst will not have any cross-sectional dispersion.

We now test whether stocks with fewer analysts and higher forecast dispersion are subject to higher revisions. Panel C of Table 8 presents the time-series average of the median forecast revision over the formation and the holding periods. The forecast revision is measured as the monthly change in the mean forecast of the current year earnings per share.[7] Since we are measuring forecast revisions over a 24 month period there will be changes in the fiscal year for which the forecast is being made. Whenever there is a change in the fiscal year for a given stock, we omit that month's forecast revision for that stock from the sample.

Panel C of Table 8 shows three major findings. First, high risk stocks and loser stocks have higher absolute forecast revisions than the low risk stocks and the winner stocks, respectively. Second, the winner stocks have positive forecast revisions and the loser stocks have negative forecast revisions. Third, in absolute value, the losers display much stronger revisions. Turning to figures, the forecast revisions for the higher risk loser (winner) stocks are -1.31% (-0.37%) at $t = -6$, -5.31% (0.72%) at $t = -1$ and -2.44% (0.08%) at $t = +6$.

We now test whether the loser and the winner stocks have systematic earnings surprises. Panel A of Table 9 presents the time-series mean of the cross-sectional median earnings surprise for the next four quarterly earnings announcements after the portfolio

[7] We have also checked that our results are unchanged when the forecasts are for the next fiscal year and for the year after that as well.

formation date. Earnings surprise is measured as the actual earnings per share minus the prior month's mean analyst forecast of the earnings per share. The loser stocks have negative earnings surprises while the winner stocks have positive earnings surprises. Also, the earnings surprises are much larger for the high risk stocks than for the low risk stocks and are larger for high risk losers than for high risk winners. Consider the high risk stocks. The loser portfolio stocks have earnings surprises of -20.48%, -16.15%, -14.52% and -11.58% over the four quarters after the formation of the portfolio. For the winner stocks the earnings surprises are 6.64%, 3.04%, 2.87% and 0.95%. Thus, analysts are surprised by the actual earnings of both the winner and loser stocks for up to a year after the formation of the portfolio.

Panel B of Table 9 presents the time series mean of the cross-sectional median standardized unexpected earnings (SUE) for the next four quarterly earnings announcements after the portfolio formation date. The SUE for a firm is computed as the actual earnings less the earnings four quarters ago. This earnings change is standardized by its standard deviation estimated over the prior eight quarters. The winner (loser) stocks have positive (negative) SUEs for four (three) quarters after the portfolio formation. In absolute terms, the loser stocks have higher SUEs than the winner stocks. Consider the high risk stocks. The loser stocks have SUEs of -46.04, -31.06, -11.52 and 1.63 over the four quarters after the formation of the portfolio. For the winner stocks the SUEs are 30.90, 20.98, 10.96 and 2.50.

In sum, the loser stocks have fewer analysts following them and their forecast dispersion is higher than of the winner stocks. Also, the forecast revisions are negative and higher in absolute terms for the loser stocks than for the winner stocks whose forecast revisions are generally positive. Moreover, the earnings surprises and SUEs of the loser (winner) stocks are negative (positive) for upto four quarters after the portfolio formation. All these effects are more pronounced for the high risk stocks. These results suggest that, based on the formation period returns of the loser and winner stocks, the market does not anticipate the future financial and operating performance of these stocks.

3.3 Market characteristics of winners and losers

We now turn to market measures, including return volatility and stock illiquidity. The monthly volatility is the sum of squared daily returns. To measure illiquidity, we use

Amihud's (2002) measure, defined as the monthly average of the daily absolute return per dollar of trading volume.[8] Due to differences in measuring trading volume for NYSE-AMEX versus Nasdaq stocks, we report illiquidity separately for NYSE-AMEX and Nasdaq.

Volatility is presented in Panel A of Table 10. The evidence suggests that the volatility of the loser and winner portfolios of the highest credit risk group is equal in month $t = -6$. But the volatility of loser (winner) stocks keeps on rising (falling) over the formation period. The return volatility of loser stocks is uniformly higher than that of the winner stocks throughout the entire 24 months examined. Interestingly, we do not observe as large a change in volatility among the other credit risk groups. Consider, for instance, the low credit risk loser stocks. The volatility of these firms does increase mildly over the formation period from 0.71 to 0.82 per month. However, the volatility stabilizes around 0.72 over the holding months. The high credit risk losers display the highest volatility among the six groups examined.

Panel B displays the average institutional holdings over the formation and holding periods. The institutional holdings are available from 1980 onwards from the Thomson Financial database at a quarterly frequency. The database provides information on shares held by stock and institution. For each particular stock in our sample, we aggregate the total shares held by all institutions at the end of each quarter and divide by the total shares outstanding of the firm. Our institutional holdings variable thus represents the percentage of shares outstanding held by institutions.

The results reveal that institutional investors consistently sell the loser stocks and buy the winner stocks over the formation period and during part of the holding period. While this effect is marginal in the low and medium risk categories, it is most prominent among high credit risk winners and losers. In month $t = -6$ about 45% of the shares of high credit risk losers are held by institutions. This ratio declines to about 41% in month $t = -1$ and keeps declining over the investment and holding periods reaching a minimum of 35.8% in month $t = +12$ of the holding period. For winners, on the other hand, 38% of the shares outstanding are held by institutions in month $t = -6$. This increases to about 43% in month $t = -1$ and reaches a peak of about 49.5% in month $t = +12$ of the holding period. Thus, institutions sell the high risk losers and buy the

[8]Hasbrouck (2005) shows that Amihud's (2002) measure is most closely related to trade based measures of illiquidity such as the bid-ask spreads.

high risk winners. Moreover, the buying of the high credit risk winners and the selling of the high credit risk losers by institutions reverses after twelve months into the holding period. This is important because Jegadeesh and Titman (1993) have shown that the momentum strategy returns become negative after a holding period of twelve months.

Panels C and D of Table 10 display Amihud's (2002) illiquidity measure for NYSE-AMEX and NASDAQ stocks, respectively. The illiquidity among high credit risk losers increases consistently over the formation and holding periods. In contrast, among high credit risk winners, the illiquidity measure declines from 51.94 in month $t = -6$ to 28.49 in month $t = -1$. It then remains steady around 30 throughout the entire holding period. Over the holding period, the illiquidity measure of high credit risk losers is consistently the largest. The results for NASDAQ stocks are similar.

Overall, high credit risk losers have the largest volatility and display the largest illiquidity during the holding period. Moreover, their increase in volatility and illiquidity over the formation and holding periods is the largest.

3.3.1 Summary

Tables 7 through 10 point to an interesting dynamic among the credit risk sorted loser and winner stocks that can explain the return continuation. Over the formation and holding periods, the operating and financial conditions of loser (winner) stocks deteriorate (improve). This is particularly evident in the high credit risk category. Sales growth, profit margins, operating cash flows, and interest coverage decline for loser stocks and improve for the winner stocks. In addition, stock return volatility and illiquidity rise (fall) for the losers (winners). The market does not anticipate the deteriorating (improving) conditions of losers (winners) over the formation period. As the market realizes such changing conditions, institutions buy winners and sell losers. Given this trading activity and given relatively large illiquidity, the loser stocks keep on losing and the winner stocks keep on winning. This generates stock return continuation among the high credit risk losers and winners that ultimately explains the profitability of momentum strategies.

4 Conclusion

This paper establishes a strong and previously unexplored link between momentum profitability and firm credit rating. We also explain the source of the momentum profits across the high credit-risk firms. Our empirical findings are based on a sample of 3,578 NYSE, AMEX, and NASDAQ firms rated by S&P over the July 1985-December 2003 period. Our selected sample is representative. Rated and non-rated firms share similar characteristics in terms of (i) their stock return distribution, (ii) the momentum profits they generate, and (iii) their industry distribution among the 20 industries studied by Moskowitz and Grinblatt (1999).

We show that the extreme winner and loser portfolios are comprised mainly of high credit risk stocks. Momentum profitability is statistically significant and economically large among low-rated firms, but it is nonexistent among high-grade firms. Once we exclude from the analysis the high credit risk firms, which account altogether for less than four percent of market capitalization, the profitability of momentum strategies becomes statistically insignificant.

We show that among high credit risk stocks, where momentum profitability is recorded, the operating and financial performance of the loser stocks deteriorates and that of the winner stocks improves over the formation and holding periods. This operating performance of the winner and loser stocks is not anticipated by the market as evidenced by the earnings surprises and analyst forecast revisions. Moreover, stock return volatility increases and liquidity declines for the loser stocks and the opposite is true for the winner stocks. Over the formation and holding periods, institutional holdings decline for the loser stocks and increase for the winner stocks. This selling pressure in the high credit risk losers and buying pressure in the high credit risk winners, both of which are relatively illiquid, results in the return continuations over the formation and holding periods, thus giving rise to the momentum phenomenon.

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Table 1
PANEL A: Raw Momentum in Rated and Unrated Firms

For each month t, all NYSE, AMEX, and NASDAQ stocks on the monthly CRSP tape with returns for months $t-6$ through $t-1$ are ranked into decile portfolios according to their cumulative return during that period. We exclude stocks which at the end of month $t-1$ are priced below \$5 or are smaller than the smallest NYSE size decile. Decile portfolios are formed monthly and their returns are computed by weighting equally all firms in that decile ranking. The momentum strategy involves buying the winner portfolio P10 and selling the loser portfolio P1. The positions are held for the following six-months ($t+1$ through $t+6$). There is a one month lag between the formation and the holding periods. Monthly returns represent the equally-weighted average return from this month's momentum strategy and all strategies from up to five months ago. The table shows the average raw monthly profits during the holding period of the winner P10 and loser P1 portfolios as well as the momentum strategy returns. t-statistics are in parentheses (bold if indicating 5% level of significance). The sample period is July 1985 - December 2003.

		All Firms	Rated Firms	Unrated Firms
# of Firms		13,018	3,578	9,440
Overall	P10−P1	1.49 (**3.48**)	1.29 (**3.15**)	1.43 (**3.41**)
	P1	0.17 (0.29)	0.25 (0.45)	-0.05 (-0.07)
	P10	1.66 (**3.15**)	1.54 (**3.74**)	1.39 (**2.46**)
Non-January	P10−P1	1.82 (**4.55**)	1.54 (**3.96**)	1.81 (**4.70**)
	P1	-0.32 (-0.55)	-0.07 (-0.13)	-0.60 (-0.99)
	P10	1.51 (**2.69**)	1.47 (**3.37**)	1.21 (**2.02**)
January	P10−P1	-2.36 (-0.92)	-1.58 (-0.65)	-2.86 (-1.08)
	P1	5.72 (1.90)	3.97 (1.53)	6.21 (1.91)
	P10	3.37 (**2.59**)	2.39 (1.91)	3.34 (**2.49**)
Expansion	P10−P1	1.49 (**3.39**)	1.27 (**3.03**)	1.43 (**3.31**)
	P1	0.12 (0.20)	0.30 (0.55)	-0.14 (-0.23)
	P10	1.61 (**2.95**)	1.57 (**3.72**)	1.29 (**2.21**)
Recession	P10−P1	1.42 (0.80)	1.48 (0.83)	1.46 (0.81)
	P1	0.83 (0.24)	-0.29 (-0.09)	1.14 (0.32)
	P10	2.25 (1.09)	1.18 (0.65)	2.60 (1.18)

Table 1(continued)

PANEL B: Industry Classification

The table presents the industry composition of the entire universe of stocks available on CRSP with at least six monthly observations, as well as the composition of the sample of firms rated by Standard & Poor's. We exclude observations on stocks priced below $5 or smaller than the smallest NYSE size decile. The industry classification is based on the first two digits of each company's SIC code available on CRSP. The industry groups examined here follow the classification used by Moskowitz and Grinblatt (1999). The period examined is July 1985 to December 2003.

		All Firms		Firms Rated by S&P	
Industry	SIC Codes	Number	Percent	Number	Percent
Mining	10-14	482	3.70	182	5.09
Food	20	165	1.27	79	2.21
Apparel	22-23	110	0.84	40	1.12
Paper	26	81	0.62	59	1.65
Chemical	28	572	4.39	136	3.80
Petroleum	29	52	0.40	37	1.03
Construction	32	71	0.55	30	0.84
Prim. Metals	33	129	0.99	64	1.79
Fab. Metals	34	112	0.86	42	1.17
Machinery	35	527	4.05	142	3.97
Electrical Eq.	36	824	6.33	198	5.53
Transport Eq.	37	192	1.47	94	2.63
Manufacturing	38-39	683	5.25	123	3.44
Railroads	40	25	0.19	13	0.36
Other Transport.	41-47	258	1.98	96	2.68
Utilities	49	320	2.46	198	5.53
Dept. Stores	53	70	0.54	35	0.98
Retail	50-52,54-59	1,149	8.83	362	10.12
Financial	60-69	3,466	26.62	685	19.14
Other	other	3,730	28.65	963	26.91
Total		13,018	100.00	3,578	100.00

PANEL C: Return and Size Characteristics of Rated and Unrated Firms

The table presents the cross-sectional average descriptive statistics of monthly returns across stocks rated by Standard & Poor's and unrated stocks listed on CRSP. For a stock to be considered in any sample, it needs to have at least six monthly return observations available on CRSP, be priced above $5, and be larger than the smallest NYSE size decile. The middle two rows report the average alpha and beta with respect to the market excess return. The last three rows provide the time-series averages of the cross-sectional medians, means, and standard deviations of the market capitalization over the sample period - July 1985 to December 2003.

	Firms Rated by S&P	Unrated Firms
Return (%) - Mean	1.29	1.25
- Standard Deviation	14.21	18.06
- Skewness	0.51	0.84
- Kurtosis	6.07	7.02
Alpha (%)	0.27	0.32
Mkt Beta	1.07	1.12
Size ($mln) - Median	596.92	83.15
Number of Stocks	3,578	9,440

Table 2
Credit Rating Profile of Momentum Portfolios over Formation Period

For each month t, all stocks rated by Standard & Poor's with returns for months $t-J$ through $t-1$ (formation period) available on CRSP are ranked into decile portfolios according to their return during the formation period. We exclude stocks which at the end of month $t-1$ are priced below \$5 or are smaller than the smallest NYSE size decile. The table shows for each decile portfolio the median numeric S&P rating during formation periods of J=3, J=6, J=9, and J=12 months. This S&P rating is assigned by Standard & Poor's to a firm (not a bond) based on the overall quality of the firm's outstanding debt, either public or private. The rating is available from COMPUSTAT on a quarterly basis starting in 1985. We transform the S&P ratings into conventional numeric scores. The numeric rating corresponds to: AAA=1, AA+=2, AA=3, AA−=4, A+=5, A=6, A−=7, BBB+=8, BBB=9, BBB−=10, BB+=11, BB=12, BB−=13, B+=14, B=15, B−=16, CCC+=17, CCC=18, CCC−=19, CC=20, C=21, D=22. The sample includes 3,453 firms. The sample period is July 1985 to December 2003.

	J=3	J=6	J=9	J=12
P1	12.85	13.06	13.18	13.22
P2	9.84	10.12	10.29	10.30
P3	8.66	8.64	8.69	8.62
P4	8.06	8.07	8.00	7.93
P5	7.77	7.75	7.64	7.58
P6	7.72	7.64	7.61	7.49
P7	7.81	7.69	7.60	7.53
P8	8.08	7.89	7.70	7.66
P9	8.91	8.59	8.34	8.22
P10	11.44	11.19	11.01	10.91

Table 3
Momentum By Credit Risk Group

For each month t, all stocks rated by Standard & Poor's with available return data for months $t-6$ through $t-1$ (formation period) are divided into 3 terciles [PANEL A] (as well as 10 deciles [PANEL B]) based on their credit rating. We exclude stocks, which at the end of month $t-1$, are priced below \$5 or are smaller than the smallest NYSE size decile. For each credit rating group, we compute the return of the loser portfolio P1 as the equally-weighted average return over the holding period of the worst-performing 10% [PANEL A] (30% [PANEL B]) and the winner portfolio P10 (P3 in PANEL B) of the best-performing 10% [PANEL A] (30% [PANEL B]) of the stocks based on their returns over the formation period (months $t+1$ through $t+6$). There is a one month lag between the formation and the holding periods. The momentum strategy involves buying the winner portfolio and selling the loser portfolio and holding the position for six months. Since the momentum strategy is implemented each month, the monthly returns represent the equally-weighted average return from this month's momentum strategy and all strategies from up to five months ago. The table shows for each credit rating group, the average returns of the momentum strategy, as well as the average return of the loser and winner portfolios. The sample period is July 1985 to December 2003. The numeric S&P rating is presented in bold and is ascending in credit risk, i.e. 1=AAA, 2=AA+, 3=AA, ..., 21=C, 22=D.

PANEL A: 10 Momentum and 3 Credit Rating Groups

		Rating Tercile (1=Lowest Risk, 3=Highest Risk)		
		1	2	3
Average Rating		A+ 4.97	BBB+ 8.50	BB− 13.02
Overall	P10−P1	0.27 (0.88)	0.75 (**2.12**)	2.35 (**4.21**)
	P1	1.12 (**2.81**)	0.81 (1.68)	-0.43 (-0.59)
	P10	1.40 (**4.13**)	1.56 (**4.26**)	1.92 (**3.77**)
Non-January	P10−P1	0.43 (1.38)	0.95 (**2.69**)	2.70 (**5.21**)
	P1	0.98 (**2.36**)	0.61 (1.21)	-0.92 (-1.28)
	P10	1.41 (**4.03**)	1.56 (**4.05**)	1.78 (**3.31**)
January	P10−P1	-1.54 (-1.10)	-1.55 (-0.93)	-1.59 (-0.45)
	P1	2.76 (1.87)	3.10 (1.80)	5.08 (1.29)
	P10	1.22 (0.94)	1.55 (1.31)	3.48 (**2.36**)
Expansion	P10−P1	0.30 (0.94)	0.78 (**2.12**)	2.30 (**4.02**)
	P1	1.14 (**2.95**)	0.85 (1.78)	-0.39 (-0.55)
	P10	1.44 (**4.11**)	1.63 (**4.32**)	1.91 (**3.69**)
Recession	P10−P1	-0.06 (-0.04)	0.38 (0.29)	3.01 (1.23)
	P1	0.89 (0.38)	0.34 (0.13)	-0.94 (-0.21)
	P10	0.84 (0.65)	0.72 (0.47)	2.07 (0.86)

Table 3(continued)

PANEL B: 3 Momentum and 10 Credit Rating Groups

		Rating Decile (1=Lowest Risk, 10=Highest Risk)									
Average		AA	A+	A	A−	BBB+	BBB	BBB−	BB	BB−	B
Rating		3.17	4.98	6.13	7.09	8.04	9.03	10.13	11.82	13.19	14.52
Overall	P3−P1	0.07	0.07	0.15	0.20	0.21	0.32	0.55	0.73	1.12	2.04
		(0.32)	(0.36)	(0.73)	(0.94)	(1.01)	(1.52)	(**2.18**)	(**2.46**)	(**3.46**)	(**4.63**)
	P1	1.13	1.11	1.14	1.08	0.95	0.95	0.85	0.56	0.17	-0.47
		(**3.67**)	(**3.36**)	(**3.20**)	(**2.98**)	(**2.63**)	(**2.55**)	(**1.98**)	(1.14)	(0.31)	(-0.69)
	P3	1.19	1.19	1.28	1.28	1.17	1.27	1.40	1.29	1.29	1.56
		(**3.96**)	(**3.94**)	(**4.17**)	(**4.11**)	(**3.74**)	(**3.93**)	(**4.00**)	(**3.14**)	(**2.88**)	(**3.04**)
Non-January	P3−P1	0.22	0.17	0.25	0.30	0.30	0.42	0.70	0.96	1.34	2.28
		(1.05)	(0.84)	(1.25)	(1.43)	(1.46)	(**2.03**)	(**2.81**)	(**3.34**)	(**4.35**)	(**5.52**)
	P1	1.03	1.04	1.03	0.98	0.86	0.82	0.67	0.27	-0.20	-0.93
		(**3.25**)	(**3.02**)	(**2.81**)	(**2.61**)	(**2.30**)	(**2.13**)	(1.51)	(0.53)	(-0.36)	(-1.40)
	P3	1.26	1.21	1.28	1.27	1.17	1.24	1.38	1.23	1.15	1.36
		(**4.06**)	(**3.89**)	(**4.01**)	(**3.91**)	(**3.57**)	(**3.67**)	(**3.75**)	(**2.85**)	(**2.42**)	(**2.52**)
January	P3−P1	-1.68	-1.07	-1.05	-0.94	-0.84	-0.87	-1.23	-1.98	-1.43	-0.77
		(-1.80)	(-1.24)	(-1.10)	(-0.88)	(-0.80)	(-0.86)	(-1.06)	(-1.33)	(-0.77)	(-0.29)
	P1	2.16	1.95	2.31	2.27	2.00	2.46	2.83	3.88	4.40	4.68
		(1.86)	(1.58)	(1.72)	(1.59)	(1.40)	(1.72)	(1.92)	(**2.26**)	(1.68)	(1.28)
	P3	0.48	0.87	1.26	1.33	1.16	1.59	1.60	1.90	2.96	3.91
		(0.38)	(0.75)	(1.11)	(1.23)	(1.10)	(1.41)	(1.43)	(1.50)	(**2.20**)	(**2.39**)
Expansion	P3−P1	0.10	0.11	0.17	0.21	0.25	0.37	0.60	0.78	1.06	1.92
		(0.43)	(0.51)	(0.82)	(0.96)	(1.17)	(1.71)	(**2.34**)	(**2.55**)	(**3.21**)	(**4.30**)
	P1	1.12	1.11	1.14	1.11	0.96	0.94	0.85	0.56	0.19	-0.40
		(**3.70**)	(**3.40**)	(**3.29**)	(**3.12**)	(**2.68**)	(**2.54**)	(**2.01**)	(1.16)	(0.35)	(-0.61)
	P3	1.22	1.22	1.31	1.32	1.21	1.30	1.45	1.33	1.25	1.51
		(**3.90**)	(**3.91**)	(**4.13**)	(**4.13**)	(**3.76**)	(**3.92**)	(**4.01**)	(**3.18**)	(**2.79**)	(**2.92**)
Recession	P3−P1	-0.26	-0.35	-0.10	0.07	-0.26	-0.28	-0.10	0.12	1.80	3.49
		(-0.37)	(-0.42)	(-0.11)	(0.08)	(-0.28)	(-0.32)	(-0.09)	(0.10)	(1.28)	(1.68)
	P1	1.14	1.13	1.04	0.72	0.92	1.14	0.85	0.59	-0.00	-1.33
		(0.68)	(0.61)	(0.51)	(0.35)	(0.45)	(0.56)	(0.36)	(0.20)	(-0.00)	(-0.33)
	P3	0.87	0.78	0.94	0.79	0.66	0.86	0.75	0.71	1.80	2.16
		(0.76)	(0.66)	(0.74)	(0.59)	(0.51)	(0.64)	(0.54)	(0.39)	(0.77)	(0.87)

Table 4
Unconditional Momentum over Different Rating Subsamples

For each month t, all NYSE, AMEX, and NASDAQ stocks rated by S&P and available on CRSP with returns for months $t-6$ through $t-1$ are ranked into decile portfolios based on their return during that period. We exclude stocks, which at the end of month $t-1$, are priced below \$5 or are smaller than the smallest NYSE size decile. Portfolio returns are computed monthly by weighting equally all firms in that decile ranking. The momentum strategy involves buying the winner and selling the loser portfolio and holding the position for six months (from $t+1$ to $t+6$). The monthly returns represent the equally-weighted average return from this month's momentum strategy and all strategies from up to five months ago. Each subsequent row in the table represents a monotonically decreasing sample of stocks obtained by sequentially excluding firms with the lowest/highest (PANEL A/PANEL B) credit rating. The first column shows the raw monthly profits from the momentum strategy for each subsample of firms. t-statistics are in parentheses. The second column shows the market capitalization of the given subsample as a percentage of the overall sample of S&P rated firms. The third (forth) column provides the average number (percentage) of firms per month in each subsample. Sample: July 1985 - December 2003.

PANEL A: Excluding Worst Rated Firms First

Stock Sample	Momentum Profits	Percent of Total Market Cap	Number of Firms	Percentage of Firms
All firms	1.29 (**3.15**)	100.00	1,639.00	100.00
AAA-D	1.28 (**3.13**)	100.00	1,638.79	99.99
AAA-C	1.23 (**2.98**)	99.98	1,637.69	99.92
AAA-CC	1.23 (**2.98**)	99.98	1,637.69	99.92
AAA-CCC−	1.21 (**2.96**)	99.97	1,636.91	99.87
AAA-CCC	1.18 (**2.89**)	99.97	1,635.83	99.81
AAA-CCC+	1.13 (**2.79**)	99.95	1,632.70	99.62
AAA-B−	1.12 (**2.81**)	99.90	1,625.35	99.17
AAA-B	1.00 (**2.62**)	99.65	1,603.33	97.82
AAA-B+	0.84 (**2.33**)	99.12	1,559.48	95.15
AAA-BB−	0.68 (**2.02**)	98.12	1,426.10	87.01
AAA-BB	0.56 (1.73)	96.62	1,292.14	78.84
AAA-BB+	0.43 (1.38)	95.03	1,181.43	72.08
AAA-BBB−	0.39 (1.26)	92.96	1,085.80	66.25
AAA-BBB	0.31 (1.02)	89.06	943.73	57.58
AAA-BBB+	0.26 (0.84)	82.96	762.56	46.53
AAA-A−	0.23 (0.75)	75.65	612.67	37.38
AAA-A	0.21 (0.69)	68.02	467.64	28.53
AAA-A+	0.13 (0.42)	51.97	287.00	17.51
AAA-AA−	0.33 (1.12)	38.94	176.44	10.76

Table 4 (continued)
PANEL B: Excluding Best Rated Firms First

Stock Sample	Momentum Profits	Percent of Total Market Cap	Number of Firms	Percentage of Firms
All firms	1.29 (**3.15**)	100.00	1,639.00	100.00
AA+ and lower	1.29 (**3.13**)	84.02	1,606.51	98.02
AA and lower	1.30 (**3.14**)	81.87	1,589.84	97.00
AA− and lower	1.35 (**3.24**)	69.09	1,525.44	93.07
A+ and lower	1.39 (**3.29**)	59.85	1,454.10	88.72
A and lower	1.46 (**3.41**)	46.67	1,337.96	81.63
A− and lower	1.58 (**3.56**)	30.55	1,151.98	70.29
BBB+ and lower	1.71 (**3.74**)	22.80	1,004.84	61.31
BBB and lower	1.85 (**3.85**)	15.82	853.27	52.06
BBB− and lower	2.09 (**4.10**)	9.96	673.48	41.09
BB+ and lower	2.34 (**4.28**)	6.39	532.81	32.51
BB and lower	2.47 (**4.27**)	4.43	439.00	26.78
BB− and lower	2.82 (**4.60**)	2.98	328.69	20.05
B+ and lower	3.33 (**4.68**)	1.67	197.25	12.03
B and lower	3.74 (**4.09**)	0.77	69.19	4.22

Table 5
Cross-Sectional Analysis

For each month t, and each rating group (Rating Group 1 to 10), we run cross-sectional regressions of future K-month returns ($t+1$ through $t+K$) on the past K-month returns ($t-K$ through $t-1$) using all stocks on the monthly CRSP tape with available credit rating and return data, and which at the beginning of the holding period are priced above \$5 and are bigger than the smallest NYSE size decile:

$$r_{(t+1:t+K),i} = a_{K,t} + b_{K,t} r_{(t-K:t-1),i} + e_{(t+1:t+K),i}$$

where K represents 3-, 6-, 9-, and 12-month formation/holding period horizons. Note that one month is skipped between the formation and holding periods. The average rating per rating decile is presented in the second row. The table reports the time-series average slope coefficients, $\overline{b_{K,t}}$, from the the cross-sectional regressions for different investment period horizons K and credit risk groups. Given the overlapping periods, the t-statistics reported in parentheses below the coefficients use the Hansen and Hodrick (1980) adjusted standard errors (t-statistics in bold indicate 5% level of significance).

PANEL A: 3 Credit Rating Groups

	Rating Tercile (1=Lowest Risk, 3=Highest Risk)			All Firms
	1	2	3	
Average	A+	BBB+	BB−	BBB
Rating	4.97	8.50	13.02	8.83
J,K=3	-0.02 (-0.76)	0.01 (0.34)	0.05 (**3.29**)	0.02 (1.53)
J,K=6	0.03 (1.07)	0.05 (**2.15**)	0.10 (**5.26**)	0.07 (**3.40**)
J,K=9	0.06 (1.75)	0.06 (**2.02**)	0.08 (**4.05**)	0.07 (**3.28**)
J,K=12	0.04 (1.24)	0.03 (1.30)	0.03 (**2.36**)	0.04 (**2.53**)

PANEL B: 10 Credit Rating Groups

	Rating Decile (1=Lowest Risk, 10=Highest Risk)										All
	1	2	3	4	5	6	7	8	9	10	Firms
Average	AA	A+	A	A−	BBB+	BBB	BBB−	BB	BB−	B	BBB
Rating	3.17	4.98	6.13	7.09	8.04	9.03	10.13	11.82	13.19	14.52	8.83
J,K=3	-0.03 (-1.77)	-0.02 (-0.94)	-0.01 (-0.64)	-0.00 (-0.08)	-0.00 (-0.03)	0.00 (0.16)	0.02 (1.30)	0.02 (1.26)	0.03 (**2.10**)	0.07 (**4.39**)	0.02 (1.53)
J,K=6	0.03 (0.89)	0.02 (0.78)	0.03 (1.12)	0.03 (1.11)	0.05 (1.31)	0.06 (**2.38**)	0.07 (**3.19**)	0.07 (**3.03**)	0.09 (**4.42**)	0.12 (**5.31**)	0.07 (**3.40**)
J,K=9	0.07 (1.47)	0.04 (1.01)	0.06 (1.80)	0.06 (1.77)	0.06 (1.56)	0.07 (1.94)	0.07 (**2.19**)	0.06 (**2.37**)	0.08 (**2.66**)	0.08 (**4.00**)	0.07 (**3.28**)
J,K=12	0.07 (1.18)	0.02 (0.75)	0.03 (0.97)	0.03 (0.97)	0.04 (1.51)	0.05 (1.34)	0.04 (1.05)	0.02 (0.89)	0.05 (1.80)	0.04 (**2.42**)	0.04 (**2.53**)

Table 6
Alphas and Betas of Momentum Portfolio Returns By Credit Risk Group

For each month t, all stocks rated by Standard & Poor's with available return data for months $t-6$ through $t-1$ are divided into 3 (or 10) deciles based on their credit rating. We exclude stocks which at the end of month $t-1$ are priced below \$5 or are smaller than the smallest NYSE size decile. For each credit rating decile, we compute the return of the equally-weighted average return over the $t+1$ to $t+6$ month holding period of the worst-performing (P1) and the best-performing (P10) deciles of the stocks based on their returns over the $t-6$ to $t-1$ period. PANEL A shows results from regressing the monthly return of the momentum strategy (P10−P1) on the Fama and French (1993) factors: $r_{i,m} = \alpha_i + b_i Mkt + s_i SMB + h_i HML$, where Mkt is the market excess return, SMB is the small firm factor, and HML is the value factor. The table reports the average factor loadings in the above regression. t-statistics are provided in parentheses (bold indicating 5% significance). PANEL B adjusts returns under the CAPM. The sample period is Jul 1985 - Dec 2003.

PANEL A: The Fama and French (1993) Model

		Rating Tercile (1=Lowest Risk, 3=Highest Risk)		
		1	2	3
Average		A+	BBB+	BB−
Rating		4.97	8.50	13.02
Overall	α	0.41	1.02	2.53
		(1.28)	(**2.85**)	(**4.47**)
	Mkt	-0.13	-0.29	-0.32
		(-1.75)	(**-3.31**)	(**-2.35**)
	SMB	0.09	-0.07	-0.04
		(0.97)	(-0.64)	(-0.23)
	HML	-0.18	-0.30	0.02
		(-1.58)	(**-2.29**)	(0.10)
Non-January	α	0.58	1.22	2.89
		(1.84)	(**3.46**)	(**5.54**)
	Mkt	-0.15	-0.31	-0.34
		(-1.89)	(**-3.52**)	(**-2.64**)
	SMB	0.15	-0.03	0.05
		(1.57)	(-0.30)	(0.34)
	HML	-0.21	-0.37	-0.10
		(-1.81)	(**-2.75**)	(-0.49)
January	α	-0.67	-0.54	0.69
		(-0.43)	(-0.29)	(0.19)
	Mkt	-0.15	-0.25	-0.57
		(-0.46)	(-0.62)	(-0.74)
	SMB	-0.80	-0.81	-1.93
		(-1.87)	(-1.54)	(-1.92)
	HML	0.43	0.56	1.72
		(1.02)	(1.09)	(1.75)
Expansion	α	0.41	1.02	2.43
		(1.27)	(**2.71**)	(**4.11**)
	Mkt	-0.06	-0.22	-0.22
		(-0.75)	(**-2.36**)	(-1.53)
	SMB	0.14	-0.01	0.04
		(1.46)	(-0.06)	(0.23)
	HML	-0.20	-0.28	0.02
		(-1.68)	(**-2.01**)	(0.09)
Recession	α	0.26	0.67	3.68
		(0.35)	(0.81)	(**2.16**)
	Mkt	-0.53	-0.63	-0.76
		(**-3.30**)	(**-3.54**)	(**-2.05**)
	SMB	0.10	-0.35	-0.26
		(0.44)	(-1.35)	(-0.49)
	HML	0.77	-0.10	1.13
		(**2.45**)	(-0.30)	(1.58)

Table 6(continued)

PANEL B: The CAPM Model

		Rating Tercile (1=Lowest Risk, 3=Highest Risk)		
		1	2	3
Overall	α	0.31	0.86	2.55
		(0.97)	(**2.44**)	(**4.60**)
	Mkt	-0.05	-0.19	-0.34
		(-0.82)	(**-2.48**)	(**-2.85**)
Non-January	α	0.45	1.03	2.84
		(1.44)	(**2.94**)	(**5.54**)
	Mkt	-0.04	-0.17	-0.29
		(-0.61)	(**-2.29**)	(**-2.70**)
January	α	-1.35	-1.14	-0.49
		(-0.86)	(-0.62)	(-0.13)
	Mkt	-0.11	-0.23	-0.62
		(-0.33)	(-0.59)	(-0.75)
Expansion	α	0.28	0.85	2.43
		(0.88)	(**2.30**)	(**4.25**)
	Mkt	0.03	-0.12	-0.23
		(0.43)	(-1.44)	(-1.82)
Recession	α	0.11	0.55	3.28
		(0.13)	(0.68)	(1.84)
	Mkt	-0.71	-0.73	-1.17
		(**-4.83**)	(**-5.13**)	(**-3.73**)

Table 7
Characteristics over Months of Holding Period

For each month t, all stocks rated by Standard & Poor's with available return data for months $t-6$ through $t-1$ (formation period) are divided into 3 groups (lowest 30%, middle 40%, and highest 30%) based on their S&P credit rating. We exclude stocks which at the end of month $t-1$ are priced below \$5 or are smaller than the smallest NYSE size decile. For each month of the 18 months in the holding period (months t through $t+17$), we compute the cross-sectional median over each firm-level characteristic for stocks in the loser portfolio P1 and the winner portfolio P10 constructed based on the stocks' return over the formation period. Each Panel of the table shows the time-series average of these cross-sectional medians of each characteristic for each month of the holding period. The industry adjustment consists of subtracting from each stock characteristic the median characteristic for the industry to which the stock belongs. The median industry characteristics are recomputed each month based on the available stocks for this month. The numeric S&P rating is presented in bold and is ascending in credit risk, i.e. 1=AAA, 2=AA+, 3=AA, ..., 21=C, 22=D. The composition of each panel is as follows: PANEL A: Industry Adjusted Sales Growth; PANEL B: Industry Adjusted Profit Margin = Net Income / Sales - Average Industry Profit Margin; PANEL C: Industry Adjusted Net Cash Flows = Net Income + Depreciation / Total Assets - Average Industry Ratio; PANEL D: Industry Adjusted Interest Coverage = EBIT / Interest Expense - Average Industry Interest Coverage; PANEL E: Industry Adjusted Total Asset Turnover = Sales / Total Assets - Average Industry Turnover. The sample period is July 1985 to December 2003.

PANEL A: Industry Adjusted Sales Growth

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	-0.09	0.08	-0.11	0.10	0.33	0.58
-5	-0.17	0.12	-0.22	0.22	0.20	0.68
-4	-0.23	0.10	-0.27	0.24	0.12	0.70
-3	-0.26	0.08	-0.33	0.28	-0.06	0.76
-2	-0.25	0.08	-0.41	0.28	-0.19	0.82
-1	-0.26	0.07	-0.48	0.27	-0.29	0.83
0	-0.31	0.06	-0.49	0.25	-0.32	0.78
1	-0.33	-0.01	-0.46	0.19	-0.31	0.82
2	-0.36	0.03	-0.46	0.19	-0.41	0.85
3	-0.38	0.04	-0.46	0.18	-0.47	0.85
4	-0.43	0.09	-0.45	0.16	-0.53	0.72
5	-0.40	0.08	-0.44	0.14	-0.47	0.65
6	-0.34	0.12	-0.46	0.12	-0.38	0.59
7	-0.28	0.13	-0.45	0.16	-0.30	0.48
8	-0.27	0.10	-0.46	0.17	-0.28	0.45
9	-0.27	0.05	-0.45	0.18	-0.31	0.42
10	-0.27	0.03	-0.48	0.15	-0.32	0.42
11	-0.27	0.01	-0.45	0.10	-0.35	0.34
12	-0.28	-0.02	-0.43	0.03	-0.38	0.33
13	-0.28	-0.08	-0.38	-0.02	-0.42	0.29
14	-0.30	-0.05	-0.38	-0.04	-0.44	0.26
15	-0.30	-0.03	-0.35	-0.06	-0.42	0.16
16	-0.30	-0.01	-0.33	-0.08	-0.37	0.14
17	-0.27	-0.02	-0.32	-0.10	-0.35	0.20

Table 7(continued)

PANEL B: Industry Adjusted Profit Margin =
Net Income / Sales (in %) - Average Industry Profit Margin (in %)

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	1.27	1.73	-0.33	0.27	-3.50	-2.29
-5	1.17	1.81	-0.51	0.36	-3.93	-2.06
-4	1.07	1.94	-0.71	0.44	-4.50	-1.81
-3	0.96	1.99	-0.95	0.54	-5.16	-1.63
-2	0.85	2.07	-1.17	0.62	-5.99	-1.45
-1	0.73	2.07	-1.30	0.68	-6.50	-1.29
0	0.63	2.11	-1.41	0.75	-6.91	-1.17
1	0.55	2.14	-1.50	0.81	-6.91	-1.06
2	0.51	2.14	-1.54	0.91	-7.04	-1.05
3	0.45	2.09	-1.55	0.95	-7.16	-1.02
4	0.41	2.10	-1.52	1.00	-7.53	-0.96
5	0.40	2.17	-1.57	1.06	-7.85	-0.92
6	0.41	2.28	-1.63	1.12	-8.28	-0.84
7	0.40	2.35	-1.63	1.18	-8.30	-0.73
8	0.38	2.41	-1.57	1.22	-8.24	-0.70
9	0.36	2.37	-1.52	1.24	-7.95	-0.67
10	0.39	2.32	-1.54	1.25	-7.65	-0.83
11	0.39	2.22	-1.53	1.19	-7.16	-0.86
12	0.40	2.19	-1.52	1.15	-6.95	-0.97
13	0.45	2.15	-1.49	1.07	-6.67	-1.08
14	0.51	2.12	-1.46	1.02	-6.55	-1.14
15	0.53	2.04	-1.39	0.98	-6.38	-1.24
16	0.54	2.04	-1.34	0.96	-6.36	-1.25
17	0.54	2.02	-1.34	1.00	-6.39	-1.36

Table 7(continued)

PANEL C: Industry Adjusted Net Cash Flows = Net Income + Depreciation / Total Assets (in %) - Average Industry Ratio (in %)

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	0.45	0.52	-0.00	0.15	-0.75	-0.50
-5	0.43	0.53	-0.04	0.18	-0.82	-0.44
-4	0.40	0.56	-0.09	0.20	-0.91	-0.37
-3	0.38	0.56	-0.15	0.22	-1.00	-0.30
-2	0.35	0.59	-0.19	0.25	-1.10	-0.25
-1	0.32	0.60	-0.23	0.28	-1.14	-0.22
0	0.30	0.61	-0.26	0.29	-1.19	-0.23
1	0.29	0.62	-0.28	0.31	-1.19	-0.23
2	0.28	0.62	-0.28	0.33	-1.23	-0.24
3	0.27	0.63	-0.27	0.35	-1.22	-0.21
4	0.25	0.64	-0.25	0.34	-1.25	-0.20
5	0.25	0.65	-0.25	0.34	-1.25	-0.19
6	0.26	0.68	-0.25	0.33	-1.23	-0.18
7	0.27	0.68	-0.26	0.33	-1.20	-0.16
8	0.27	0.68	-0.25	0.32	-1.19	-0.14
9	0.27	0.65	-0.25	0.32	-1.18	-0.13
10	0.27	0.63	-0.24	0.34	-1.14	-0.14
11	0.27	0.61	-0.24	0.34	-1.08	-0.15
12	0.26	0.58	-0.23	0.32	-1.07	-0.16
13	0.26	0.58	-0.23	0.32	-1.05	-0.17
14	0.25	0.57	-0.22	0.31	-1.04	-0.18
15	0.23	0.59	-0.20	0.30	-1.03	-0.19
16	0.23	0.58	-0.20	0.29	-1.03	-0.18
17	0.24	0.58	-0.19	0.29	-1.03	-0.21

Table 7(continued)

PANEL D: Industry Adjusted Interest Coverage = EBIT / Interest Expense - Average Industry Interest Coverage

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	2.27	2.88	0.18	0.47	-1.43	-1.22
-5	2.18	2.95	0.06	0.54	-1.56	-1.13
-4	2.07	2.98	-0.04	0.62	-1.73	-1.05
-3	1.96	3.10	-0.16	0.72	-1.89	-0.99
-2	1.85	3.19	-0.27	0.84	-2.02	-0.94
-1	1.81	3.26	-0.34	0.88	-2.05	-0.90
0	1.77	3.32	-0.41	0.92	-2.11	-0.85
1	1.73	3.36	-0.45	0.95	-2.13	-0.79
2	1.62	3.42	-0.49	1.07	-2.17	-0.78
3	1.51	3.35	-0.51	1.15	-2.22	-0.75
4	1.44	3.37	-0.49	1.21	-2.26	-0.74
5	1.44	3.47	-0.49	1.26	-2.31	-0.70
6	1.43	3.58	-0.48	1.30	-2.31	-0.67
7	1.41	3.63	-0.48	1.35	-2.32	-0.63
8	1.36	3.57	-0.47	1.37	-2.28	-0.58
9	1.34	3.55	-0.46	1.40	-2.23	-0.54
10	1.37	3.55	-0.48	1.41	-2.16	-0.55
11	1.39	3.49	-0.46	1.37	-2.07	-0.58
12	1.41	3.47	-0.43	1.32	-2.05	-0.61
13	1.41	3.34	-0.41	1.27	-2.07	-0.65
14	1.42	3.38	-0.41	1.27	-2.12	-0.66
15	1.44	3.38	-0.40	1.26	-2.13	-0.66
16	1.47	3.47	-0.38	1.24	-2.10	-0.65
17	1.48	3.42	-0.35	1.18	-2.10	-0.63

Table 7(continued)

PANEL E: Industry Adjusted Total Asset Turnover = Sales / Total Assets (in %) - Average Industry Turnover (in %)

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	0.14	0.35	0.10	0.47	-2.38	-0.38
-5	0.12	0.41	0.08	0.51	-2.50	-0.22
-4	0.12	0.37	0.00	0.56	-2.62	-0.11
-3	0.12	0.34	-0.13	0.59	-2.75	-0.01
-2	0.17	0.32	-0.20	0.67	-2.75	-0.04
-1	0.21	0.34	-0.24	0.65	-2.72	0.02
0	0.19	0.30	-0.29	0.60	-2.69	0.03
1	0.16	0.27	-0.36	0.57	-2.63	0.08
2	0.09	0.27	-0.43	0.52	-2.57	0.09
3	0.03	0.29	-0.44	0.58	-2.60	0.14
4	-0.06	0.30	-0.49	0.65	-2.60	0.15
5	-0.09	0.32	-0.53	0.69	-2.58	0.17
6	-0.13	0.33	-0.56	0.69	-2.47	0.08
7	-0.11	0.33	-0.52	0.69	-2.40	0.05
8	-0.12	0.24	-0.55	0.70	-2.28	0.06
9	-0.07	0.18	-0.56	0.72	-2.17	0.12
10	-0.01	0.16	-0.56	0.65	-2.03	0.04
11	0.04	0.12	-0.53	0.62	-1.88	0.08
12	0.02	0.11	-0.45	0.54	-1.81	0.14
13	-0.01	0.09	-0.39	0.50	-1.65	0.24
14	-0.04	0.09	-0.35	0.53	-1.65	0.17
15	-0.06	0.07	-0.34	0.53	-1.58	0.15
16	-0.06	0.06	-0.37	0.53	-1.61	0.16
17	-0.08	0.13	-0.39	0.52	-1.56	0.20

Table 8
Analyst Coverage Over Formation and Holding Periods

For each month t, all stocks rated by Standard & Poor's with available return data for months $t-6$ through $t-1$ (formation period) are divided into 3 groups (lowest 30%, middle 40%, and highest 30%) based on their S&P credit rating. We exclude stocks which at the end of month $t-1$ are priced below \$5 or are smaller than the smallest NYSE size decile. For each month of the 18 months in the holding period (months t through $t+17$), we compute the cross-sectional median over the analyst coverage, forecast dispersion, or forecast revisions, for stocks in the loser portfolio P1 and the winner portfolio P10 constructed based on the stocks' return over the formation period. The analyst data is extracted from I/B/E/S. The sample period is July 1985 to December 2003. PANEL A summarizes the number of analysts providing earnings per share forecasts. PANEL B: summarizes the dispersion in analyst forecasts for each month. PANEL C summarizes the percentage change in mean analyst forecast of earnings per share for the next fiscal period end.

PANEL A: Number of Analysts Covering The Firm

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	16.84	16.91	11.80	11.54	7.74	6.07
-5	16.83	16.98	11.78	11.62	7.68	6.13
-4	16.72	16.99	11.74	11.58	7.62	6.17
-3	16.70	16.96	11.74	11.65	7.65	6.25
-2	16.55	17.07	11.66	11.63	7.64	6.30
-1	16.44	16.98	11.61	11.66	7.58	6.33
0	16.56	17.03	11.58	11.67	7.47	6.33
1	16.52	17.07	11.51	11.70	7.36	6.39
2	16.43	16.94	11.47	11.69	7.28	6.42
3	16.47	17.00	11.41	11.68	7.23	6.51
4	16.43	16.96	11.34	11.76	7.06	6.67
5	16.44	16.92	11.33	11.84	6.93	6.77
6	16.27	17.05	11.27	11.95	6.79	6.75
7	16.19	17.13	11.21	12.05	6.62	6.88
8	16.09	17.15	11.23	12.08	6.54	6.98
9	15.93	17.13	11.16	12.16	6.48	7.13
10	15.90	17.20	11.08	12.19	6.33	7.24
11	15.76	17.21	10.99	12.27	6.25	7.28
12	15.65	17.22	10.86	12.26	6.20	7.33
13	15.54	17.33	10.78	12.30	6.14	7.39
14	15.48	17.31	10.62	12.34	6.16	7.43
15	15.43	17.34	10.60	12.43	6.16	7.43
16	15.43	17.34	10.68	12.47	6.10	7.52
17	15.35	17.35	10.64	12.59	5.97	7.58

Table 8(continued)

PANEL B: Dispersion in Analyst Forecasts (Standard Deviation $\times 100$)

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	6.01	4.42	9.31	6.93	11.07	8.51
-5	6.23	4.41	9.71	6.90	11.87	8.37
-4	6.52	4.49	10.20	6.98	12.37	8.23
-3	6.72	4.61	10.63	7.12	12.69	8.31
-2	6.96	4.60	11.33	7.19	13.14	8.10
-1	7.22	4.63	11.89	7.36	13.66	8.10
0	7.49	4.51	11.94	7.30	14.15	8.01
1	7.54	4.54	11.88	7.27	14.19	7.93
2	7.55	4.54	11.74	7.16	14.25	7.82
3	7.47	4.41	11.65	6.97	14.34	7.85
4	7.36	4.45	11.58	6.97	14.51	7.88
5	7.36	4.44	11.28	6.95	14.48	7.77
6	7.31	4.41	11.01	6.88	14.11	7.77
7	7.16	4.45	10.74	7.00	14.31	7.86
8	6.88	4.58	10.66	7.07	13.91	7.73
9	6.98	4.64	10.38	7.05	13.72	7.59
10	6.78	4.77	10.17	7.14	13.23	7.72
11	6.89	4.73	10.10	6.91	12.86	7.73
12	6.82	4.82	9.92	6.95	12.67	7.69
13	6.78	4.74	9.93	6.84	12.58	7.53
14	6.70	4.57	9.78	6.80	12.12	7.61
15	6.67	4.61	9.39	6.60	11.45	7.77
16	6.55	4.54	9.23	6.62	10.95	7.68
17	6.43	4.39	9.05	6.59	10.74	7.90

Table 8(continued)

PANEL C: Revisions in Analyst Forecasts for EPS for Current Fiscal Year

$\left(\frac{Forecast_{(t)} - Forecast_{(t-1)}}{Abs(Forecast_{(t-1)})}\right)$

This Panel summarizes the monthly percentage change in mean analyst earnings per share forecast for the current fiscal year.

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	-0.24	-0.13	-0.67	-0.17	-1.31	-0.37
-5	-0.35	0.03	-1.04	-0.05	-2.11	0.07
-4	-0.59	0.07	-1.59	0.08	-3.17	0.21
-3	-0.76	0.16	-2.02	0.13	-3.85	0.47
-2	-1.06	0.21	-2.38	0.29	-4.59	0.60
-1	-1.23	0.22	-2.89	0.40	-5.31	0.72
0	-1.27	0.21	-2.89	0.38	-5.42	0.73
1	-0.99	0.14	-2.36	0.25	-4.19	0.42
2	-0.91	0.10	-2.11	0.18	-3.80	0.27
3	-0.71	0.08	-1.87	0.17	-3.45	0.22
4	-0.57	0.06	-1.60	0.16	-2.92	0.17
5	-0.59	0.03	-1.35	0.10	-2.50	0.09
6	-0.58	0.04	-1.19	0.06	-2.44	0.08
7	-0.53	0.06	-1.04	0.09	-2.04	0.10
8	-0.47	0.01	-0.90	0.06	-1.88	0.01
9	-0.40	0.02	-0.80	0.03	-1.46	-0.06
10	-0.41	0.05	-0.79	0.06	-1.49	-0.10
11	-0.38	-0.01	-0.62	0.01	-1.18	-0.16
12	-0.33	-0.04	-0.57	-0.04	-0.90	-0.25
13	-0.25	-0.08	-0.54	-0.03	-0.78	-0.32
14	-0.23	-0.04	-0.49	-0.04	-0.56	-0.35
15	-0.21	-0.05	-0.42	-0.11	-0.53	-0.30
16	-0.17	-0.06	-0.35	-0.16	-0.28	-0.36
17	-0.14	-0.06	-0.31	-0.14	-0.39	-0.42

Table 9
Earning Surprises around Earning Announcements

For each month t, all stocks rated by Standard & Poor's with available return data for months $t-6$ through $t-1$ (formation period) are divided into 3 groups (lowest 30%, middle 40%, and highest 30%) based on their S&P credit rating. We exclude stocks which at the end of month $t-1$ are priced below \$5 or are smaller than the smallest NYSE size decile. PANEL A: For each of the four subsequent quarters, we compute the time-series mean of the cross-sectional median earning surprise (i.e. actual EPS on the earnings announcement date minus prior month mean analyst forecast of EPS, standardized by absolute value of actual EPS) for stocks in the loser portfolio P1 and the winner portfolio P10 constructed based on the stocks' return over the formation period. The numbers are reported in percentages. PANEL B provides the standardized unexpected earnings (SUE) at the announcement date over the same 4 subsequent quarters. The SUE for a firm is computed as the actual earnings less the earnings four quarters ago. This earnings change is standardized by its standard deviation estimated over the prior eight quarters. The analyst data is extracted from I/B/E/S.

PANEL A: Earning Surprises

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Quarter	P1	P10	P1	P10	P1	P10
1	-2.29	2.62	-9.45	3.92	-20.48	6.64
2	-1.52	2.13	-6.95	2.88	-16.15	3.04
3	-0.81	1.81	-3.57	2.52	-14.52	2.87
4	-0.42	1.62	-1.49	2.54	-11.58	0.95

PANEL B: Standardized Unexpected Earnings

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Quarter	P1	P10	P1	P10	P1	P10
1	-16.90	16.44	-32.72	24.78	-46.04	30.90
2	-11.08	9.92	-19.23	17.18	-31.06	20.98
3	-1.76	3.51	-5.69	8.61	-11.52	10.96
4	4.44	2.31	4.31	3.00	1.63	2.50

Table 10
Market Characteristics of Winners and Losers

For each month t, all stocks rated by Standard & Poor's with available return data for months $t-6$ through $t-1$ (formation period) are divided into 3 groups (lowest 30%, middle 40%, and highest 30%) based on their S&P credit rating. We exclude stocks which at the end of month $t-1$ are priced below \$5 or are smaller than the smallest NYSE size decile. For each month of the 18 months in the holding period (months t through $t+17$), we compute the cross-sectional median over each firm-level characteristic for stocks in the loser portfolio P1 and the winner portfolio P10 constructed based on the stocks' return over the formation period. Each Panel of the table shows the time-series average of these cross-sectional medians of each characteristic for each month of the holding period. The numeric S&P rating is presented in bold and is ascending in credit risk, i.e. 1=AAA, 2=AA+, 3=AA, ..., 21=C, 22=D. The composition of each panel is as follows: PANEL A: Volatility (sum of squared daily returns); PANEL B: NYSE/AMEX Illiquidity (as in Amihud (2002)); PANEL C: NASDAQ Illiquidity (as in Amihud (2002)); PANEL D: Book to Market Ratio = BV of Equity / MV of Equity; PANEL E: Institutional Holding (% of shares outstanding held by institutions). The sample period is July 1985 to December 2003.

PANEL A: Volatility (sum of squared daily returns $\times 100$)

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	0.71	0.68	0.94	0.94	1.86	1.86
-5	0.75	0.68	0.99	0.89	2.14	1.78
-4	0.76	0.69	1.05	0.88	2.32	1.76
-3	0.78	0.69	1.07	0.90	2.36	1.73
-2	0.83	0.70	1.07	0.89	2.48	1.62
-1	0.82	0.72	1.10	0.89	2.64	1.67
0	0.80	0.70	1.12	0.86	2.59	1.58
1	0.76	0.74	1.10	0.90	2.53	1.63
2	0.73	0.73	1.09	0.91	2.50	1.69
3	0.72	0.74	1.08	0.94	2.53	1.66
4	0.71	0.75	1.13	0.95	2.59	1.66
5	0.72	0.72	1.10	0.93	2.62	1.70
6	0.73	0.74	1.09	0.93	2.58	1.66
7	0.72	0.73	1.08	0.93	2.54	1.68
8	0.72	0.74	1.09	0.92	2.52	1.64
9	0.72	0.73	1.04	0.92	2.42	1.66
10	0.72	0.77	1.06	0.93	2.41	1.70
11	0.71	0.76	1.01	0.92	2.41	1.69
12	0.72	0.73	1.03	0.92	2.35	1.73
13	0.72	0.72	1.04	0.89	2.33	1.69
14	0.73	0.71	1.04	0.89	2.38	1.66
15	0.73	0.71	1.04	0.86	2.36	1.67
16	0.71	0.71	1.02	0.86	2.26	1.63
17	0.72	0.72	1.04	0.86	2.22	1.64

Table 10(continued)

PANEL B: Institutional Holding (% of shares outstanding held by institutions)

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	50.36	51.06	51.80	51.42	45.02	37.57
-5	50.37	51.28	51.75	51.70	44.70	38.04
-4	50.25	51.59	51.42	52.12	43.96	38.86
-3	50.08	51.67	50.99	52.43	42.92	39.94
-2	49.84	51.84	50.55	52.65	41.86	41.45
-1	49.47	52.05	50.18	52.87	40.90	43.02
0	49.30	52.28	49.84	53.21	40.07	44.27
1	49.15	52.39	49.67	53.78	39.26	45.23
2	49.21	52.32	49.45	54.09	38.60	45.92
3	49.39	52.41	49.29	54.38	38.08	46.64
4	49.69	52.51	49.22	54.44	37.48	47.16
5	49.93	52.63	49.18	54.67	37.18	47.82
6	50.23	52.71	49.07	54.85	36.84	47.96
7	50.38	52.77	49.21	55.05	36.45	48.40
8	50.47	52.80	49.34	55.27	36.13	48.64
9	50.64	52.77	49.49	55.48	36.11	48.82
10	50.77	52.84	49.53	55.70	36.20	49.03
11	51.10	52.88	49.70	55.89	36.03	49.16
12	51.32	52.90	49.97	56.09	35.80	49.47
13	51.55	52.86	50.11	56.12	35.80	49.33
14	51.87	52.85	50.48	56.09	36.06	49.33
15	52.22	52.98	50.70	56.11	36.45	49.12
16	52.47	53.04	50.96	56.24	36.64	48.90
17	52.68	53.03	51.17	56.37	36.65	48.60

Table 10(continued)

PANEL B: NYSE/AMEX Illiquidity (as in Amihud (2002) $\times 10^8$)

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	7.83	8.67	12.66	13.17	34.67	51.94
-5	7.76	8.50	12.64	12.45	35.60	46.46
-4	7.52	8.39	12.47	11.76	36.25	42.26
-3	7.26	8.04	12.28	11.25	36.05	37.48
-2	7.13	7.58	12.34	10.55	37.35	34.07
-1	7.03	6.91	12.30	9.84	37.72	28.49
0	7.04	7.01	12.04	9.70	37.29	29.31
1	7.34	6.94	12.62	10.19	38.96	30.67
2	7.39	6.98	12.49	10.09	38.75	31.09
3	7.47	7.14	12.71	10.04	40.31	31.13
4	7.63	7.09	12.75	9.84	41.23	31.58
5	7.58	6.84	12.66	9.88	41.72	31.59
6	7.47	6.86	12.55	9.23	43.30	31.62
7	7.40	6.87	12.89	8.99	45.17	30.24
8	7.48	6.50	12.77	8.67	45.65	30.09
9	7.28	6.33	12.90	8.65	47.32	29.54
10	7.35	6.15	13.18	8.45	47.51	28.83
11	7.23	6.46	13.16	8.31	48.65	29.09
12	7.52	6.21	13.31	8.41	48.27	29.99
13	7.45	6.01	13.42	8.43	48.31	30.41
14	7.34	5.81	13.30	8.56	52.26	30.69
15	7.32	5.93	13.29	8.38	52.81	31.01
16	7.28	5.77	13.09	8.24	53.65	31.73
17	7.23	5.72	13.14	8.09	52.89	31.65

Table 10(continued)

PANEL C: NASDAQ Illiquidity (as in Amihud (2002) $\times 10^8$)

	Credit Risk Group					
	Low Risk		Medium Risk		High Risk	
Month	P1	P10	P1	P10	P1	P10
-6	67.18	96.32	74.27	74.64	55.31	92.27
-5	69.23	82.66	81.29	75.62	59.17	72.70
-4	70.92	85.02	81.36	67.80	74.99	61.03
-3	64.83	70.20	71.31	60.09	70.72	48.14
-2	61.70	72.19	76.55	52.73	68.04	42.74
-1	67.70	63.10	76.10	49.92	66.65	46.76
0	63.88	58.71	72.19	46.86	79.93	44.37
1	66.63	64.17	70.62	51.73	83.67	48.08
2	69.33	62.52	68.77	44.98	81.87	45.79
3	77.63	64.66	74.37	47.89	70.55	39.41
4	69.94	62.40	68.89	46.74	81.39	37.11
5	76.57	66.41	74.94	43.45	91.86	40.25
6	81.64	76.02	73.26	61.03	125.10	41.54
7	88.61	83.03	86.18	59.29	116.86	40.22
8	96.77	90.25	89.16	63.84	106.72	42.63
9	100.96	80.96	109.64	65.81	119.46	42.17
10	107.78	94.20	101.05	76.30	139.33	65.17
11	100.31	92.78	117.86	69.08	142.79	76.53
12	90.50	79.84	116.69	69.20	154.34	75.30
13	87.56	67.00	112.77	65.59	175.34	67.77
14	103.11	70.19	112.69	60.20	158.73	72.01
15	101.22	75.95	96.80	55.44	135.92	55.92
16	131.68	73.49	88.09	66.48	187.78	53.87
17	99.07	78.71	108.51	64.60	244.95	65.32