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Gross Profitability and Momentum: Evidence from India

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ABSTRACT: This study investigates the joint impact of an investment strategy that integrates gross profitability and the 52-week high price indicator within the context of the Indian stock market. This study uses an empirical approach commonly found in asset pricing literature. The analysis incorporates data from October 2002 to September 2022. Firms are classified into tercile portfolios according to their profitability and momentum metrics, and their overall performance is assessed using an independent double-sorting methodology. The empirical analysis presents results for both value-weighted and equally weighted portfolio returns. A combined long-short strategy yields an equally weighted monthly return of 0.32%, accompanied by a corresponding Fama-French alpha of 1.08%. The equally weighted return is approximately 1.79 times greater than that of the standalone profitability strategy and nearly equivalent to that of the standalone 52-week high-momentum strategy. This highlights the enhanced performance of the combined approach relative to the individual strategies, particularly in terms of risk-adjusted returns. In recent years, increasing attention has been paid to multifactor investment strategies. This study demonstrates that integrating two significant factors, profitability and momentum, enhances portfolio performance. The first study to investigate the synergistic effects of combining profitability and momentum, offers empirical evidence supporting the superior outcomes of such a strategy. However, this area remains underexplored, particularly in the context of the Indian market.

KEYWORDS: Asset pricing, Behavioural Finance, Gross profitability, 52-week high momentum, India.

I. INTRODUCTION

Factor-based investing is an investment technique that focuses on identifying and investing in specific factors that drive returns in different asset classes. Allocating funds to various factors can enhance portfolio performance, mitigate volatility, and enhance diversification. Investing based on market capitalization is a prominent investment strategy. According to Banz, (1981), smaller firms outperform larger firms in terms of risk-adjusted returns, thus challenging the capital asset pricing model. Researchers have thoroughly examined highly regarded investment approaches that take into factors such as the B/M ratio (book-to-market), P/CF ratio (price-to-cash flow), P/E ratio (price-to-earnings), liquidity, and leverage. These methods are not restricted to market capitalization. Book-to-market investing has been successful in the US market, as first shown by Stattman (1980). Basu (1977) examines how price-to-earnings ratios affect equity investment performance. Lakonishok et al. (1994) investigated the cash flows-to-price ratio effects on returns. They find that stocks with a greater cash flows-to-price ratio offer higher returns. Bhandari (1988) found that higher leverage leads to better average returns, while Amihud & Mendelson (1986) report that lower liquidity results in higher returns, highlighting the risk premium associated with illiquid assets. found that leveraged stocks produce better average returns. Jegadeesh & Titman (1993) established the profitability of momentum strategies, which involve buying stocks with strong past performance and selling those with weak performance over 3 to 12 months. These strategies yield significant anomalous returns, independent of systematic risk or delayed price reactions.

These findings underline the importance of multi-factor approaches to investment, extending beyond market capitalization to include size, value, liquidity, leverage, and momentum.

Gross profitability (hereafter referred to as GP), a concept introduced by Novy-Marx (2013), is a financial metric that measures a company's profitability by comparing its revenue to costs, excluding certain expenses such as interest, taxes, depreciation, and amortization. This approach focuses on the core operational efficiency of a business, providing insights into its fundamental earning power. Novy-Marx's research demonstrated that GP has been a strong predictor of future stock returns, often outperforming traditional value metrics. The strategy involves investing in stocks with high GP, based on the premise that these companies are more likely to maintain their competitive advantage and generate superior returns over time.

On the other hand, the 52-week high (hereafter referred to as 52WH) momentum strategy, proposed by George & Hwang (2004), takes a different approach to stock selection. This strategy involves buying stocks that trade near their 52WH price and selling stocks that are far from it. The underlying principle is rooted in behavioral finance, suggesting that investors use the 52WH as a psychological reference point to evaluate potential investments. When a stock approaches its 52WH, it may trigger increased investor attention and buying pressure, potentially leading to a continued price appreciation. Conversely, stock trading far below their 52WHs may be overlooked or viewed less favorably by investors.

The combination of these two strategies has been an area of interest for researchers and practitioners seeking to enhance investment performance. By integrating GP and 52WH momentum, investors aim to identify stocks that not only demonstrate strong fundamental profitability but also exhibit positive price momentum. This combined approach attempts to leverage both the quality factor associated with profitability and the momentum factor linked to recent price performance.

However, the effectiveness of this combined strategy has shown varying results across different markets and time periods. For instance, Bhootra (2018) conducted a study in the US market and found that a combined approach significantly outperformed individual strategies. The research suggested that integrating GP with the 52WH momentum strategy led to enhanced returns and improved risk-adjusted performance compared to using either strategy in isolation. In contrast, Özkan (2021) examined the same combined strategy in the Turkish stock market and observed no superior performance compared with individual strategies. This divergence in results highlights the importance of considering market-specific factors, such as liquidity, regulatory environment, and investor behavior, when evaluating the efficacy of investment strategies across different geographical contexts.

This research represents one of the initial empirical investigations into the joint impact of GP and a 52WH momentum approach in India's stock market. By combining these two significant factors, this study offers valuable insights into how integrating the quality (profitability) and momentum elements can improve portfolio outcomes. While existing research has largely concentrated on mature markets, such as the United States, this investigation contributes to the expanding research on factor-based investing in emerging economies, particularly India. The results underscore the distinctive characteristics of the Indian stock market, defined by specific economic, regulatory, and investor behavior patterns.

This evidence piques interest in the performance of the combined strategy in the Indian stock market. In order to achieve this objective, portfolios with both long and short positions were created using the GP metric developed by Novy-Marx (2013) and the 52-week price measure proposed by George & Hwang (2004). The findings provide evidence that the strategy is superior in terms of performance in the Indian stock market throughout the period 2002–2022. The structure of this paper is organized as follows: Section 2 provides a comprehensive review of the existing literature relevant to the study. Section 3 outlines the research methodology employed in the investigation. Section 4 details the findings of the study and offers a thorough discussion of the results. Finally, Section 5 concludes the paper by summarizing the key insights and presenting actionable recommendations based on the findings.

II. LITERATURE REVIEW

Gross Profitability

GP has emerged as a significant predictor of stock returns and a measure of firm performance. Novy-Marx (2013) introduced the concept of GP, defined as gross profit scaled by book value of total assets, as a powerful predictor of the cross-section of average returns (Ball et al., 2015). This seminal work demonstrated that GP outperforms other measures of profitability such as net income, cash flows, and dividends in predicting returns. However, subsequent research has challenged and expanded upon these findings. Ball et al. (2015) argue that the predictive power of GP may be attributed to its deflator rather than the numerator. They propose an alternative measure, operating profitability, which better matches current expenses with current revenue and exhibits a stronger link with expected returns. This measure predicts returns up to ten years ahead, suggesting a more fundamental relationship with firm performance.

Recent studies have explored the relationship between GP and other financial indicators. Alqatamin et al. (2017) found that gross profit margin, along with other profitability measures, has a significant relationship with stock returns in Jordanian manufacturing companies (Allozi & Obeidat, 2016). Similarly, Ciftci and Cready (2011) observed a negative and convex relationship between firm age and profitability, including gross profit margin, in Turkish firms (Akben-Selcuk, 2016).

Kogan & Papanikolaou (2013) provide a theoretical framework explaining the GP premium, suggesting that variable production costs reduce systematic risk of firms' cash flows when capital and variable inputs are complementary. This operating hedge effect is weaker for more profitable firms, giving rise to the observed premium. In the context of emerging economies, Chen et al. (2005) found a positive relationship between gross profit margin and intellectual capital in Chinese manufacturing companies, highlighting the importance of intangible assets in value creation (Xu & Liu, 2021). Additional profitability indicators have also been explored in the literature. Examples of citations include the work of Chen et al. (2011), Ball et al. (2015), Fama & French

(2015), Hou et al. (2012) applied operating profitability, cash-based operating profitability, income before extraordinary items, net income and other related measures of profitability. The precise cause of this profitability effect is unclear. Wang & Yu (2012) and Lam et al. (2014) claimed behavioural biases while Li & Zhang (2010), Jiang et al. (2018) and Hou et al. (2012) hypothesised that the q-theory, which incorporates investment frictions, is the underlying cause of the profitability impact. Fama & French (2008) examined the impact on profitability in the US market. For profitable small stocks, profitability increases average returns, according to the report. There is a positive relationship between profitable microcap and big stocks, although the average slopes are within 1.2 standard errors of zero. The results indicate a favourable correlation between profitability and average returns. Sehgal & Subramaniam (2012) used Fama-French three-factor model data to examine profitability and stock returns. They finds a negative link between profitability and stock returns, contradicting previous research. Chen et al. (2018) reveal a robust and widespread profitability effect in international equity markets, suggesting that this phenomenon is not limited to the United States but also extends to numerous other countries.

52-week high momentum

The 52WH momentum strategy has been a subject of extensive research in finance literature, with several studies examining its profitability and underlying mechanisms. George & Hwang (2004) introduced this strategy, which involves buying stocks near their 52WH and selling those far from it (Hao et al., (2018). Their findings suggest that this approach generates significant profits, particularly during periods of high investor sentiment. Subsequent research has explored various aspects of the 52WH momentum strategy. Liu et al. (2011) conduct an out-of-sample test using Australian stock data, and find that the strategy is highly profitable, especially for stocks approved for short-selling (Marshall & Cahan, 2005). They reported an average monthly return of 2.14%, which is considerably larger than equivalent returns in the US market and other momentum strategies in Australia. Interestingly, some studies have identified contradictions and nuances in the 52WH momentum strategy. Du (2008) examined the profitability of 52WH prices across 18 market indices from 1969 to 2004. The findings indicate that previous returns were marginally more profitable than the 52WH price. Burghof & Prothmann (2011) examined how 52WH returns affected UK market uncertainty from 1989 to 2008. The study indicated that information ambiguity increases 52-week earnings, implying anchoring. Bhootra & Hur (2013) proposed a new momentum strategy based on the timing of a stock's 52WH price, finding that stocks that reached their 52WH more recently outperform those that reached it in the distant past. This suggests that the recency of the 52WH price is also a crucial factor in momentum strategies. Ansari & Khan (2012) investigated if momentum profit existed in the Indian stock market and sought to understand its origins by using both risk-based and behavioural models. To test behavioural models, R2, idiosyncratic volatility, and delay metrics are used. The study builds momentum portfolios using the same methods as Jegadeesh and Titman. According to the report, momentum earnings were very prevalent in India between 1995 and 2006. Risk-based models like the Fama-French and CAPM are unable to explain the phenomenon. The relationship between idiosyncratic risk and momentum is positive, supporting the idea that behavioural characteristics are the genesis of momentum phenomena. Hao et al. (2018) investigated the relationship between the profitability of the 52WH momentum strategy and investor sentiment. It is hypothesised that when investor sentiment is strong, investors' investing decisions may be influenced by behavioural biases. This can lead to larger returns for the 52WH momentum strategy after periods of high sentiment. Their empirical findings validate this prediction. Raju (2023) uses data from October 2004 to August 2023 and several portfolio construction frameworks to show that the Indian stock market has a clear and strong 52-week effect. This study compares the predictive potential of this phenomenon with academic momentum. Stocks near their past 52 weeks have greater returns and Sharpe ratio, even after controlling for firm size. In conclusion, the literature on 52WH momentum strategies reveals their potential for generating significant profits, particularly in certain market conditions and for specific types of stocks. However, the effectiveness of these strategies can vary across markets and time periods, and may be influenced by factors such as investor sentiment, market efficiency, and the timing of the 52WH price. Future research could further explore the interplay between these factors and the long-term sustainability of momentum strategies under evolving market conditions.

III. RESEARCH METHODOLOGY

Our sample was derived from the Centre for Monitoring of Indian Economy database from October 2002 to September 2022. The dataset comprises the monthly share prices of companies that are part of the National Stock Exchange (NSE) 500 index. The NSE is considered the preeminent stock exchange in India, boasting the biggest trading volume. The NIFTY 500 serves as the premiere comprehensive stock market index in India, encompassing a wide range of companies listed on the Indian stock market. The dataset comprises the top 500 firms that are listed on the NSE. The NIFTY 500 index encompasses approximately 96.1% of the market capitalization available for public trading and approximately 96.5% of the overall trading volume on the National Stock Exchange. In accordance with Novy-Marx's (2013) methodology, financial firms are removed from the sample.

The approach used to calculate the GP variable was similar to that employed by Novy-Marx (2013). The GP is calculated by subtracting the cost of goods sold from revenues and then dividing the result by the book value of total assets. The variable is calculated annually in March for all firms with accessible data.

A stock's 52WH is the highest closing price within the preceding 52 weeks. The ratio given in George & Hwang's (2004) study is determined as follows:

$$\text{Ratio} = \frac{\text{Current price}}{\text{52WH price}}$$

A higher ratio indicates closer proximity of the current price to the 52WH.

We compute the value-weighted (hereafter referred to as VW) and equally weighted (hereafter referred to as EW) excess portfolio returns for stocks sorted on GP, as well as the ratio between October of year t and September of year t+1. In accordance with Novy-Marx's (2013) methodology, we categorize firms into portfolios based on their GP, dividing them into quintiles. Similarly, we constructed quintile portfolios following the approach outlined in George & Hwang (2004) for the ratio portfolios. The lowest (highest) profit and ratio portfolios are denoted by profit1 (or profit5) and ratio1 (or ratio5), respectively. A zero-cost portfolio return is computed after employing double sorting based on the GP and a 52WH ratio. Additionally, we computed the Fama-French alphas (hereafter referred to as FF alphas) through a regression analysis, where we regressed the monthly portfolio returns over time against the market factor (MKTRF), size factor (SMB), and book-to-market factor (HML). Factor data were sourced from Agarwalla et al. (2013).

IV. RESULTS AND DISCUSSION

A. Gross profitability and 52-high momentum strategies

We commence the empirical evaluation by analyzing the gross profitability premium in our dataset. Firms were sorted into quintile portfolios based on the gross profit to total assets ratio, as outlined by Novy-Marx (2013).

Table I: Gross profitability and stock returns

Panel A: value-weighted returns

	Excess return	*Excess return (t-statistic)*	FF alpha	*FF alpha (t-statistic)*
Profit 1	1.79***	*3.10*	0.98***	*4.54*
Profit 2	1.49***	*2.78*	0.80***	*4.03*
Profit 3	1.84***	*3.56*	1.14***	*6.09*
Profit 4	1.83***	*3.45*	1.21***	*6.85*
Profit 5	1.52***	*4.09*	1.21***	*5.39*
Profit 5 – Profit 1	-0.27	*-0.60*	0.22	*0.58*

Panel B: equally weighted returns

	Excess return	*Excess return (t-statistic)*	FF alpha	*FF alpha (t-statistic)*
Profit 1	1.68**	*2.44*	0.64***	*4.31*
Profit 2	1.70***	*2.64*	0.85***	*5.38*
Profit 3	2.17***	*3.56*	1.41***	*8.25*
Profit 4	1.95***	*3.45*	1.32***	*6.53*
Profit 5	1.86***	*3.66*	1.33***	*6.50*
Profit 5 – Profit 1	0.18	*0.53*	0.69***	*2.85*

Note: At the end of September each year from 2002 to 2022, we categorise firms into quintile portfolios (profit 1 – profit 5) according to the ratio of gross profits to total assets. Table I displays the VW excess returns in Panel A and the EW excess returns in Panel B, alongside their corresponding FF alphas. The t-statistics are presented in italics.

In Panel A, the Profit 1 and Profit 5 (low and high profitability) portfolios earn an excess return of 1.79% and 1.52% per month, respectively. The corresponding t-statistics for these excess returns are 3.10 and 4.09, respectively. The long-short hedging portfolio generates a monthly return of -0.27% (t = -0.60), indicating that the raw excess return is not statistically significant. However, the FF alpha for the low-profitability portfolio is 0.98% per month, while the high-profitability portfolio yields an FF alpha of 1.21%, both of which are statistically significant. The long-short portfolio itself produces an FF alpha of 0.22% per month, though the t-statistic of 0.58 suggests that this result lacks statistical significance. These findings contrast with those of Novy-Marx (2013), who reported a monthly excess return of 0.31% (t = 2.49) and an FF alpha of 0.52 (t = 4.49) for the hedge portfolio, demonstrating statistically significant performance. Similarly, Bhootra (2018) found that the hedging portfolio delivered positive and statistically significant excess returns and FF alphas, further supporting the profitability premium.

The analysis in Panel B demonstrates that the EW portfolio consistently outperforms in terms of raw excess returns across almost all portfolios, with Profit 1 being the sole exception. The monthly return difference between high and low profitability portfolios is calculated at 0.18%, although this disparity lacks statistical significance (t = 0.53). It's worth noting that the hedge portfolio achieves a substantial and statistically significant FF alpha of 0.69% (t = 2.85). In summary, the EW portfolio showcases better performance compared to its VW counterpart, with higher t-statistics lending further credence to these results.

The results provide partial validation of Novy-Marx's (2013) findings, as there is a statistically significant profitability premium evident in the EW risk-adjusted returns (FF alpha). Nonetheless, the results based on value weighting do not indicate a significant profitability premium, which stands in contrast to the findings presented by Novy-Marx.

Table II. Current price to 52-week high price ratio and stock returns

Panel A: value-weighted returns

	Excess return	*Excess return (t-statistic)*	FF alpha	*FF alpha (t-statistic)*
Ratio 1	2.18***	*3.31*	1.17***	*4.07*
Ratio 2	1.75***	*2.85*	0.94***	*3.71*
Ratio 3	1.64***	*3.27*	1.06***	*5.94*
Ratio 4	1.78***	*3.62*	1.26***	*7.59*
Ratio 5	1.77***	*4.08*	1.28***	*7.41*
Ratio 5 – Ratio 1	-0.40	*-0.89*	0.11	*0.27*

Panel B: equally weighted returns

	Excess return	*Excess return (t-statistic)*	FF alpha	*FF alpha (t-statistic)*
Ratio 1	1.69**	*2.45*	0.60***	*2.84*
Ratio 2	1.86***	*2.88*	1.00***	*5.42*
Ratio 3	2.02***	*3.29*	1.32***	*9.42*
Ratio 4	1.96***	*3.67*	1.38***	*11.17*
Ratio 5	2.00***	*3.90*	1.45***	*9.06*
Ratio 5 – Ratio 1	0.32	*0.93*	0.85***	*3.13*

Note: At the end of September each year from 2002 to 2022, we categorise firms into quintile portfolios (ratio1 – ratio5) according to the ratio of current price to the 52WH price. Table II displays the VW excess returns in Panel A and the EW excess returns in Panel B, alongside their corresponding FF alphas. The t-statistics are italicized.

The monthly VW excess return for the low-ratio portfolio is 2.18%. However, panel A reveals that the high ratio portfolio has a monthly VW excess return of 1.77%. A low ratio portfolio outperforms a high ratio portfolio by 0.40 % each month, which is

statistically insignificant. The corresponding FF alpha of the hedge portfolio is 0.11 % per month (t = 0.27) which is statistically insignificant.

Unlike VW data, EW returns offer more compelling evidence of a momentum impact. In Panel B, excess returns rise from Ratio 1 (1.69%) to Ratio 5 (2.00%), indicating that equities nearer to their 52WH often yield greater returns. The return differential between high and low ratio stocks (Ratio 5 – Ratio 1) is positive (0.32%), although not statistically significant (t = 0.93). The FF alpha for the profitability spread is 0.85% per month and is statistically significant (t = 3.13), which means that stocks that are getting close to their 52WH have a strong risk-adjusted return premium.

Table II presents mixed evidence concerning the validity of the 52WH momentum effect as proposed by George & Hwang (2004). The returns of the EW portfolio substantiate their hypothesis, especially regarding risk-adjusted metrics; however, the VW results do not demonstrate a significant profitability spread. The findings indicate that the 52WH effect is likely more significant in smaller stocks, while larger stocks do not exhibit similar momentum characteristics in the dataset analysed.

B. Integrating profitability with momentum

The primary objective of this study is to examine the efficacy of an investment strategy that integrates profitability and momentum factors.

Table III. Double sort on gross profitability and 52-week high ratio: value-weighted returns

Panel A: value-weighted excess returns

	Ratio 1	Ratio 2	Ratio 3	Ratio 3 – Ratio 1
Profit 1	2.24***	1.69***	1.13**	-1.11** *-2.13*
Profit 2	2.04***	1.25**	2.04***	0.01 *0.02*
Profit 3	2.03***	1.81***	1.68***	-0.35 *-0.65*
Profit 3 – Profit 1	-0.20 *-0.32*	0.12 *0.31*	0.55 *1.45*	

Panel B: value-weighted Fama-French alphas

	Ratio 1	Ratio 2	Ratio 3	Ratio 3 – Ratio 1
Profit 1	1.00*** *2.91*	0.98*** *4.43*	0.40* *1.74*	-0.60 *-1.42*
Profit 2	1.18*** *3.26*	0.57*** *2.70*	1.52*** *6.41*	0.34 *0.81*
Profit 3	1.44*** *3.27*	1.28*** *4.42*	1.28*** *5.61*	-0.16 *-0.32*
Profit 3 – Profit 1	0.44 *0.81*	0.29 *0.81*	0.88** *2.42*	

Panel C: value-weighted returns: (high profit, high ratio) – (low profit, low ratio)

	Raw return	FF alpha	mktrf	smb	hml
(3,3) -(1,1)	-0.56 *-0.94*	0.28 *0.67*	-0.59 *-5.01*	-0.08 *-0.63*	-0.54 *-4.80*

Note: At the end of September each year from 2002 to 2022, firms are independently sorted into tercile portfolios based on two key metrics: (1) the ratio of gross profits to total assets (categorized as Profit1 to Profit3, where Profit1 represents the lowest profitability and Profit3 the highest), and (2) the ratio of their current price to the 52WH price (categorized as Ratio1 to Ratio3, where Ratio1 indicates the lowest ratio and Ratio3 the highest). Table III reports the VW excess returns (Panel A) and FF alphas (Panel B) for the nine portfolios formed by intersecting these sorts, as well as the return differences between the extreme portfolios. Additionally, Panel C provides the VW returns, FF alphas, and regression coefficients for the extreme difference

portfolio (high profit, high ratio minus low profit, low ratio), estimated by regressing its returns on the contemporaneous Fama-French factors. The t-statistics are italicized.

The VW monthly return for the portfolio that goes long on high profitability stocks and short on low profitability stocks is -0.20% (t = -0.32) among stocks with the lowest 52WH ratio (Ratio1). In terms of risk-adjusted performance, this portfolio generates an FF alpha of 0.44% per month (t = 0.81), though this result is not statistically significant. In contrast, the same long-short profitability strategy applied to stocks with the highest 52WH ratio (Ratio3) yields a monthly return of 0.55% (t = 1.45) and an FF alpha of 0.88% (t = 2.42), which is statistically significant at conventional levels. These findings suggest that the profitability strategy performs more effectively among stocks with higher momentum, as measured by the 52WH ratio, both in terms of raw returns and risk-adjusted performance.

The VW returns for the high-minus-low 52WH ratio portfolios are -1.11% for stocks with the lowest profitability (Profit1) and -0.35% for stocks with the highest profitability (Profit3). In terms of risk-adjusted performance, the momentum strategy yields an FF alpha of -0.60% (t = -1.42) for the lowest profitability portfolio, indicating underperformance that is not statistically significant. In contrast, the same momentum strategy applied to the highest profitability portfolio results in an FF alpha of -0.16% (t = -0.32), which is also not statistically significant. These results suggest that the momentum effect, as measured by the 52WH ratio, is weaker and less consistent across profitability levels, with both high and low profitability portfolios exhibiting negative alphas, albeit with limited statistical significance.

Panel C of Table III reports a VW monthly return of -0.56% (t = -0.94) for the combined profitability-momentum strategy, with a corresponding FF alpha of 0.28% (t = 0.67), both of which are statistically insignificant. In comparison, the first and second tables reveal that the standalone VW monthly returns for the pure profitability and pure momentum strategies are -0.27% and -0.40%, respectively. These results indicate that the mixed approach, which integrates both profitability and momentum factors, underperforms relative to the standalone profitability and momentum strategies. This suggests that combining these two factors does not enhance performance and may, in fact, yield inferior outcomes compared to employing each strategy independently.

Furthermore, the profitability-momentum VW strategy exhibits negative loadings on the market factor (MKTRF), the size factor (SMB), and the book-to-market factor (HML). These negative exposures contribute to a higher FF alpha compared to the raw return, as the risk-adjusted performance accounts for the strategy's adverse sensitivity to these common risk factors. This suggests that the strategy's outperformance, as measured by alpha, is partially driven by its contrarian positioning relative to market, size, and value factors, rather than by its raw return performance.

The results align with Bhootra's (2018) findings to some extent. High-profitability stocks (Profit 3) yield greater excess returns and FF alphas, especially when associated with elevated 52WH ratios (Ratio 3). The relationship between profitability and the 52WH ratio is less evident, as the disparity between extreme portfolios (Panel C) lacks statistical significance. The 52WH ratio, serving as an indicator of momentum, presents varied outcomes. In low-profitability stocks, increased momentum (Ratio 3) correlates with diminished returns, whereas in high-profitability stocks, momentum exhibits a neutral or marginally positive impact. High-profitability portfolios yield substantial FF alphas; however, the extreme portfolio, characterised by high profit and high ratio minus low profit and low ratio, does not exhibit significant alphas. This indicates that the relationship between profitability and the 52WH ratio is less pronounced in this sample.

Table IV. Double sort on gross profitability and 52-week high ratio: equally weighted returns

Panel A: equally weighted excess returns

	Ratio 1	Ratio 2	Ratio 3	Ratio 3 – Ratio 1
Profit 1	1.63**	1.60**	1.58**	-0.05 *-0.15*
Profit 2	1.91***	2.11***	2.17***	0.25 *0.75*
Profit 3	1.90***	2.03***	1.95***	0.04 *0.11*
Profit 3 – Profit 1	0.28 *0.76*	0.43 *1.57*	0.36 *1.07*	

Panel B: equally weighted Fama-French alphas

	Ratio 1	Ratio 2	Ratio 3	Ratio 3 – Ratio 1
Profit 1	0.42**	0.79***	0.81***	0.39
	2.01	*4.29*	*4.13*	*1.39*
Profit 2	1.00***	1.38***	1.61***	0.61**
	3.84	*8.20*	*7.24*	*2.01*
Profit 3	1.11***	1.45***	1.50***	0.38
	3.23	*6.58*	*7.37*	*1.08*
Profit 3 – Profit 1	0.70**	0.66**	0.69**	
	2.08	*2.45*	*2.35*	

Panel C: equally weighted returns: (high profit, high ratio) – (low profit, low ratio)

	Raw return	FF alpha	mktrf	smb	hml
(3,3) -(1,1)	0.32	1.08***	-0.34	-0.32	-0.64
	0.78	*3.90*	*-4.42*	*-3.64*	*-8.38*

Note: At the end of September each year from 2002 to 2022, firms are independently sorted into tercile portfolios based on two key metrics: (1) the ratio of gross profits to total assets (categorized as Profit1 to Profit3, where Profit1 represents the lowest profitability and Profit3 the highest), and (2) the ratio of their current price to the 52WH price (categorized as Ratio1 to Ratio3, where Ratio1 indicates the lowest ratio and Ratio3 the highest). Table IV reports the EW excess returns (Panel A) and FF alphas (Panel B) for the nine portfolios formed by intersecting these sorts, as well as the return differences between the extreme portfolios. Additionally, Panel C provides the EW returns, FF alphas, and regression coefficients for the extreme difference portfolio (high profit, high ratio minus low profit, low ratio), estimated by regressing its returns on the contemporaneous Fama-French factors. The t-statistics are italicized.

The portfolio constructed by taking a long position in firms with the highest profitability and a short position in those with the lowest profitability generates an EW monthly return of 0.28% (t = 0.76) for stocks with the lowest 52WH ratio (Ratio1). The corresponding FF alpha for this portfolio is 0.70% per month (t = 2.08), which is statistically significant. In contrast, the same long-short profitability strategy applied to stocks with the highest 52WH ratio (Ratio3) yields a monthly return of 0.36% (t = 1.07) and a FF alpha of 0.69% (t = 2.35), also statistically significant. These results suggest that the profitability premium is robust across different levels of momentum, as measured by the 52WH ratio, with both low- and high-momentum portfolios delivering significant risk-adjusted returns.

The EW high-minus-low 52WH ratio portfolios generate returns of -0.05% for stocks with the lowest profitability (Profit1) and 0.04% for stocks with the highest profitability (Profit3). The momentum strategy produces an FF alpha of 0.39% (t = 1.39) for the lowest profitability portfolio, indicating a positive but marginally significant risk-adjusted performance. In contrast, when applied to the highest profitability portfolio, the momentum strategy yields an alpha of 0.38% (t = 1.08), which is not statistically significant. These findings suggest that the momentum effect, as measured by the 52WH ratio, is more pronounced among low-profitability stocks, while its impact on high-profitability stocks remains weaker and statistically insignificant.

Panel C of Table IV reports an EW monthly return of 0.32% (t = -0.78) for the combined profitability-momentum strategy, alongside a corresponding FF alpha of 1.08% (t = 3.90), which is statistically significant. In comparison, Tables I and II reveals that the standalone profitability and momentum strategies generate EW monthly returns of 0.18% and 0.32%, respectively. The combined approach demonstrates superior performance, delivering a return that is 1.78 times greater than that of the pure profitability strategy and nearly equivalent to that of the pure momentum strategy. These results highlight the enhanced efficacy of integrating profitability and momentum factors, as the combined strategy not only matches the performance of the momentum strategy but also significantly outperforms the profitability strategy on a risk-adjusted basis.

Furthermore, the profitability-momentum VW strategy exhibits negative loadings on the market factor (MKTRF), the size factor (SMB), and the book-to-market factor (HML). These adverse exposures contribute to a higher FF alpha relative to the raw return, as the risk-adjusted performance accounts for the strategy's inverse relationship with these systematic risk factors.

In Panel C of Tables III and IV, the EW returns demonstrate more favorable outcomes compared to the VW returns. This is supported by higher t-statistics, which provide statistical evidence of the robustness and significance of the EW strategy's performance. The stronger statistical significance associated with EW returns suggests that this approach may offer more reliable and consistent results relative to the VW methodology.

The results showed a partial alignment with Bhootra's (2018) findings. High-profitability stocks (Profit 3) demonstrate higher excess returns and FF alphas, particularly for portfolios with higher 52WH ratios (Ratio 3). However, the interaction between profitability and momentum is less pronounced, as the difference between extreme portfolios (Panel C) is not statistically significant in terms of raw returns but shows significance in risk-adjusted performance (FF alpha = 1.08%). The 52WH ratio, serving as a proxy for momentum, yields mixed outcomes: for low-profitability stocks, higher momentum (Ratio 3) results in slightly elevated alphas (0.39%), whereas for high-profitability stocks, the effect of momentum is neutral (0.38%, not significant). High-profitability portfolios consistently produce significant FF alphas, and the extreme portfolio achieves a significant alpha of 1.08%. This indicates that the combined profitability-momentum strategy delivers superior risk-adjusted performance, aligning with Bhootra's (2018) conclusions.

V. CONCLUSION AND RECOMMENDATIONS

In light of the growing interest in factor-based investing among both academic researchers and investment practitioners, this study concurrently evaluates the efficacy of two prominent strategies: the gross profitability approach introduced by Novy-Marx (2013) and the 52WH momentum strategy proposed by George & Hwang (2004). By examining these strategies in tandem, we aim to provide a comprehensive understanding of their individual and combined performance in the context of modern factor investing.

A combined long-short strategy yields an EW monthly return of 0.32%, accompanied by a corresponding FF alpha of 1.08%. The EW return is approximately 1.79 times greater than that of the standalone profitability strategy and nearly equivalent to that of the standalone 52WH-momentum strategy. This highlights the enhanced performance of the combined approach relative to the individual strategies, particularly in terms of risk-adjusted returns.

Overall, EW portfolios demonstrate greater consistency in returns and alphas across profitability and momentum categories, whereas VW portfolios exhibit notable underperformance, particularly for low-profitability, high-momentum stocks. The EW methodology produces higher and statistically significant FF alphas, especially for the extreme portfolios, in contrast to the VW approach, which fails to achieve significant risk-adjusted performance. These findings indicate that the combined profitability-momentum strategy is more effective when smaller firms are equally represented, underscoring the critical role of portfolio construction methodology in the success of factor-based investment strategies.

The findings provide a significant contribution to the expanding body of research on factor-based investing and are relevant to scholars and professionals involved in the field of investment management.

LIMITATIONS AND FUTURE DIRECTIONS

The scope of our study was restricted to examining the momentum of stocks that reached their 52WHs. Future research could explore alternative indicators of momentum, such as past-return-based momentum.

As a measure of the overall quality of a firm, we evaluate gross profitability, but other factors, such as safety, growth, and management quality, should also be considered (Asness et al., 2019). Exploring these dimensions may offer a promising avenue for future academic exploration.

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