AlphaQuant
Engineered for Alpha

Small Cap Investing
Outlook and Strategies

February 2024

Executive Summary

- Over the 1984-2023 period, the Russell 2000 Index of small cap stocks has under-performed the large cap Russell 1000 Index by about 200 bps/year. Small caps also displayed greater downside volatility over this period.
- We identified five major large-small cap cycles since 1984. Over the last decade large caps have out-performed massively driven by the dominance of technology and mega cap stocks.
- This long, unbalanced relative performance has resulted in small caps trading at attractive market multiples and it has encouraged some investors to call for a rotation out of large and into small caps.
- We found that macro indicators such as the OECD Composite Leading Indicators (CLI) and the Yield Curve seem to point to a favorable performance of small caps versus large cap, based on past cycles.
- However, from a fundamental, bottom-up standpoint, as a whole - small caps appear less attractive. Our analysis shows a structural decline in profitability and projected long-term growth.
- From a small cap investment strategy standpoint, there is potential to add significant value over the benchmark by just screening out money-losing companies and focusing on profitable companies, based on this research.

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Introduction

We first review the relative performance of small caps versus large caps. We then compare selected fundamentals of small vs. large cap stocks over time to quantify and contrast their characteristic patterns in terms of profitability, leverage and liquidity – factors we have linked to relative outperformance. Finally, we provide some insight on small cap investment strategies with strong potential to out-perform their benchmarks, based on this research.

Performance and Risk Analysis

Figure 1 reports the risk and return stats for two widely used small cap universes – the S&P 600 and the Russell 2000. Please note that the Russell Indexes' inception was a decade earlier than the S&P's. Importantly, the S&P 600 has performed significantly better vs. the S&P 500 than the Russell 2000 vs. the Russell 1000. Moreover, over the common period (1994-2023) the S&P 600 has out-performed the Russell 2000 by 170bps per year (not reported in the table).

This return differential is attributable to the fact that the S&P 600 universe includes a higher percentage of profitable companies than the Russell 2000. As we'll illustrate later, this becomes very relevant when designing an active small cap strategy. In terms of risk metrics – as expected - small cap stocks display higher volatility and greater sensitivity in down markets than large cap stocks.

This is associated with investors' flight to quality during market drawdowns and to small companies' greater sensitivity to the business cycle, historically.

Figure 1. Portfolio Statistics: Large vs. Small Caps

	S&P Indexes (1994-2023)		Russell Indexes (1984-2023)	
	S&P 500	S&P 600	R 1000	R 2000
CAGR	10.1%	10.2%	11.5%	9.6%
Vol	15.2%	19.2%	15.4%	19.7%
R/Vol	0.66	0.53	0.75	0.49
Avg Up Mkts	3.4%	3.6%	3.5%	3.7%
Avg Down Mkts	-3.9%	-4.2%	-3.7%	-4.3%

Source: Factset, 12/1984 – 12/2023, monthly data

Small vs. Large Caps Cycles

We have defined five major cycles, over the period under study, shown in the table below.

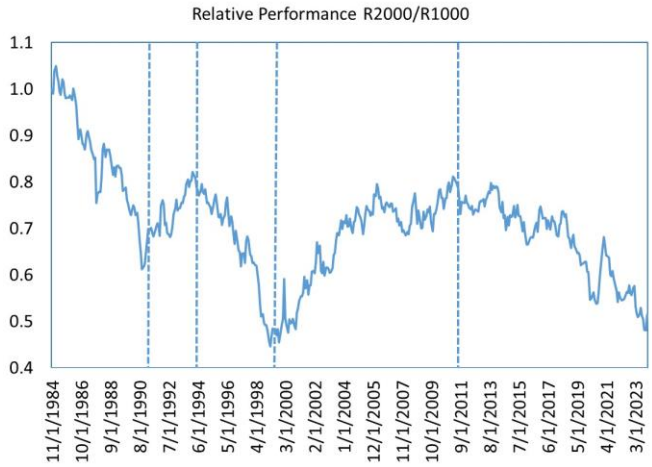
Figure 2. Large-Small Cap Cycle Periods

12/31/1984 - 10/31/1990	Largecaps out-perform
10/31/1991 - 3/31/1994	Smallcaps out-perform
3/31/1995 - 3/31/1999	Largecaps out-perform
3/31/1999 - 5/31/2011	Smallcaps out-perform
5/31/2012 - 12/31/2023	Largecaps out-perform

Source: Factset

Figure 3 shows the relative performance of the Russell 2000 vs. the Russell 1000. As the line rises (declines) small caps out-(under) perform. April 2011 represents the peak of the most recent small cap regime of out-performance which unfolded in the aftermath of the late 1990s tech bubble burst. Since then, for over a decade now, small cap stocks have significantly under-performed.

Figure 3. Relative Performance of R2000 vs R1000



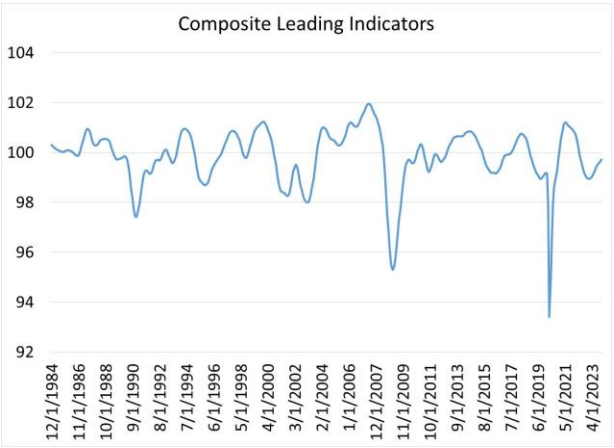
Source: Factset, 12/1984 – 12/2023

This period of under-performance has coincided with a massive out-performance of a concentrated group of large and mega cap technology stocks which have dominated the US stock market over the most recent decade. Invoking reversion to mean based on historic cycles, several investors have called for a rotation away from large caps and into small caps. In the next section we analyze small caps' returns in different economic regimes and offer a simple investment decision framework for tactical allocation.

Small Cap Performance in Different Economic Regimes

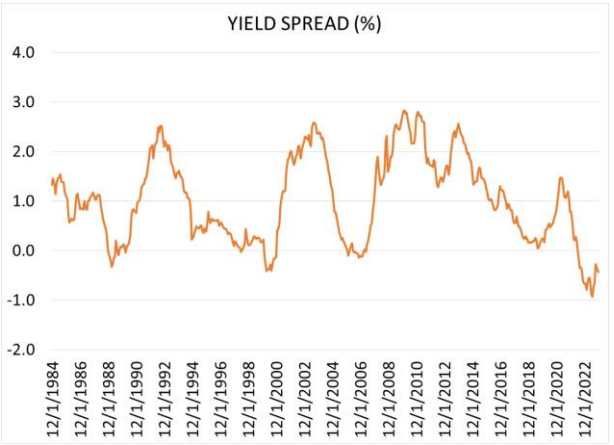
The relative performance of small cap vs. large cap stocks has historically varied in relation to the overall economic environment, monetary policy stance and the overall business cycle. Based on this relationship, we suggest a simple but sound analytical framework to evaluate small vs large caps allocations. We identified two indicators that when combined may provide insight to the relative performance of small vs. large caps: the OECD Composite Leading Indicators (CLI) for the U.S. and the Yield Spread (10-Year US Treasury Constant Maturity Minus 2-Year Treasury Constant Maturity). The CLI were developed to provide early signals of turning points in the economic cycle by modelling the difference between real GDP level and its trend (GDP gap). A CLI reading above (below) 100 is an indication that anticipates levels of GDP above (below) long-term trend. The yield spread has been extensively employed to forecast the probability of economic recessions and recoveries. A widening spread typically leads to a positive yield curve, indicating stable economic conditions in the future. Conversely, a flattening spread and eventually an "inverted" spread may signal economic weakness and potential impending recession.

Figure 4. OECD Composite Leading Indicators U.S.



Source: www.fred.stlouisfed.org

Figure 5. Yield Spread (10 yr. minus 2yr. Treasury)



Source: www.fred.stlouisfed.org

Figure 6. CLI Trend And Small Cap Returns

# of months	REGIME	R 2000	R 1000	Diff
68	LEI Above 100 and decreasing	0.98%	1.22%	-0.24%
163	LEI Above 100 and increasing	1.09%	1.22%	-0.13%
158	LEI Below 100 and decreasing	0.54%	0.69%	-0.15%
80	LEI Below 100 and increasing	1.36%	1.06%	0.30%

Source: Alpha Quant Models Calculations 1984-2023

Figure 7. Yield Spread Changes And Small Cap Returns

# of months	REGIME	R 2000	R 1000	Diff
217	POSITIVE and steepening	1.12%	0.93%	0.20%
200	POSITIVE and flattening	0.64%	1.03%	-0.39%
47	NEGATIVE and flattening	1.02%	1.13%	-0.11%
5	NEGATIVE and steepening	3.88%	3.08%	0.81%

Source: Alpha Quant Models Calculations 1984-2023

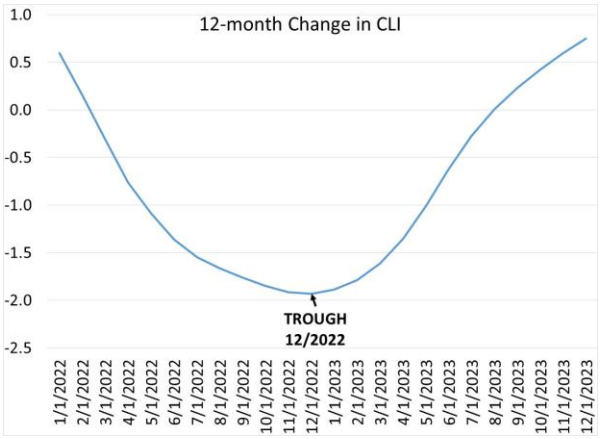
In this study, we focus on the year-over year rate of change and the direction of these two indicators rather than the absolute levels. We partition the data into four "regimes" based on the CLI's reading (above or below 100) and its trend (increasing/decreasing) and calculate the average monthly returns for the R1000 and R2000 indexes. Figure 6 shows that small cap stocks historically tend to out-perform when the CLI is below 100 but increasing: as economic conditions improve, investors may anticipate a stronger rebound of small caps. Conversely, small caps tend to under-perform when economic conditions are strong but the trend is negative (cycle peak).

We run a similar analysis for the yield spread (positive/negative) and its trend (steepening/flattening). Figure 7 shows that small caps have out-performed when the yield spread is widening: a steepening curve may signal improving economic conditions and potentially lower short-term interest rates which is more favorable to small caps, historically. In contrast, small caps tend to under-perform with a positive but flattening yield curve which generally anticipates an economic slowdown. In the next sections we employ this framework, in addition to other indicators, to assess the relative attractiveness of small caps vs. large caps.

What Does the Change In The CLI and Yield Spread Currently Signal For Small Caps?

The graph in Figure 8 zooms in the most recent months to better identify the trend in the Composite Leading Indicators (CLI). It appears that the CLI has reached a bottom in December 2022 and since then has been improving quite steadily. As our long-term study illustrates, this is a regime (CLI below 100 and increasing) that favors small caps over large caps - if this trend continues.

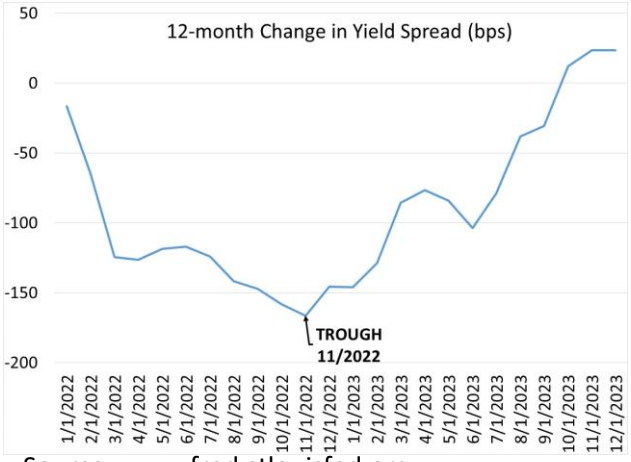
Figure 8. Change in Composite Leading Indicators



Source: www.fred.stlouisfed.org

Turning to the Yield Spread, we see a similar trend with a steepening of the yield curve starting in November 2022 from very negative levels. And while the actual yield spread as of January 2024 was still negative, the recent steepening has narrowed the spread to just -26 basis points from a trough (July 2023) of -93 basis points.

Figure 9. 12-Month Change in Yield Spread (bps)



Source: www.fred.stlouisfed.org

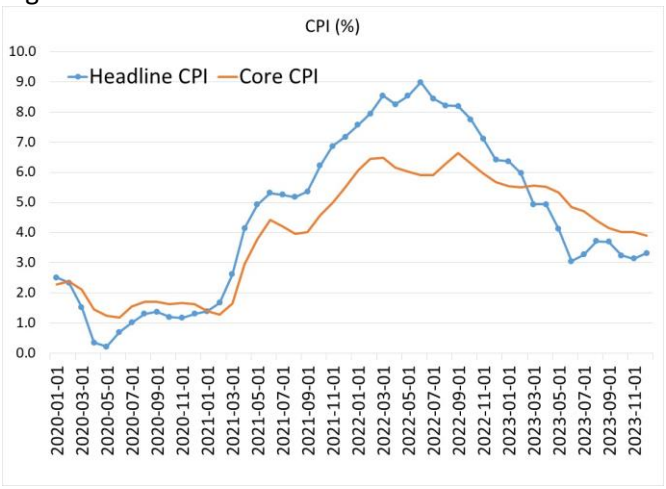
In summary, both the Composite Leading Indicators (CLI) and the Yield Curve Spread seem to indicate improving economic trends and a more positive outlook for small cap stocks.

The CLI is still below 100 but shows tentative signs of recovery from slowdown and its year-over-year positive change anticipates GDP above long-term growth.

Embedded in the yield curve are market expectations about the direction of inflation and monetary policy. The most recent curve steepening seems to imply the expectation of a peak in inflation and an accommodative monetary policy stance. While these two indicators need confirmation over the next few months, they are moving in the right direction pointing to a favorable environment for small caps.

Figure 10 shows evidence that price pressures in the US are cooling. While headline inflation is still high, core prices excluding food and energy - which are typically more important in shaping Fed policy - are declining steadily.

Figure 10. Consumer Price Indexes



Source: www.fred.stlouisfed.org

In the next section we examine over time the fundamentals of small caps and compare them against the large caps to gain a full picture of profitability levels and trends.

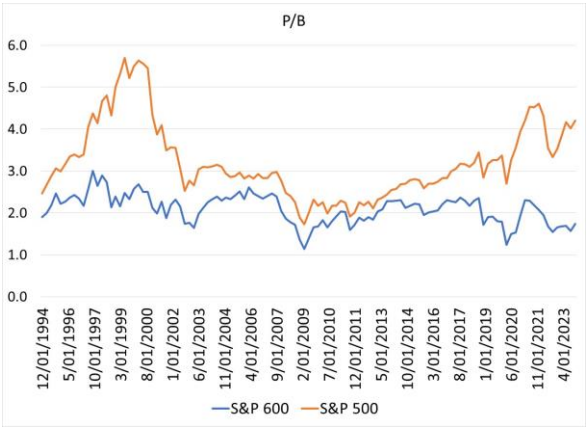
To reach a comprehensive evaluation, we also look at valuation metrics to assess the relative attractiveness of small caps vs. large caps.

Fundamental and Valuation Metrics Analysis

Recently, some investors have recommended to favor small caps vs. large caps based on a simple comparison of commonly employed valuation ratios such price-to-book or price-to-earnings.

In fact, such an analysis shows an apparently unwarranted valuation gap between the two groups which could call for an allocation shift to small caps. To attain a more comprehensive picture, we look at valuation ratios in conjunction with their fundamental drivers such as profitability and growth.

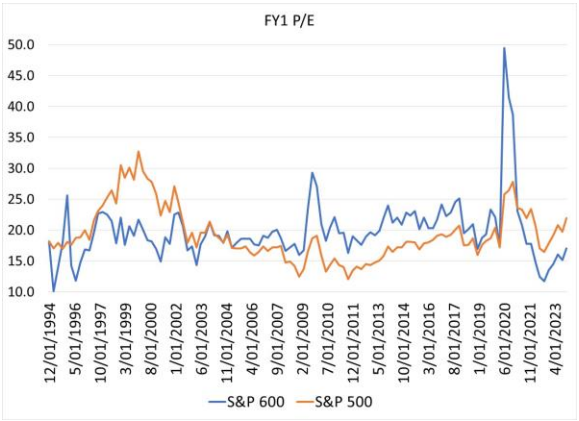
Figure 11. Price-to-Book Ratio



Source: Factset

Figure 11 and Figure 12 show the price-to-book and price-to-earnings ratio for the S&P 600 vs. the S&P 500. The price-to-book of the S&P 500 has been steadily increasing over the last decade, while the S&P 600's has remained relatively flat over the period.

Figure 12. Price-to-Earnings Ratio



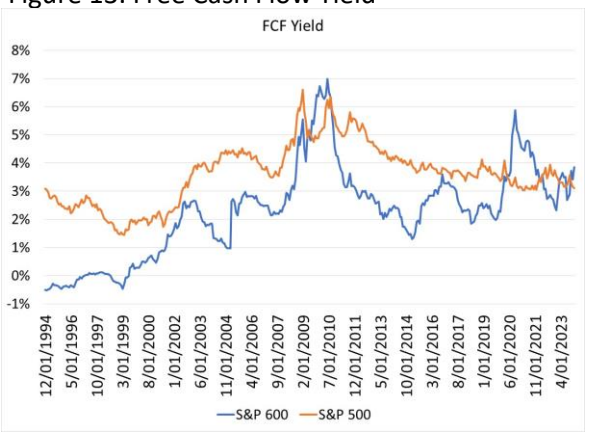
Source: Factset

More recently, this divergence in P/B has increased significantly. On a P/E basis, small caps look currently cheaper as well (Figure 12).

Figure 13 offers an alternative view of relative valuation. It displays the free cash flow yield (FCFY) for small caps and large caps.

The FCFY is calculated by taking the most recent annual free cash flow (FCF) divided by the enterprise value. FCF is a more robust measure of value than book value or earnings, as it reflects the increasing impact of intangible assets

Figure 13. Free Cash Flow Yield



Source: Factset

and accounts for working capital needs and capital investments.

Using enterprise value rather than market capitalization in the denominator accounts for net debt as well.

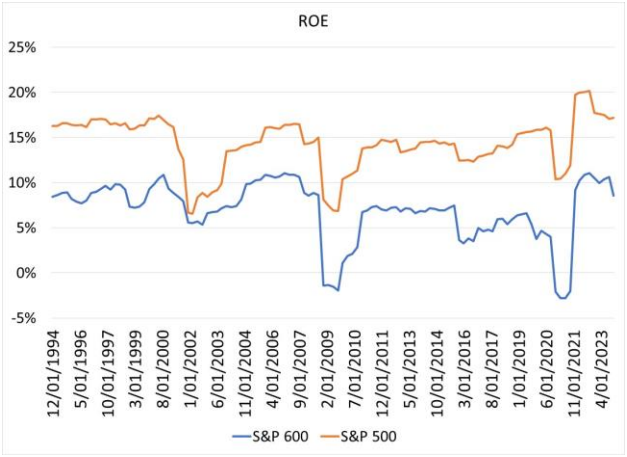
On a free cash flow basis, small caps are trading in line with the large caps.

In our opinion, a simple comparison of valuation ratios should not be the base for investment decisions. It is important to evaluate the fundamental drivers of valuation to reach a fuller picture and reach an informed decision.

In the next section we analyze the underlying fundamental forces shaping the valuation and relative performance of small versus large cap stocks.

Is the current valuation gap a true opportunity or it is justified by fundamentals? Figure 14 displays the return on equity (ROE) for the two universes of stocks. Return on equity is the main fundamental driver of price-to-book (PB): generally, the higher the ROE, the higher the PB. ROE historically follows a cyclical pattern linked to the business cycle – as corporate earnings expand profitability increases and vice versa. Small caps have displayed a more marked cyclical behavior with deeper ROE drawdowns. In addition, since the end of the great financial crisis, large companies' ROE has been steadier and currently is well-above its long-term average. Conversely, ROE for small companies appears to have weakened and was recently in line with its long-term average. Thus, the higher ROE level and its lower historical volatility may justify large caps' price-to-book premium.

Figure 14. Return on Equity



Source: Factset

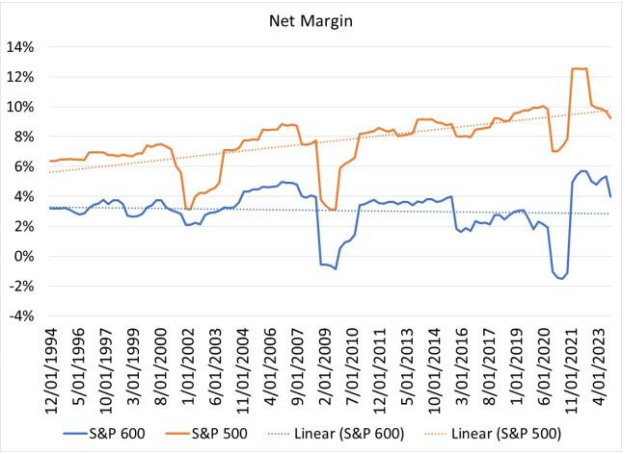
The DuPont analysis offers a useful framework to break down the underlying fundamentals driving the long-term trend in ROE. In essence the DuPont analysis separates ROE into three ratios:

ROE = Net Margin x Asset Turnover x Equity Multiplier

When comparing ROE trends in Figure 14 to net profit margin in Figure 15, it can be concluded that overall cyclicality of ROE is determined by the fluctuations in net margin as induced by the different rate of change of revenue and costs throughout the business cycle.

Further, large caps display a positive long-term trend within a cyclical pattern. Small caps' net margin is significantly lower and more cyclical.

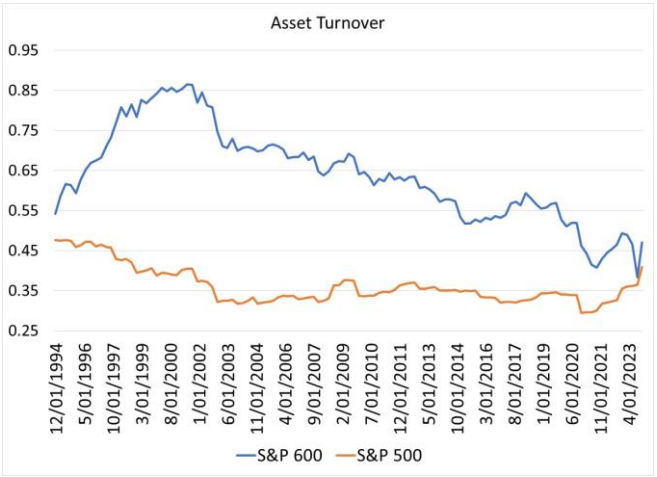
Figure 15. Net Profit Margin



Source: Factset

Figure 16 displays the asset turnover (sales divided by assets). Small caps have experienced a steady decline in assets' productivity over the last 20 years.

Figure 16. Asset Turnover

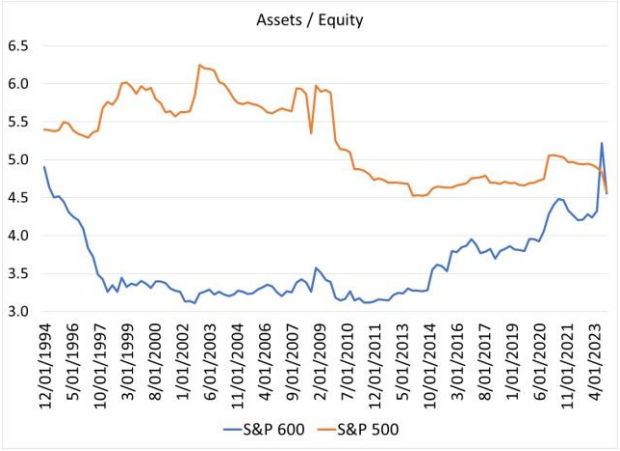


Source: Factset

It's unclear how much of this decline is attributable to a degradation of operating efficiency or to a change in industry composition of the S&P 600 universe. It could also be the effect of a lack of pricing power during an overall deflationary period.

Figure 17 displays the equity multiplier (total assets divided by equity). Two opposite trends are noticeable: for large caps, the equity multiplier has been declining while for the equity multiplier of small caps has been increasing over the period.

Figure 17. Equity Multiplier

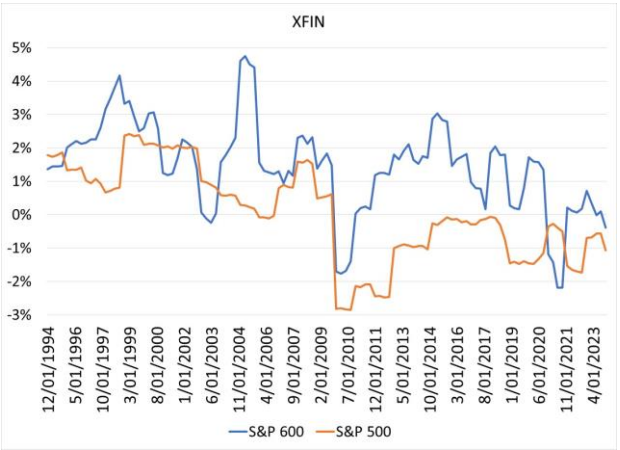


Source: Factset

A high multiplier indicates that a significant portion of a firm's assets are financed by debt and that the current shareholders own fewer assets than the current creditors.

A lower multiplier is considered more favorable because such companies are less dependent on debt financing and therefore do not need to use additional cash flows to service debt.

Figure 18. Net Issuance of Debt and Equity



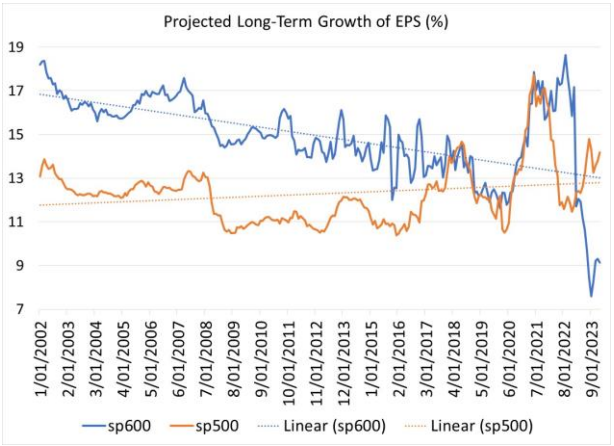
Source: Factset

Figure 18 shows small caps' greater reliance on external financing as a percentage of assets.

In summary, the "quality" of the ROE has been deteriorating for small caps through a combination of declining asset turnover and increasing equity multiplier. In our view, this lower quality ROE could be supportive of the current price-to-book valuation spread between large and small caps.

What about the price-to-earnings (PE) premium? Companies' PE ratios are largely determined by their expected earnings growth. Figure 19 graphs analysts' mean projected long-term growth of EPS (cap-weighted average). Interestingly, small caps' projected long-term growth has been steadily declining over the last 20 years even though they were higher than large companies' for about 90% of the months between 2001 and 2023.

Figure 19. Estimated Long-Term EPS Growth



Source: Factset

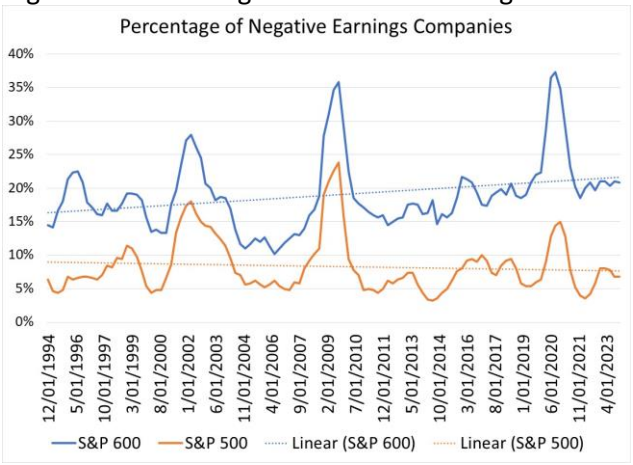
More recently, a massive divergence has occurred as analysts have revised sharply downward small caps' long-term growth expectations while at the same time have revised upward their growth expectations for large caps.

Currently, large caps are projected to grow earnings about 5% faster than small caps over the long term. This is a historically large growth differential with a significant impact on estimated companies' intrinsic values. In summary, both inferior profitability and lower growth expectations may justify the current valuation spread between small and large caps. Until those fundamental gaps are closed it's hard to make a high conviction small cap allocation call on a broad market basis.

Small Cap Strategies

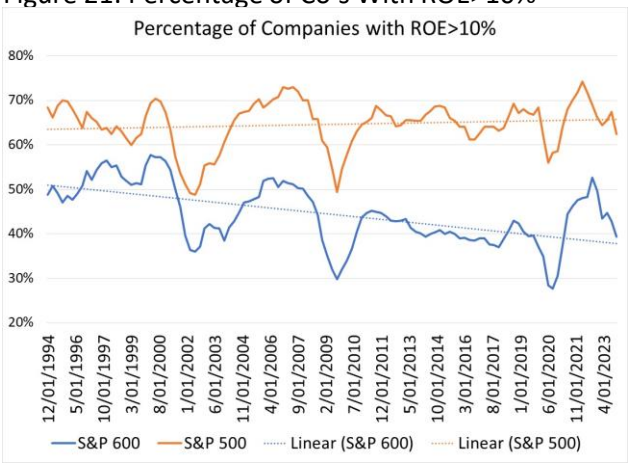
Given the challenging landscape in small caps, in this section we illustrate a simple framework to select small cap stocks with a high probability of out-performing their benchmark, based on historic patterns. Figure 20 and Figure 21 highlight a notable trend: small caps have seen a steady erosion of profitability over the period under study. These trends are even more marked in the Russell 2000 universe which includes a significant number of unprofitable companies.

Figure 20. Percentage of Co's With Earnings Losses



Source: Factset

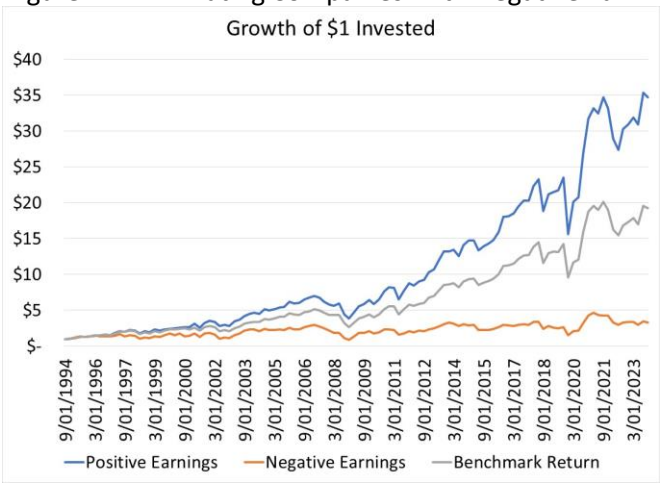
Figure 21. Percentage of Co's With ROE>10%



Source: Factset

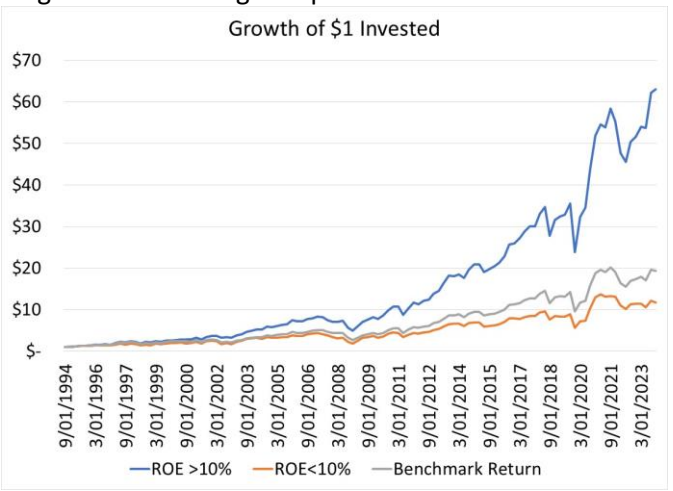
Figure 22 illustrates the impact of profitability as a relevant investment selection factor by excluding unprofitable stocks from the universe. In this example, we display the performance of an equal-weighted portfolio that only includes companies with positive earnings. This simple elimination strategy with quarterly rebalance generated a CAGR of 13% over the 1994-2023 period versus 11% for the S&P 600 Index. The portfolio comprised of loss-making companies compounded at only 4% over the same period.

Figure 22. Eliminating Companies With Negative Earnings



Source: Factset

Figure 23. Selecting Companies With ROE>10%



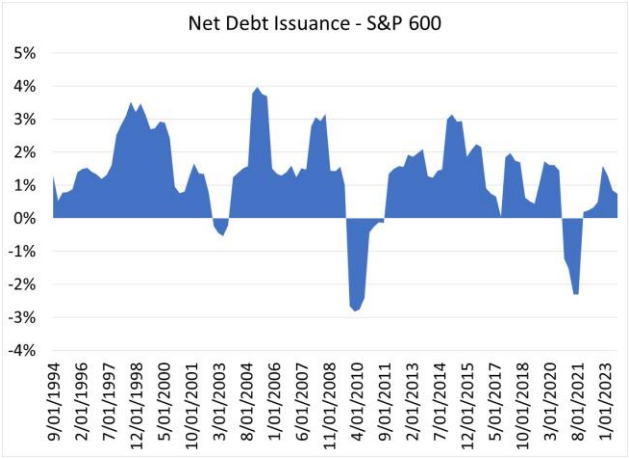
Source: Factset

Similarly, Figure 23 displays the performance of a strategy that selects only companies with a return on equity greater than 10%. This simple selection strategy with quarterly rebalance generated a CAGR of 15% over the 1994-2023 period versus 11% for the S&P 600 Index.

These results highlight the potential efficacy of selecting only profitable companies when investing in small caps. Indeed, this may represent a fundamental approach to add value over a passive, index-like investment by just screening out unprofitable companies.

We identify additional stock selection factors with the potential to enhance portfolio returns of systematic small cap strategies. As shown in Figure 24, small companies tend to rely on external financing (debt issuance), as generally smaller firms do not have the same financial resources and established revenue streams as larger companies. This is more relevant currently given that interest rates and cost of capital are elevated.

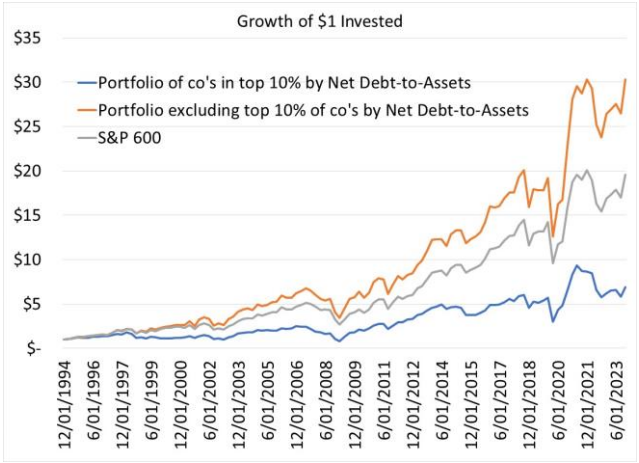
Figure 24. Net Debt Issuance As % of Total Assets



Source: Factset

Further compounding the impact of higher financing costs is the small caps' high portion of long-term debt maturing soon that may have to be refinanced at higher rates. High debt leverage increases the fundamental risk of small caps: as the corporate earnings cycle slowdowns, small companies' earnings typically weaken, their interest coverage deteriorates and credit risk increases. Based on this potential impact of higher leverage and financing costs, screening out companies with high debt leverage may enhance the selection of small cap stocks.

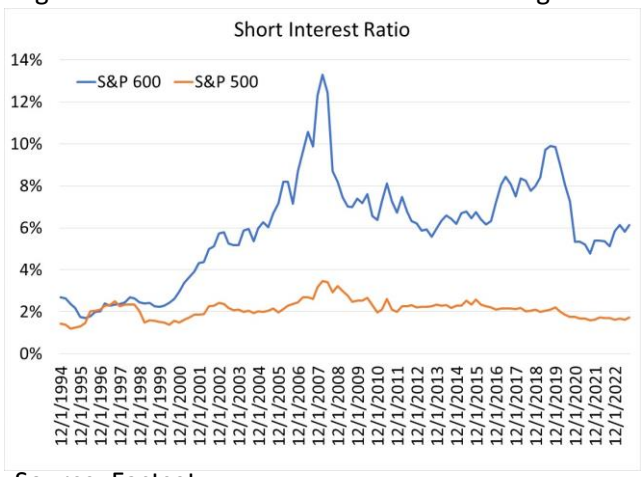
Figure 25. Net Debt Factor And Portfolio Returns



Source: Factset

Figure 25 shows the returns of a simple strategy that screens out of the S&P 600 companies the companies in the top 10% of net debt-to-assets ratio. Based on this simulation, excluding the top 10% of companies by Net Debt-to-Assets results in a CAGR of 12% vs. 11% for the S&P 600 Index over 1994-2023. The portfolio comprised of the most indebted companies only grew 6.5% over the same period.

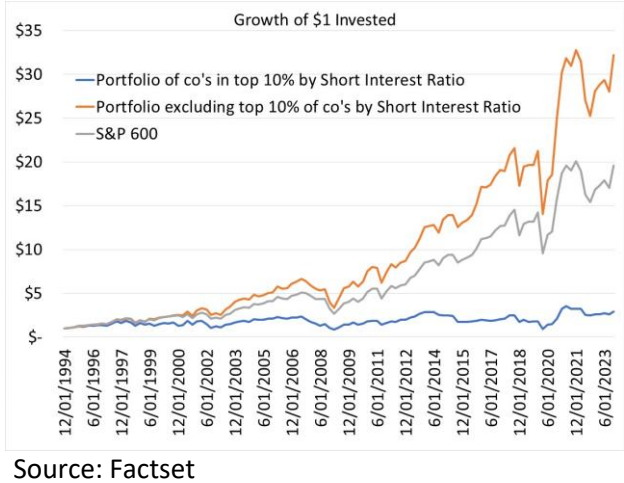
Figure 26. Short Interest As % of Outstanding Shares



Source: Factset

Lastly, we explore the relationship between short interest and small cap stock returns. Figure 26 shows the aggregate value of the short interest ratio (SIR). The significantly higher levels of SIR for small caps indicates that short sellers tend to target smaller companies, possibly by exploiting information inefficiencies. And they tend to be correct! The most shorted 10% of the universe generated a meager CAGR of 3.5% vs. 11% for the S&P 600. Excluding the most shorted decile results in a portfolio CAGR of 12.5% over the period.

Figure 27. Short Interest Factor And Portfolio Returns



Source: Factset

APPENDIX: FACTOR REGRESSION ANALYSIS

As reported on page 2, over the common period of 1994-2023 the S&P 600 out-performed the Russell 2000 by a significant 170 bps per year. In this appendix we compare these two indexes through established factor models. A large body of academic research reports that performance can be explained by factors. Factors may be thought of as stocks' relevant attributes to explain their risk and return. Certain factors have historically earned a long-term risk premium and represent exposure to systematic sources of risk. *This statistical analysis helps explains the out-performance of the S&P 600 over the Russell 2000 and supports the results of our strategy design which demonstrates that portfolio returns can be improved by just excluding unprofitable companies and/or selecting profitable companies.*

Figure 1A. Factor Regression

Fama-French model: $R_a = R_{rf} + B_{mkt} \times (R_{mkt} - R_{rf}) + B_{smb} \times SMB + B_{hml} \times HML + B_{rmw} \times RMW + B_{cma} \times CMA + \alpha$

iShares Russell 2000 ETF			
Factor	**Loading**	**t-stat**	**p-value**
Market (Rm-Rf)	1.00	99.28	0
Size (SMB)	0.81	43.79	0
Value (HML)	0.08	4.68	0
Profitability (RMW)	-0.10	-4.53	0
Investment (CMA)	-0.03	-1.09	0.278
Alpha (α)	-9.25bps	-2.23	0.028
Annualized Alpha (α)	-1.11%		

Vanguard S&P Small-Cap 600 ETF			
Factor	**Loading**	**t-stat**	**p-value**
Market (Rm-Rf)	0.97	60.82	0
Size (SMB)	0.84	28.55	0
Value (HML)	0.19	7.23	0
Profitability (RMW)	0.12	3.34	0.001
Investment (CMA)	0.01	0.34	0.736
Alpha (α)	1.06bps	0.16	0.873
Annualized Alpha (α)	0.13%		

Source: Alpha Quant Models, Portfolio Visualizer

The tables above report the Fama-French factor model coefficients and t-stats. Both indexes have similar positive loadings on size, reflecting their small cap focus. The value factor (HML) is higher for the S&P 600 reflecting more exposure to this factor. *More importantly, the profitability factor (RMW) is negative and statistically significant for the Russell 1000 and positive and significant for the S&P 600. This divergence in profitability is the main driver of the performance differential between the two indexes.* In addition, the investment factor is negative (although statistically weak), for the Russell 1000 reflecting an aggressive capital investment policy.

Figure 2A reports the Return and Risk Contribution analysis for the two ETFs and confirms the importance of the profitability factor (RMW) as main differentiator driving both returns and risk: higher exposure to profitable companies increases returns and decreases risk.

Figure 2A. Factor Based Risk and Returns Contribution

ETF Ticker	Cum Return	Ann. Return	Ann. St Dev	Return Contribution						Risk Contribution					
				Market	SMB	HML	RMW	CMA	Alpha	Market	SMB	HML	RMW	CMA	Alpha
IWM	244.51%	9.72%	19.39%	80.31%	-9.09%	-0.75%	-2.43%	-0.12%	-7.30%	70.42%	26.77%	0.94%	0.98%	0.11%	0.77%
VIOO	321.02%	11.38%	19.22%	83.91%	-10.03%	-2.11%	3.00%	0.05%	0.89%	67.70%	27.81%	3.35%	-0.81%	-0.02%	1.97%

Source: Alpha Quant Models, Portfolio Visualizer

Methodology: Results are based on multiple linear regression against monthly factor returns. Period is 10/2010-01/2024. 36-month rolling regressions.

Massimo Santicchia is a Co-Founder and Managing Member of Alpha Quant Models LLC. Massimo has over 20 years of investment experience including: CIO at Alpha Quant Advisors, CIO at Cypress Trust Company, and VP of Investment Strategy at S&P Investment Advisory Services LLC. His expertise encompasses fundamental, quantitative analysis, portfolio management and investment strategy development.

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