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FINDING VALUE IN ANALYST ESTIMATES FOR VALUE INVESTORS

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Summary

Value investing is a storied strategy that involves buying (long) stocks that appear cheap relative to their intrinsic value, often proxied by fundamental data from financial statements. For quant funds and hedge funds, the concept of value investing naturally extends to selling (short) stocks that appear expensive relative to their intrinsic value. Fama and French's research throughout the 1990s systematized these ideas with careful empirical analysis of previous decades. It influenced all institutional investors to adopt value investing to some degree, whether it is just benchmarking and risk evaluation of their performance or an automated quantitative investment framework they follow to the letter. In the last decade following the 2008-9 Great Recession, value investors watched in agony as the growth stocks they tend to bet against took off to stratospheric valuations and led many to question: "Is (Systematic) Value Investing Dead?"¹

We bring sell-side analyst expectations to this debate and show that forward-looking estimates data can provide insights into why the value factor has been underperforming recently. We then use these insights to highlight how Visible Alpha consensus data can improve systematic value strategies. The novel metric we compute is the analyst expectations of the stock's return on average equity ("RoE") each month over the next rolling year. A firm expected to generate higher returns on equity than it costs to raise the equity for that investment should earn excess returns and trade at a premium. Although intuitive in theory, the expectations data on accounting measures of returns over a longer horizon were hard to get by before Visible Alpha started systematically capturing analysts' forecasts of entire income statements, balance sheets, and cash flow statements.

A strategy that buys the highest expected RoE stocks and shorts the lowest RoE stocks every month in the U.S. mid/large cap investible universe generates up to 1.03% monthly alpha.² In other words, analysts' expectations of RoE correlate with future stock returns. We then investigate analyst expectations of value and growth stock RoE separately.

This leads to a new culprit for value stocks underperforming: value stocks exhibit significantly lower expected RoE than growth stocks.

Therefore, any strategy that invests in low expected RoE stocks will likely underperform even though it doesn't directly consider these expectations.

1 Israel, Ronen, et al. "Is (Systematic) Value Investing Dead?". The Journal of Portfolio Management, Quantitative Special Issue 2021, 47 (2), 38- 62.

2 Depending on the specifics of portfolio weighting and rebalancing rules applied.

We bring this new insight on value's underperformance into a broader context of other criticisms of value investing in academic and industry debates. The first issue is that the historical book-to-market is no longer a good measure of value. We replace the historical book-to-market with analyst expectation measures such as earnings-to-market and revenue-to-market and find that strategies using forward-looking data to identify value vs. growth stocks tend to perform better. However, these improvements are too incremental and do not change the big picture. The second issue is that the book value ignores the intangible assets (e.g., patents, copyrights, intellectual property, brands, etc.) that today's growth firms increasingly build upon. Visible Alpha captures analyst expectations of intangible vs. physical assets (e.g., Goodwill vs. Property, Plant, and Equipment), so we compute tangible book-to-market measures as alternatives. These measures incrementally improve the portfolio performance but the strategy's overall performance remains unimpressive regardless of the measure that replaces the historical book-to-market.

Finally, we address our new criticism of value investing: it unintentionally picks "value trap" stocks that only appear cheap and bets against growth stocks for which analysts have the highest expectations after a deep analysis of the fundamentals. We modify the traditional portfolios by adding a second level of sorting by RoE expectations after book-to-market. The new portfolio drops value stocks with below-median RoE expectations and does not bet against growth stocks with above-median RoE expectations. The improvement we obtain is mixed. Avoiding value traps leads to better performance for long-only value investors but not for growth investors, so the long/short strategy performs similarly to the baseline. We suspect that our expected RoE measure is too short-term for growth stocks. Some younger and fast-growing firms in the portfolio might exhibit low or negative RoE in the next 12 months as they continue to burn through capital, and this may not be concerning for growth investors who might care more about the next 3- to 5-year RoE instead. Visible Alpha captures these mid- to long-term expectations that we hope to analyze in future research.

Data and Methodology

Through partnerships with the world's premier investment research organizations, Visible Alpha creates datasets from sell-side assets, including working analyst model spreadsheets, research reports, and corporate access events. Unlike typical sell-side consensus datasets focusing on specific accounts that analysts discuss in research reports, Visible Alpha data covers entire financial statements, including income statements, balance sheets, and cash flow statements. Visible Alpha's data also covers business drivers and segment breakdowns at the deepest granularity available in analysts' models. The dataset covers over 7,000 publicly traded firms³ globally from 2014, forecasted years out to 2025 and beyond, and over 100,000 standardized line items.

We track monthly consensus expectations, or forecasts, for six standardized metrics: *Common Shareholders Equity* (ParameterId: 5495) for the book value of the firm; *Net Income Applicable to Common Stockholders, Primary* (ParameterId: 5655) for earnings of the firm; *Total Revenue* (ParameterId: 190) for sales of the firm; *Total Assets* (ParameterId: 470); *Intangible assets, net* (ParameterId: 526); and *Property, Plant and Equipment, Net* (ParameterId: 1217) from the balance sheet of the firm. We use Visible Alpha Actuals, *VAActuals* for short, for historical data on book value. Visible Alpha's partnership with FactSet provides adjusted closing stock prices and market capitalization data.

We use VettaFi's S-Network U.S. Equity Large/Mid-Cap 1000 Index, or SN1000 for short, as the investible universe.⁴ The SN1000 index rebalances quarterly; we use SN1000 quarterly constituents from December 2015 through March 2023, effective until June 30, 2023. The constituents are available at the ISIN level each quarter, and we map these securities to Visible Alpha Company Identifier or VACOMPANYID.⁵ SN1000 covered 1802 unique securities during the sample period, which corresponds to Visible Alpha estimates and actuals data for 1595 companies.⁶

³ Including inactive firms.

⁴ We thank VettaFi for collaborating with Visible Alpha on this project by sharing their index data. SN1000 is similar to Russell 1000 in terms of coverage. For more information about SN1000 index, please visit <https://vettafi.com/issuer-services/indexing/market-cap/us-benchmark/SN1000/>

⁵ VACOMPANYID is a higher-level entity identifier than ISIN, a security-level identifier. Each company can have many securities at issue, and the index might have invested in different securities of the same company at different quarters.

⁶ 1658 out of 1802 ISINs the index invested in can be mapped to a VACOMPANYID. The remaining securities belong to companies Visible Alpha has not collected any analyst model. Please refer to the previous footnote to explain ISIN vs VACOMPANYID differences. 1598 out of 1658 VACOMPANYIDs have forecast and historical data available; the remaining companies have analyst models, but most of them are not processed to initiate Visible Alpha consensus coverage, three of them are not quarterly-reporting companies with USD estimates.

Figure 1 plots the monthly coverage of the SN1000 index mapped to Visible Alpha by the number of companies and their cumulative weight in the index. Figure 1 plots two lines to distinguish forecast vs. historical data coverage. The annotated numbers in black show the number of securities (by ISIN) in the SN1000 index invested, the orange annotation indicates the number of companies (by VACOMPANYID) with consensus revenue estimates, and the purple annotation shows the number of companies with historical book value data. Visible Alpha data became commercial in 2017, which we use as the beginning of the sample in this paper.⁷ This sample period guarantees at least 75% coverage of SN1000 by weight at the beginning, up to 98% by April 30, 2023.

Figure 1: Visible Alpha Coverage of SN1000 Index

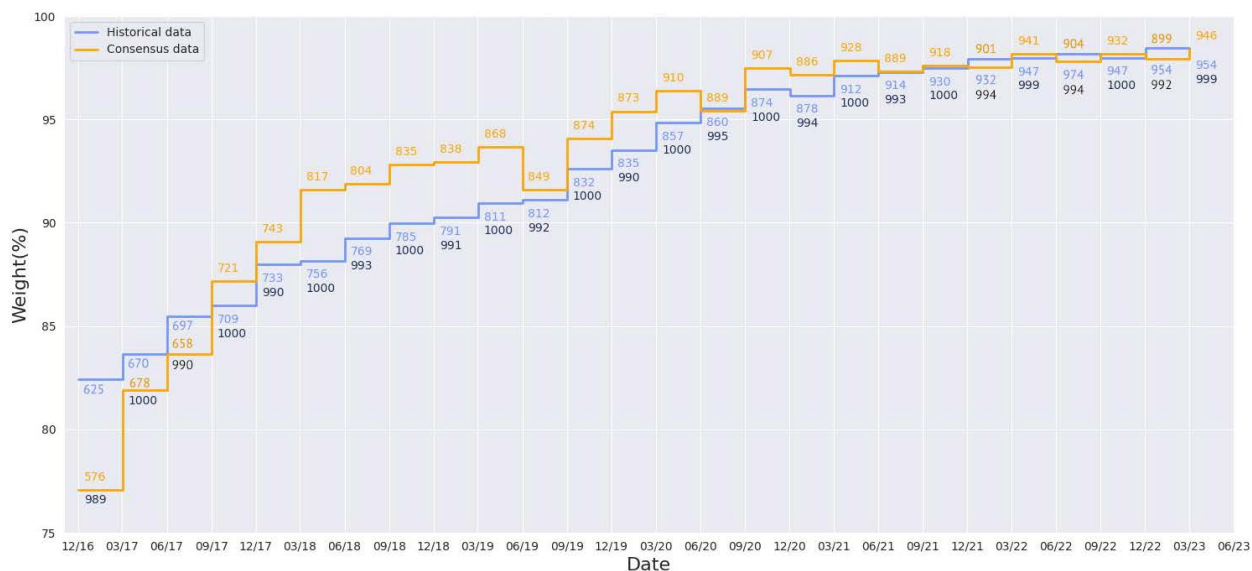


Table 1 summarizes coverage by sector and size.⁸ The bulk of the coverage is mid-caps and above, as the SN1000 is designed to do, but there are also small-cap stocks covered. Financials, technology, and industrials sectors comprise roughly half of the SN1000 index coverage.

⁷ Small differences between the two lines in later years is due to different proxies used to count the number of companies; revenue estimates are more likely to be present in analyst models than historical book values.

⁸ We use the market capitalization values in USD as of the last month the SN1000 index held the security. The latest date we use is 2023-06-26. Out of the 1595 companies we cover, we have the market cap data for the last occurrence in the SN1000 index for 1415 companies only. The following rule groups the sizes: less than 300 million is Micro, less than 2 billion is Small, less than 10 billion is Medium, less than 200 billion is Large, and more than 200 billion is Mega.

Table 1: Coverage Statistics by Sector and Size

Sector/Size	Micro	Small	Mid	Large	Mega	Total
Financials	3	15	140	104	4	266
Technology	0	15	123	109	12	259
Industrials	0	12	104	82	0	198
Health Care	1	22	103	65	6	197
Consumer Services	0	22	89	66	5	182
Consumer Goods	0	6	53	41	4	104
Energy	0	11	40	28	2	81
Materials	0	4	30	29	0	63
Utilities	0	0	21	29	0	50
Telecommunications	0	3	9	3	0	15
Total	4	110	712	556	33	1415

Analysts' Expectations of Returns

Return on equity (“RoE”) and return on assets (“RoA”) are two commonly used financial metrics that help investors evaluate the profitability and efficiency of a company. RoE measures a company’s net income relative to its shareholder equity. RoA, on the other hand, is a ratio that measures a company’s net income relative to its total assets. They both indicate how efficiently a company is using its capital to generate profits. The difference between RoE and RoA lies in the ratio’s denominator: RoA uses total assets, including equity and debt, while RoE uses only equity. Hence, a company with a higher degree of debt financing for the same amount of assets generating the same level of earnings will have a higher RoE compared to a company with little or no debt, due to the financial leverage they employ.

In practice, we can calculate RoE and RoA in various ways depending on whether we use historical or forward-looking expectations and what time window we choose. In this paper, we compute forward-looking analyst expectations of RoE and RoA over the next four quarters at the end of every month. We measure quarterly net income with *Net Income Applicable to Common Stockholders, Primary* (ParameterId: 5655).⁹ The *primary* designation applies to whether the analysts primarily forecast GAAP or non-GAAP (i.e., operating) net income for the

⁹ This line item captures net income excluding payments to non-common stockholders such as special dividends to preferred shareholders.

company as a basis for headline earnings in public announcements.¹⁰ For the denominator, we use *Common Shareholders Equity* (ParameterId: 5495) or Total Assets (ParameterId: 470) for RoE and RoA, respectively. At each end of the month in the sample period, we identify the companies' next four unannounced fiscal quarters, and the numerator is the sum of the consensus net income expectations for those four quarters. The denominator is the average of the consensus total assets or common shareholders equity expectations for the same upcoming four quarters.¹¹

Damodaran (2008)¹² provides a conceptual framework relating the accounting measurement of return on investment to excess returns the stock earns on the market. A firm expected to generate higher returns on investment than it costs to raise capital for that investment should earn excess returns and trade at a premium. However, this idea garnered less interest in practice partly because expected returns on investment over a longer horizon than a single quarter were not observable at scale before Visible Alpha. Visible Alpha does not capture the analyst assumptions on the cost of equity or capital either. Still, even without these assumptions, this section shows that we can generate significant long/short spreads by sorting stocks into portfolios based on analyst expectations of RoA and RoE.

Table 2 provides summary statistics of RoA and RoE distributions in the sample from 2016 to April 2023. The average RoA was 6.4% with an 8.1% standard deviation, whereas the average RoE was 26.8% with a 63.7% standard deviation. Not surprisingly, RoA expectations are deflated by including the debt in the denominator compared to RoE, and the firm's financial leverage amplifies the variation in RoA almost eightfold. Figure 2 plots the RoE distribution as a histogram and a fitted density function.¹³

10 Visible Alpha reviews earnings announcement transcripts, 8-Ks, and similar filings to determine the primary earnings for most analysts covering the company. In cases when analysts forecast both GAAP and a non-GAAP operating number, Visible Alpha computes two separate consensus forecasts for Net Income Applicable to Common Stockholders, GAAP, and Operating (ParameterIds 5640 and 5641 respectively) and tags one flavor as *Primary* (ParameterId: 5655) instead of mixing analyst forecasts in one consensus estimate that may or may not contain adjustments. Generally, for U.S. companies, the non-GAAP operating version is more popular with analysts, but there are numerous exceptions for companies where analysts focus exclusively on the GAAP version.

11 If there are not four quarters of expectations, to sum or to average, in the computation of the returns, we leave the value null at first. Then we interpolate the null values if there are no more than two consecutive quarters of missing data using linear interpolation from past months' estimates. So when at least a full quarter of estimates are missing, we don't interpolate any month in those missing consecutive months. We interpolate the numerator and denominator separately and then compute the ratio, instead of interpolating the ratio directly.

12 Damodaran, Aswath, "Return on Capital (ROC), Return on Invested Capital (ROIC) and Return on Equity (ROE): Measurement and Implications", SSRN Working Paper, July 2007, available at: <https://ssrn.com/abstract=1105499>. Damodaran discusses issues using historical accounting returns to forecast future excess returns on the market and does not consider using expectations of accounting returns instead. His main application is to compare the accounting measure of returns to the correct measure of the cost of capital.

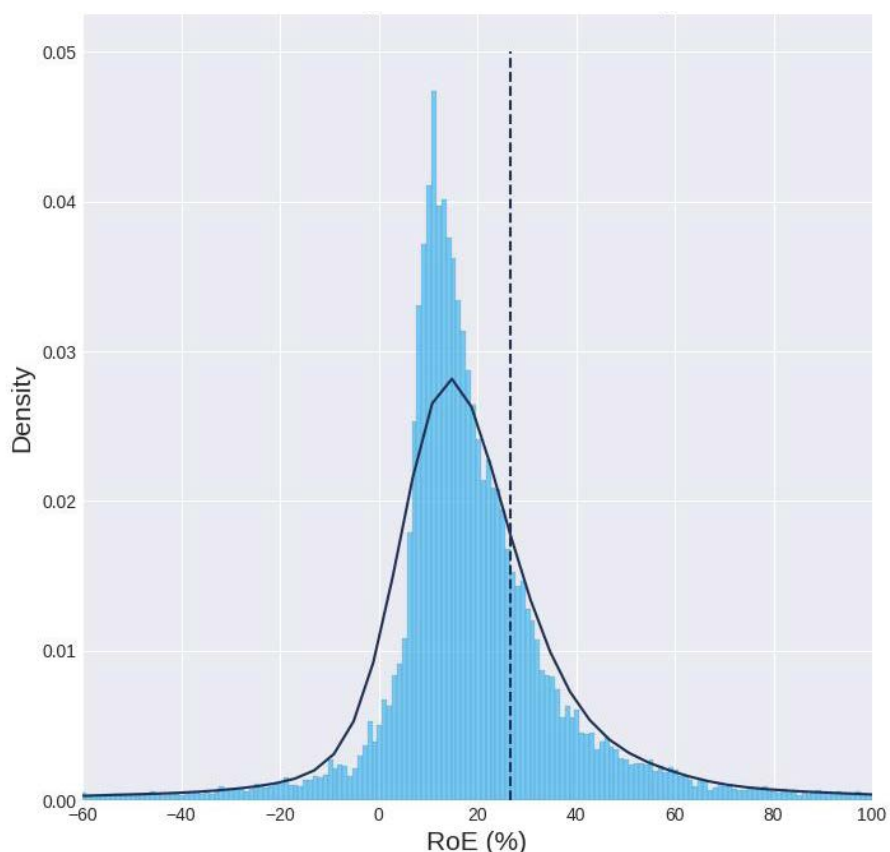
13 RoA version of the same chart is relegated to the codebase accompanying this paper.

Both RoA and RoE, but particularly the latter, have right-skewed distributions with the averages marked with a dashed line meaningfully higher than the medians, combined with a long right tail, violating any normality assumption on expected returns.

Table 2: Summary Statistics of RoA and RoE

	Mean	Min	30th	Median	70th	Max	Std
RoA	6.4%	-43%	3.3%	6.1%	9.2%	28.8%	8.1%
RoE	26.8%	-91%	11.2%	16.5%	24.5%	658%	63.7%

Figure 2: Expected Return on Equity Probability in Full Sample



We follow a similar Fama-French method to sort stocks by expected RoA or RoE and label them *High* vs. *Low* using the 70th and 30th percentile breakpoints, respectively. Figure 3 plots the monthly breakpoints for RoE.¹⁴ The breakpoints hover around the full sample 30th and 70th percentile figures of 11.2% and 24.5% reported in Table 2, except for a brief period around the beginning of Covid-19 lockdowns when the expectations plummeted. We simulate, or “backtest,” the performance of a strategy that invests in high RoE stocks in the SN1000 universe

¹⁴ RoA version of the same chart is relegated to the codebase accompanying this paper.

at a set rebalance frequency (monthly, quarterly, or annually) with a set portfolio weighting rule (market value-weighted or equal-weighted). Figure 4 plots the RoE strategy with monthly rebalancing and value weights starting in 2017.¹⁵

The stocks that sell-side analysts expected higher return on equity outperformed those that analysts had lower expectations in the market. Put differently, the analyst expectations of RoE (and RoA) are correlated with future returns.

Figure 3: RoE Monthly Breakpoints



We compute long/short returns from the long and short portfolio value spread, mimicking a zero investment initial portfolio. Table 3A reports the performance metrics of the strategy Figure 4 illustrates.¹⁶ The value-weighted long/short strategy (rebalanced monthly) delivers an

¹⁵ The codebase accompanying this paper contains backtest results for all variations of weight types and rebalancing rules. The RoA version of same chart is very similar and relegated to the codebase accompanying this paper

¹⁶ Across all tables that report performance metrics, * denotes significant at a 95% confidence level and *** denotes a 99% confidence level. The numbers in parenthesis denote the t-statistic.

average 1.03% monthly return, significant at a 99% confidence level, and has a Sharpe ratio of 1.04. We test a sector-neutral version and an equal-weighted version; both deliver significant monthly average returns at a 95% confidence level, albeit returns are slightly muted and have a lower Sharpe ratio.¹⁷ A long-only version that invests only in the highest expected RoE stocks doesn't provide comparable returns.

**Figure 4: High vs. Low RoE
Rebalanced Monthly, Value Weighted**



Table 3A: Performance Metrics for RoE Strategy Rebalanced Monthly, 2017-April 2023

	Value-Weighted			Equal-Weighted		
	Long/Short	Long Only	Sector Neutral	Long/Short	Long Only	Sector Neutral
Average Monthly Return	1.03*** (2.74)	0.34 (0.33)	0.74* (2.15)	0.72* (2.19)	0.41 (0.36)	0.32 (1.34)
Cumulative Return	116.83	112.83	66.26	70.32	63.5	23.21
Sharpe Ratio	1.04	0.66	0.73	0.88	0.47	0.49
Annualized Volatility	0.13	0.21	0.12	0.1	0.21	0.07
Max Drawdown	18.91	35	21.22	20.37	39.43	20.08

¹⁷ Quarterly and annual backtest results are relegated to the codebase accompanying this paper. We find significant average monthly returns with quarterly rebalancing with value- and equal-weighting without sector neutrality. Annual strategy delivers significant returns only for the value-weighted version. Both quarterly and annually rebalanced value-weighted versions have comparable Sharpe ratios to the version presented in Table 3A.

Table 3B replicates the same exercise using expected RoA instead of RoE.¹⁸ The results are materially the same; both value- and equal-weighted portfolios deliver monthly returns significant at a 95% confidence level, albeit smaller in magnitude than their RoE counterparts.

Table 3B: Performance Metrics for RoA Strategy Rebalanced Monthly, 2017-April 2023

	Value-Weighted			Equal-Weighted		
	Long/Short	Long Only	Sector Neutral	Long/Short	Long Only	Sector Neutral
Average Monthly Return	0.91* (2.13)	0.32 (0.33)	0.71 (1.68)	0.84* (2.43)	0.36 (0.34)	0.51 (1.73)
Cumulative Return	95.32	109.2	58.7	86.13	78.58	41.76
Sharpe Ratio	0.83	0.65	0.62	0.97	0.54	0.69
Annualized Volatility	0.14	0.21	0.13	0.11	0.21	0.09
Max Drawdown	25	34.13	28.92	19.05	36.53	19.67

Value Premium

The value premium refers to the tendency of stocks with low prices relative to their fundamental value (i.e., “value” stocks) to outperform stocks with high prices relative to their fundamental value (i.e., “growth” stocks) over the long term. This concept was popularized in the academic literature by Eugene Fama and Kenneth French in the 1990s. Fama and French developed a framework for the cross-section of equity returns based on three factors: market beta (the tendency of a stock to move with the overall market), size (the market capitalization of a stock), and value (the price-to-book ratio of a stock). They found that stocks with high book-to-market ratios (i.e., value stocks) tend to outperform stocks with low book-to-market ratios (i.e., growth stocks) over the long term, even after controlling for market beta and size.

This section reconstructs the strategy in its original form with historical book-to-market data and alternative measures that most quants use in practice. We take each firm’s last known quarter’s book value, Common Shareholders’ Equity (ParameterId: 5495), divided by the firm’s market capitalization (excluding Treasury stock), as book-to-market. We follow a similar Fama-French method to sort stocks by this measure and label them *Value* vs. *Growth* using the 70th

¹⁸ Similar to Table 3A, quarterly and annually backtested versions are relegated to the codebase accompanying this paper. As is the case for RoE, value- and equal-weighted strategies deliver significant monthly average returns at 95% confidence level but the returns become insignificant if the portfolios are sector neutral.

and 30th percentile breakpoints, respectively. Figure 5 plots the value-weighted and monthly rebalanced Value and Growth portfolio values. A long/short strategy that buys high book-to-market stocks and sells low book-to-market stocks would lose money consistently since 2017. The growth portfolio skyrocketed until 2022 except for brief intermissions like Covid-19 lockdowns and only came down when the low-interest rate, easy-money policy began to change. The value portfolio during the same time was all but stagnant.

Figure 5: Value vs. Growth Historical Book-to-Market Rebalanced Monthly, Value Weighted

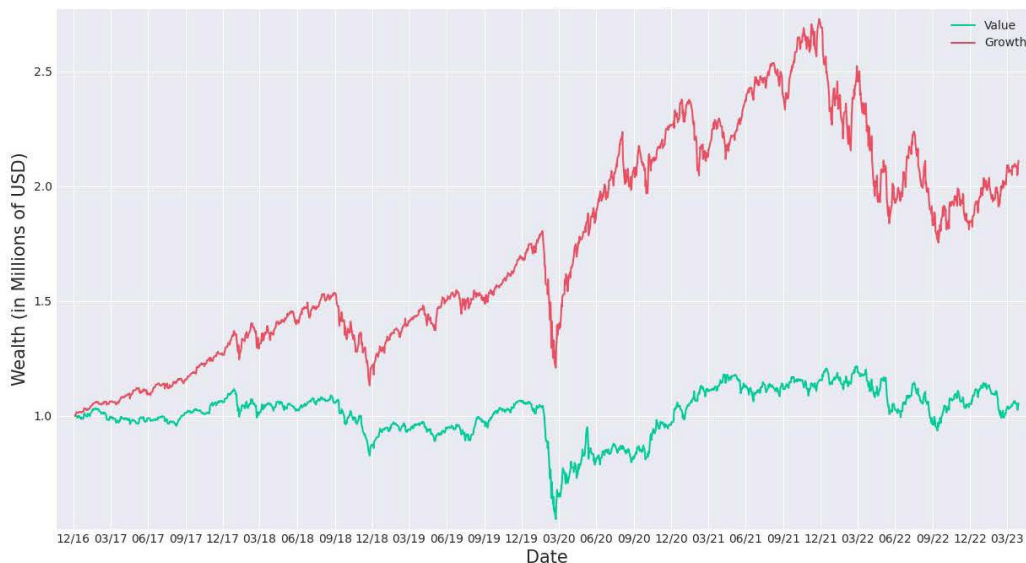


Figure 6 plots the ratio of value and growth portfolios starting in 2017 using various alternative measures common in the quant factor industry. First, we replace historical and backward-looking book value with analyst expectations of book value that Visible Alpha captures in forward-looking balance sheet estimates. Second, we compute expected earnings-to-market (or earnings yield) using the next four quarters' analyst expectations of *Net Income Applicable to Common Stockholders, Primary* (ParameterId: 5655). Third, we compute expected revenue-to-market using the next four quarters' analyst expectations of *Total Revenue* (ParameterId: 190) as the most widely forecasted metric in analyst models. All portfolios are constructed *sector-neutral*, as an additional dose of realism, so the stocks are ranked top to bottom compared to those in the exact Visible Alpha sector definition instead of the whole investible universe.

All combinations of the long/short strategies betting against growth stocks at the expense of value stocks would lose money at varying degrees during the sample period. The book-to-market-based portfolios fare the worst, and forward-looking earnings-to-market-based portfolios perform almost identically, except starting in 2022 with the monetary policy change. The revenue-to-market-based spread performs the best among this group, but this amounts to a -3.5% annualized return with a Sharpe ratio of 0.1 during the sample period, hardly an attractive performance for an institutional investor.

Figure 6: Value / Growth Ratio
Rebalanced Monthly, Value Weighted, Sector-Neutral Portfolios



A common criticism of the underperformance of value measures is that they don't capture the importance of intangible assets in valuing a company. Intangible assets (patents, copyrights, intellectual property, brands, etc.) are expensed on the income statement when incurred and not added to the book value because there is a higher uncertainty around measuring the potential of those intangible assets. Several recent studies have tried to adjust the book value to account for the intangibles.¹⁹ We evaluate two simple approaches in Figure 7. The first approach computes a forward-looking tangible book-to-market where we subtract the analyst forecast of *Intangible Assets, Net* (ParameterId: 526) from book value. The second approach tackles intangibles more directly; instead of trying to adjust the book value for intangibles, we rank stocks using forward-looking *Property, Plant and Equipment, Net* (ParameterId: 1217), or PPE for short, to market.

¹⁹ For example, Dugar, Amitabh and Pozharny, Jacob, "Equity Investing in the Age of Intangibles." *Financial Analysts Journal*, 2020, available at: <https://ssrn.com/abstract=3770088>. Vincenz, Stefan, "Intangible Value: An International Perspective", SSRN Working Paper, 2023, available at: <https://ssrn.com/abstract=4344729>.

**Figure 7: Value / Growth Ratio Controlling Intangible Assets
Rebalanced Monthly, Value Weighted, Sector-Neutral Portfolios**



Figure 7 illustrates that either approach to accounting for intangibles outperforms book-to-market and revenue-to-market portfolios from the previous figure. However, the performance of these strategies in absolute terms still needs to be attractive to institutional investors during the sample period. Table 4 produces a performance scorecard corresponding to each measure. Visible Alpha-based measures outperformed the historical book-to-market baseline incrementally from left to right. Nevertheless, no measure generates a statistically significant and positive monthly return, and all portfolios had negative annualized returns except for PPE-to-market, which turns a profit starting in 2022.

**Table 4: Performance Metrics Rebalanced Monthly,
Sector Neutral, 2017-April 2023**

	Historical B/M		Expected B/M		Forecast E/M		Forecast R/M		Forecast Tangible B/M		Forecast PPE/M	
	VW	EW	VW	EW	VW	EW	VW	EW	VW	EW	VW	EW
Average Monthly Return	1.9 (0.52)	-0.06 (-0.05)	1.3 (0.46)	0.17 (0.12)	1.66 (0.59)	-0.13 (-0.11)	0.28 (0.23)	0.22 (0.28)	0.05 (0.07)	-0.01 (-0.01)	0.34 (0.56)	0.31 (0.37)
Cumulative Return	-66.47	-34.5	-60.63	-34.66	-47.87	-37.35	-20.2	-1.54	-10.4	-10.1	17.84	4.7
Sharpe Ratio	0.23	0.01	0.18	0.08	0.31	-0.05	0.1	0.11	0.03	0	0.23	0.16
Annualized Volatility	0.91	0.38	0.78	0.46	0.93	0.34	0.39	0.24	0.22	0.18	0.19	0.28
Max Drawdown	93.95	73.33	89.68	79.68	95.7	73.19	70.87	52.46	45.97	37.77	36.79	61.28

Can Investors Detect and Avoid Value Traps?

A value trap is a stock that looks cheap but is cheap for a good reason if you analyze them carefully. So not all value stocks will necessarily perform well over the long term, let alone outperform growth stocks, even if they appear to be undervalued based on various measures we tested in the previous section. This section proposes a systematic approach to improve value investing by filtering out value traps using analyst expectations of returns such as RoE and RoA.

When a strategy buys value stocks by traditional measures, it buys stocks that analysts expect low return on equity or assets on average. Figures 8a and 8b illustrate this finding. Figure 8a plots the average RoE expectations annually for value vs. growth stocks. The difference in RoE expectations is large and statistically significant: in the full sample, the median expected RoE for value stocks is a measly 10%, while the same figure for growth stocks is 30%.²⁰ Figure 8b plots the time-series average RoE at each percentile for Value vs Growth stocks.²¹ The analyst expectations of RoE on growth stocks overtake value stocks starting as low as the 20th percentile of RoE distribution.²² We established that analysts' expectations of RoE and RoA correlate with future stock returns. Therefore, any strategy that invests in low expected RoE and RoA stocks will likely underperform even though they don't directly consider these expectations.

20 More precisely, the median expected RoE is 10.5% and 30.6%, and the mean is 10.2% to 44.6% for value and growth stocks, respectively. The difference in the means is significant at a 99% confidence level. The same result holds for the expected RoA. The median expected RoA is 2.8% and 10.7%, and the mean is 3.3% to 9.4% for value and growth stocks, respectively. The year 2023 includes data up to April 30, 2023 only.

21 Each month we identify Value and Growth stocks using 30th and 70th percentile breakpoints by historical book-to-market, then compute every fifth percentile of RoE distribution for Value and Growth stocks for that month. We then average the values across time for each percentile to arrive at Figure 8. The figure could be interpreted as a cumulative distribution function, or cdf, or RoE by Value vs. Growth. The single-crossing property of cdf hints at second-order stochastic dominance order relationship between RoE distributions Value and Growth stocks have.

22 The maximum value is capped at 150% RoE for presentation. The max RoE is in the 600-700% range. For the RoA version of this analysis, please refer to the codebase accompanying this paper. The results are materially the same for expected RoA but at different magnitudes.

Figure 8A: Average Expected RoE of Value vs. Growth Stocks

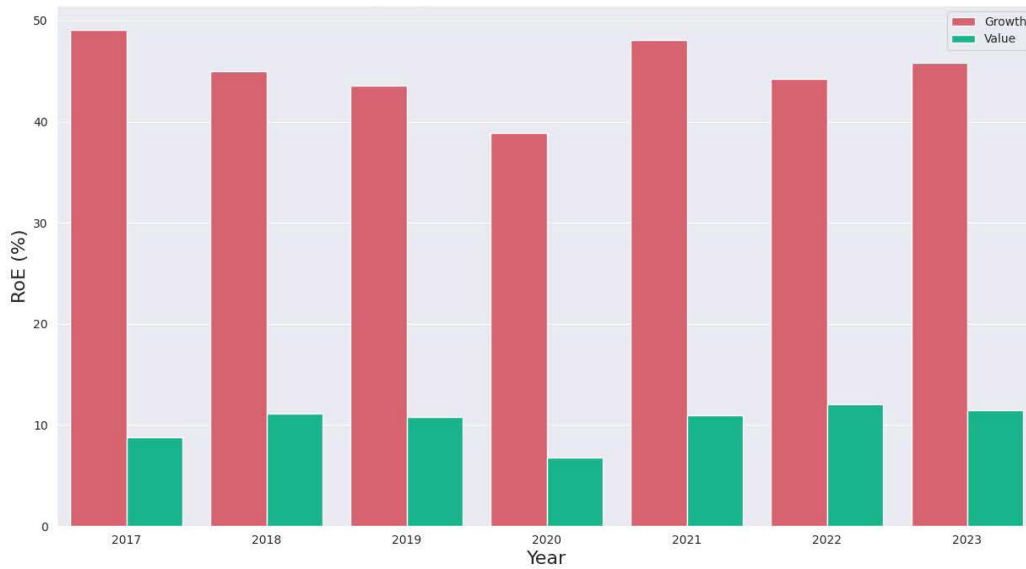


Figure 8B: Estimated RoE Distribution of Value vs. Growth Stocks

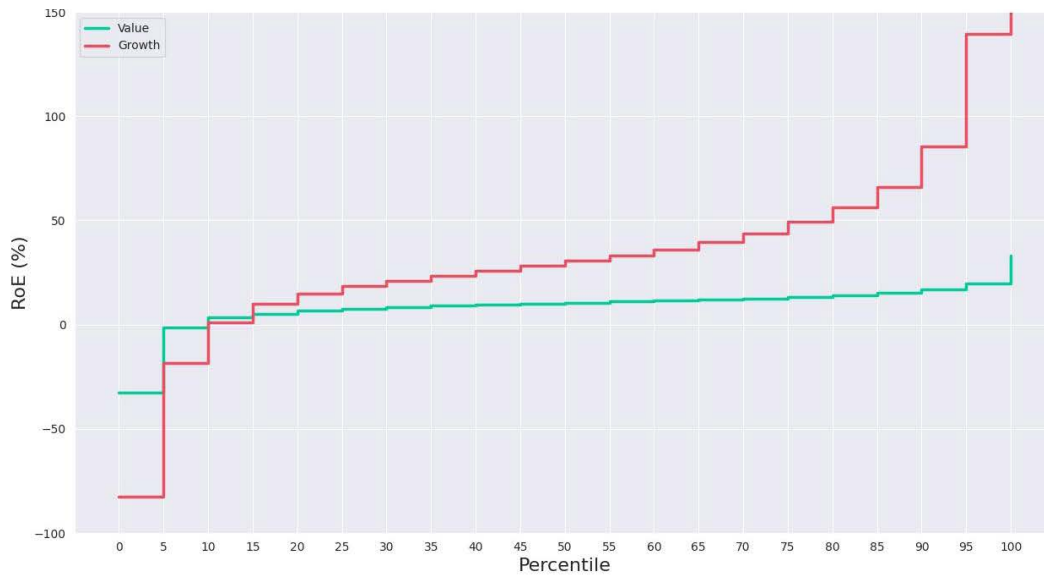


Figure 9 compares the baseline value portfolio using historical book-to-market to two new portfolios we created by sorting value stocks by RoE and investing only in above- or below-median RoE value stocks. Since value stocks generally have low expected RoE, we want to evaluate whether we can improve the performance of this strategy by excluding what analysts believe to be value traps using an expected RoE proxy. The green line in Figure 9 plots this modified strategy investing only in half of the value stocks in the baseline portfolio plotted in

navy blue, and the red line plots the portfolio of the other half of the value stocks.²³ The expected RoE filter on value stocks appears to be a good idea; this strategy outperforms the baseline value portfolio in terms of annualized and cumulative returns, but the monthly average returns are not statistically different.²⁴

**Figure 9: Value Portfolios with High vs. Low RoE
Rebalanced Monthly, Value Weighted, Sector-Neutral**



We apply the same RoE screening to the growth portfolios, i.e., identify growth stocks using low historical book-to-market first and then sort them again by high vs. low expected RoE. Since growth stocks have higher expected RoE on average and expected RoE correlates to future stock returns, betting against all growth stocks is potentially a losing idea. There is also a simple application for long-only investors who may benefit from excluding growth stocks that analysts expect low RoE. Figure 10 plots three lines: navy blue for the baseline growth portfolio, green for growth stocks with above-median RoEs, and red for growth stocks with below-median RoEs. Unlike in the value case, a growth portfolio with a RoE filter does not produce intuitive results, at least at a glance. Lowest RoE growth stocks temporarily outperformed high RoE stocks during the most bullish eras of the sample period, even though all portfolios were

²³ The portfolios are not exactly split equally in practice because the expected RoE data is missing more often than historical book-to-market. The new portfolios are strict subsets of the baseline portfolio but may omit some stocks simply because there is no RoE data to filter them on. Therefore, the weights are not simply proportionally adjusted relative to the baseline portfolio either. This explains why the navy baseline in Figure 9 is not strictly in between the green and the red lines.

²⁴ Two-sample t-test statistic comparing the average monthly return of the Value portfolio with High RoE to the baseline Value portfolio is 0.03, and it is not significant at the 95% confidence level. The test statistic for Value + High RoE to Value + Low RoE is 0.22 and also not significant at the 95% confidence level.

practically identical by the end.²⁵ Our expected RoE measure looks only at the subsequent unreported four-quarter earnings, a short-term for growth stocks. Some younger and fast-growing firms in the portfolio might exhibit low or negative RoE in the next 12 months as they burn through capital, and this may not be concerning for growth investors who might care more about the next 3- to 5-year RoE instead. Value stocks, on the other hand, tend to be older and more mature firms, so low RoE in the next year is a more poignant indicator of long-term performance than growth stocks.

Figure 10: Growth Portfolios with High vs. Low RoE Rebalanced Monthly, Value Weighted, Sector-Neutral



Table 5 concludes this section by summarizing the performance of various long/short and long-only strategies discussed here. The value portfolio with an expected RoE filter leads to slightly higher average monthly returns that are not statistically significant at a 95% confidence level, but these incremental improvements do add up to almost 40% higher cumulative return by the end of the sample period, not to mention better Sharpe ratios.

²⁵ Two-sample t-test statistic comparing the average monthly return of the Value portfolio with High RoE to the baseline Value portfolio is 0.13, and it is not significant at the 95% confidence level. The test statistic for Value + High RoE to Value + Low RoE is -0.13 and also not significant at the 95% confidence level.

The first columns indicate that long/short strategies with and without an expected RoE filter perform similarly. Both strategies would almost certainly bankrupt by the end of the sample period. Compared to Table 4, the historical book-to-market long/short portfolio performs dramatically worse. This is because Table 4 reports a portfolio constructed to be sector-neutral; i.e., investing in the top and bottom 30% of each sector to diversify, whereas Table 5 is not; i.e., investing in top and bottom 30% of SN1000 can result in sector-skewed portfolios.²⁶

Table 5: Performance Metrics Rebalanced Monthly, Sector Neutral, 2017-April 2023

	Value - Growth Long/Short		(Value + High RoE) - (Growth + Low RoE)		Value Long-Only		Value+ High RoE Long Only	
	VW	EW	VW	EW	VW	EW	VW	EW
Average Monthly Return	-13 (-1.04)	-23.2 (-0.9)	-16.2 (0.27)	30.8 (0.39)	0.5 (0.39)	0.67 (0.43)	0.5 (0.67)	0.7 (0.66)
Cumulative Return	-99.16	-98.82	-97.29	-97.16	5.53	15.1	42	19.68
Sharpe Ratio	-0.56	-0.55	-0.57	-0.26	0.15	0.21	0.36	0.24
Annualized Volatility	19.34	24.53	9.93	6.10	0.23	0.26	0.23	0.25
Max Drawdown	99.29	98.83	99.03	97.19	50.66	53.48	42.53	52.15



The full codebase for this analysis is available via Visible Alpha Insights. Clients can access the [codebase here](#). For all others, please [contact our sales team](#).

²⁶ The decision to drop sector-neutrality in this section is driven by the addition of expected RoE filter. We showed in Section 3 that investing in high vs. low RoE translates into sector-skewed portfolios by definition during the sample period. Therefore, the first column of Table 5 shows a different benchmark portfolio than the first column of Table 4 where expected RoE is not used in any comparison portfolios.

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