

Warren Buffett's investment success: Three-sigma event or repeatable wonder?

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ABSTRACT

This paper examines Warren Buffett's equity investment approach in light of advances in academic finance to assess whether Buffett's approach can be repeated with efficacious results, or if Buffett's success is simply the development of an extremely low probability event. Aspects of Buffett's investment approach are captured in a simple quantified approximation that is tested to see if some of the effectiveness of Buffett's approach can be picked up in a repeatable rule-based equity investment system. It is found that Buffett's investment approach is not well captured in a rule-based investment system, but that in light of the evidence from the finance literature, it is unlikely Buffett's success is the result of chance.

I. INTRODUCTION

Warren E. Buffett's investment success has been a persistent anomaly to the semi-strong form of the efficient market hypothesis (EMH), which posits that "security prices always fully reflect"¹ all "obviously"² public information. The implication is that "*most* fundamental analysis is... doomed to failure."³ Bodie et al. (2005) qualify their assertion with "most" for they note that analysts with "a unique insight will be rewarded,"⁴ but that "in the end it is likely that the margin of superiority that any professional manager can

¹ Andrei Shleifer, *Inefficient markets: An introduction to behavioral finance* (Oxford: Oxford University Press, 2002), p. 1

² Eugene F. Fama, "Efficient capital markets: A review of theory and empirical work" (*Journal of Finance*, 1970, v46: 283-417), p. 404.

³ Zvi Bodie, Alex Kane, Alan J. Marcus, *Investments*, 6th ed. (New York: McGraw-Hill, 2005) p. 377

⁴ *ibid.*

add is so slight that the statistician will not easily be able to detect it.”⁵ Applying this observation to Warren Buffett is difficult however, because 1) as Buffett noted in 1984, his investment strategy evolved largely out of investment philosophies and strategies that were/are available via texts published from the early to mid 20th century,⁶ and 2) his superior investment results have not been “slight”.

Buffett Partnership, Ltd., a limited investment partnership Buffett managed from 1957-1969, beat the Dow Jones Industrial Average (DJIA) every year of its existence, achieving a cumulative return of 2,749.9% relative to the DJIA’s 152.6%.⁷ More impressive is Buffett’s performance at Berkshire Hathaway Inc. (Berkshire), a then-beleaguered exchange-listed textile company he took majority-control of in 1965. Gradually transforming Berkshire into an investment vehicle, Buffett acquired businesses and various marketable securities that led to Berkshire’s per share growth in book value – which Buffett contends is a “conservative but reasonably adequate proxy for growth in intrinsic business value”⁸ – beating the pre-tax total return of the S&P 500 in 36 of 41 years, achieving an after-tax cumulative return of 305,134% relative to the S&P 500’s pre-tax total return (with reinvested dividends) of 5,583%.⁹ These results are too far from slight and too consistent to discount as being the result of either luck or the upside of investing in abnormally risky assets. It is also unfounded to contend that Buffett

⁵ Bodie et al. (2005), *Investments*, p. 405. Also see Eugene F. Fama, “Random walks in stock market prices” (*Financial Analysts Journal*, 1965, v21(5): 55-59); in which Fama writes: “additional fundamental analysis is of value only when the analyst has new information... or has new insights concerning the effects of generally available information...”

⁶ Warren E. Buffett, “The superinvestors of Graham-and-Doddsville” (*Hermes* [Columbia Business School], 1984: 4-15), p. 14-15.

⁷ Buffett (1984), “The superinvestors...”, p. 7.

⁸ Warren E. Buffett, “Shareholder letter” in *Berkshire Hathaway 1983 Annual Report* (Omaha: Berkshire Hathaway Inc., 1984); importantly, Buffett highlights the distinction between book value and intrinsic business value (an analogous term to fundamental business value).

⁹ “Corporate performance vs. the S&P 500” in *Berkshire Hathaway 2005 Annual Report* (Omaha: Berkshire Hathaway Inc., 2006), p. 2.

achieved such success by utilizing illicit information, for he gathered his information largely from annual reports and field research, known as scuttlebutt.¹⁰ In response to such anomalous success which is “hard to reconcile with absolutely efficient markets,”¹¹ Nobel Laureate William F. Sharpe dismissed Buffett’s success as a “‘three sigma event’ – a statistical aberration so out of line as to require no further attention,”¹² hence the title of this paper. Similar dismissals of Buffett’s success threatening the validity of the EMH have been made by Nobel Laureates Paul Samuelson¹³ and Merton Miller,¹⁴ and economist Burton Malkiel.¹⁵ Such an attitude towards Buffett’s investment success is characteristic of the academic finance community.¹⁶

This sort of general dismissal to a potential anomaly to the semi-strong form of the EMH is unscientific. The science of economics, indeed the science of anything, is enhanced particularly when potential anomalies to widely accepted theories are examined, and if found to be truly anomalous, the standard theories are reformed to incorporate them or replaced by novel theories.¹⁷ In this spirit, this paper will examine Warren Buffett’s investment success in the context of economic theory.

This paper will first provide a short biography of Warren Buffett. It will then explore the anatomy of Buffett’s approach to equity investing, the development of the ideas that make up the approach, and its implications in light of academic finance, particularly in

¹⁰ Roger Lowenstein, *Buffett: The making of an American capitalist* (New York: Broadway Books, 1995), pp. 310-311.

¹¹ Bodie et al. (2005), *Investments*, p. 405.

¹² Lowenstein (1995), *Buffett...*, p. 312.

¹³ Paul Samuelson, “The judgment of economic science on rational portfolio management” (*Journal of Portfolio Management*, 1989, v16: 4-12).

¹⁴ John Price and Edward Kelly, “Warren Buffett: Investment genius or statistical anomaly?” (IWIF, 2004, v1: 50-57), p. 51. <<http://www.ballarat.edu.au/ard/itms/CIAO/IWIF/iwif1papers/PriceKellyIWIF1.pdf>>

¹⁵ *ibid.*

¹⁶ *ibid.*

¹⁷ Thomas S. Kuhn, *The structure of scientific revolutions*, 3rd ed. (Chicago: University of Chicago, 1996); see especially chapter 6 and pp. 85-86.

regards to behavioral finance. Next, a simple quantified approximation of Warren Buffett's investment approach will be proposed, tested, and analyzed. It is hoped that this paper will provide a concise summary of Warren Buffett's investment approach, and by analyzing Mr. Buffett's anomalous success through the lenses of economic theory, assess whether Buffett's investment success is something anomalous, or evidence of systemic features in financial markets missed by the semi-strong form of the EMH.

II. SHORT BIOGRAPHY OF WARREN BUFFETT

Warren Edward Buffett was born in Omaha, Nebraska on April 30, 1930 to Howard Buffett, a securities broker, and Lily Stahl Buffett.¹⁸ Buffett earned a B.S. in Economics from the University of Nebraska-Lincoln in 1950¹⁹ and an M.S. in Finance from Columbia University in 1951,²⁰ where he studies under his "idol", Benjamin Graham, who would become Buffett's mentor and life-long friend.²¹ Buffett worked for Graham at Graham-Newman, a mutual fund, from 1952-1956, when the company liquidated.²²

In 1956, Buffett began managing money via limited investment partnerships, which he later merged into Buffett Partnership, Ltd. He managed this partnership until 1969, when he liquidated it. In 1965, Buffett Partnership took majority control of the common equity in a publicly-traded textile company, Berkshire Hathaway, at c. \$15/share.²³

¹⁸ Lowenstein (1995), *Buffett*, p. 8.

¹⁹ Lowenstein (1995), *Buffett*, pp. 34-35.

²⁰ Lowenstein (1995), *Buffett*, p. 45.

²¹ "Warren Buffett" in *Forbes 2005 World's Richest People* (*Forbes.com*, 2005, accessed April 20, 2006). <<http://www.forbes.com/static/bill2005/LIRC0R3.html?passListId=10&passYear=2005&passListType=Person&uniqueId=C0R3&datatype=Person>>

²² Lowenstein (1995), *Buffett*, pp. 52, 58.

²³ Lowenstein (1995), *Buffett*, p. 130.

Buffett served as the company's executive committee chairman from 1965 to 1970,²⁴ and since 1970, has served as the company's Chairman and CEO.²⁵ As of March 13, 2006, Warren Buffett owned 38.3% of Berkshire Hathaway's voting rights, and 32.3%²⁶ of its economic interests, valued at US\$43.08 billion as of April 20, 2006.²⁷ This fortune has afforded him the No. 2 spot on Forbes' 2005 list of the *World's Richest People*, behind William Gates III of Microsoft.²⁸

III. ANATOMY OF WARREN BUFFETT'S INVESTMENT APPROACH

Sources

Warren Buffett's investment approach towards equities will be summarized and analyzed in this section using documents written by Warren Buffett and ones referred to by Warren Buffett. Given the difficulty of assessing the validity of hearsay statements, documents whose authors claim to have special insights into Buffett's strategy are not used. It is important to note the limitations of this anatomization of the strategy. Warren Buffett has stated in the past that he will not reveal everything about his investment methods. He has however, revealed much in his own writings and has pointed readers in the direction for good advice.

²⁴ *ibid.*

²⁵ Lowenstein (1995), *Buffett*, p. 137.

²⁶ Consisting of 498,320 Class A (out of 1,260,704) and 177 Class B shares (out of 8,407,392), which are 1/30 of the economic value of a Class A share, but 1/200 of its voting power.

²⁷ Berkshire Hathaway, *SEC schedule 14A information: Proxy statement pursuant to section 14(a) of the Securities Exchange Act of 1934* (Omaha: Berkshire Hathaway, Inc. & the US SEC, March 13, 2006), pp. 1, 8.

²⁸ "Warren Buffett" at *Forbes.com* (2005)

The principle source of direct information about Buffett's investment approach is the letters he writes every year in the annual reports of Berkshire Hathaway, Inc. He has also written in various periodicals, which are also helpful in learning about his method of investing. The principle source of indirect information about Buffett's investment approach are the books he has credited for strongly influencing his investment approach. Of primary importance are the writings of Benjamin Graham and David Dodd, whose investing principles Buffett cites has the primary influence on his investment approach: "Our prosperity is the fruit of their intellectual tree."²⁹ Of their published works, Buffett cites *Security Analysis* (1934) as a key influence. Of Ben Graham's solo-works, Buffett cites *The Intelligent Investor* (1949), a book Buffett calls the "best book on investing ever written."³⁰ Buffett also credits the works of Philip Fisher and John Burr Williams³¹ as having influenced the principles by which he allocates capital.

Margin of safety principle

Buffett (2004) summarizes what he looks for in the underlying businesses of equity investments: "(1) have favorable and enduring economic characteristics; (2) are run by talented and honest managers and (3) are available at a sensible price."³² Evaluating the second facet is beyond the scope of this paper, but facets (1) and (3) will be covered. I will begin with (3), regarding purchasing businesses at sensible prices.

²⁹ Warren E. Buffett, "Shareholder letter" in *Berkshire Hathaway 1988 Annual Report* (Omaha: Berkshire Hathaway Inc., 1989), in section on the death of David Dodd.

³⁰ Buffett (1985), "[1984] Shareholder letter", in the section on the "Washington Public Power Supply System".

³¹ Warren E. Buffett, "Shareholder letter" in *Berkshire Hathaway 1992 Annual Report* (Omaha: Berkshire Hathaway Inc., 1993), in section on "Common Stock Investments".

³² Warren E. Buffett, "Chairman's Letter" in *Berkshire Hathaway 2003 Annual Report* (Omaha: Berkshire Hathaway Inc., 2004), p. 4.

Graham (1949) wrote in summing up the secret to investing, “Confronted with a challenge to distill the secret of sound investment into three words, we venture the motto, Margin of Safety.”³³ Reflecting on this statement in 1991, Buffett asserted that “Forty-two years after reading that, I still think those are the right three words.”³⁴ Margin of safety is a principle that can be applied in various ways, but in its essence, it refers to leaving a buffer zone in situations to insulate an agent from negative possibilities in a time horizon.

For instance, if a business tends to have \$100 million in debt servicing expenses per year, and tends to earn \$500 million per year, the margin of safety in this situation is \$400 million. Graham (1949) uses a similar example to explain margin of safety, which is appropriate because it is a principle that comes out of business. This business principle can be applied to all facets of private and publicly-traded businesses. Barriers to competition can, for example, be a source for margin of safety in the area of pricing power. Inelastic demand for a product can be a source of margin of safety from inflation. In summary, many examples can be conjured up.

Applying this principle to security investing specifically, becomes problematic in light of the efficient market theory; a problem that will be discussed later. Nonetheless, the principle of margin of safety is applied specifically to security investing in a way that is best explained by an illustration. If an investor estimates that a business is worth about \$100 million, and purchases it for \$75 million, then the investor’s margin of safety is \$25 million. The investor would want to do this because the future is uncertain, and therefore his/her estimates of business value, which is calculated out of unknowns, could be

³³ Benjamin Graham, *The Intelligent Investor* (New York: Harper, 1949), p. 277 in forth edition (1972);

³⁴ Warren E. Buffett, “Shareholder letter” in *Berkshire Hathaway 1990 Annual Report* (Omaha: Berkshire Hathaway Inc., 1991), in section on “Marketable Securities”.

significantly different than what the business is actually worth on a discounted cash flow (DCF) basis. Fama's (1970) description of the semi-strong form of the EMH leaves little room for this application of the margin of safety principle, for under the semi-strong form of the EMH, an arbitrageur would quickly buy and bid up the price of a publicly-traded business whose market price was supposedly quoted below its fundamental value.

Despite this criticism of Buffett's margin of safety principle from proponents of the semi-strong form of the EMH, it is a corner-stone to his investment approach.

Distinction between fundamental value and market value

Buffett and his intellectual forefathers make/made a clear distinction between business value, often referred to as fundamental value in finance, and market value of a business' common equity. Fundamental value of a company's equity is the present value of expected cash flows less the company's liabilities.³⁵ Buffett describes intrinsic value and its imprecision in the following way:

We define intrinsic value as the discounted value of the cash that can be taken out of a business during its remaining life. Anyone calculating intrinsic value necessarily comes up with a highly subjective figure that will change both as estimates of future cash flows are revised and as interest rates move. Despite its fuzziness, however, intrinsic value is all-important and is the only logical way to evaluate the relative attractiveness of investments and businesses.

³⁵ For excellent writings on valuation, see especially: Aswath Damodaran, *Investment Valuation*, 2nd ed. (New York: Wiley, 2002) & McKinsey & Company Inc., Tim Koller, Marc Goedhart, and David Wesels, *Valuation: Measuring and managing the value of companies*, 4th ed. (New Jersey: Wiley, 2005).

This highlighting of intrinsic value's imprecision may be important in understanding how market prices can deviate from reasonable estimates of fundamental value to begin with. If rational investors have different estimates of fundamental value, and particularly small margin of safety requirements, they will trade with each other when the market price of the equity in question deviates from their individual estimates, resulting in a natural level of volatility that is not irrational. Shleifer (2000) describes the possibility of such a characteristic in financial markets.³⁶ Such volatility may then attract speculative momentum traders who possess zero or negative margins of safety, and who perpetuate deviations between a stock's market price and fundamental value. De Long et al. (1989) notes that such "noise traders provide... an opportunity [to] be exploited by skillful rational investors."³⁷ Fundamental-value focused investors with small margins of safety may then jettison their interests in the stock, fearing that the market-fundamental value deviation may worsen, causing them to incur losses. The selling of these investors would cause the market price of the stock to fall even farther below fundamental value. The logical question is, why would anyone expect the trend of the market price to ever revert towards fundamental value? The real-world reason is that the company whose stock is undervalued will have an incentive to repurchase the stock (as it would be say, buying \$20 for \$15), decreasing the share supply and increasing the fundamental value/share, and thus putting upward pressure on the share price (on the flip side, a company with a particularly overvalued stock will have an incentive to issue more securities or make acquisitions with the company's stock). Similarly, investors that require particularly large margins of safety may begin purchasing the stock if it should fall within their

³⁶ Shleifer (2002), *Inefficient markets*, pp. 183.

³⁷ J. Bradford De Long et al., "The size and incidence of the losses from noise trading" (*The Journal of Finance*, 1989, v44(3): 681-696), p. 694.

desirable margin of safety ranges, putting pressure on the price trend to reverse towards fundamental value. Unfortunately, Shleifer (2000) notes that much more research is needed to better understand how market prices are determined, and thus how they deviate from fundamental values.³⁸ However market prices tend to deviate from fundamental values, this section will show that such deviations do indeed occur, contrary to the EMH.

The market value of a company's equity is the shares outstanding multiplied by the current market price of a share of stock of the company's common equity. Buffett, Graham, and Dodd hold, inconsistent with the semi-strong form of EMH, that market prices do not necessarily reflect accurate estimates of a business' fundamental value (in which case prices are not "right"³⁹). Graham and Dodd (1934) assert:

The market level of common stocks is governed more by their current earnings than by their long-term average. This fact accounts in good part for the wide fluctuations in common-stock prices, which largely (though by no means invariably) parallel the changes in their earnings between good years and bad.⁴⁰

Shleifer (2002) provides an explanation of why this may be. He notes that investors tend to underreact to news, but tend to overreact to consistent patterns. In the short-term underreaction situations, prices tend to keep trending upwards to good news after the initial upward reaction, and prices tend to keep trending downwards to bad news after the initial downward reaction. In the longer-term overreaction situations, companies that report consistently good news tend to be overpriced in the securities market, and businesses who report consistently bad news tend to be under priced.⁴¹ Graham

³⁸ *ibid.*

³⁹ Bodie et al. (2005), *Investments*, p. 396.

⁴⁰ Benjamin Graham and David Dood, *Security Analysis* (New York: McGraw-Hill, 1934), p. 432.

⁴¹ Shleifer (2002), *Inefficient markets*, pp. 112-113.

recognized this regularity in equity markets and it is why they prescribed an investment policy based on purchasing a diversified basket of equities which were conservatively financed and were trading far below their book values.⁴² Buffett originally utilized this investment approach, which in finance literature is called value investing, but found problems with it and adjusted it. These adjustments will be discussed later. Despite his abandonment of value investing in its original form, there is evidence that such value strategies do provide excess returns that cannot simply be explained by exposing a portfolio to abnormal amounts of risks. Lakonishok et al. (1994) find that a simple value strategy tends to beat a glamour stock strategy (purchasing in-favor equities) by 10-11% per year. They credit this anomaly to the semi-strong form of the EMH to “out-of-favor (or value) stocks hav[ing] been underpriced relative to their risk and return characteristics.” Lakonishok et al. (1994) provide various explanations of this finding, including that investors form expectational errors due to overreaction to strings of good and bad news.⁴³

More concrete evidence of market prices diverting from fundamental values are found in securities differing only in proportion, trading at proportionally different prices. Froot and Dabora (1999) document a case in which the prices of the shares of Royal Dutch Petroleum and shares of Shell Transport and Trading, whose shares differ in proportion (60/40) and primary listings of their shares (Amsterdam/London), diverge significantly from their 60/40 proportion over a fifteen year period. The deviations range

⁴² Graham (1949), *The Intelligent Investor*, pp. 214-216. For a detailed overview of this type of strategy, see especially Tweedy, Browne Company LLC's *What has worked in investing* (undated) <http://www.tweedy.com/library_docs/papers/what_has_worked_all.pdf>

⁴³ Josef Lakonishok, Andrei Shleifer, and Robert W. Vishny, “Contrarian investment extrapolation, and risk.” (*The Journal of Finance*, 1994, v49(5): 1541-1578), see especially pp. 1574-1577. A similar and insightful discussion of this issue can be found in: Wayne Guay, “Discussion of value investing: The use of historical financial statement information to separate winners from losers” (*Journal of Accounting Research*, 2000, v38: 43-51)

from an underpricing of Royal Dutch to Shell by 35% to overpricing by 10%.⁴⁴ A similar irregularity of this sort is documented by Cochrane (2002), in which the shares of 3Com were trading for less than the value of its liquid position in Palm.⁴⁵

In light of the accumulation of anomalous evidence against the EMH, Burton Malkiel, who once supported the EMH, concludes:

Undoubtedly, some market participants are demonstrably less than rational. As a result, pricing irregularities and even predictable patterns in stock returns can appear over time and even persist for short periods. Moreover, the market cannot be perfectly efficient, or there would be no incentive for professionals to uncover the information that gets so quickly reflected in market prices... Undoubtedly, with the passage of time and with increasing sophistication of our databases and empirical techniques, we will document further apparent departures from efficiency and further patterns in the development of stock returns.⁴⁶

Thus, there is evidence that market values of equities do at times deviate from their fundamental values. However, this does not in of itself suggest an investment program that will provide abnormally high returns, for deviations between market and fundamental values may be difficult to detect, be very small, and persists for long periods of time. Since valuation is imprecise and based off of unknowns, what seem to be mispricings may not at all be mispricings (hence the need for margin of safety!). If mispricings are small, it may not be profitable to exploit them. Also of great importance,

⁴⁴ Kenneth A. Froot and Emil Dabora, "How are stock prices affected by the location of trade?" (*Journal of Financial Economics*, 1999, v53: 189-216). See also Shleifer (2002), *Inefficient markets*, p. 30.

⁴⁵ John H. Cochrane, "Stocks as money: Convenience yield and the tech-stock bubble" (unpublished, May 23, 2002), pp. 1-4. <http://gsbwww.uchicago.edu/fac/john.cochrane/research/Papers/cochrane_stock_as_money.pdf>

⁴⁶ Burton G. Malkiel, "The efficient market hypothesis and its critics" (*The Journal of Economic Perspectives*, 2003, v17(1): 59-82), p. 80.

if a mispricing exists at present, investors have little way of knowing when the market price will revert towards fundamental value, or if the mispricing will worsen (resulting in an unrealized loss). Warren Buffett provides an approach that aims to exploit these deviations in a way that has provided superior investment returns.

Common stocks as shares in a business

As a business man would not buy a business without evaluating, Buffett holds that an investor should not purchase ownership interests in businesses via publicly-traded stock without first evaluating the company to be purchased. This belief implies that as an investor has limited time to devote to evaluating businesses, the number of distinct businesses this type of investor can invest in will be limited, and that these investments represent something more complex than random variables possessing idiosyncratic and systemic market risks. Therefore, the type of widespread diversification prescribed by Markowitz (1991) is not practical or possible.⁴⁷ Nor would such diversification be desired. If one were to over-extend one's research efforts, s/he may sacrifice the quality of his/her valuations and understandings of the particular businesses. In selecting businesses to evaluate, Buffett only investigates businesses which are easy for him to understand. This overall business franchise-focused approach greatly differs from Graham's investment approach, which sacrificed deeper understandings for businesses for greater diversification. Damodaran (2002) notes that the underlying assumption in this investment philosophy – which Damodaran states Buffett is very successful at

⁴⁷ Harry M. Markowitz, *Portfolio selection: Efficient diversification of investments*, 2nd ed. (Cambridge, MA: Blackwell, 1991), see especially pp. 5, 217.

implementing – is that “Investors who understand a business well are in a better position to value it correctly.”⁴⁸

Unlike Graham’s investment program, which is the typical value strategy, Buffett integrated the key teaching of Phil Fisher that it is better to buy “an outstanding business at a sensible price, not a mediocre business at a bargain price”.⁴⁹ The reason for this change may have been the difficulties Buffett found with Graham’s approach. If one buys a security that is trading below book value, it is likely because it has a low return on equity. Take for instance two securities, each of which have a book value of \$10, and are the same in every way (including idiosyncratic risks) except that Stock A yields \$2/year and Stock B yields \$1/year. If both securities start trading at \$10, lack of demand for Stock B will drop the price to \$5/share. The obvious problem is that Stock B is not undervalued even though it is trading below its book value. Therefore, a value strategy as such, that forms a portfolio of low price-to-book stocks, will include these securities that are not undervalued at all, but are in fact fairly valued. Even if some of the securities in this portfolio were genuinely selling less than their fundamental values, an initial profit would eventually be realized as the deviation between market and fundamental values shrinks, but over the long-run, the stock will tend to provide below-average returns because its fundamental value will grow slower than average (a result of below average return on equity).⁵⁰ This would thus require constant adjustments to the value portfolio – replacing stocks that are no longer undervalued with ones that are – which could be difficult if low price-to-book stocks are not available at a particular time. The time

⁴⁸ Damodaran (2002), *Investment Valuation*, p. 9.

⁴⁹ Warren E. Buffett, “Shareholder letter” in *Berkshire Hathaway 1987 Annual Report* (Omaha: Berkshire Hathaway Inc., 1988), in section titled “Common Stocks”.

⁵⁰ For a criticism on value investing, see especially: Philip A. Fisher, *Common Stocks and Uncommon Profits* (New York: Wiley, 1996; originally published in 1958), p. 52.

dedicated to doing this would prevent an analyst from specialization in a particular set of businesses, the specialization of which helps provide more accurate valuations (as mentioned earlier⁵¹).

Instead of mimicking Graham's classic approach to investing, Buffett only invest in high quality companies (which will be elaborated on in the next section) that are selling significantly below their fundamental values. The reason for this is simple: if an investor can acquire a business with above average to high return on equity with a large margin of safety, then the fundamental value of the business will compound faster than a business that has a lower return on equity. There is of course the case of idiosyncratic risks. Buffett minimizes such risks by only purchasing businesses that are conservatively financed and have "predictable" earnings (predictable to the analyst because the analyst is competent in evaluating the particular type of business).⁵² The characteristics Buffett attributes to "high quality" companies is the subject of the next subsection.

"Outstanding business"?

As stated earlier, Buffett looks for businesses with "favorable and enduring economic characteristics" (i.e. outstanding businesses). He elaborates on this statement throughout his writings. The concrete characteristics that Buffett attributes to "outstanding businesses" are succinctly summarized succinctly by Price (2004).⁵³ They are 1) high return on equity, 2) conservatively financed (little or no debt, or if there is such debt, the

⁵¹ Damodaran (2002), *Investment Valuation*, p. 9.

⁵² Warren E. Buffett, "Chairman's Letter" in *Berkshire Hathaway 1996 Annual Report* (Omaha: Berkshire Hathaway Inc., 1997), in section titled "Common Stocks".

⁵³ Price and Kelly (2004), "Warren Buffett...", pp. 53-54.

company should be able to pay it off even if extremely poor business outcomes transpire), 3) high quality management, and 4) durability in the business' franchise, better known as an "economic moat". The third characteristic will not be discussed in this paper, but the other three will.

Return on equity – net earnings divided by shareholder equity – measures how well money invested in a particular business is being utilized. If for instance, a company is achieving a risk-adjusted return on equity below that of the businesses in general, then the capital employed in that business could be put to better use by redeploying the capital to higher-return uses. Return on equity loses its usefulness though when companies utilized heavy amounts of leverage.

It is essential in Buffett's investment approach that the businesses underlying the equity securities he buys be conservatively financed. This is necessitated by the low level of diversification the approach employs. As Buffett exposes himself to much idiosyncratic business risks by owning a small basket of securities, he insures that such risk is minimal. If a company possesses low levels of debt, it will be more able to endure "extraordinary adverse conditions".⁵⁴

The most complicated aspect of "outstanding businesses" as defined by Buffett, is an economic moat. An economic moat can be a particularly strong brand that provides a barrier to entry to competitors and inflation protection via pricing power. Inflation protection and pricing power in general are of especial aid in valuation, where one of the unknowns that could easily foul a valuation is future inflation. For commodity-type businesses, inflation could be devastating as they are unable to raise their prices, resulting in deterioration of the business' fundamental value. Attributes of products can be a

⁵⁴ Buffett (1988), "[1987] Shareholder letter", in section titled "Financing".

source of economic moat, say, if the product expires quickly and must be repurchased soon after (i.e. disposable shaving razors).⁵⁵ An economic moat can be a business having a lower cost-structure than its competitors, such as by having superior economies of scale.⁵⁶ This aspect of the businesses Buffett looks for is difficult to quantify. One limited way of quantifying it would be by looking for companies with unusually high profit margins. Intuitively, if a company did not have some sort of barriers to entry into its product spaces, then the profit margins would erode to more normal levels. What is “unusual” and what is “normal” of course are arbitrary terms.

Now that Buffett’s investment approach has been summarized, a simple approximation of his approach will be proposed, tested, and analyzed.

IV. SIMPLE APPROXIMATION OF BUFFETT’S APPROACH

Limitations

A simple investment rule will be proposed in this section that aims to approximate, in a very limited way, Warren Buffett’s investment approach. In forming an approximation, repeatability has been chosen over accuracy of Buffett’s investment approach. Various key aspects are lost in doing this: 1) businesses are not heavily researched or well understood so details of economic moats or lack thereof, 2) estimates of fundamental value are not utilized due to the very subjective nature of valuation, as a result, there is no

⁵⁵ Warren E. Buffett, “Shareholder letter” in *Berkshire Hathaway 1993 Annual Report* (Omaha: Berkshire Hathaway Inc., 1994), in section titled “Common Stock Investments”.

⁵⁶ Buffett (1997), “[1996] Shareholder letter”, in section titled “Insurance – GEICO and Other Primary Operations”

certainty that the securities entered into the portfolio of the approximate investment strategy are trading below their fundamental values; 3) management is not analyzed at all except indirectly and murkily through return on equity, and 4) P/E is used as a proxy for possible undervaluations despite Buffett specifically advising against this:

Common yardsticks such as dividend yield, the ratio of price to earnings or to book value, and even growth rates have *nothing* to do with valuation except to the extent they provide clues to the amount and timing of cash flows into and from the business.⁵⁷

There is also the problem that it is assumed that investors, on the day each portfolio is formed (the first day of trading of the year after the most recent historical accounting data year), know the fourth-quarter accounting data in the last year of historical accounting data. Obviously, this does not occur in real life – fourth-quarter data becomes available usually sometime in the first-quarter of the following year. However, in real life, investors may have a somewhat fair estimate of what fourth-quarter results will be due to analyst estimates. Nonetheless, this lack of realism is incorporated into these tests to make possible the use of calendar year comparisons (making it easier to compare portfolio results with that of relevant indexes), instead of fiscal year comparisons. If fiscal years were to be used though, the portfolios would be formed on the first trading day of the second-quarter of the year after the last year of historical accounting data.

Approximate rule-based investment approach

⁵⁷ Warren E. Buffett, “Chairman’s Letter” in *Berkshire Hathaway 2000 Annual Report* (Omaha: Berkshire Hathaway Inc., 2001), in section titled “Investments”.

Despite its limitations, the approximate investment intends to capture some elements of Warren Buffett's actual investment approach. The approximation is as follows. It will utilize five years of past accounting data to sort out stocks whose average return on equity is 16% or higher during the five year period, and does not fall below 15% during any of the years; have a cash flow/interest expense above 5 (cash flow being net income + depreciation and amortization) in each of the five years; have a debt/equity ratio not more than 1.5 in the most recent year of accounting data; have sales of at least \$100 million in each of the five years;⁵⁸ have at least 0% growth in sales and cash flow from first year of accounting data to the last year; and have market value of equity/cash flow ratios below 15 at the close of the last year of accounting data. The performance of these portfolios will be examined up to five years after formation. Each security in a portfolio will be value-weighted at the beginning of each year. Portfolio returns will be calculated for each calendar year. For cases in which a security is delisted before the end of a year, the cash proceeds of the delisting or lack thereof (i.e. bankruptcy) are assumed to be placed in a cash account which has a yield of 0%. At the end of each year, the portfolios are rebalanced amongst the surviving securities.

Return data is from the Center for Research in Security Prices (CRSP) and accounting data from COMPUSTAT. Stocks are sorted from those listed on the New York Stock exchange and the American Stock Exchange. Lakonishok et al. (1994) detail the various biases that may exist in these data sources.⁵⁹ I use three formation periods – 1986 to

⁵⁸ This is derived from Buffett's acquisition criteria that he will only buy businesses with at least \$75 million in pre-tax earnings (2005 *Berkshire Hathaway Annual Report*, p. 25). Therefore, a cut-off of \$100 million in sales is quite inclusive in light of Buffett's acquisition criteria.

⁵⁹ Lakonishok et al. (1994), "Contrarian...", p. 1544.

1990, 1991 to 1995, and 1996 to 2000 – and three sample periods: 1991 to 1995, 1996 to 2000, and 2001 to 2005.

It should be noted that Buffett could have adjusted his investment portfolio anytime during the year, and thus purchased securities at much more advantageous prices than the approximate investment approach could. This limitation likely substantially hindered the profitability of the approximate investment approach.

Results

Given the inconclusiveness of the 1991-1995 and the 1996-2000 samples, I decided not to form the portfolio for the last sample period, for the first two samples give enough bearing to the conclusion that Warren Buffett's investment strategy is too thinking-based to approximate with a rule-based system with any degree of success. The results for the first two sample periods are as follows:

Year	Return of approximate portfolios (assuming no tax)	Return of S&P 500 (assuming no tax)	Non-risk-adjusted economic return of approximate portfolios
1991	37.18%	30.5%	6.68%
1992	11.04%	7.6%	3.44%
1993	7.68%	10.1%	-2.42%
1994	2.16%	1.3%	0.86%

1995	36.97%	37.6%	-0.63%
1996	25.21%	23%	2.21%
1997	31.37%	33.4%	-2.03%
1998	41.54%	28.6%	12.94%
1999	17.90%	21.0%	-3.10%
2000	(19.04%)	(9.1%)	-9.94%
Cumulative return	410.05%	400.14%	9.91%

Analysis

The meager non-risk-adjusted economic return of the approximate portfolio is so small as not to warrant adjusting it for risk via some tool like the Capital Asset Pricing Model. Clearly, the approximate investment approach did not produce anything close to the abnormal investment returns produced by Warren Buffett. It did however, pick up some of the securities Warren Buffett invested in.

V. CONCLUSION

Although the approximate investment approach failed to produce abnormal returns, this is not conclusive evidence that Warren Buffett's investment success is a result of luck, for the approximate investment approach is just an approximation, and a poor one indeed. Its inconclusiveness does make it obvious that it is difficult to replicate Buffett's approach via

a rule-based investment system. As Buffett (2004) highlights, after criticizing rule-based investment systems: “What’s required is thinking rather than polling.”⁶⁰

Price and Kelly (2004) estimate that if Buffett’s investment success were the result of luck, the probability of his success occurring by pure chance is 1/100 billion.⁶¹ In light of this extremely small possibility of luck, and evidence from financial literature showing that market prices do not necessarily reflect underlying fundamental values, it is reasonable to conclude that Buffett’s success was not the result of luck, but rather reflects the exploitation of systemic features in financial markets not yet well understood by the academic community. Nonetheless, repeating Warren Buffett’s results would truly be a wonder.

⁶⁰ Warren E. Buffett, “Chairman’s Letter” in *Berkshire Hathaway 2001 Annual Report* (Omaha: Berkshire Hathaway Inc., 2002), in section titled “Common Stock Investments”.Section titled “Investments”.

⁶¹ Price and Kelly (2004), “Warren Buffett...”, p. 52.

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