The Profitability Puzzle

Incorporating profitability as a risk factor

June 2024

timeline
MONEY FOR LIFE

timeline.co

Abstract

This paper aims to take a deep dive into the profitability risk factor, building on Timeline's previous research on Risk Factors, which treated profitability and quality as interchangeable.

We start by clarifying the difference between Quality and Profitability as two separate risk factors, showing that while they share similarities, they each have their own flavour. Our empirical analysis highlights profitability's unique role as a significant risk factor, distinct from other Quality metrics.

Next, we examine why most traditional small-cap, value-focused portfolios struggle with low profitability and investigate whether there is a case to be made for incorporating high profitability alongside a value strategy.

Finally, we explore how blending profitability with value and size strategies in an equity portfolio might work out. Our findings suggest that mixing securities with value, size, and profitability traits could be the secret sauce for achieving better risk-adjusted returns.

Quality vs Profitability

High Quality and High Profitability are often conflated in industry discussions, with the two factors being considered as a proxy for one another. However, in reality, there are some significant differences between the two, as explained below.

Quality

The quality risk factor refers to the likelihood that the stocks of high-quality companies will outperform those of lower-quality companies over the long term. The concept of "quality" in a company is multifaceted and not as easily defined as more straightforward metrics like size or value. However, it generally encapsulates traits of a company that are associated with lower risk and more sustainable profits.

The systematic analysis of quality as a risk factor gained prominence in the 2000s, although elements of what would be considered quality investing can be traced back much earlier. For instance, Benjamin Graham, often known as the father of value investing, emphasised the importance of investing in companies with sound management and financials back in the 1930s and 1940s. However, the modern concept of quality as a distinct risk factor was highlighted by the significant contributions of academics such as Asness, Frazzini, and Lasse H. Pedersen. Their 2014 working paper, "Quality Minus Junk,"[1] provided rigorous empirical support for the idea that high-quality companies, as determined by various financial metrics, tend to deliver superior long-term performance.

Quality is typically measured using a variety of metrics, including:

- **Profitability:** This is one of the most straightforward measures of quality. Companies that can generate higher earnings relative to their expenses and costs are considered to be of higher quality. Different profitability metrics, such as return on assets (ROA), return on equity (ROE), and return on invested capital (ROIC), may be used.

- **Leverage:** Quality companies are often characterised by prudent financial management, which includes using less debt in their capital structure. Lower leverage ratios imply less financial risk and a greater ability to withstand economic downturns.

- **Earnings Variability:** Companies that demonstrate consistent earnings over time are viewed as more predictable and hence of higher quality. Earnings stability is associated with mature, well-established companies with a competitive advantage in their industries.

- **Net Payout:** This metric assesses a company's distribution policies regarding dividends and share buybacks. A disciplined approach to payouts, which may indicate a company's confidence in its ongoing cash flow and profits, contributes to the quality factor.

[1] (Quality Minus Junk, 2017)

High Profitability

The concept of the high profitability premium as an influential factor in asset pricing represents a relatively recent development in the field of financial economics. Robert Novy-Marx[2] formally identified and brought this premium to prominence in 2011. Novy-Marx's seminal work shed light on the importance of a firm's profitability, mainly gross profits, as a critical indicator of its potential to deliver higher returns to investors.

Before Novy-Marx's research, the prevalent emphasis within financial analysis was on net income. Net income, or the income statement's bottom line, is a company's earnings after all expenses have been deducted from revenues. However, this figure was found to be inconsistent as a predictor of higher returns due to its susceptibility to being influenced by various non-operational factors, including tax strategies, financial engineering, and one-off items that could obscure a company's true operating performance.

In his research, Novy-Marx proposed a shift in focus from net income to a higher line item on the income statement—specifically, gross profits or operating profit. Gross profits, calculated as sales minus the cost of goods sold, reflect the core efficiency of a company's business operations before administrative and overhead costs, interest, taxes, depreciation, and amortisation are considered. Similarly, operating profit considers a company's profit from its operational business activities, providing a clearer view of its operational efficiency and core earnings power.

The identification of the High Profitability premium was a significant development in asset pricing theory. Recognising its importance, Eugene Fama and Kenneth French, who had already revolutionised the field with their three-factor model that included market risk, size, and value factors, expanded their model to include profitability as one of the additional factors.[3] This new model, known as the five-factor model, was thus augmented to account for firms with high profitability scores, acknowledging that such firms tend to generate superior returns compared to those with lower profitability scores.

The inclusion of the High Profitability premium into the Fama-French Asset Pricing Framework marked a pivotal moment in the evolution of financial understanding. Since then, it has been a focus of academic research and practical investment strategy, as it offers a more nuanced and robust approach to evaluating a company's performance and potential return on investment.

[2] (Novy-Marx, 2011)
[3] (Fama & French, 2015)

Quality vs Profitability

The chart below, an extract from research conducted by Dimensional Fund Advisors[4], gives us some interesting insights into the characteristics of typical quality metrics. It illustrates that portfolios constructed with high-quality metrics consistently outperform those with lower ones, underscoring the significance of the quality factor. Such a uniform advantage across various quality dimensions indicates that diligent consideration of these metrics can materially benefit long-term investment performance.

EXHIBIT 2: Average Monthly Return (%) for Hypothetical Portfolios Formed on Quality Metrics, July 1, 1974–December 31, 2022

Returns in USD. Past performance, including hypothetical performance, is no guarantee of future results. Actual investment returns may be lower. Filters were applied to data retroactively and with the benefit of hindsight. Groups of stocks and their returns are hypothetical, are not representative of indices, actual investments, or actual strategies managed by Dimensional, and do not reflect costs and fees associated with an actual investment. See Additional Information in Appendix.

Operating profitability emerges as the predominant driver of portfolio returns within the spectrum of quality metrics. This noteworthy recognition underscores the significance of operational profitability as a robust gauge of a company's financial robustness and capacity to generate exceptional returns.

Upon analysing the data above, it becomes evident that alternative quality metrics don't contain incremental information about a stock's performance over and above profitability. Profitability is more effective than other quality metrics. Therefore, in the second part of this research, we will evaluate how the profitability factor compares to the size and value factors.

[4] (Dimensional Fund Advisors, 2023)

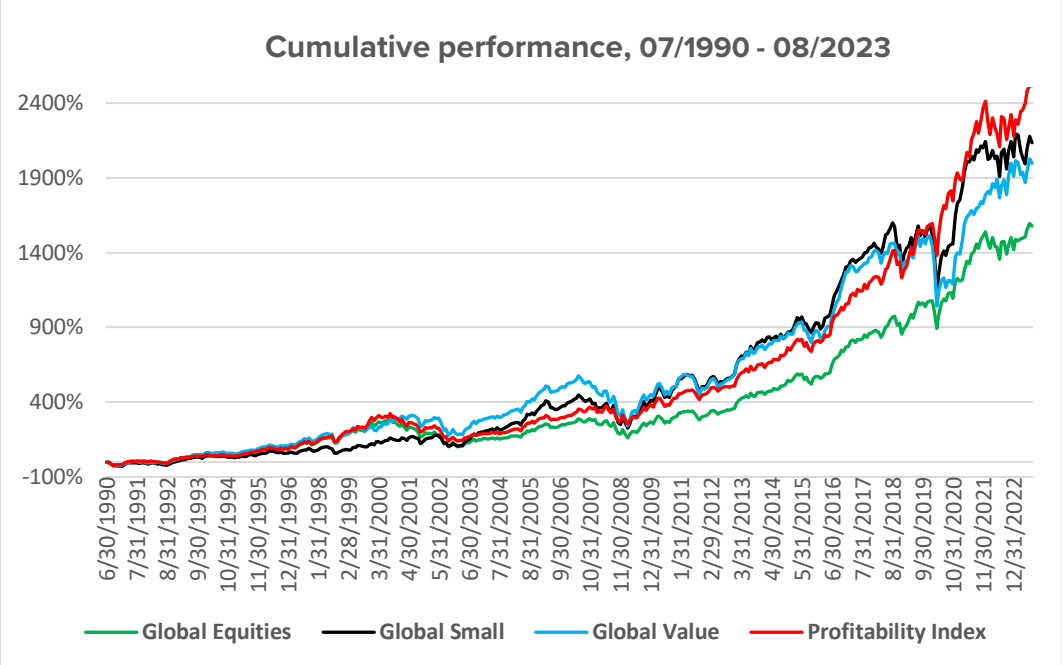
High Profitability vs Size/Value

As we advance into the next stage of our research, our objective is to scrutinise the historical performance of high-profitability companies compared to small-cap stocks, value stocks, and global equities. The aim is to ascertain if there exists a historical premium that could justify a strategic tilt in a global equity portfolio towards high profitability, small-cap, and value stocks. An integral part of this exploration involves examining the correlation between these categories to evaluate the potential benefits of diversification. Such benefits could be crucial in constructing a robust multi-asset portfolio that can withstand various market cycles while seeking to enhance returns.

Cumulative Returns

The chart below illustrates the cumulative performance of different investment styles from July 1990 to August 2023. It shows that all considered risk factors—global small-cap, global value, and high profitability—have outperformed global equities, which is indicated by the upward trend of all lines above the baseline global equities line.

This specific analysis began in 1990, but it's important to note that for U.S. equities, similar backtested results stretch back to the 1970s, indicating consistency in these trends across different time horizons.



Source: Global Equities measured by Morningstar Global Markets GR GBP, Global Small measured by Dimensional Global Small Index, Global Value measured by Dimensional Global Large Value Index, and profitability measured by the Fama/French Developed High Profitability Index. Data from July 1990 to August 2023.

While the cumulative chart provides an overarching view of growth over time, it doesn't tell the whole story. To truly understand the significance and reliability of each premium, it's necessary to dissect the returns into different periods and analyse them through rolling scenarios. This more granular approach can help reveal each factor's robustness, showing us how they perform overall and how they react to different market conditions over time.

Rolling Returns

The chart below depicts excess factor return over rolling 10-year periods and presents a compelling narrative about the relative performance of different investment factors against global equities. As illustrated below, profitability stands out for its defensive characteristics—it has not shown any negative excess returns over the periods analysed, indicating a consistent outperformance over global equities.

Notably, the chart illustrates that while the profitability index has offered a stable excess return over global equities, its performance compared to small-cap and value factors reveals additional layers of market behaviour. When small-cap and value stocks perform strongly, they exhibit a more pronounced 10-year excess return compared to profitability. However, this higher return potential comes with greater volatility and a more pronounced downside, as evidenced by steeper declines during unfavourable periods.

In contrast, the profitability index's 10-year rolling excess return over global equities showcases less volatility and more consistent performance, suggesting its utility as a potential hedging instrument within equity portfolios. Although it generally underperforms small-cap stocks over most rolling periods, its strength is most notable when it does not outperform the broader market.

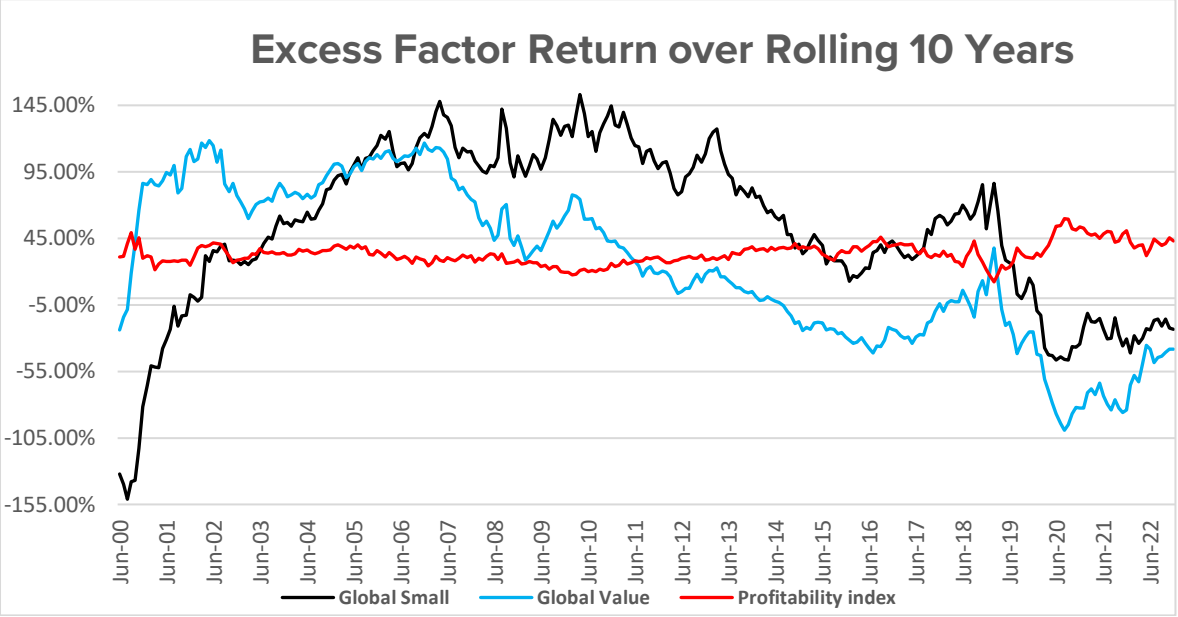
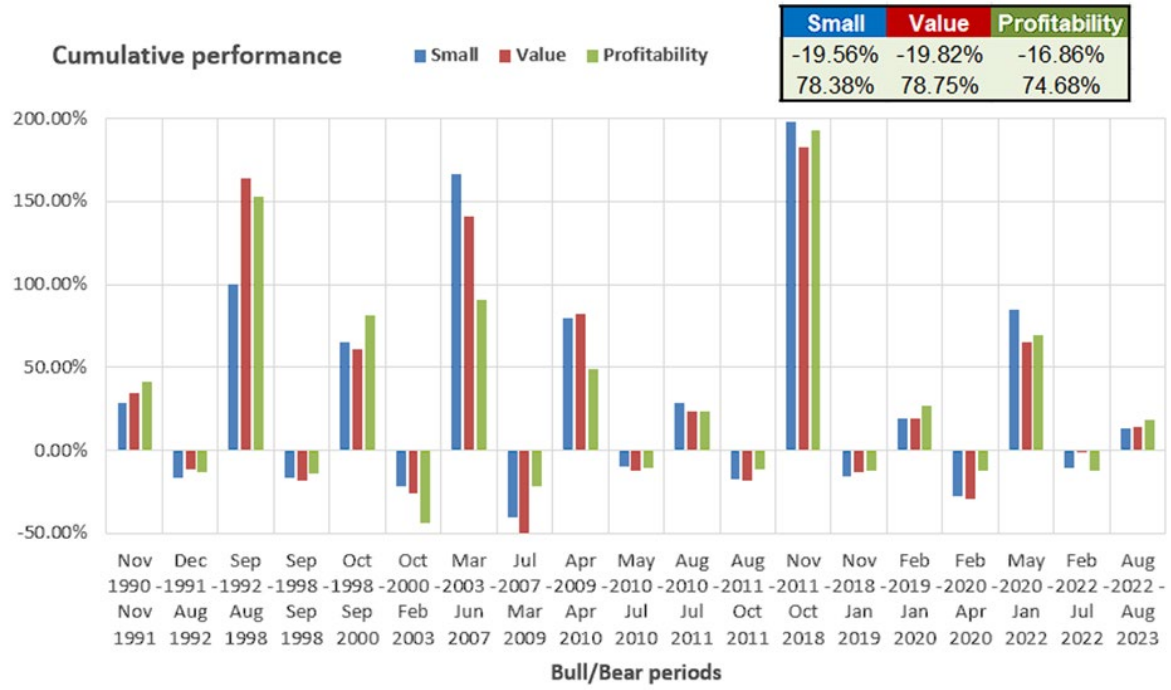


Chart depicts the rolling 10-year excess returns of global small-cap, global value, and high profitability equities compared to global equities. Data sampled monthly from July 1990 to August 2023. Source: Global Equities measured by Morningstar Global Markets GR GBP, Global Small measured by Dimensional Global Small Index, Global Value measured by Dimensional Global Large Value Index, and profitability measured by the Fama/French Developed High Profitability Index.

Bull & Bear Market Factor Returns

In the previous chart, we saw that profitability seems more defensive than size and value. To test this theory, we now move our attention to bull and bear markets. The bar chart presented below illustrates the cumulative performance of small, value, and profitability factors during distinct bull and bear periods in the global equity market from July 1990 to August 2023. It paints a picture of how each factor fared relative to market cycles, offering insights into their behaviour in different economic conditions.



Cumulative performance of small, value and profitability during the bulls and bears of global equity from 07/1990 to 08/2023.

Source: Global Equities measured by Morningstar Global Markets GR GBP, Global Small measured by Dimensional Global Small Index, Global Value measured by Dimensional Global Large Value Index, and profitability measured by the Fama/French Developed High Profitability Index.

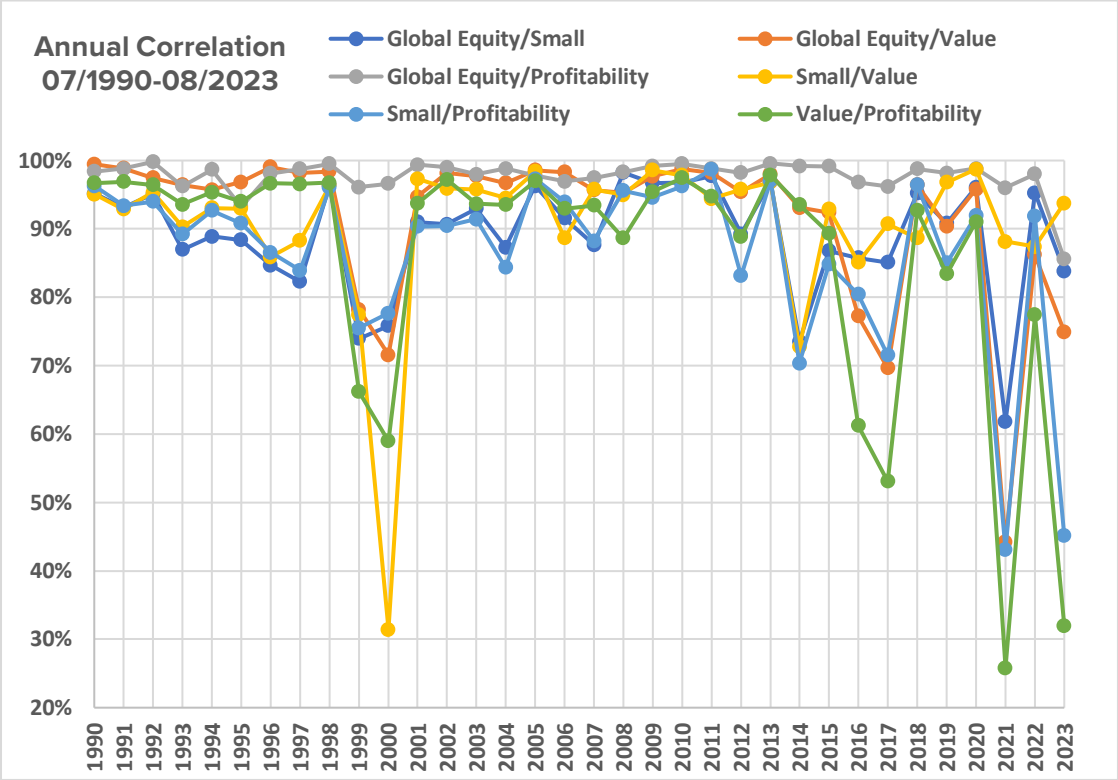
The performance during bear markets (marked with negative returns) suggests that the Profitability factor tends to be more resilient, with an average downturn performance slightly better than small-cap and value factors. Specifically, small and value factors average downturns of around -19.56% and -19.82%, respectively, while Profitability limits its average losses to -16.86%. This indicates that the Profitability factor may serve as a relatively defensive element in an investment strategy, potentially providing a cushion against the downside risks associated with equity market volatility.

Conversely, during bull markets, all three factors show substantial positive performance, with small and value experiencing larger upswings than profitability. This difference in performance variability between bull and bear markets reinforces the notion that profitability may not lead the charge during market rallies. However, its less volatile nature and reduced drawdowns during downturns could make it a strategic component of a diversified portfolio incorporating a profitability tilt—not as a wholesale replacement for small-cap and value tilts but as a complementary approach to mitigate risks associated with those factors.

Diversification Benefits of Integrating Profitability

Given the somewhat limited defensive properties of the high profitability premium, we now turn our attention to the diversification benefits of integrating small and value with profitability by looking at their correlations.

The analysis of correlations between the different risk factors—small, value, and profitability—and their relationship with the broader global equity market over time from July 1990 to August 2023 is vital for understanding the diversification benefits they might offer.



Annual correlations of small, value, profitability and global global equities from 07/1990 to 08/2023.

Source: Global Equities measured by Morningstar Global Markets GR GBP, Global Small measured by Dimensional Global Small Index, Global Value measured by Dimensional Global Large Value Index, and profitability measured by the Fama/French Developed High Profitability Index.

The grey line representing the correlation between global equities and the profitability index shows that these two asset classes are closely aligned, indicating that the profitability premium tends to move in tandem with the overall market. Therefore, while the high profitability premium may not offer substantial diversification benefits in relation to global equities, it does reinforce the market's movements, underscoring its parallel behaviour rather than providing a counterbalance.

Looking at the correlation between small and value (the yellow line), we notice a period in the early 2000s where the correlation dropped significantly, suggesting that during certain times, small and value stocks have the potential to offer diversification benefits. However, this effect does not persist over longer periods as their correlation increases, aligning them more closely.

The most compelling insight arises from the green line, which illustrates the correlation between value stocks and the profitability premium. The relatively low and, at times, very low correlations suggest that these factors often move independently of one another. Such a relationship is particularly important because it implies that when combined in a portfolio, value and profitability can potentially offer robust diversification benefits. This low correlation

suggests that integrating these factors may well smooth out portfolio volatility, as they can offset each other's movements to some extent, reinforcing the case for their joint inclusion in a diversified investment strategy.

Profitability's Underweight in Value and Small-Cap Portfolios

As we laid the foundation for our study, we found that the majority of industry strategies favouring a small-cap and value bias tend to also be underweight in the high-profitability factor. In the next part of our research, we aim to uncover why portfolios with a tilt towards value and small caps, including our Timeline Classic model, often show a lower exposure to high profitability. This investigation will take us through the dynamics connecting profitability with company size and market valuation.

High Profitability Average Price-Book

Typically, high-profitability stocks lean towards the growth spectrum of equities. For instance, the DFA US High Profitability Index[5], which has a relatively high price-to-book (P/B) ratio of 8.84, is more reflective of growth stocks. This contrasts sharply with the broader S&P Total US Market Index, which has a lower P/B ratio of 3.3. Such indices, emphasising profitability, naturally gravitate towards growth stocks due to their higher market valuations and lower book-to-market ratios.

To support the above, we returned to Robert Novi-Marx's work on profitability, "The Other Side of Value: The Gross Profitability Premium[6]," to try and establish the impact of small and value stocks on a portfolio's overall profitability exposure.

The impact of Value stocks on a portfolio's average profitability exposure

Table 2 from Robert Novi-Marx's study provides a clear explanation for the lower profitability typically found in value-tilted portfolios. The table ranks portfolios based on their gross profitability, measured by the gross profits-to-assets (GPA) ratio. This ratio is a way to see how much profit a company makes relative to its size.

The highlighted area in the table shows that the portfolios at the high end of profitability, with the best GPA ratios, also have lower book-to-market (BM) ratios, averaging around 0.33. This lower BM ratio is a hallmark of growth stocks—companies whose stock prices are high relative to their book value because the market expects them to grow quickly. On the flip side, the portfolios with the lowest profitability (or worst GPA ratios) have higher BM ratios, with an average of 1.10. These are the value stocks considered to be undervalued by the market and thus priced low relative to their book value.

[5] Measured by the Dimensional US High Profitability ETF as of 25/03/2024
[6] (Novy-Marx, 2011)

Table 2. Excess returns to portfolios sorted on profitability

This table shows monthly value-weighted average excess returns to portfolios sorted on gross profits-to-assets ((REVT - COGS) / AT), employing NYSE breakpoints, and results of time-series regressions of these portfolios' returns on the Fama-French factors. It also shows time-series average portfolio characteristics (portfolio gross profits-to-assets (GPA), book-to-market (BM), average firm size (ME, in $\$10^6$), and number of firms (n)). Panel B provides similar results for portfolios sorted on book-to-market. The sample excludes financial firms (those with one-digit SIC codes of six), and covers July 1963 to December 2010.

Panel A: portfolios sorted on gross profits-to-assets

		FF3 alphas and factor loadings				portfolio characteristics			
	r^e	α	MKT	SMB	HML	GPA	BM	ME	n
Low	0.31	-0.18	0.94	0.04	0.15	0.10	1.10	748	771
	[1.65]	[-2.54]	[57.7]	[1.57]	[5.87]				
2	0.41	-0.11	1.03	-0.07	0.20	0.20	0.98	1,100	598
	[2.08]	[-1.65]	[67.5]	[-3.13]	[8.51]				
3	0.52	0.02	1.02	-0.00	0.12	0.30	1.00	1,114	670
	[2.60]	[0.27]	[69.9]	[-0.21]	[5.42]				
4	0.41	0.05	1.01	0.04	-0.24	0.42	0.53	1,114	779
	[1.94]	[0.83]	[70.6]	[1.90]	[-11.2]				
High	0.62	0.34	0.92	-0.04	-0.29	0.68	0.33	1,096	938
	[3.12]	[5.01]	[58.3]	[-2.03]	[-12.3]				
H-L	0.31	0.52	-0.03	-0.08	-0.44				
	[2.49]	[4.49]	[-0.99]	[-2.15]	[-10.8]				

Source: (Novy-Marx, 2011)

So, in simple terms, the table suggests a trend: the more profitable a company is, the more likely it is to be classified as a growth stock with a higher market valuation and a lower ratio of book value to market price. Less profitable companies tend to be seen as value stocks, with lower market valuations and higher book-to-market ratios. This helps explain why a portfolio focusing on value stocks, which have lower profitability, might end up with an overall lower profitability exposure.

The impact of Small-cap stocks on a portfolio's average profitability exposure

Table 6 from Novi-Marx's research, as illustrated below, examines the effect of a company's size on a portfolio's average profitability exposure. Interestingly, the gross profits-to-assets ratio remains fairly consistent across different sizes of firms, with small to large firms showing GPA ratios between 0.25 to 0.28. This consistent profitability across sizes suggests that, unlike value, size does not have a considerable impact on a portfolio's profitability exposure. The book-to-market ratios, however, decrease as the size increases, meaning smaller firms are more value-oriented while larger firms lean towards growth.

Table 6. Size portfolio time-series average characteristics

This table reports the time-series averages of the characteristics of quintile portfolios sorted on market equity. Portfolio break points are based on NYSE stocks only. The sample excludes financial firms (those with one-digit SIC codes of six), and covers July 1963 to December 2010.

	(small)	(2)	(3)	(4)	(large)
number of firms	2,427	749	484	384	335
percent of firms	54.2	16.9	11.3	9.26	8.25
average capitalization ($\$10^6$)	39.6	206	509	1,272	9,494
total capitalization ($\$10^9$)	101	173	273	544	3,652
total capitalization (%)	2.43	3.73	6.13	12.6	75.1
portfolio book-to-market	2.64	1.36	1.06	0.88	0.61
portfolio gross profits-to-assets	0.27	0.28	0.26	0.25	0.27

Source: (Novy-Marx, 2011)

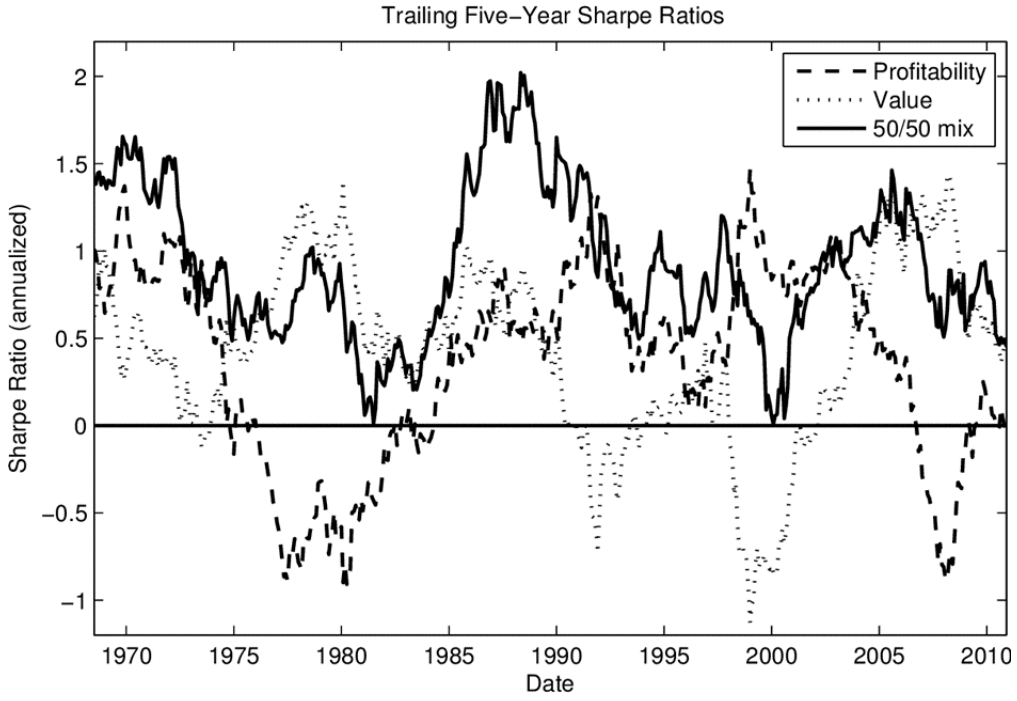
The evidence provided in these tables illustrates why a small and value tilted portfolio, such as our Timeline Classic model, may naturally have lower exposure to high profitability stocks: the intrinsic characteristics of value stocks correspond with lower profitability, and size doesn't compensate for this gap.

The benefits of combining Profitability and Value

The intriguing question at the heart of our research is whether there's a compelling rationale for integrating high profitability with a value investing approach, given their apparently opposing natures.

The chart below from Novi-Marx's work illustrates the trailing five-year Sharpe Ratios, a metric for risk-adjusted returns, spanning several decades up to around 2010. It contrasts investment strategies focused solely on value (dotted line), exclusively on profitability (dashed line), and an equal blend of both (solid line). The Sharpe Ratio informs us about the return per unit of risk; the higher the Sharpe Ratio, the more favourable the risk-adjusted return.

Observing the chart, it's apparent that each strategy's performance fluctuates, with none consistently outperforming the others across all periods. However, the 50/50 mix tends to exhibit a middle-ground trajectory, suggesting that combining value and profitability may buffer against the volatility inherent in each individual approach.



Source: (Novy-Marx, 2011)

In conclusion, Novy-Marx's paper points out that trading based on gross profits relative to assets bridges the gap between value and growth strategies. It aligns with the value investing philosophy, which seeks cost-effective, productive assets. While value strategies concentrate on acquiring undervalued assets, profitability strategies hinge on identifying and investing in highly productive assets. This duality underscores the potential of marrying the principles of value with the forward-looking nature of growth through a profitability lens.

Practical Implementation

In the conclusive stage of our research, we assessed the performance of portfolios integrating value, profitability, and small-cap risk factors with a global equity baseline. Four synthetic, hypothetical portfolios were constructed and evaluated over 1, 3, 5, 7, and 10-year rolling periods, with a spotlight on the 10-year returns.

1. 100% Global Equity

Portfolio 1 serves as our benchmark. It purely consists of global equities and yields an annualised return of 8.76% with a Sharpe ratio of 0.60 over 10 years.

Rolling annualised average, data up to 31/10/2023	1	3	5	7	10
Return - annualised	10.40%	10.34%	9.85%	9.56%	8.76%
Return - cumulative	10.40%	34.34%	59.94%	89.52%	131.52%
Volatility	12.87%	13.64%	13.89%	14.13%	14.39%
Sharpe Ratio	1.03	0.85	0.75	0.69	0.60

2. 50% Global Equity, 50% Value

Portfolio 2 introduces a mix of 50% value stocks with global equities, boosting the 10-year annualised return to 9.26% and nudging the Sharpe ratio up to 0.61. This uptick suggests an enhancement in return without a substantial increase in risk.

Rolling annualised average, data up to 31/10/2023	1	3	5	7	10
Return - annualised	11.01%	10.72%	10.15%	9.93%	9.26%
Return - cumulative	11.01%	35.72%	62.12%	93.95%	142.34%
Volatility	13.28%	14.26%	14.56%	14.83%	15.13%
Sharpe Ratio	1.09	0.86	0.75	0.69	0.61

3. 50% Global Equity, 25% Value, 25% Profitability

Portfolio 3 adds a layer of complexity by splitting half the equity portion between value and high profitability stocks, resulting in a further improved 10-year annualised return of 9.39% and a Sharpe ratio of 0.65. This demonstrates that adding profitability to the mix can offer better risk-adjusted returns.

Rolling annualised average, data up to 31/10/2023	1	3	5	7	10
Return - annualised	11.02%	10.87%	10.37%	10.13%	9.39%
Return - cumulative	11.02%	36.29%	63.81%	96.46%	145.39%
Volatility	12.85%	13.67%	13.93%	14.17%	14.43%
Sharpe Ratio	1.10	0.89	0.79	0.73	0.65

4. 50% Global Equity, 17% Value, 17% Profitability, 16% Small-cap

Portfolio 4 delves deeper into diversification, incorporating size alongside value and profitability for an even spread across these risk factors. The result is a notable 10-year annualised return of 9.53% and the highest Sharpe ratio of 0.66 among the portfolios, indicating that a multifaceted approach to factor integration can further optimise both return and risk profile.

Rolling annualised average, data up to 31/10/2023	1	3	5	7	10
Return - annualised	11.06%	10.87%	10.36%	10.15%	9.53%
Return - cumulative	11.06%	36.29%	63.71%	96.70%	148.47%
Volatility	12.89%	13.73%	13.97%	14.20%	14.47%
Sharpe Ratio	1.10	0.89	0.79	0.73	0.66

The analysis underlines the potential benefits of a diversified approach that strategically combines various risk factors with global equity exposure. Incrementally including value, profitability, and small-cap considerations has shown not only an increase in annualised returns but also an improvement in the Sharpe ratio, suggesting a more efficient performance relative to the risk taken.

These findings advocate for the nuanced integration of select risk factors to enhance portfolio outcomes over longer investment horizons, a strategy that is exemplified in our Timeline Classic model. Measuring the value and size exposure, with a respective 9% and 19% tilt in our Classic model, is relatively straightforward. However, quantifying the profitability exposure presents a greater challenge. In our approach, profitability is specifically targeted within the value segment of the portfolio through a targeted small-value strategy. This method is supported by the literature outlined in this research, indicating that profitability stocks achieve their greatest potential when integrated within a value strategy, as opposed to being pursued independently.

Conclusion

The objective of our research was to clarify the relationship between quality and profitability, which are often misunderstood aspects of investment dynamics. We've shown that profitability isn't just another facet of quality but a significant risk factor in its own right, competing with the likes of size and value factors.

Our findings revealed that when examined independently, profitability can significantly enhance portfolio performance and diversification, highlighting its unique impact on investment returns. Moreover, integrating profitability into a value and size strategy offers the potential for investors to achieve superior risk-adjusted returns, as demonstrated through simulations of the profitability premium within a global equity portfolio alongside value and size premiums.

These insights emphasise the critical role of profitability in portfolio construction. By incorporating a nuanced understanding of profitability alongside size and value considerations, investors can aim for better outcomes.

Timeline, 70 Gracechurch Street, 4th Floor, London, EC3V 0HR. 0203 998 8300.

timeline
MONEY FOR LIFE

timeline.co