

THE PRACTICAL IMPLEMENTATION OF EQUITY VALUATION IN QUANTITATIVE VALUE INVESTING

In this paper, the practice of value investing is explained and analyzed by drawing from the academic and applied literature on equity valuation – namely, assessing stocks based on both their qualitative and quantitative values. Strategies highlighted by influential figures in the financial world are also discussed. Such concepts coincide and even bolster the arguments that have been made in favor of the profitability of the continued practice of value investing.

Background

Historically there has been tension between value investors based on whether “The Value Anomaly” persists due to price, (buying companies that are selling for less than they are worth), or whether it persists because “value” is really the present value of future profits. We suggest that it is both. Persistent value is the identification of high quality companies at a cheap (or fair) price.

Value investing is the most consistent method of outperforming the U.S. stock market. Indeed, consider the following: In Benjamin Graham’s original method (as described in his seminal 1934 book Security Analysis) he recommended various quantitative tests which, if satisfied, would offer you a high quality portfolio of companies at a reasonable price. The efficacy of this method persists today. In 2013 Graham’s method was applied to the entire investment universe, and with the results subsequently split into deciles. When applied quarterly from 1934 to 2013 the performance is as follows: the top 20% of companies (meaning cheapest with highest quality) returned 14%, while the bottom 20% (the most expensive and the lowest quality) averaged 5%. The S&P Midcap 400 returned 8.5% over the same period. (Levin and Graham) The internal value that a firm possesses – the firm’s predicted payoffs to its shareholders – is one way an individual might gauge a company’s financial wellbeing. Another method would be to simply assess the firm’s market price. The market price, however, does not always parallel the information exhibited in the firm’s intrinsic value. It is this discrepancy that often exists between the market price and the intrinsic value of the firm that consequently drives the crucial practice of value investing.

Value Effect

As Graham articulated in 1934, the value effect describes the consistent pattern of abnormally positive stock returns from firms with relatively lower trading prices, low volatility, low Beta values [as compared to the stock index (a failure of the Capital Asset Pricing Model (CAPM)], high profitability, low distress risk, and sustainable flows of cash. More specifically, Graham laid out a 10-part “screen” that included necessary characteristics for a “high quality” stock. If a firm possessed all of the characteristics, the stock would be worth an investment. The 10 factors

measure both the quantitative price of a stock – or, rather, the “cheapness” of the stock – and also measure the firm’s intrinsic quality. As an example of the stock’s relative “cheapness”, one factor for investment is an earnings yield (earnings-to-price ratio) that is double the AAA bond yield. An example of a firm’s intrinsic value that Graham searched for is a ratio of at least two when current assets are compared to current liabilities.

Residual Income Model

The residual income model (RIM) was developed by professor James Ohlson in the 1990s as a tool intended to relate accessible firm data with firm quality. In its simplest form, RIM equates firm value to the summation of an invested capital base and the present value of future residual income. Thus, a firm’s intrinsic value today is both the initial asset base with which the firm begins and the predicted future growth of the firm from the asset base. The formal equation of the RIM is as follows:

$$P_t^* = B_t + \sum_{i=1}^{\infty} \frac{E_t[NI_{t+i} - (r_e * B_{t+i-1})]}{(1+r_e)^i}$$

Where, B is the present book value of the firm, E_t is the expected value of the firm, NI_{t+i} is the net income for period $t+i$, r_e is the cost of equity capital, and ROE_{t+i} is the after-tax return on book equity for period $t+i$. Once decomposed, the equation simplifies a firm’s value into capital and the present value of the future residual income (PVRI_t). The first part of the right hand side of the equation – the book value of the firm – is essentially the initial invested capital base, while the rest of the right hand side of the equation (beginning at the summation) calculates the projected value of the future growth of that capital base.

Value Investing

If we relate the RIM to the practice of value investing, we can see that in its application, value investing is based off of the two properties of cheapness and quality. Many investors misperceive the implications of the RIM and instead only look to invest in stocks that are “cheap”, thus disregarding the more important part of the equation – the firm’s “quality.” Growth opportunities are the basis of any firm’s quality, and Graham suggested that a firm with high liquidity, low leverage (debt), and a high rate of consistent, sustained growth is a “high quality” firm. When it comes to measuring cheapness, typical indicators include the firm’s book-to-market ratio, the earnings-to-price ratio, the cashflow-to-price ratio, and the sales-to-enterprise ratio. Some argue that value stocks exhibiting cheap prices are more vulnerable to risk and thus more affected by recessions. Warren Buffet found the opposite. He was drawn to value investing since the cheaper a high quality stock became, the safer it was. Buffet said, “These are good companies, and yet they’re cheap. The stocks have gotten cheaper than five years ago, and yet the businesses are more valuable.” (The Snowball, Schroeder, 2008) Upon Buffett’s purchase of stocks from the company Western Insurance, author Alice Schroeder describes, “It was the cheapest stock with the highest margin of safety he’d

ever seen in his life.”¹ A firm’s quality can be measured in its profitability and growth, sustained earnings, safety (lower Beta value), and high payouts to creditors. In a 2000 study, eight indicators measuring firms’ cash flows, profit margins, and asset turnovers generated a composite score that successfully distinguished high return value stocks from low return “glamour” (growth) stocks. The value stocks exhibited higher cash flows, greater profit margins, and greater asset turnovers.

Notable Investors’ Approaches

Various investors have achieved high levels of success with methods and theories that each reflects the basic tenets of value investing at its core. Investors like Warren Buffett, Julian Robertson, Joel Greenblatt, and Charlie Munger have all abided by the value investing concept of targeting stocks both low in price and high in quality.

For example, in American investor and hedge fund owner Joel Greenblatt’s *The Little Book that Beats the Market* (2005), he attempts to quantify the main principles of Warren Buffett’s investment strategy of purchasing high quality companies at reasonable prices. Noted for famously saying, “It is far better to buy a wonderful company at a fair price than a fair company at a wonderful price,” Buffett underscored the importance of finding the proper balance between price and quality.² Greenblatt set out to create a strategy known today as *The Magic Formula* that would include a stock that purchased shares at “fair prices” from “wonderful companies.” Greenblatt categorized companies via a quality metric that analyzed a firm’s return-on-capital and earnings-yield. Consequently, *The Magic Formula* looked for companies that possessed high return-on-capital and high earnings-yield. Having been applied to data from U.S. companies, *The Magic Formula* showed that firms ranked at the top of the return-on-capital screen and on the top of the earnings-yield screen reported much higher returns than other firms by a considerable margin over the past 50 years.³

Academic Literature

Much evidence has been gathered from previous academic studies to prove and support the success created by value investing. Piotroski and So, in a 2000 study, showed that companies with higher cash flows, asset turnovers, and profit margins systematically earn higher returns. Piotroski & So reached this conclusion by developing a composite score based on eight indicators assessing a firm’s performance. In 2012, the two used this composite score to show that the trend of

¹ Schroeder, Alice. *The Snowball: Warren Buffett and the Business of Life*. New York: Bantam, 2008. Print.

² Chairman’s Letter, Berkshire Hathaway, Inc., Annual Report, 1989.

³ Gray and Carlisle (2013) using U.S. data from 1964-2011.

more people investing in stocks with relatively higher prices (the glamour effect) results from expectation errors about future market conditions and prices (recency bias).

In another study in 2013, Asness, Frazzini, and Petersen show that the market does indeed undervalue and underprice the ultimately higher quality value stocks. Defining such stocks as those that are “safe, profitable, growing, and well-managed,” Asness, Frazzini, and Petersen created a “Quality Minus Junk” portfolio of stocks sorted using their quality metrics of profitability, growth, safety, and payout. Out of 23 countries analyzed in the study, 22 exhibited positive returns with the “Quality Minus Junk” portfolio. 21 indicators were used in the study and divided into four overall categories: profitability (measuring gross-profit and cash flow), growth (measuring positive changes in the profitability metrics), safety (measuring volatility, financial distress, Beta, and leverage), and payout (measuring equity and debt issuances). In their study, Asness, Frazzini, and Petersen also showed that safer firms earned higher returns. Safe firms were those with lower volatility, lower Beta, and lower financial distress. The study also showed that firms providing higher payouts to shareholders, issuing less debt, and paying higher dividends also earned higher returns. All of their results supported the basic principles of value investing as conceptualized by Graham.

The Persistence of Value Investing

Various factors explain why value investing still continues to this day and remains a beneficial investment strategy.

- *Risk based explanations*
Value stocks are considered riskier, which explains why their future returns are projected as higher than most as a form of compensation for the inherent risk (Fama and French, 1992). Many investors make the mistake of aiming to invest in value stocks by solely focusing on cheap stocks, which, to a certain extent, are priced low as a reflection of their low quality (so-called “value – traps”). However, the risk-based explanation fails to recognize that value stocks are actually safer than more expensive, or lower quality “growth” stocks. Studies suggested that stocks with lower Beta, lower volatility, and lower financial distress are the ones that earn higher returns (Asness, Frazzini, and Petersen, 2013).
- *Preference based explanations*
Some investors prefer to invest in stocks that have much higher potential payoffs and return distributions that are skewed to the right. These are perceived to be so-called “growth” or “glamour” stocks. As a result, these stocks typically are priced higher or “over-priced”, as investors pay more for anticipated future earnings, which consequently promulgates the persistence of the value effect. Ironically, this herd mentality of investors pursuing what

- they perceive to be a rapid and large payoff is exactly what shifts the return distribution to the left, contributing to a leftward skewness.
- *Institutional- & Friction-based explanations*
 - Prudent man concerns*

Some investors are more likely to invest in glamour stocks, simply because such seemingly high return and frequently cited stocks make for more justifiable financial decisions (consider Amazon, Twitter, etc.). In the case of losses, glamour stocks also might have greater justifiability post-investment as a sound decision at the time. This element is a completely behavioral response, bringing together loss aversion (Prospect Theory), and availability bias. For some investors, companies that possess greater cultural recognition and approval like Amazon appear less risky and thus a more “prudent” investment decision, in spite of their higher prices. Consequently, a trend emerges with investors gravitating away from the lesser-known firms with potentially greater value and lower price. By investing in a well-known company like Amazon, the repercussions of investment losses could potentially be mitigated by its familiarity and widespread recognition.
 - Limits to arbitrage*

The value effect also persists because of limits to arbitrage that would otherwise even out the pricing levels of the value and glamour stocks. Some limits include the profit realization time frame, which can require a significant amount of time for the complete returns of the value stocks to be earned. Another limitation is the fact that some investors decide to withdraw their money from funds that are losing money, despite the fact that such losses are only resulting from a temporary mispricing. Lastly, the size of the company being invested in can act as a limit to arbitrage. There may simply not be enough shares for large competitors to buy, for it to be meaningful for them – no matter how desirable it may be.
 - *Behavioral-based explanations*
 - Saliency vs. weight*

Griffin and Tversky (1992) show that “high weight” (high statistical reliability) and “low saliency” events are typically underweighted, while “low weight” and “high saliency” events are typically overweighted. In the investing world, firms that exhibit low saliency are perceived as “boring” and thus receive less-than-normal weight and those glamour firms with higher saliency received more-than-normal weight. This pattern thus promotes the value/glamour effect.
 - Extrapolation*

There is a tendency for people to over-extrapolate previously-observed trends and events. Studies show that investors

underestimate the tendency for trends in firms' past to revert and overestimate the tendency for these firms to continue. Consequently, investors tend to overestimate the performance of past trends of firms when attempting to value the firms' future cash flows, thereby underpricing the value stocks and continuing to overprice the glamour stocks.

Momentum trading

Value stocks are considered negative momentum stocks, and thus are affected by the positive feedback effects of noise trading that could push prices even further away from their true value.

Confirmation bias (overconfidence)

Overconfidence in high "information uncertainty" environments also promotes the value effect. Evidence from various studies shows that such firms functioning in these "information uncertainty" environments tend to earn lower returns. Investors typically overweigh firm value metrics that exist in a future time period and underweight firm value metrics closer to the present.

Conclusion

The continued success and persistence of value investing remains an important financial tool for its high-return profits and relatively low-cost investment. From the theoretical foundations laid out by Benjamin Graham to Warren Buffett's highly successful and application of Graham's principles, the value effect has been heavily analyzed both in academia and amongst investment practitioners. Many of the most relevant studies are referenced throughout this paper. Asness, Frazzini, and Petersen, in particular, highlighted that the "safe, profitable, growing, and well-managed" firms were the ones that earned the higher returns. This paper also listed the various explanations for the persistence of the value effect, from behavioral to institutional theories, as well as the prevalent academic literature centered on this phenomenon. Indeed, perhaps the most compelling feature of value investing is how remarkably simple its basic premise is: quality and cheapness are the key determinants of long term investment success.