



OUR QUANTITATIVE VALUE PHILOSOPHY

BUY THE CHEAPEST, HIGHEST QUALITY VALUE STOCKS

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EXECUTIVE SUMMARY

Benjamin Graham, who first established the idea of purchasing stocks at a discount to their intrinsic value more than 80 years ago, is known today as the father of value investing. Since Graham's time, academic research has shown that low price to fundamentals stocks have historically outperformed the market. In the investing world, Graham's most famous student, Warren Buffett, has inspired legions of investors to adopt the value philosophy. Despite the widespread knowledge that value investing generates higher returns over the long-haul, value-based strategies continue to outperform the market. Is the competitive marketplace offering a free lunch? The answer relates to a fundamental truth: human beings behave irrationally. We are influenced by an evolutionary history that preserved traits fitted for keeping us alive in the jungle, not for optimizing our portfolio decision-making ability. While we will never eliminate our subconscious biases, we can minimize their effects by employing quantitative tools.

"Quantitative," is often considered to be an opaque mathematical black art, only practiced by Ivory Tower academics and practitioners with their heads in the clouds. Nothing could be further from the truth. Quantitative, or systematic, processes are merely tools that value investors can use to minimize their unavoidable instincts. Quantitative tools serve two purposes: 1) to protect us from our own behavioral errors, and 2) to exploit the behavioral errors of others. Our tools do not necessarily need to be complex, but they do need to be systematic. Broad-based academic research overwhelmingly demonstrates that simple, systematic processes outperform human experts. Unfortunately, the inability of human beings to robustly outperform simple systematic processes holds true for investing, just as it holds true for most other fields.¹

Alpha Architect's Quantitative Value (QV) philosophy is best suited for value investors who can acknowledge their own fallibility. Much of the analysis conducted by value investors—reading financial statements, interpreting past trends, and assessing relative valuations—can be done faster, more effectively, and across a wider swath of securities by an automated process. Gut-instinct value investors argue that experience adds value in the stock-selection process, but the evidence doesn't support this interpretation. The reason value investors underperform simple models is that when value managers exploit qualitative signals, like all humans, they unconsciously introduce cognitive biases into their investment process, and these biases lead to predictable underperformance. Our approach is not infallible, but it does promise one thing: a value investment strategy that is *Built to Beat Behavioral Bias*.

PLEASE READ IMPORTANT DISCLOSURES AT THE END OF THIS DOCUMENT.

¹ Grove, W., Zald, D., Lebow, B., and B. Nelson, 2000, "Clinical Versus Mechanical Prediction: A Meta-Analysis," *Psychological Assessment* 12, p. 19-30.

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INTRODUCTION

When we set out to research and develop our Quantitative Value (QV) approach we had one mission in mind:

- Identify the most effective way to capture the value premium via systematic means.

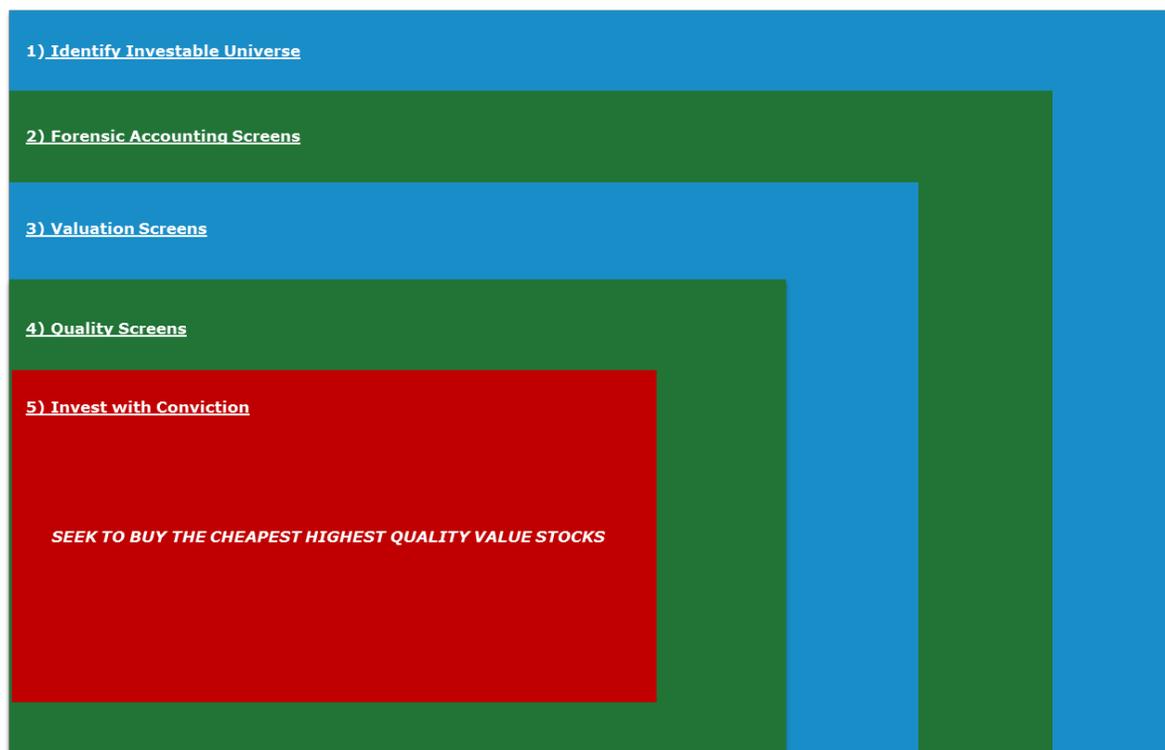
Our mission involved two core beliefs:

- Value investing works over the long haul, and therefore, a focus on value principles is paramount.
- We can't control our own biases, and therefore, our decision-making process must be automated.

What resulted from our research adventures might be considered the Holy Grail of value investing. Others agreed with us. In 2011, Alpha Architect partnered with a multi-billion dollar family office and sophisticated investors to turn our theoretical QV approach into a reality. We built the operational infrastructure to ensure a smooth transition from theory to practice. In the end, we boiled down our entire process into five sequential steps (depicted in Figure 1):

1. **Identify Investable Universe:** Our universe generally consists of mid- to large-capitalization U.S. exchange-traded stocks.
2. **Forensic Accounting Screens:** We conduct financial statement analysis with statistical models to avoid firms at risk for financial distress or financial statement manipulation.
3. **Valuation Screens:** We screen for stocks with low enterprise values relative to operating earnings.
4. **Quality Screens:** We rank the cheapest stocks on their long-term business fundamentals and current financial strength.
5. **Invest with Conviction:** We seek to invest in the cheapest, highest quality value stocks. This form of investing is by definition contrarian, and requires disciplined commitment, as well as a thorough understanding of its theoretical and intellectual underpinnings.

Figure 1: The Quantitative Value (QV) Process



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STEP 1: IDENTIFY THE INVESTABLE UNIVERSE

The first step in the QV investing process involves setting boundaries on the universe for further screening. There are several reasons we place such limits around the stocks to consider. A critical aspect involves liquidity, which is related to the size of the stocks under consideration. In general, if we include stocks that are too small, the possibility of large price moves on small volume can lead to significantly overstated theoretical returns relative to actual returns. In other words, if we include small stocks in our universe, the back-tested results may generate phenomenal returns, but these returns may be unobtainable in the real world, even when operating with small amounts of capital.

In order to honestly assess and implement the QV approach, we eliminate all stocks below the 40th percentile breakpoint of the NYSE by market capitalization. As of December 31, 2013, the 40th percentile corresponded to a market capitalization of approximately \$2 billion. Our universe also excludes ADRs, REITS, ETFs, financial firms, and others that present various data challenges incompatible with the QV approach. Another requirement is that the firms we analyze have an adequate number of years of data to draw from, as some of the QV metrics require that we analyze financial data over the past eight years.

In summary, our investment universe contains liquid, non-financial companies with at least eight years of public operating history.

STEP 2: FORENSIC ACCOUNTING SCREENS

As noted value investor Seth Klarman has advised, “Loss avoidance must be the cornerstone of your investment philosophy.” This is an important concept, and underlies the first phase of our approach. As an initial criterion for making a successful investment, **we seek to eliminate those firms that risk causing permanent loss of capital.**

Permanent loss of capital can come in many forms, but we reduce these risks into two basic categories:

- 1) Financial statement manipulation and/or fraud
- 2) Financial distress (e.g., bankruptcy)

Our first set of tools, specifically developed to identify potential manipulation problems, involves calculating measures related to accruals. Accruals can be defined as the difference between net income and cash from operations.

Bernstein succinctly states the problem with accruals:²

*CFO (cash flow from operations), as a measure of performance, is less subject to distortion than is the net income figure. This is so because the accrual system, which produces the income number, relies on accruals, deferrals, allocations and valuations, all of which involve higher degrees of subjectivity than what enters the determination of CFO. That is why analysts prefer to relate CFO to reported net income as a check on the quality of that income. Some analysts believe that the higher the ratio of CFO to net income, the higher the quality of that income. **Put another way, a company with a high level of net income and a low cash flow may be using income recognition or expense accrual criteria that are suspect.***

As Bernstein states, the problem with accruals is that they open the door for potential financial statement manipulation. A range of academic research has tested the hypothesis that investors fail to appreciate the importance of accrual measures and their impact on stock returns.³ We have leveraged this research to develop our own forensic accounting tools that use various accrual metrics to identify potential manipulation and subsequently eliminate these firms from our investment set.

² Bernstein, L. 1993. *Financial Statement Analysis*. 5th ed. Homewood, IL: Irwin.

³ Examples include Sloan, 1996, Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings? *Accounting Review* 71, p. 289-315 and Hirshleifer, Hou, Teoh, and Zhang, 2004, Do Investors Overvalue Firms with Bloated Balance Sheets? *Journal of Accounting and Economics* 38, p. 297-331.

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Another set of tools we use to identify potential problem companies involves statistical prediction techniques. Implementation of these models is highly technical, but the mechanism is intuitive. An example helps illuminate the process. Consider the case of financial statement manipulation: We hypothesize that high accruals, lots of leverage, rapidly changing financial statement ratios, and rapid sales growth might be related to manipulation. The problem is we don't fully understand how these variables are related. In order to identify this relationship we need to do two things: 1) Identify a group of firms that manipulated their financial statements in the past, and 2) use statistical techniques to identify the relationship between the manipulator firms and the variables we think matter. Finally, we can test our statistical model on another sample of manipulator firms and examine if the model has any "out-of-sample" prediction ability. If our statistical model works, it will predict, with a success rate better than chance, if a firm has manipulated financial statements. While this process sounds complicated, the procedure outlined is followed by academic researchers who have identified effective ways to pinpoint manipulation and financial distress.⁴ We leverage these studies, and our own internal research, to develop prediction models that identify problematic firms and eliminate them.

STEP 3: VALUATION SCREENS

Step 1 and Step 2 help us identify a universe that we can feel comfortable analyzing. On average, we are left with a universe of around 800 U.S. publicly traded common stocks that are large and liquid enough for us to trade and don't show statistical evidence that they may suffer from an imminent and permanent loss of capital event. While these steps are important, Step 3 is just as critical.

In Step 3, we screen for the cheapest stocks. Ben Graham long ago recognized the importance of paying a low price for stocks. Graham's "value anomaly," or the significant outperformance of low price-to-fundamental stocks relative to high price-to-fundamentals, is now well-established in the academic and practitioner communities. However, over the years practitioners have sought to exploit the value anomaly by exploring a range of strategies. Typically, these ad-hoc value screens include measures such as low price-to-earnings, low price-to-book value, dividends, and others. In contrast, we asked a simple question: which measure of value works the best for identifying stocks most likely to outperform? To answer the question, we look to the world of horse racing, where winners are separated from losers via a time-tested, merit-based process.⁵ We review historical stock market returns and pit a variety of value strategies directly against one another. The horses in our race are the following valuation metrics:

- **P/E – Price-to-Earnings:** The P/E ratio is simply a firm's price divided by its earnings per share.
- **TEV/EBITDA – Enterprise Multiple:** Employed extensively in private equity, this is simply a firm's total enterprise value divided by earnings before interest, taxes, depreciation and amortization (EBITDA).
- **FCF/TEV – Free Cash Flow Yield:** The numerator for this metric is Free Cash Flow, which is net income + depreciation and amortization – working capital changes – capital expenditures. Once again, total enterprise value is in the denominator.
- **GP/TEV – Gross Profits Yield:** Revenue – cost of goods sold in the numerator, and total enterprise value in the denominator.
- **P/B – Price-to-Book:** The market value of a firm divided by the firm's book value.

In running our horse race, we measure returns from July 1971 through December 2010, eliminating micro-cap stocks. This horse race only includes the top-notch thoroughbreds (reasonably liquid stocks) and we leave the lower caliber ponies for another day (illiquid micro-cap stocks).

Figure 3, taken from our "Journal of Portfolio Management" paper, highlights the compound growth rates for the various price measures that make up our horse race. All portfolios are equal-weighted and we compare the performance of the strategies relative to the equal-weighted universe (EW Mkt).

⁴ Beneish, M. D, 1999, The detection of earnings manipulation, *Financial Analysts Journal*, 55(5), 24-36 and Campbell, Hilscher, Szilagyi, 2011, Predicting Financial Distress and the Performance of Distressed Stocks, *Journal of Investment Management* 9, p. 14-34.

⁵ Jack Vogel and I have a formal paper on this subject, "Analyzing Valuation Measures: A Performance Horse Race over the Past 40 Years," published in *The Journal of Portfolio Management* 39, p 112-121.

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Figure 3: Valuation Metric Horse Race for Equal-Weight Portfolios

	P/E	TEV/EBITDA	FCF/TEV	GP/TEV	P/B	EW Mkt
Annual Returns						
1	10.44%	7.97%	11.03%	8.31%	9.20%	13.04%
2	12.40%	11.36%	11.19%	11.20%	11.93%	13.04%
3	13.74%	12.55%	12.80%	13.41%	13.49%	13.04%
4	14.60%	15.51%	14.38%	15.64%	15.64%	13.04%
5	15.99%	17.66%	16.57%	16.53%	15.03%	13.04%
5-1	5.54%	9.69%	5.54%	8.22%	5.83%	N/A
Annual Sharpe Ratio	0.59	0.66	0.62	0.59	0.52	0.45
Annual Sortino Ratio	0.80	0.90	0.87	0.83	0.69	0.66

The results are hypothetical results and are NOT an indicator of future results and do NOT represent returns that any investor actually attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.

We are particularly focused on a few metrics in assessing our horse race. The first is the best-performing price ratio, which turns out to be TEV/EBITDA, with a raw compound annual growth rate of 17.66%. Next, we review our strategies in terms of how well the return of each compensates us per unit of risk incurred. Two common ways of measuring this are the Sharpe and Sortino ratios. TEV/EBITDA appears to offer superior risk-adjusted performance versus our other price metrics. Its Sharpe ratio of 0.66 and Sortino ratio of 0.90 are the highest observed, suggesting that the TEV/EBITDA metric offers the best risk/reward ratio, whether one defines risk as overall volatility or downside volatility only.

Our analysis demonstrates that all of the valuation-based metrics beat the benchmark; however, the question still remains: What is the best metric to use when screening companies for value? Our team remains committed to enterprise multiples since they represent the valuation that a private buyer would use to assess an investment opportunity. And as Benjamin Graham, the intellectual founder of the value investment philosophy, states in his classic text, *The Intelligent Investor*, "Investment is most intelligent when it is most businesslike".⁶

We use a variation on the enterprise multiple as part our valuation screening technology, and screen our universe from Step 1 and Step 2 down to the top 10 percent of cheapest stocks. This screen ensures we are dealing with a subset of firms that are sitting in the "bargain bin" at our neighborhood stock market.

STEP 4: QUALITY SCREENS

After "cleaning" our liquid universe and identifying the cheapest stocks we will consider for investment, we move onto Step 4 of our investment process. Step 4 addresses a simple concern: How do we separate cheap stocks that may be cheap for a good reason from cheap stocks that are fundamentally mispriced?

Figure 4 depicts our quality approach in the form of a platform with two legs, both required for stability. The first thing we must acknowledge is that cheap stocks always have short-run problems--otherwise they wouldn't be cheap. Second, we need a way to distinguish between those firms that have problems that can be overcome, versus those with problems that will persist.

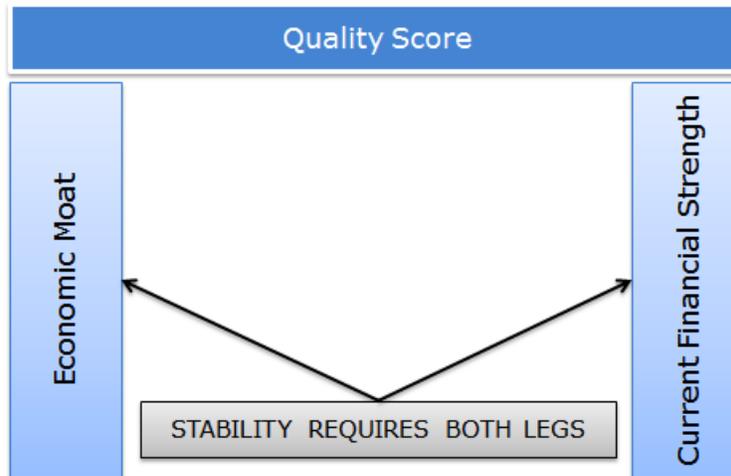
Our primary job as security analysts is to identify which firms show evidence of an economic "moat" and which firms don't (left leg of our quality platform). One can think of economic moat as a sustainable competitive advantage that allows a firm to earn profits in excess of what they would earn in a perfectly competitive environment. But, identifying economic moat is not enough. These cheap firms are often distressed, so they simultaneously need current financial

⁶ Graham, B. 1993. *The Intelligent Investor*. 4th Revised Edition. New York, NY: Harper & Row Publishers.

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strength, as represented by a strong current financial position and operational momentum (right leg of the quality platform), so they can survive the prevailing storm and emerge in a position to benefit from their economic moat. For example, a firm with strong economic moat (left leg intact) undergoing a short-term shock, but lacking current financial strength (right leg is broken) might end up bankrupt before they end up profitable. Obviously, this is a situation we want to avoid as value investors who are hunting in the “bargain bin.”

Figure 4: Quality Platform



In summary, our approach to identifying high quality firms involves two steps:

- 1) Identifying Economic Moat
- 2) Identifying Current Financial Strength

IDENTIFYING ECONOMIC MOAT

In thinking about economic moat, we turn to the Sage of Omaha for guidance. Warren Buffett looks for businesses with enduring competitive advantages that differentiate them from competitors, and provide them with sustainable earnings power. What kinds of competitive advantages might those be? A firm might manufacture goods at a lower cost, provide a product for which there are no direct substitutes, or represent a trusted brand that keeps customers coming back. These types of advantages, and others like them, are factors that allow companies to defend market share, similar to how a moat protects a castle from aggressors.

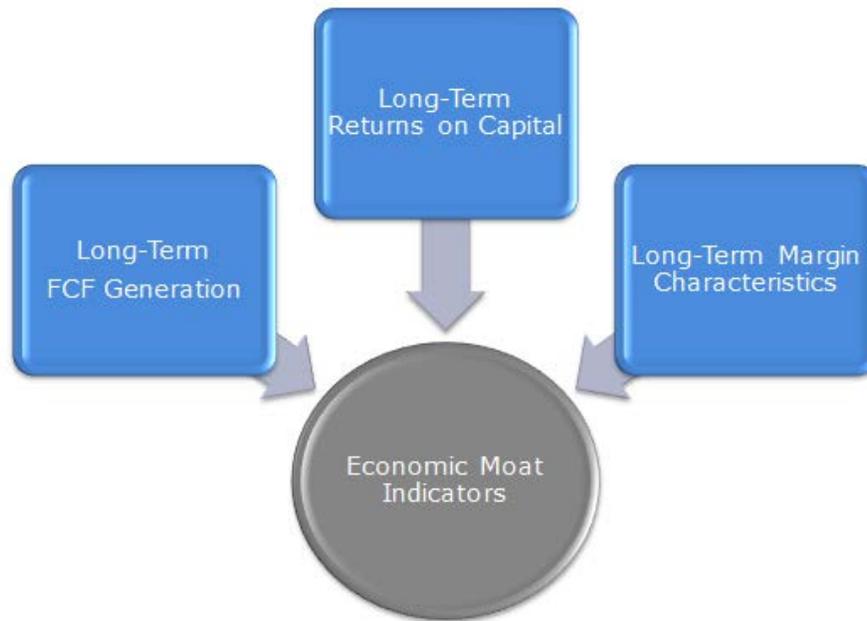
As quantitative investors, we are not focused on understanding the details of the many types of competitive advantages. Instead, we want to identify which metrics are appropriate when assessing such an economic moat generally.

One key feature of economic moats is that they enhance the profitability of investments due to some inherent, moat-related competitive advantage, which allows the firm to generate above-average returns on invested capital. Any business with a wide moat therefore requires lower rates of reinvestment to maintain or grow existing production capacity, leaving additional capital that can be distributed to owners without affecting the company's future growth prospects. It is for this reason that we look to methods of measuring investment profitability as a means of identifying companies that possess economic moats.

In assessing an economic moat, we are particularly interested in high returns that are sustained over a full business cycle. To do so, we use eight years for our long-term average calculation, as this captures a typical boom-bust business cycle. We use three metrics that help us identify statistical evidence for an economic moat: Long-term free cash flow generation; long-term returns on capital; and long-term margin characteristics. Figure 5 visually depicts the measures we examine.

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Figure 5: Economic Moat Indicators



Economic moat is a valuable quality signal, but it only represents one leg of our quality platform. We must also be certain that the cheap stocks under consideration have some level of current financial strength.

CURRENT FINANCIAL STRENGTH

We introduce the notion of financial strength with an analogy. Suppose you had to sail across the Atlantic and were given a choice between making the crossing in either an eight foot sailing dinghy, or a 60 foot yacht. Which would you choose? Obviously, you would want the safety and security afforded by the larger, more seaworthy yacht. The same concept holds when deciding upon the stocks to include in your portfolio: all things being equal, an investor should seek out those financially strong stocks that are less vulnerable to downturns in the business cycle or other macroeconomic shocks.

We know intuitively why a durable 60 foot yacht protects sailors better than a fragile dinghy: its heavy keel keeps it stable, it won't roll violently in heavy winds, and it can take a pounding by waves. What are the financial characteristics that enable a firm to protect capital during a stormy business climate or from unanticipated adverse developments in the business? Several years ago, Joseph Piotroski, a specialist in accounting-based fundamental analysis, and currently a professor at Stanford, did some interesting analysis relating to this subject. Piotroski started with the cheapest stocks, as measure by price-to-book, but reasoned that he could do better than a simple value-based quantitative approach by further refining his universe to eliminate cheap firms that were likely to underperform the market, based on their weak financial strength. He used a nine-point scale, utilizing common accounting ratios and measurements, to evaluate the financial strength of companies and eliminated those most at risk of financial distress. This scale, which he called the "F_SCORE," involved financial statement metrics across several areas: profitability, leverage, liquidity and source of funds, and operating efficiency. The results were nothing short of astonishing: Piotroski found that a value investment strategy that bought expected winners and shorted expected losers generated a 23 percent annual return between 1976 and 1996—a record of which even Buffett would be proud.⁷

As Sir Isaac Newton noted, "If I have seen further, it is by standing on the shoulders of giants." We also believe in standing on the shoulders of giants whenever possible since, as Newton observed, you can see so much farther. We

⁷ Piotroski, J., 2000, "Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers," *Journal of Accounting Research* 38, p. 1-41.

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therefore use Piotroski's F-SCORE as a basis for our approach to measuring financial strength, but with some improvements. Here is a simple outline for our current financial strength 10-point checklist:

1. Current profitability (3 items)
2. Stability (3 items)
3. Recent operational improvements (4 items)

The current financial strength score reduces the overall financial health of a firm to a single number between 0 and 10, which can be used as a basis for comparing a firm's overall financial strength versus that for other firms.

INTEGRATING PRICE WITH QUALITY

For both aspects of quality--Economic Moat and Current Financial Strength--we tabulate thousands of data points based on the principles discussed above and derive quality scores for all firms in our cheap universe identified in Step 3. We sort our cheap universe on our composite quality score to identify a universe of what we believe are the cheapest, highest quality value firms.

But we don't end there. We know from behavioral finance research that the value anomaly is driven by sentiment: investors aggressively dump stocks that are out of favor. We seek to leverage this academic finding, systematically.

STEP 5: INVEST WITH CONVICTION

Steps 1 through 4 systematically identify the cheapest, highest quality value stocks. We believe that this portfolio of stocks has the highest probability of being undervalued by the investment community. In our opinion, we have identified the ultimate form of contrarian value investing and we think this portfolio will outperform the market over the long-haul. One question remains: How do we construct our final QV portfolio?

Charlie Munger, at the 2004 Berkshire Hathaway Annual Meeting, is quoted as saying, "The idea of excessive diversification is madness...almost all good investments will involve relatively low diversification." Another word for Munger's issue with diversification for a skilled manager is "diworsification." Elton and Gruber, professors with multiple papers and books on the subject of diversification,⁸ highlight that the benefits to holding a bigger portfolio of securities decline rapidly after a portfolio grows beyond 50 securities. So while we are protected by diversification, we don't want too much. Charlie Munger is right: to the extent you believe you have a reliable method of constructing a high alpha "active" portfolio, less diversification is desirable.

In the spirit of having conviction, we construct our portfolios to hold around 40 securities, on average. Consider our typical process:

1. **Identify Investable Universe:** We typically generate 900 names in this step of the process.
2. **Forensic Accounting Screens:** We usually eliminate 100 names, bringing the total to 800 stocks.
3. **Valuation Screens:** Here we screen on the cheapest 10% of the universe, or 80 stocks.
4. **Quality Screens:** We calculate a composite quality score and eliminate the bottom half, leaving 40 stocks.
5. **Invest with Conviction:** We invest in our basket of 40 stocks that are the cheapest, highest quality value stocks.

WHY ISN'T EVERYONE DOING THIS?

In our opinion, we have identified the ultimate form of contrarian value investing and we think this portfolio will outperform the market over the long-haul. But while all of this may sound promising, one must consider a simple question: **If this is so easy, why aren't all investors doing it?**

⁸ Elton, E. and Martin Gruber, 1977, Risk Reduction and Portfolio Size: An Analytical Solution, *The Journal of Business* 50, p 415-437.

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Unfortunately, being a contrarian necessarily requires that an investor do something that doesn't feel comfortable. Nobody likes pain, especially self-inflicted pain. Our investors must buy stocks that probably make them uneasy, and almost all our portfolio holdings have business problems that play out on the front page of the Wall Street Journal and over the CNBC airwaves. Some of these problems will play out in the future and we will lose money on these positions, but on average, the problems are never as bad as advertised and we will make money in the aggregate when expectations revert to normal. Nevertheless, the road is bumpy, full of volatility, and is not for everyone.

Consider the experience of a systematic value investor who simply buys low-priced stocks. Our approach, while not exactly the same as a simple low-price value strategy, shares many of the same characteristics—both good and bad—so this thought experiment serves as a nice case study to contextualize the costs and benefits of contrarian investment programs.

Using data on portfolios sorted by book-to-market ratios⁹, we examine time periods where it was painful to be a value investor. One such period is during the run-up to the internet bubble. We examine the gross total returns (including dividends and cash distributions) from 1/1/1994-12/31/1999 for a Value portfolio (High book-to-market quintile, market-weighted returns), and a Growth portfolio (Low book-to-market quintile, market-weighted returns), the S&P 500 total return index, and the Risk-Free return (90-day T-Bills).¹⁰

Figure 8 highlights the extreme underperformance of the simple value portfolio relative to a simple growth portfolio and the broader market. From 1994 to 1999, value underperformed growth by over 10 percentage points a year. Now that's pain! When one compounds that spread over 5 years it translates into a serious spread in cumulative performance.

Figure 8: Value and Growth 1994 to 1999

Summary Statistics*	Value Stocks	Growth Stocks	SP500	RF
CAGR	15.68%	25.87%	23.84%	4.92%
Standard Deviation	12.03%	15.44%	13.63%	0.21%
Downside Deviation (MAR=5%)	9.06%	11.19%	10.50%	0.17%
Sharpe Ratio	0.88	1.27	1.30	0.00
Sortino Ratio (MAR=5%)	1.14	1.73	1.67	-1.11
Worst Drawdown	-14.24%	-15.41%	-15.18%	N/A

The results are hypothetical results and are NOT an indicator of future results and do NOT represent returns that any investor actually attained. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.

Figure 9 makes the point even more clear. The value strategy underperforms the broad market for 6 straight years. Even the most disciplined and hardened value investor would have a hard time staying disciplined to a philosophy that lost to the market for 6 years in a row. Amazingly, Warren Buffett, arguably the greatest investor of all-time, was criticized in the media for "losing his magic touch" at the tail-end of the late '90s bull market.¹¹

Figure 9: Annual Performance 1994 to 1999

	Value Stocks	Growth Stocks	SP500	RF
1994	-3.19%	2.62%	1.35%	3.91%
1995	35.88%	36.51%	37.64%	5.60%
1996	14.74%	21.23%	23.23%	5.20%
1997	31.39%	28.68%	33.60%	5.25%
1998	19.35%	41.52%	29.32%	4.85%
1999	1.17%	28.46%	21.35%	4.69%

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⁹ From Ken French Website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

¹⁰ Source: Bloomberg, LP and Ken French website, <http://goo.gl/iyNmS>

¹¹ <http://online.barrons.com/news/articles/SB945992010127068546>

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Of course, looking back, we now realize that in 1999 the internet bubble was about to burst. Value investors got the last laugh. From 1999 to 2013 value stocks earned 8.89 percent a year relative to the market's paltry 3.82 percent performance.

Figure 10: Value and Growth 2000 to 2013

Summary Statistics*	Value Stocks	Growth Stocks	SP500	RF
CAGR	8.89%	3.07%	3.82%	1.99%
Standard Deviation	19.83%	16.33%	15.60%	0.58%
Downside Deviation (MAR=5%)	14.89%	12.13%	11.59%	0.46%
Sharpe Ratio	0.43	0.15	0.19	0.00
Sortino Ratio (MAR=5%)	0.37	-0.05	0.00	-6.56
Worst Drawdown	-55.56%	-52.22%	-50.21%	-0.01%

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Over the full cycle from 1994 to 2013, value revealed its true form: Value earned 10.88 percent a year, while the market earned 9.45 percent a year. An investor compounding at a 1.43 percent spread over the market return over nearly twenty years will generate a substantially different wealth profile over time. Figure 10 shows the performance of the simple low-price value strategy relative to the market from 2000 to 2013 and Figure 11 has performance over the entire cycle (1994 to 2013).

Figure 11: Value and Growth 1994 to 2013

Summary Statistics*	Value Stocks	Growth Stocks	SP500	RF
CAGR	10.88%	9.44%	9.45%	2.86%
Standard Deviation	17.84%	16.26%	15.19%	0.62%
Downside Deviation (MAR=5%)	13.89%	11.89%	11.33%	0.53%
Sharpe Ratio	0.51	0.47	0.49	0.00
Sortino Ratio (MAR=5%)	0.50	0.45	0.46	-4.08
Worst Drawdown	-55.56%	-52.22%	-50.21%	-0.01%

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CONCLUSION

In the short-run, most of us simply cannot endure the pain that value investing strategies impose on our portfolios and our psyches. For those in the investment advisory business, providing a strategy with the potential for multi-year underperformance is akin to career suicide. And yet, at Alpha Architect, we explicitly focus on a value investing philosophy because the evidence for outperformance is so striking and robust. Our hope is that we can educate investors with the appropriate temperament on what it takes to achieve long-term investment success as a value-investor. The single most important factor is sticking to a value philosophy through thick and thin. Our systematic value investment process facilitates our ability as investors to simply "follow the model" and avoid behavioral biases that can poison even the most professional and independent fundamental value investors.

Value investing works over the long-haul. Benjamin Graham distilled the secret of sound value investment into three words: "margin of safety." We've focused on the behavioral aspects that drive value investing and taken Graham's original motto a bit further. Our enhanced process can be distilled into the following:

"Buy the cheapest, highest quality value stocks."

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DISCLOSURES

Performance figures contained herein are hypothetical, unaudited and prepared by Alpha Architect; hypothetical results are intended for illustrative purposes only.

Past performance is not indicative of future results, which may vary.

There is a risk of substantial loss associated with trading commodities, futures, options and other financial instruments. Before trading, investors should carefully consider their financial position and risk tolerance to determine if the proposed trading style is appropriate. Investors should realize that when trading futures, commodities and/or granting/writing options one could lose the full balance of their account. It is also possible to lose more than the initial deposit when trading futures and/or granting/writing options. All funds committed to such a trading strategy should be purely risk capital.

Hypothetical performance results (e.g., quantitative back-tests) have many inherent limitations, some of which, but not all, are described herein. No representation is being made that any fund or account will or is likely to achieve profits or losses similar to those shown herein. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently realized by any particular trading program. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or adhere to a particular trading program in spite of trading losses are material points which can adversely affect actual trading results. The hypothetical performance results contained herein represent the application of the quantitative models as currently in effect on the date first written above and there can be no assurance that the models will remain the same in the future or that an application of the current models in the future will produce similar results because the relevant market and economic conditions that prevailed during the hypothetical performance period will not necessarily recur. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results, all of which can adversely affect actual trading results. Hypothetical performance results are presented for illustrative purposes only.

Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.

There is no guarantee, express or implied, that long-term return and/or volatility targets will be achieved. Realized returns and/or volatility may come in higher or lower than expected.