

DO DEEP VALUE STOCKS GENERATE EXCESS RETURNS?

ABSTRACT

The study raises the question whether Ben Graham's "net net" strategy or the Net Current Asset Value (NCAV) criterion for stock selection generates risk-adjusted excess returns. After controlling for Fama-French five risk factors and the January effect, we find that NCAV stock portfolio generate significant excess returns. However, after we account for several liquidity risk factors such as bid-ask spread, trading volume, and the level of stock price, we document no significant risk-adjusted excess returns. These findings have significant implications for investors and portfolio managers who rely on Ben Graham's value investing strategy.

Keywords: *Net Current Asset Value, Value Investing, Excess Returns*

INTRODUCTION

"There can be no sound reason for a stock's selling continuously below its liquidation value.... Stocks selling below liquidation value are in many cases too cheap, and so offer an attractive medium for purchase. We have thus a profitable field here for the technique of security analysis."

-Benjamin Graham & David Dodd, *Security Analysis*, 1934 [10]

Benjamin Graham's net current asset value (NCAV) technique for stock selection was first published in 1934 in Graham and Dodd's *Security Analysis* [10], and is a method well known to security analysts. The method is easily understood and applied, and the returns appear to be abnormally high. For example, the Graham-Newman Corporation reported returns of around 20% per year over a 30-year period ending in 1956.ⁱ It remains a criterion used by institutional investors today.ⁱⁱ

This article reexamines the performance of Graham's NCAV technique over the period 1969 – 2014. Given the popularity and good performance of the technique, there is relatively little academic research available. What is available is controversial. Some papers document abnormally high returns and others do not find any statistically significant positive returns.

Prior studies that document high excess returns accruing to the NCAV technique include [15], [18], [1], [19] and [4]. Oppenheimer [15] uses a sample from 1970 – 1982 and finds that firms that pass the NCAV screening technique (hereafter NCAV firms) generate positive and significant alphas after controlling for market risk and the small-firm effect. However, the alpha is not significantly positive each year. High alphas tend to coincide with the recovery after the recession in the early 1970s. Vu [18] generates a sample of NYSE stocks that meet the NCAV criterion for the period 1977 – 1984. His results indicate excess returns over 24% for a two-year holding period. Bildersee et al. [1] test a form of the NCAV rule on Japanese stocks, in which they normalize a firm's NCAV by market value of equity, and then form portfolios with positive normalized NCAV. This strategy creates excess returns, but differs slightly from Graham's technique. Xiao and Arnold [19] document high excess returns for the London Stock Exchange for the period 1981 to 2005, with annualized returns around 20%. Finally, Dudzinski and Kunkel [4] document annualized returns of around 25% for the period 2003 to 2010.

Researchers finding no excess returns after adjusting for risk include Oppenheimer [14], who studies the period from 1949 to 1972 using a value-weighted portfolio. Oppenheimer's [14] study excludes years in which there are less than nine eligible securities, leaving 13 years in the sample. In another study, Lauterbach and Vu (1993) find that the excess returns documented by Vu [18] are explained by the small-firm premium. After controlling for market risk and the small-firm effect, Lauterbach and Vu [12] show that the excess return on NCAV stocks is actually negative, around -15% over a two- year investment window. Overall, the literature on returns and risks associated with NCAV stocks provides mixed evidence.

Our study differs from prior studies in several ways. First, we extend prior research using more recent data, and a longer sample period (1969-2014). We gather data from Compustat and CRSP for the period 1969 – 2014 to identify all potential NCAV stocks, and obtain a list of 606 firms. Our sample overlaps most of those prior studies indicated above, except for Oppenheimer [14]. Second, we create a matched sample firms, based on industry and size, and compare the results for the NCAV firms with that of matched sample firms. Third, we examine risk-return relationship using the Fama- French five risk factor asset pricing model [9] while controlling for the January effect. We then compare the results with that of matched sample firms. Fourth, we investigate the impact of trading cost and liquidity risk on excess returns (alpha) associated with NCAV stocks. Finally, we provide additional analysis of the operating characteristics of firms that fall into the category of NCAV securities based on Graham's technique and compare them with that of matched sample firms to determine if there is any operational change that might explain the excess returns.

We find that the NCAV technique generates annualized returns of nearly 30 percent, although variation throughout the sample is significant. After controlling for risk factors based on the Fama-French five-factor asset pricing model and the January effect, we find monthly alpha for NCAV sample firms is 1.30 percent which is significant at the 1 percent level. In contrast, our matched sample has insignificant alpha which is below those of the NCAV firms. We find the difference in alpha between the two samples can be attributed to practical difficulties in trading NCAV stocks which are characterized by higher bid-ask spread, lower trading volume, and lower stock price per share in comparison to that of matched sample firms.

We conclude our study with an examination of several financial ratios for the NCAV firms and the matched sample of firms to determine if there is any operational change that might explain why the NCAV firms are priced so low. According to our data, NCAV firms hold more cash and are less profitable than the matched sample, and may have less efficient inventory management. NCAV firms have lower long-term leverage than that of the matched sample firms indicating no evidence that the NCAV firms are not in financial distress. Overall, we do not find any difference in operational characteristic between NCAV stocks and matched sample firms that would lead the NCAV firms to be so significantly underpriced.

The remainder of this paper is organized as follows. Section 2 describes sample selection, data, and research methodology. Section 3 presents the empirical evidence, and Section 4 concludes.

SAMPLE SELECTION, DATA, AND RESEARCH METHODOLOGY

The NCAV calculation is an approximation of a firm's liquidating value. As Graham argued, no firm should continuously sell below its liquidating value because the firm would either recover or be liquidated. Consistent with previous literature (Oppenheimer [14], [15]), we calculate a firm's NCAV as total current assets net of all liabilities and preferred stock. We then divide this by the firm's total shares outstanding. As per Oppenheimer [15], our model investor purchases the stock if the November closing price is less than or equal to two-thirds of the firm's December NCAV per share. We assume the purchase occurs the last trading day in December of each year.

To build our sample we begin with all firms on the CRSP and Compustat databases from 1969 to 2014 and that trade on the NYSE, AMEX, or NASDAQ.ⁱⁱⁱ We also require the following accounting data to calculate the NCAV per share: Current Assets, Total Liabilities, and Preferred Stock. In our analysis of operational changes, we require much more data, but this does not reduce our sample size. We remove any firm that is not headquartered in the U.S. Our final sample is 606 unique firms. From these firms we form monthly portfolios, rebalancing every December. Portfolio returns are equally weighted. As shown in Table 1, the number of firms in each portfolio varies widely across the sample.

For firms that are delisted, we use the delisting return in the month the firm is delisted. 26 firms are delisted while they are NCAV firms. Eleven of the firms have a documented delisting return, but the other 15 do not. These 15 have a delisting code of 100, which means the issue is still trading on the NYSE/AMEX/NASDAQ, and they display a return in each month, and a delisting price of 0. These 15 firms were eliminated from the sample due to vagueness regarding the delisting^{iv} and are not counted in the 606 firms. Of the remaining eleven firms, eight are delisted due to mergers (codes 231 and 233), and one each for liquidation (code 450), unavailable reason (code 500), and company request (code 750). We include these firms in our final sample as an investor would not know the NCAV firm that was purchased would eventually be delisted, and this is a risk such an investor would take to implement the NCAV technique.

Following Graham's suggestion, we calculate the returns for 12-month and 30-month holding periods. For both portfolios, we assume the stocks are purchased at the end of December. The 12-month portfolios rebalance in the following December. For the 30-month portfolios, we have different base years and show the results separately for each year. Since some of the firms in the NCAV sample

remain in the sample for several years, the 30-month portfolios have some overlap in the specific firms included in the sample. We expect the typical NCAV investor would hold the firm until it recovered, at least, so we are not concerned about the overlap. Thus our returns are understood easily: if an investor were to form a portfolio of NCAV firms in year t , and hold it for 30 months, that investor would have earned the gross returns shown here.

After creating our sample of NCAV firms, we create a matched sample using the primary 4-digit SIC code of the firms and the total assets^v of the firms. We do not use market capitalization as a proxy for size because the market capitalization of the NCAV firms is, we argue, substantially impaired, and as such is not a good guide of the actual size of the firm. We form portfolios of the matched firms in the same way we formed portfolios of the NCAV firms.

To calculate the risk-adjusted returns for both samples, we use the Fama-French five factor model [15], augmented by a dummy variable to capture the January effect. The five-factor model uses the Fama-French three factor model^{vi} as its base and adds on a factor for profitability, and a factor related to the firm's investment patterns. The profitability factor is the difference between the returns on stocks that are highly profitable, and stocks that have low profitability. Profitability is measured by operating profit. The investment factor is the difference in returns between firms that have aggressive capital expenditure patterns and firms that have conservative capital expenditure patterns. Fama and French [15] indicate that including these factors makes the value factor redundant, but we include all factors in one model for our portfolios for completeness.

After calculating the alphas based on the Fama-French five risk factor model we calculate the difference in alphas between the NCAV and matched firms. We then attempt to explain the difference in alphas by way of differences in stock's trading characteristics such the bid-ask spread, monthly volume, and the stock price per share of a typical firm.

We conduct this analysis as follows. First, instead of calculating portfolio alphas, we calculate alphas for individual securities. This is known to result in a much worse fit for the model and is generally considered to yield less reliable results. However, calculating firm alphas allows us to compare the alpha of each NCAV firm directly with the matched firm, and attempt to explain the difference using the firm specific characteristics.

To calculate the alphas at the individual firm level, we run the Fama-French five factor model for individual firms to calculate the factor sensitivities for the firm. We use one set of factor sensitivities for all NCAV firms, and another set for all matched firms, over the whole sample. We then calculate the expected returns based on these fixed factor sensitivities and the time-varying factor returns. The alpha for each firm is calculated as the actual monthly return less the risk-free rate less the factor-based expected return. The risk-free rate is the 10-year Treasury Constant Maturity rate. For each NCAV firm-month observation, we have the matched firm-month observation. From this we calculate the difference in alphas.

The independent variables we use to explain the difference in alphas are the bid-ask spread, monthly trading volume, the stock's price level as measured in November, and the size of the firm as measured by the market value of equity. The regression we use takes a log-

log form. The dependent variable is the natural logarithm of one plus the difference in alphas. For each independent variable, we divide the relevant NCAV measure by the relevant matched firm measure, and take the natural logarithm of the result. In the results presented here, we remove the size measure from the regression as it had a strong correlation with the other three variables and created inefficient results without adding explanatory value.

For our final analysis, we create a set of ratios to compare operational changes in the sample of NCAV firms and the sample of matched firms. Our ratios begin the years prior to the NCAV firm entering the sample for the first time, and end the years after the firm entered the sample. Note this means that, for some of these firms, they are still NCAV firms. The ratios are as follows: Gross Margin ((Revenue – COGS)/Revenue); Cash to Total Assets (Cash/Total Assets); Operating Margin (EBIT/Revenue); Days' Sales Outstanding or DSO (Accounts Receivable/Average Daily Sales); Days' Sales in Inventory or DSI (Inventory/Average Daily Sales); Days' Payables Outstanding or DPO (Accounts Payable/Average Daily COGS); Total Leverage (Total Liabilities/Total Assets); Long-term Leverage (Long-term Debt/Total Assets); Short-term Leverage (Short-term Debt/Total Assets); Times Interest Earned (EBIT/Interest Expense); Fixed Asset Turnover (Revenue/Net PP&E); and the Altman Z-score.^{vii}

RESULTS

We begin our discussion with a review of the availability of NCAV opportunities and some of the characteristics of NCAV firms. In Table 1, we show the number of firms available for inclusion in the NCAV portfolios each year, along with the mean and median monthly returns on the portfolio for each year, and the standard deviation of the monthly returns.

First, consistent with previous research, the number of firms passing the NCAV test increases after recessions. Second, while most mean monthly returns are positive, this is not always the case. Even years that have a relatively high number of NCAV opportunities can have negative monthly mean returns: 1974 has 66 qualifying firms, for example, with mean return of -1.23% per month, and a median of -4.87% per month. 2011 has 22 qualifying firms, with mean return of -1.49% per month and a median of -1.41% per month. In general, however, years with more opportunities have higher returns. 2003 has 66 qualifying firms and a monthly mean and median return of 10.20% and 9.38%. 2009 has 105 qualifying firms and a monthly mean and median return of 9.65% and 10.43%. These are the best two years in the sample.

The mean monthly return for the full sample of NCAV firms is 4.08%. This is significantly higher than certain benchmarks, including the S&P 500, the CRSP value-weighted and equal-weighted indices, and the smallest decile of the CRSP stocks. These results are presented in Panel B of Table 1. There we show the NCAV firms also have the highest Sharpe ratio of the various benchmarks.

TABLE 1.**NCAV RETURNS BY YEAR****Panel A: Returns on the NCAV Sample by Year**

This table shows, in Panel A, the number of firms that are in the portfolio (Firms), and new firms entering the sample in parentheses next to that; the number of monthly returns recorded in the year (Obs.), the mean monthly return (Mean), the median monthly return (Median), and the standard deviation of monthly returns in the year (Std. Dev.). In Panel B, we show the mean, standard deviation, and correlations between the S&P 500, CRSP Value and Equal weighted indices, the smallest decile of the CRSP (rebalanced each year), and the NCAV sample.

Year	Firms	Mean	Median	Std. Dev.	Year	Firms	Mean	Median	Std. Dev.
1969	1	-1.45%	-4.98%	11.11%	1992	30	3.46%	1.35%	6.05%
1970	1	0.03%	-0.51%	9.25%	1993	25	5.26%	4.55%	4.24%
1971	9	-0.21%	-2.21%	7.79%	1994	14	0.89%	0.80%	3.39%
1972	10	1.10%	-0.03%	7.37%	1995	16	3.64%	3.21%	5.40%
1973	9	-3.92%	-2.82%	7.50%	1996	18	2.04%	1.71%	4.42%
1974	66	-1.23%	-4.87%	10.80%	1997	15	1.90%	1.20%	5.35%
1975	178	6.50%	4.43%	11.46%	1998	16	1.19%	3.54%	6.64%
1976	86	5.01%	0.42%	10.06%	1999	38	6.46%	5.08%	7.72%
1977	64	2.13%	1.93%	2.36%	2000	34	1.48%	-2.32%	8.13%
1978	44	2.61%	3.71%	8.36%	2001	70	4.41%	2.20%	11.53%
1979	37	3.07%	2.75%	5.00%	2002	70	0.93%	0.65%	7.31%
1980	29	2.90%	4.97%	6.26%	2003	66	10.20%	9.38%	8.54%
1981	19	3.18%	4.55%	5.05%	2004	14	1.39%	1.29%	4.87%
1982	12	2.37%	1.74%	4.66%	2005	9	-0.04%	1.21%	3.91%
1983	11	3.51%	1.71%	6.53%	2006	9	-0.01%	1.06%	6.77%
1984	4	-0.84%	-0.14%	6.72%	2007	7	-1.57%	-1.15%	4.31%
1985	4	2.83%	2.11%	4.61%	2008	15	-3.02%	-0.11%	6.43%
1986	6	5.32%	5.05%	7.05%	2009	105	9.65%	10.43%	8.52%
1987	7	1.29%	3.02%	9.54%	2010	21	2.76%	4.16%	7.39%
1988	18	5.61%	5.22%	4.75%	2011	22	-1.49%	-1.41%	5.02%
1989	12	1.23%	1.64%	3.78%	2012	43	1.97%	2.60%	5.37%
1990	11	-1.01%	-0.75%	4.40%	2013	41	4.83%	3.65%	4.24%

1991	42	2.60%	0.50%	6.45%	2014	19	0.28%	-0.62%	3.50%
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Panel B: Index Returns and Risk

	S&P 500	CRSP VW	CRSP EW	CRSP CAPI	NCAV
Mean	0.64%	0.89%	1.08%	1.55%	4.08%
Standard Deviation	4.41%	4.59%	5.78%	7.68%	6.30%
Correlation	0.59	0.65	0.84	0.81	1.00
Sharpe Ratio	0.15	0.19	0.19	0.20	0.65

To further illustrate the difference over time in NCAV returns, we show the value of \$1 invested at the beginning^{viii} of 1969 in each of the above indices in Figure 1. We calculate the value of the investment using the total returns on each index, but do not consider transaction costs, effects of rebalancing, or taxation. Since the NCAV opportunities are quite few in some years, we also illustrate two other investment portfolios: one investing \$0.90 in the S&P 500 and \$0.10 in the NCAV sample, and the other investing \$0.90 in CRSP CAPI index and \$0.10 in the NCAV sample. We do this to illustrate the significant improvement that an opportunistic approach to NCAV investing can have on an otherwise mainstream portfolio. These results should indicate the importance of the NCAV method of stock selection. We next turn to describing the sample of NCAV firms.

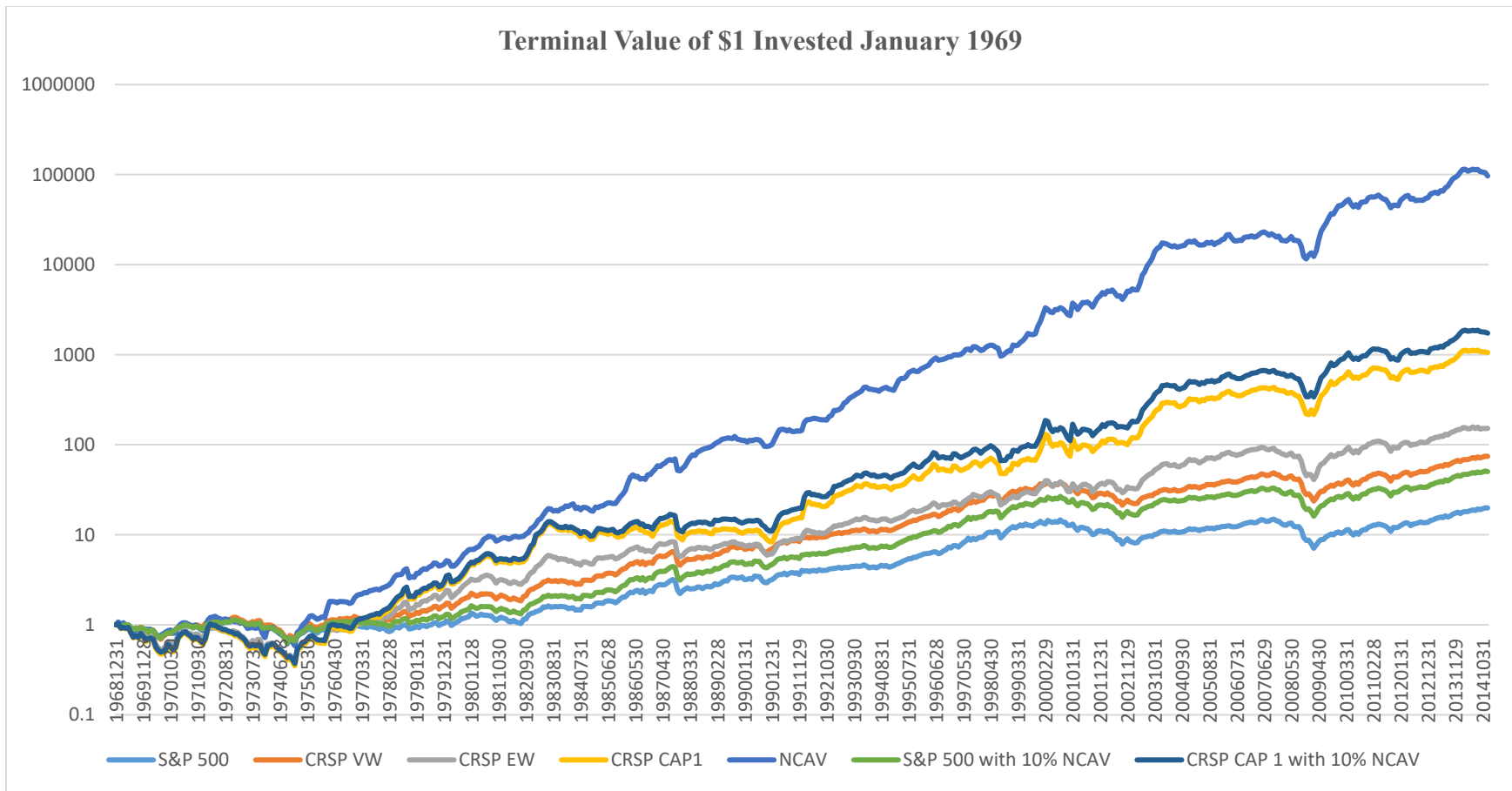


Figure 1: Time path of \$1 invested at the beginning of 1969 and held in various indices, and in the NCAV portfolio. S&P 500 with 10% NCAV and CRSP CAP 1 with 10% NCAV combine a 90% holding in the S&P 500 or in the bottom decile of the CRSP firms with a 10% position in the NCAV firms. This graph doesn't consider the effects of rebalancing.

It is important to understand how the sample of NCAV firms has changed over the decades. In Table 2 we show the distribution of firms across the 12 large sectors for the full sample (Panel A), and for the sample broken down roughly by decade (Panel B). In Panel C of Table 2, we show the annual returns by primary exchange (NYSE, AMEX, or NASDAQ). The firm counts differ across the tables because of how we count observations. In Panel A, we count unique observations, so each firm only counts once in this table even though a firm may qualify as an NCAV firm multiple years in a row. In Panel B and Panel C, we simply count the number of firms that qualify as NCAV firms each year.

Most NCAV firms come from the Business Equipment sector. The least common sector is Energy, which is also the sector with highest monthly mean returns at 9.04%. The sector with the lowest returns is Telecommunications and Television Broadcasting (Telecom), with 11 firms and 1.38% return. The decade-based distribution shows us that the industry from which most NCAV firms are drawn varies considerably from 1969 through 2014.

Panel B shows the distribution for four categories, roughly corresponding to the decades in the sample. The first group extends from 1969 to 1979, the second from 1980 to 1989, the third from 1990 to 1999, and the last from 2000 to 2014. We present two measures to show how the sector distribution has changed over the decades. The “% of Sector in Decade” shows the percentage of the total NCAV firms of the decade that are drawn from that sector. The “% of Decade in Sector” shows the percentage of the total NCAV firms from that sector that are drawn from that decade. For example, the Business Equipment sector has respective percentages of 13.6% and 18.5% for the 1969 – 1979 period. That means 13.6% of the NCAV firms in the 1969 – 1979 period belong to the Business Equipment sector, and 18.5% of the total NCAV firms from the Business Equipment sector belong to the 1969 – 1979 period.

The most common sector from which NCAV firms are drawn is the Business Equipment sector, which is in the top three sectors from 1980 – 2014. Also common is the Wholesale & Retail sector, which is in the top three sectors for the full sample. Overall, the distribution reflects the sectors that would be most prone to losses from a recession and have significant current assets.

Finally, we examine the distribution of returns by primary stock exchange and year in Panel C. Though we do not have data from the NASDAQ until 1973, firms listed on this exchange have the highest returns and most NCAV firms are listed on the NASDAQ. This is expected given the 2000s had a significant portion of the sample of NCAV firms, and many technology firms, which would often be included in the Business Equipment sector, have chosen to list on the NASDAQ. The NYSE has the least NCAV firms, and the lowest mean monthly return.

Table 2: Distribution of Returns

Panel A: Returns by Sector

This table shows mean and median returns and the standard deviation of returns for 1969 - 2014, broken down by Fama-French sector. We use the firm's primary SIC, as reported in Compustat, to assign the firm to a sector. Panel A shows the returns. Panel B shows the breakdown of firms fitting the NCAV criterion by sector and decade. The label % of Sector in Decade is the percentage of firms that fit the NCAV criterion in the decade that come from the sector indicated. % of Decade in Sector is the percentage of firms that fit the NCAV criterion in the sector that come from the decade indicated. The Utilities sector is not listed as there were no firms from this sector in our sample.

Sector	Firms	Mean	Median	Std Dev
Consumer Nondurables	59	4.94%	3.31%	4.60%
Consumer Durables	31	2.97%	3.66%	4.30%
Manufacturing	83	5.38%	5.04%	5.80%
Energy	5	9.04%	3.99%	9.05%
Chemicals	8	6.94%	3.81%	9.56%
Business Equipment	180	6.11%	5.20%	6.64%
Telecom	11	1.38%	0.46%	3.77%
Wholesale & Retail Shopping	119	5.41%	4.31%	5.05%
Healthcare, Medical Eq., Drugs	48	7.13%	6.17%	7.12%
Finance	17	5.40%	3.02%	10.69%
Mines, Const, Bus.Services	45	6.77%	4.54%	10.17%

Panel B: Distribution of NCAV firms by sector and decade

Sector	1969 – 1979			1980 – 1989			1990 – 1999			2000 - 2014		
	Obs	% of Sector in Decade	% of Decade in Sector	Obs	% of Sector in Decade	% of Decade in Sector	Obs	% of Sector in Decade	% of Decade in Sector	Obs	% of Sector in Decade	% of Decade in Sector
Consumer Nondurables	103	17.9	66.5	17	15.0	11.0	14	7.2	9.0	21	3.6	13.5
Consumer Durables	34	5.9	38.2	8	7.1	9.0	18	9.3	20.2	29	5.0	32.6
Manufacturing	102	17.8	56.0	26	23.0	14.3	24	12.4	13.2	30	5.2	16.5
Energy	3	0.5	27.3	0	0.0	0.0	2	1.0	18.2	6	1.0	54.5
Chemicals	10	1.7	52.6	0	0.0	0.0	1	0.5	5.3	8	1.4	42.1
Business Equipment	78	13.6	18.5	19	16.8	4.5	58	29.9	13.8	266	46.1	63.2
Telecom	3	0.5	8.1	0	0.0	0.0	20	10.3	54.1	14	2.4	37.8
Wholesale & Retail	176	30.7	52.4	27	23.9	8.0	29	14.9	8.6	104	18.0	31.0
Healthcare, Med, Drugs	10	1.7	14.3	2	1.8	2.9	9	4.6	12.9	49	8.5	70.0
Finance	20	3.5	62.5	2	1.8	6.3	3	1.5	9.4	7	1.2	21.9
Mines, Const, Bus.Serv	35	6.1	33.0	12	10.6	11.3	16	8.2	15.1	43	7.5	40.6
Total	574			113			194			577		

Panel C: Distribution of NCAV Firms by Primary Exchange and Year

Year	AMEX		NYSE		NASDAQ	
	Firms	Mean Return	Firms	Mean Return	Firms	Mean Return
Full Sample	487	3.38%	259	2.64%	712	5.08%
1969	1	-1.45%	0	0.00%	0	0.00%
1970	1	0.03%	0	0.00%	0	0.00%
1971	7	-0.38%	2	0.34%	0	0.00%
1972	9	1.19%	1	0.28%	0	0.00%
1973	8	-4.01%	1	-3.20%	0	0.00%
1974	45	-1.28%	13	-1.49%	10	-0.36%
1975	104	6.43%	39	8.29%	40	6.51%
1976	53	5.34%	12	4.35%	24	5.01%
1977	44	2.05%	7	2.15%	16	2.97%
1978	34	2.54%	5	2.03%	5	3.64%
1979	27	3.26%	4	1.81%	7	3.78%
1980	21	2.24%	4	5.16%	4	4.09%
1981	13	4.40%	3	1.90%	3	0.48%
1982	5	3.81%	4	1.71%	5	2.31%
1983	2	1.70%	2	0.74%	7	4.82%
1984	1	0.42%	2	-1.15%	1	-1.49%
1985	0	0.00%	2	2.63%	2	3.03%
1986	0	0.00%	3	4.30%	3	6.34%
1987	0	0.00%	2	3.68%	5	0.33%
1988	7	3.85%	2	2.34%	10	9.21%
1989	5	6.65%	2	0.12%	6	0.63%
1990	3	-1.64%	2	-0.24%	7	4.78%
1991	12	2.78%	5	6.49%	28	2.22%
1992	12	4.01%	3	0.73%	16	3.71%
1993	4	5.08%	2	3.15%	19	5.64%
1994	2	-0.39%	4	1.15%	8	1.08%
1995	2	-0.74%	5	2.33%	10	5.36%

1996	3	1.46%	3	-0.24%	12	2.76%
1997	4	3.08%	2	-1.09%	9	2.04%
1998	2	-1.66%	3	0.95%	12	3.52%
1999	7	7.08%	4	3.05%	31	6.59%
2000	6	-2.38%	9	3.67%	20	2.43%
2001	11	7.00%	10	3.17%	55	5.62%
2002	8	1.52%	10	-0.54%	58	1.28%
2003	4	6.92%	10	5.51%	58	11.12%
2004	1	-0.74%	7	1.49%	7	1.79%
2005	0	0.00%	4	-0.54%	5	0.32%
2006	0	0.00%	3	2.45%	7	-0.31%
2007	0	0.00%	3	-1.40%	4	-1.54%
2008	1	-4.62%	7	-2.14%	7	-3.70%
2009	8	8.40%	9	3.65%	95	10.31%
2010	1	0.04%	5	1.81%	15	3.19%
2011	1	-4.00%	6	-3.61%	15	-0.46%
2012	4	0.57%	11	0.71%	30	2.83%
2013	3	0.62%	13	2.84%	26	6.31%
2014	1	2.69%	9	-1.10%	10	1.82%

Further descriptive statistics of the NCAV and matched sample are provided in Table 3. In this table we also show certain descriptive statistics for all firms on Compustat and CRSP to get a better sense of the nature of the NCAV sample. NCAV firms are small by any measure, with the median total assets of NCAV firms at \$53 million for the whole sample, whereas the median for all Compustat firms is \$164 million. Total revenue numbers are similar. We also note the median stock price of NCAV firms is below the lower quartile value of CRSP firms, and the upper quartile trading volume of NCAV firms is smaller than the lower quartile of CRSP firms. These are small, thinly traded firms, but these values also change over time as the average firm size increases, so we show the mean and median values of the summary statistics across decades (Panel B).

Panel A of Table 3 also shows the summary statistics of the NCAV sample as a whole and of the matched sample. We created the matched sample based on primary SIC code first, and then size. We use total assets to measure size, although using total revenue yields the same results.

There is no significant difference in terms of total assets or total revenue between the NCAV sample and the matched sample, based on Z-statistics. The two samples also have similar recent operating performance in terms of return on equity, book-to-market equity value, and dividend yield. The NCAV sample does appear to have a much higher mean book-to-market ratio, but the standard deviation is so high that we cannot reject the null hypothesis that the mean book-to-market value is the same for both samples.

The following differences are all statistically significant with p-values less than 1%. NCAV firms tend to have low leverage, measured by the ratio of total liabilities to total assets. The mean for NCAV firms is 11%, whereas for the matched sample the mean is 21%. The market capitalization of NCAV firms has a mean of \$77.85 million. The mean market capitalization of the matched sample is \$259.26 million. NCAV firms may thus be more exposed to the small firm effect than the matched sample. The stock price and volume of shares traded is also significantly smaller for the NCAV firms than the matched sample, implying liquidity risk may be a concern.

Table 3, Panel B shows how these various summary statistics have changed over the decades. We show the means and medians of the NCAV firms only. Panel C shows how the summary statistics vary across the primary exchange. Mean total assets and total revenue increase significantly over the decades, but median values have not. For example, mean total assets for 1969 – 1979 was \$115 million and had risen to nearly \$3 billion by 2010 – 2014. Median total assets rise from \$23 million in 1969 – 1979 to \$134 million by 2010 – 2014. Mean total assets and total revenue for the 1990 – 1999 period are much lower than other decades, except for the 1969 – 1979 period, breaking the pattern of steadily growing assets and revenue. This may be because of the higher number of NASDAQ-listed firms during this period, which have much lower assets and revenue than firms listed on the NYSE which are a higher percentage mix in the 1980s than in the 1990s. By the 2000s, the NASDAQ listed firms have likely become more mature and are generating more revenue.

Table 3: Summary Statistics of NCAV Firms and Matched Sample

This table shows selected descriptive statistics of the firms in the NCAV sample of stocks. To help understand where NCAV stocks fit in the overall distribution of firms, we report certain statistics (revenue, stock price, monthly trading volume) for the entire sample of stocks from 1969 - 2014. Revenue is the net revenue of the firm in the year it became an NCAV firm. Compustat Revenue is the revenue for all firms in the Compustat database. Both are reported in millions of dollars. Leverage Ratio is the ratio of Total Liabilities to Total Assets. Market ROE is net income divided by market capitalization. Market Capitalization is the market value of equity as of December of the year prior to the firm entering the NCAV sample. Book-to-Market is the ratio of book value of equity to market value of equity, using book value of equity at the end of the year and the December stock price and shares outstanding to calculate market value of equity. Dividend Yield is the annual dividend payments of the past year divided by the December stock price. Stock Price (November) is the stock price at the end of November of the year prior to the firm becoming an NCAV stock. CRSP Stock Price is the stock price in November for all firms in the CRSP database from 1969 - 2014. Volume and CRSP Volume are the same as Stock Price and CRSP Stock Price, but using total monthly volume of shares traded. The Z-stat column is a simple test of the mean of the NCAV sample against the mean of the matched sample of firms for the specified characteristic. The value reported is the p-value of the Z-test.

Panel A: Summary statistics for NCAV and matched sample for period 1969 – 2014.

Variable	Mean	Lower Quartile	Median	Upper Quartile	Std Dev	Z-stat (NCAV v. Matched)
Compustat Total Assets	2424.26	39.46	164.14	873.78	11916.06	
Compustat Revenue	1847.68	34.76	152.84	744.30	10098.00	
CRSP Stock Price	17.70	5.10	12.56	24.05	17.72	
CRSP Volume	4530403	47700	311900	1935900	14671600	
NCAV Sample						
Total Assets (\$ millions)	527.07	20.85	53.36	139.13	3872.43	0.8620
Revenue (\$ millions)	432.02	20.02	53.89	153.04	2629.33	0.3364
Leverage Ratio	0.11	0.00	0.07	0.20	0.13	0.0000
Market ROE	-0.39	-0.48	0.09	0.30	6.50	0.1467
Market Cap. (\$ millions)	77.85	6.01	17.05	53.01	307.37	0.0000
Book-to-Market	6.42	2.40	3.06	4.20	21.83	1.0000
Dividend Yield (annual)	0.06	0.00	0.00	0.02	0.41	0.9995
Stock Price (November)	4.37	1.19	2.38	4.75	7.04	0.0000
Volume	16438	277	1749	9351	67130	0.0000
Matched Sample						
Total Assets (\$ millions)	397.68	15.91	43.67	131.12	1959.25	
Revenue (\$ millions)	473.22	19.77	57.66	173.55	2363.75	
Leverage Ratio	0.21	0.01	0.17	0.35	0.21	
Market ROE	-0.20	-0.11	0.05	0.13	1.38	
Market Capitalization (\$ millions)	259.26	6.29	25.21	87.58	1031.13	
Book-to-Market	1.28	0.40	0.91	1.63	1.96	
Dividend Yield (annual)	0.02	0.00	0.00	0.02	0.18	
Stock Price (November)	11.14	2.91	6.25	14.75	13.42	
Volume	38213	361	2444	15233	162392	

Panel B: Mean and median of variables for the NCAV sample across each decade in the sample.

Decade	Total Assets (\$ millions)	Total Revenue (\$ millions)	Leverage Ratio	Market ROE	Market Capitalization (\$ millions)	Book-to-Market	Dividend Yield (annual)	Price (November)	Volume
Mean									
1969 – 1979	115.19	150.71	0.18	0.42	11.38	4.48	0.03	4.15	362.24
1980 - 1989	595.70	730.56	0.16	0.39	185.09	10.50	0.13	9.17	1950.97
1990 - 1999	286.09	287.31	0.10	-0.42	49.47	9.63	0.08	5.46	6558.59
2000 - 2009	632.31	485.84	0.05	-1.11	127.82	4.66	0.05	3.11	33051.51
2010 - 2014	2966.48	1912.98	0.07	-1.97	173.18	15.39	0.17	5.30	35926.92
Median									
1969 - 1979	22.88	39.91	0.18	0.21	5.67	3.00	0.01	3.44	154.00
1980 - 1989	42.98	48.00	0.15	0.18	12.98	3.34	0.00	2.31	1057.50
1990 - 1999	57.29	58.74	0.07	0.03	17.26	3.02	0.00	2.63	1876.00
2000 - 2009	89.97	65.33	0.00	-0.58	51.67	3.00	0.00	1.38	9413.50
2010 - 2014	134.45	103.13	0.03	0.38	42.39	3.70	0.00	3.10	7049.00

Panel C: Mean and median of variables for the NCAV sample across each stock exchange platform in the sample.

Exchange	Total Assets (\$ millions)	Total Revenue (\$ millions)	Leverage Ratio	Market ROE	Market Capitalization (\$ millions)	Book-to-Market	Dividend Yield (annual)	Price (November)	Volume
Mean									
NYSE	2569.00	1663.97	0.17	1.96	203.77	13.77	0.26	9.09	33807.99
AMEX	51.97	68.45	0.16	0.09	15.02	3.48	0.02	3.55	975.26
NASDAQ	243.94	294.56	0.08	-1.24	76.87	5.99	0.03	3.57	20209.52
Median									
NYSE	174.41	227.12	0.14	0.18	39.25	3.46	0.03	5.25	1615.00
AMEX	23.57	36.00	0.15	0.19	6.34	3.16	0.00	2.5	185.00
NASDAQ	58.88	47.10	0.01	-0.11	24.40	2.88	0.00	1.74	5729.00

Leverage decreases over the decades, again likely because the sample becomes dominated by NASDAQ-listed firms, which have significantly lower leverage than NYSE or AMEX listed firms. Mean and median leverage are likely lower for these NASDAQ firms because they are Business Equipment firms, which have fewer fixed assets than manufacturing and wholesale/retail firms. Market capitalization, by design, is of course small for the whole sample, and the highest mean value occurs in the 1980 – 1989 period. The highest mean book-to-market ratio is in the 2010 – 2014 period, at 15.39. Median book-to-market is always around three or slightly above three. We discuss operating characteristics further in the conclusion of this paper. Next, we examine the excess returns from investing in NCAV firms.

Based on the summary statistics, it is clear that a few risk factors are likely good explanatory variables of the seemingly high returns on NCAV firms. We use the Fama-French five-factor model [9], and sequentially add in all five factors to find the best fit. The January effect also seems to be quite important for small firms, so we include a January dummy variable in our regressions. We also considered liquidity factors (Datar et al. [2], Liu [13], Pastor and Stambaugh [16], and reversal factors (Debondt and Thaler [3]), but found these factors were not significant and we do not report these results in the interest of brevity.

The results show that NCAV-based portfolios have positive and significant alphas, with a monthly alpha of 1.30% after controlling for the Fama-French risk factors and the January effect. On the contrary, the matched sample portfolios have alphas not different from zero.

Table 4: Excess Returns on NCAV and Matched Samples

This table shows the results of various regression models using the monthly return on the NCAV stock or the matched sample firms as the dependent variable. We show the results for 12 month holding periods. Market Premium, Size Factor, and Value Factor are the three factors of the Fama-French three factor model. January Effect is a dummy variable equal to 1 if the month is January, and 0 otherwise. All data is available from CRSP.

Variable	NCAV				Matched		
	12 month returns				12 month returns		
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3
Alpha	0.0170*** <.0001	0.0166*** <.0001	0.0128*** <.0001	0.0130*** <.0001	-0.002 0.3972	-0.0026 0.1845	-0.0007 0.7339
Market Premium	0.9522*** <.0001	0.7326*** <.0001	0.7741*** <.0001	0.7645*** <.0001	1.2529*** <.0001	1.0560*** <.0001	1.0570*** <.0001
Size Factor		1.0673***	0.9675***	0.9673***		0.9459***	0.8670***

		<.0001	<.0001	<.0001		<.0001	<.0001
Value Factor			0.1123	0.1531***			-0.0007
			0.2395	0.0283			0.3263
Profitability Factor			-0.2602***	-0.2704***			-0.0013
			0.0066	0.0042			0.1522
Investment Factor			0.0904				
			0.5304				
January Effect			0.0435***	0.0432***			0.0335***
			<.0001	<.0001			<.0001
Adj. R-sq.	0.3665	0.5622	0.6060	0.6065	0.5283	0.6569	0.6658
N	552	552	552	552	552	552	552

Consistent with Graham's advice, we next create and hold portfolios for 30 months and calculate these alphas. We create one new portfolio each year. The portfolio is formed at the end of the previous year and held for 30 months, so the returns are calculated from January of year t through June of year $t + 2$. This also allows us to examine how alphas change over the years. The results are presented in Table 5. In the interest of brevity, we show only the results of using the full Fama-French five factor model plus the January dummy.

We see immediately that positive alphas are by no means guaranteed. Only nine years of the 45 years analyzed show positive and significant alphas. The good news for modern investors is that there are no portfolios that have negative and significant alphas.^{ix} The year with the highest raw returns, 1978, has mean return of 29.30% per month, but an alpha of 0.19%. The year with the highest number of firms, 1975, also has insignificant alphas. On the other hand, the year with the second highest number of firms is 2009 and in that case the alpha is 3.63%, and statistically significant. There was no statistically significant relationship between alpha, the mean raw return, and the number of firms in the portfolio.

Table 5: Analysis of Returns for 30 Month Holding Periods

This table shows the results of 30 month holding periods of the NCAV stocks, beginning in January of the year specified. Alpha is the intercept from a regression of the monthly excess returns on the Fama-French five-factor model, plus a January Effect dummy variable. P-values are listed to the right of the coefficient estimates. Positive alphas that are significant at the 5% level or higher are in bold. * indicates the portfolio only has 24 months in the holding period. ** indicates the portfolio only has 12 months in the holding period.

Year	Alpha	p(Alpha)	Mkt-Rf	p(Mkt-Rf)	SMB	p(SMB)	HML	p(HML)	RMW	p(RMW)	CMA	p(CMA)	January	p(January)	Adj. R-Squared
1969	0.0110	0.5334	0.1570	0.6928	0.2472	0.7374	-0.5592	0.7326	-3.3719	0.0298	-1.2845	0.4503	-0.0085	0.8870	0.3749
1970	-0.0024	0.8914	-0.0641	0.8650	1.3102	0.1877	1.2400	0.4614	-0.5230	0.7945	-1.3847	0.4038	0.0028	0.6971	0.3636
1971	-0.0054	0.6047	0.5678	0.0628	1.7130	0.0044	1.6202	0.1041	0.7127	0.6132	-0.9211	0.2531	0.0436	0.2189	0.7368
1972	-0.0081	0.4632	0.5144	0.1120	1.1811	0.0069	0.5141	0.5689	0.0198	0.9794	-0.3366	0.7217	0.0814	0.0614	0.6477
1973	0.0001	0.9928	1.0389	0.0007	0.7770	0.0112	0.1319	0.7621	0.1218	0.8463	-0.0791	0.9232	0.0832	0.0616	0.7679
1974	0.0105	0.1777	1.0292	<.0001	1.9893	<.0001	-0.2112	0.5250	0.2243	0.5978	0.3562	0.5481	0.0497	0.1559	0.9403
1975	0.0823	0.8490	1.1908	<.0001	1.5300	<.0001	0.5718	0.0484	0.4189	0.3971	0.3749	0.4064	-0.0077	0.7085	0.9556
1976	0.0034	0.6081	1.0917	<.0001	1.2487	0.0007	0.3000	0.5662	0.5662	0.5034	1.3555	0.0883	0.0018	0.9346	0.8663
1977	0.0052	0.2754	0.7237	<.0001	1.1655	<.0001	-0.4156	0.3616	-0.4268	0.4202	0.5346	0.3299	0.0075	0.6282	0.8791
1978	-0.0001	0.9914	0.8487	<.0001	0.9250	0.0007	-0.2019	0.7159	0.5573	0.3641	1.2281	0.0477	0.0498	0.0215	0.8663
1979	0.0115	0.0670	0.7591	<.0001	0.7367	0.0085	0.6982	0.1497	0.6407	0.2603	0.0684	0.9037	0.0102	0.6320	0.7146
1980	0.0076	0.2155	0.3655	0.0371	1.4200	<.0001	-0.1830	0.6656	-0.3279	0.5622	0.1813	0.6843	0.0252	0.1832	0.7576
1981	0.0007	0.9385	0.6062	0.0063	1.5679	<.0001	0.4747	0.3982	0.8594	0.1710	0.5893	0.2867	0.0122	0.5941	0.5446
1982	-0.0028	0.7877	0.4778	0.0200	1.6013	0.0002	0.2408	0.6304	-0.2160	0.6743	0.4637	0.5660	-0.0379	0.1013	0.5545
1983	0.0139	0.3048	0.5080	0.1338	1.4595	0.0091	-0.6539	0.3578	-0.7915	0.2789	0.7264	0.4459	0.0202	0.5083	0.6420
1984	-0.0064	0.7357	1.2894	0.0021	2.3764	0.0382	0.2231	0.8117	1.1891	0.2304	0.5287	0.6564	0.0339	0.5091	0.4247
1985	0.0164	0.2987	0.4093	0.3219	0.5675	0.5239	-0.3671	0.6873	0.9106	0.4068	0.3751	0.6846	-0.0033	0.9475	-0.0109
1986	0.0387	0.0258	0.7443	0.0075	0.6383	0.2411	-0.8357	0.3512	-1.3081	0.2213	0.3539	0.7296	-0.0238	0.6379	0.3972
1987	0.0230	0.0670	0.7005	0.0091	0.7837	0.1111	-0.8867	0.2319	-1.2806	0.2067	1.0542	0.2567	-0.0614	0.1517	0.5214
1988	0.0059	0.4696	0.7451	0.0015	1.3924	<.0001	0.3471	0.4805	1.9232	0.0328	1.2379	0.1138	0.0314	0.1827	0.5713
1989	-0.0144	0.1324	0.7147	0.0022	1.5221	0.0002	-0.5794	0.3701	1.1346	0.1512	1.3945	0.0606	0.0992	0.0005	0.6645
1990	-0.0055	0.5355	0.5785	0.0246	0.1858	0.5837	0.3024	0.5054	0.3672	0.5909	0.1910	0.1913	0.0187	0.5220	0.2004
1991	0.9418	0.3240	0.6176	0.0352	1.4163	0.0015	0.8603	0.1956	-0.3340	0.6015	-0.7593	0.4867	0.0219	0.5284	0.5749

1992	0.0183	0.0095	0.7412	0.0074	1.0601	0.0002	0.4774	0.3101	-0.4194	0.3414	0.1080	0.9037	0.0062	0.7814	0.6388
1993	0.0263	0.0020	0.6585	0.0453	0.8558	0.0525	-0.4211	0.4950	-0.6968	0.2957	1.1996	0.2620	0.0084	0.7309	0.2482
1994	-0.0032	0.7895	1.5563	0.0013	1.0323	0.0570	-0.3509	0.6162	1.9945	0.0720	0.6817	0.4912	0.0500	0.1025	0.3465
1995	0.0108	0.5371	1.1226	0.0217	0.7586	0.2295	0.0855	0.9056	-0.6308	0.6200	0.1545	0.8769	-0.0115	0.7279	0.3928
1996	0.0042	0.7145	0.7276	0.0127	0.5823	0.0934	-0.2657	0.6689	0.3094	0.6629	0.5034	0.5219	-0.0051	0.8512	0.2888
1997	-0.0008	0.9291	0.7446	0.0016	0.6825	0.0085	0.0345	0.9414	0.0356	0.9442	0.5255	0.3712	0.0387	0.1477	0.4625
1998	0.0264	0.0617	0.6638	0.0731	0.6569	0.0641	0.0344	0.9560	-0.5487	0.3007	0.3810	0.6415	-0.0018	0.9624	0.5708
1999	0.0124	0.2922	0.9151	0.0143	0.5772	0.0162	-1.1443	0.0387	0.0813	0.8431	1.0870	0.0932	0.1579	0.0003	0.8092
2000	0.0343	0.0008	0.2106	0.3312	-0.2071	0.2718	-0.2336	0.4089	-1.0114	0.0004	0.3488	0.3456	0.0829	0.0008	0.8293
2001	0.0358	0.0082	0.8874	0.0111	0.3906	0.2359	0.0262	0.9522	-0.3774	0.4410	-0.2183	0.6096	0.1476	0.0002	0.7039
2002	0.0268	0.0019	0.9922	0.0003	0.4638	0.1407	0.1297	0.7586	-0.4582	0.1777	0.0955	0.7844	0.0484	0.0375	0.7738
2003	0.0255	0.0208	0.9271	0.0600	1.2352	0.0093	-0.3430	0.5734	-0.2010	0.7978	2.3593	0.0243	2.3449	0.4324	0.7731
2004	-0.0017	0.8258	1.0998	0.0186	0.3523	0.4067	0.3316	0.5325	-0.1601	0.7772	0.3391	0.6238	0.0314	0.1498	0.5555
2005	0.0012	0.8554	1.4478	0.0001	0.3389	0.3731	-0.9847	0.0467	-0.0190	0.9771	0.4459	0.4666	0.0270	0.1710	0.6790
2006	-0.0155	0.2333	0.7824	0.0868	0.4345	0.4449	-0.2815	0.6912	-0.5667	0.6035	-0.6732	0.4974	0.0065	0.8672	0.1809
2007	-0.0045	0.7192	0.6813	0.0104	0.7424	0.1321	-0.2356	0.4851	0.0748	0.9258	-0.4957	0.5939	0.0029	0.9266	0.4647
2008	0.0207	0.0298	1.2786	<.0001	0.0242	0.9377	-0.5790	0.0416	-0.2510	0.6181	1.3315	0.0304	0.0024	0.9286	0.7764
2009	0.0382	0.0186	1.2020	0.0014	0.8447	0.1255	0.2385	0.6505	-0.7268	0.4432	-1.6522	0.1280	0.0627	0.1792	0.5290
2010	0.0081	0.3526	0.8325	0.0002	0.6954	0.0670	0.5734	0.2328	0.2534	0.6624	0.3865	0.5415	0.0148	0.5177	0.7436
2011	0.0168	0.2668	0.4447	0.3917	0.7383	0.3848	-1.1636	0.3800	-1.2240	0.4867	1.2175	0.2912	0.0202	0.6352	0.1841
2012	0.0056	0.2953	0.9983	<.0001	1.0152	0.0069	0.0656	0.8449	0.0340	0.9351	-0.4473	0.3653	0.0706	0.0003	0.8032
2013*	-0.0120	0.2706	1.6065	0.0003	-0.1656	0.7642	1.0424	0.0972	-0.2518	0.7914	-3.1863	0.0129	0.0851	0.0417	0.5879
2014**	-0.0374	0.0143	1.7782	0.0103	-1.2675	0.0757	1.0578	0.0863	-0.8908	0.5029	-1.2090	0.4366	0.1138	0.0663	0.6519

Separating the sample by exchange, we find that NCAV alphas are only positive and significant for the firms listed on the NASDAQ or AMEX. It is apparent that firms listed on the NASDAQ are the most likely to generate excess returns for the investor at 1.88% per month on average. For the AMEX, it is 0.92% per month on average. We also note large differences in the coefficient estimates of the risk factors

Table 6: Sample Breakdowns

This table breaks down the five-factor model results for NCAV firms and the matched sample by exchange. Coefficient estimates are in the left column, and p-values are reported in the right column.

NCAV Firms						
	AMEX		NYSE		NASDAQ	
Alpha	0.0092**	0.0183	0.0025	0.3964	0.0188***	<.0001
Market Premium	0.7975***	<.0001	0.8969***	<.0001	0.6732***	<.0001
Size Factor	1.2546**	0.0192	0.5950***	<.0001	0.9174***	<.0001
Value Factor	-0.1056	0.8795	0.3888***	0.0031	0.0283	0.8236
Profitability Factor	-0.6866***	<.0001	-0.1922	0.1455	-0.3065**	0.0217
Investment Factor	0.0451	0.8165	-0.2625	0.1913	0.3572*	0.0664
January Effect	0.0721***	<.0001	0.0164	0.1044	0.0377***	0.0001
Observations	479		527		491	
Adj R Squared	0.3082		0.3979		0.4363	
Matched Sample						
	AMEX		NYSE		NASDAQ	
Alpha	-0.0130***	0.0040	0.1936	0.4105	-0.3435	0.3959
Market Premium	1.0038***	<.0001	1.1768***	<.0001	1.1014***	<.0001
Size Factor	1.2286***	<.0001	0.5395***	<.0001	0.8372***	<.0001
Value Factor	0.0637	0.7489	0.2152**	0.0418	-0.2605	0.1411
Profitability Factor	0.0159	0.9580	0.0159	0.9200	0.0305	0.9102
Investment Factor	0.0228	0.9093	0.0820	0.4378	-0.2291	0.1942
January Effect	0.0692***	<.0001	-0.0041	0.6001	0.837***	0.0003
Observations	516		564		492	
Adj R Squared	0.3647		0.5692		0.4153	

across exchanges. The market risk premium is smallest for NASDAQ firms at 0.67, and highest for NYSE firms at 0.90. The size factor (SMB) is lowest for NYSE firms at 0.60 and highest for AMEX firms at 1.25. The value factor (HML) is only significant for NYSE firms. The profitability factor is negative and significant for the AMEX and NASDAQ firms, indicating that lower profitability NCAV firms will have higher returns. The investment factor is not significant for any of the exchanges. The January effect remains large and significant for AMEX firms (7.21%) and NASDAQ firms (3.77%), but not the NYSE firms.

Matched sample firms don't have significant alphas. In fact, matched firms listed on the AMEX have significantly negative alphas. The matched sample firms are more sensitive to the market with betas above 1.00 across all three exchanges. The size factor coefficient estimates for the matched sample are similar to the estimates for the NCAV sample. Further, the value factor is only sensitive for the NYSE firms in the matched sample, similar to the NCAV sample. The profitability and investment factors are not significant in the matched sample for any of the exchanges. The January effect is significant in the matched sample for AMEX (6.92%) and NASDAQ firms (4.93%), but not the NYSE firms, similar to the NCAV sample.

The most important result is that the intercept is not significantly different from zero for any exchange. Thus, the excess returns are explained by the difficulties in attempting to buy and sell NCAV securities. The level of stock price is important for all firms. The higher the ratio of the price of the NCAV stock to its matched firm, the lower the difference in alphas. This makes sense as low priced stocks tend to be much less liquid than high priced stocks. The other results differ somewhat across exchanges. For the NYSE- and NASDAQ-listed stocks, trading volume is significant and negative, which has a similar interpretation to the price level variable. Trading volume is not significant for AMEX stocks. The bid-ask spread is only significant for AMEX stocks, and it is positive. The bigger the ratio of the bid-ask spread on the NCAV firms to the matched firms the higher the difference in alphas. Of course, higher bid-ask spreads stocks are likely to be associated with lower liquidity. Overall, we conclude that the lack of liquidity associated with NCAV stocks is likely to lead to significant excess return.

Since we are left with positive and significant alphas after controlling for risk factors, we next examine what elements of the market structure, such as liquidity, may be causing the elevated alphas of the NCAV sample as compared to the matched sample. We do this by examining the difference in individual firm alphas. The results, sorted by exchange, are presented in Table 7. The procedure we follow for these results is detailed at the end of Section 2.

Table 7: Analysis of Alpha Spread

This table shows the results of regressing the natural log of the difference in the alpha on the NCAV firm and the alpha on the matched competitor on: the natural log of the difference in bid-ask spread between the two firms (Spread); the ratio of monthly volume on the NCAV firm to the monthly volume on the competitor firm, expressed in natural log form (Log Volume); the natural log of the ratio of the NCAV firm's stock price to the matched firm's stock price, measured at the end of November in the portfolio formation year (Log Price). The firms are sorted by exchange.

Variable	NYSE	AMEX	NASDAQ
Intercept	0.0149	0.0022	0.0029
	0.3879	0.8684	0.8204
Spread	0.0058	0.0275**	0.0000
	0.7022	0.0249	0.9981
Log Volume	-0.0225***	-0.0023	-0.0079**
	<.0001	0.7411	0.0475
Log Price	-0.0512***	-0.0304***	-0.0225***
	<.0001	0.0013	0.0028
N	5324	6240	11570
Adj . R-squared	0.0118	0.0021	0.0021

Our final set of results is an analysis of certain operating characteristics between the NCAV sample and the matched sample from the year prior to entering the sample, the year the NCAV firm is in the sample, and the year after entering the sample. We show lower quartile, median, and upper quartile of the operating variables. We include revenue growth for the industry (*RG*) and asset growth of the industry (*AG*). The specific variables are: cash to total assets (*Cash/AT*); gross margin (*GM*); operating margin (*OM*); days' sales outstanding (*DSO*); days' sales in inventory (*DSI*); days' payables outstanding (*DPO*); total liabilities to total assets (*LEV*); long-term debt to total assets (*LT LEV*); short-term debt to total assets (*SLEV*); times interest earned (*TIE*); fixed asset turnover (*FAT*); and Altman's Z-score (*Z*).

For these results, we are interested in comparing the NCAV firms from before to after they were included in the NCAV portfolios to determine if there was any marked improvement in operations. We also want to compare them to the matched sample to detect performance deficiencies. Our interest is in determining if there are unique operational characteristics associated with NCAV firms that might be rationally priced below their liquidation value.

Table 8: Operational Characteristics of Firms

This table shows the raw levels for a variety of operational metrics. The index value *t* refers to the year in which the firm entered the NCAV sample for the first time. The growth variables *RG* and *AG* are calculated as the percentage change from the previous year. *RG t-1* is the change from *t-2* to *t-1*. *RG t+1* is the change from year *t* to *t+1*. *RG* is the revenue growth, and *AG* is the asset growth, calculated using net revenue and total assets respectively. *Cash/AT* is the ratio of cash and cash equivalents to total assets. *GM* is gross margin: (Revenue - COGS)/Revenue; *OM* is operating margin: EBIT/Revenue; *DSO* is days' sales outstanding: Accounts Receivable/Average Daily Revenue; *DSI* is days' sales in inventory: Inventory/Average Daily Revenue; *DPO* is days' payable outstanding: Accounts Payable/Average Daily COGS; *LEV* is Total Liabilities divided by Total Assets; *LLEV* is long-term (interest bearing) debt divided by Total Assets; *SLEV* is Short-term Debt divided by Total Assets; *TIE* is times interest earned: EBIT/Interest Expense; *FAT* is fixed asset turnover: Revenue/Net Property, Plant, and Equipment; *Z* is Altman's Z-score: $Z = 1.2*(\text{Working Capital}/\text{Total Assets}) + 1.4*(\text{Retained Earnings}/\text{Total Assets}) + 3.3*(\text{EBIT}/\text{Total Assets}) + 0.6*(\text{Market Value of Equity}/\text{Total Liabilities}) + .999*(\text{Sales}/\text{Total Assets})$.

Variable	NCAV Firms			Matched Sample		
	Lower Quartile	Median	Upper Quartile	Lower Quartile	Median	Upper Quartile
RG t-1	-0.1225	0.0163	0.1393	-0.0360	0.0773	0.2207
RG t+1	-0.1109	0.0003	0.1754	-0.1673	-0.0711	0.0460
AG t-1	-0.1208	-0.0023	0.1062	-0.0587	0.0519	0.1846
AG t+1	-0.0913	0.0114	0.1637	-0.1477	-0.0473	0.0580
Cash/AT t-1	0.0737	0.2028	0.4582	0.0588	0.1203	0.2639

Cash/AT t	0.0698	0.1833	0.4056	0.0588	0.1203	0.2643
Cash/AT t+1	0.0719	0.1998	0.4347	0.0576	0.1186	0.2582
GM t-1	0.2161	0.2993	0.4258	0.2261	0.3267	0.4729
GM t	0.2019	0.2899	0.4054	0.2224	0.3239	0.4703
GM t+1	0.2082	0.2949	0.4011	0.2323	0.3306	0.4750
OM t-1	-0.0051	0.0378	0.0830	0.0142	0.0629	0.1172
OM t	-0.0436	0.0210	0.0658	0.0078	0.0604	0.1181
OM t+1	-0.0540	0.0208	0.0647	0.0116	0.0611	0.1186
DSO t-1	45.7234	64.8510	91.6470	41.1714	58.1696	79.6768
DSO t	43.4848	63.5848	89.6288	39.5752	57.2355	77.3153
DSO t+1	44.4648	62.9558	89.1360	39.4912	56.3497	75.6346
DSI t-1	47.9171	101.9640	163.7060	36.6544	85.0597	137.9406
DSI t	48.4829	100.3355	169.1729	36.6651	84.0716	137.8597
DSI t+1	54.8696	102.3271	162.1783	39.0352	85.7502	137.8860
DPO t-1	25.2218	39.5955	60.3465	25.7698	39.2702	61.2525
DPO t	24.1347	37.6519	59.9680	25.4093	39.0417	59.7233
DPO t+1	23.7398	38.4411	58.8277	25.0282	38.1731	59.0415
LEV t-1	0.2139	0.3439	0.4970	0.3013	0.4650	0.6090
LEV t	0.2026	0.3332	0.4854	0.3109	0.4732	0.6251
LEV t+1	0.2221	0.3718	0.5193	0.3091	0.4678	0.6229
LT LEV t-1	0.0000	0.0148	0.1104	0.0074	0.1079	0.2330
LT LEV t	0.0000	0.0151	0.1178	0.0074	0.1079	0.2332
LT LEV t+1	0.0000	0.0169	0.1164	0.0091	0.1101	0.2350
SLEV t-1	0.0000	0.0000	0.0612	0.0000	0.0000	0.0462
SLEV t	0.0000	0.0000	0.0622	0.0000	0.0000	0.0478
SLEV t+1	0.0000	0.0000	0.0601	0.0000	0.0000	0.0398
TIE t-1	0.1640	3.6276	12.4775	1.0165	4.4112	12.3159
TIE t	-2.8104	2.1596	8.6800	0.8788	3.8622	11.4591
TIE t+1	-3.1605	2.3215	8.1989	1.0315	4.0209	12.4090
FAT t-1	5.3271	9.8124	18.9586	3.7337	6.4518	13.6236
FAT t	5.3004	9.7674	19.5753	3.8330	6.5018	13.4404
FAT t+1	5.0670	9.1982	19.1494	3.7468	6.4994	13.2715
Z t-1	2.6447	3.5494	4.8097	2.3083	3.4570	5.1863
Z t	2.1221	3.1022	4.0318	2.0635	3.3278	4.8153
Z t+1	2.0332	3.0270	4.1041	2.0882	3.3925	4.8892

There does not seem to appear any systematic change in operational characteristics across the years within the NCAV sample, looking from the year before entering the NCAV sample to the year after. We examine from two years before to two years after, and see the same pattern.^x So we focus on the differences between the NCAV sample and the matched sample.

First, as expected, NCAV firms have more current assets (e.g. *Cash/AT*) and appear to be somewhat worse at managing their current assets, based on the *DSO* and *DSI*. This also shows in lower operating margins (*OM*) because the gross margins appear quite similar between the two samples. The fixed asset turnover (*FAT*) is higher for the NCAV firms relative to matched sample firms. NCAV firms also tend to have significantly lower leverage ratios (debt- to -total assets) than that of matched sample firms. However, the Z-scores are very similar for both samples indicating that financial distress is not prevalent among the NCAV firms. This suggests that possible liquidation is highly unlikely for NCAV firms.

CONCLUSIONS

In this study we raise the question whether Ben Graham's "net nets" method of stock picking still generates risk-adjusted excess returns? We collect return data for our sample firms for the period 1969 – 2014 that meet Ben Graham's "net nets" method or the Net Current Asset Value (NCAV) criterion. We create a matched sample firms by industry and size in order to compare the raw returns and excess returns on portfolios of NCAV firms with that of matched sample firms. We present evidence that securities fitting Ben Graham's "net nets" method or the Net Current Asset Value (NCAV) criterion, experience superior raw returns over the 1969 – 2014 period. After controlling for the Fama-French five risk factors (e.g., Fama and French, 2015) and the January effect, we find that NCAV stock portfolio still generate significant excess return (alpha) equals to 1.3% per month. In contrast, we find no significant excess return (alpha) in the case of the industry- and size-matched sample firms after controlling for the same risk factors. We further analyze whether the type of exchange where NCAV firms are listed contributes to excess returns. Our results show significant positive alpha associated with NCAV firms included in the AMEX and NASDAQ while alpha is statistically insignificant for those NCAV firms listed in NYSE. We further dissect the excess return attributed to stocks listed in each type of stock exchanges by examining the impact of trading cost and liquidity risk. After controlling for the bid-ask spread, trading volume, and the level of stock price, we find the difference between NCAV alphas and the matched sample alphas is no longer statistically significant. These results suggest that excess returns associated Ben Graham's value investment strategy are driven by transaction costs and liquidity risks. We conclude that an investor cannot earn risk-adjusted positive excess return (alpha) by using Ben Graham's technique of finding firms selling below their net current asset value per share (NCAV firms). Our findings have significant implications for investors and portfolio managers who rely on Ben Graham's value investment strategy.

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ⁱ As reported in Oppenheimer (1986).

ⁱⁱ For example the Baupost Group managed by Seth Klarman (see Klarman and Zweig (2010), and <http://www.hedgefundletters.com/category/baupost-group/>), and Third Avenue Management (<http://www.thirdavenuefunds.com/ta/index.aspx>).

ⁱⁱⁱ CRSP does not report NASDAQ-listed stock data prior to 12/29/1972.

^{iv} Here we followed the advice of Shumway (1997).

^v We also use total revenue in robustness tests and find essentially the same results.

^{vi} See Fama & French (1992, 1993, 1996, 1998) for further discussion of the three factors.

^{vii} We use the formula: $Z = 1.2 * ((\text{Total Current Assets} - \text{Total Current Liabilities}) / \text{Total Assets}) + 1.4 * (\text{Retained Earnings} / \text{Total Assets}) + 3.3 * (\text{EBIT} / \text{Total Assets}) + 0.6 * (\text{Market Capitalization} / \text{Total Liabilities}) + (\text{Revenue} / \text{Total Assets})$

^{viii} We use monthly returns to calculate the future values of the invested amount.

^{ix} The one exception is 2014, but this year only has 12 months in the portfolio.

^x Results are available upon request.