Ben Graham's Net Nets:

Seventy-Five Years Old and Outperforming

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Abstract

The strategy of buying and holding “net nets” has been advocated by deep value investors for decades, but systematic studies of the returns to such a strategy are few. We detail the returns generated from a net nets strategy implemented from 1984 - 2008, and then attempt to explain the excess returns (alpha) generated by the net nets strategy. We find that monthly returns amount to 2.55%, and excess returns using a simple market model amount to 1.66%. Monthly returns to the NYSE-AMEX and a small-firm index amount to 0.85% and 1.24% during the same time period. We conclude by examining potential factors to explain the excess returns on the net nets strategy. We examine the market risk premium, small firm premium, value premium, momentum, long-term reversal, liquidity factors, and the January effect. Of the various pricing factors, we find only the market risk premium, small firm premium, and liquidity factor are significant. We also note about half of the returns are earned in January. However, inclusion of these factors still does not explain the excess return available from the net nets strategy. Thus, we are left with a puzzle.

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Benjamin Graham first described his "net current asset value" (NCAV) rule for stock selection in the 1934 edition of *Security Analysis*. Graham proposed that investors purchase stocks trading at a discount to NCAV because the NCAV represented "a rough measure of liquidating value" and "there can be no *sound* reason for a stock's selling continuously below its liquidating value" (Graham and Dodd [1934]). According to Graham, it meant the stock was "too cheap, and therefore offered an attractive medium for purchase." Graham applied his NCAV rule in the operations of his investment company, Graham-Newman Corporation, through the period 1930 to 1956. He reported that stocks selected on the basis of the rule earned, on average, around 20 per cent per year (Oppenheimer [1986]).

In the seventy-fifth anniversary of the publication of *Security Analysis*, the NCAV rule continues to show considerable performance in generating excess returns. This simple method of handicapping data readily available from a company's balance sheet generates a sizeable return: more than 20% annually. The returns are not explained by common asset pricing models. This anomaly indicates that application of the NCAV rule can identify underpriced firms in a systematic way. Furthermore, this profitability of this method continues to make it an attractive method of stock picking.

The academic interest in Graham's method has been relatively sparse. Greenblatt et al. [1981], Oppenheimer [1986], and Vu [1988] have reviewed the usefulness of the NCAV rule. In his 1986 paper, Oppenheimer presented evidence showing the profitability of the NCAV method for 1970 to 1983. We picked up where Oppenheimer left off, updating the results to December 31, 2008, using Oppenheimer's method of picking stocks

As one can view the NCAV rule as identifying deep value stocks, called "net nets," investigations of the NCAV rule fall into the literature about value investing and the long-run outperformance of value stocks over growth stocks. The value investing literature is large and growing. It is populated by such well-known work as Fama and French [1992, 1996, 1998], Lakonishok, Shleifer, and Vishny [1992, 1994] and many others. Chan and Lakonishok [2004] provide a review and update of the empirical data regarding the value investing premium. They demonstrate that, aside from the late 1990s, value stocks outperformed growth stocks and had lower risk. This phenomenon is not limited to the U.S.

The liquidation value of a firm, for which the NCAV criterion serves as a proxy, is the lowest measure of a firm's value. Firms trading at a discount to NCAV are therefore deeply discounted. Following Fama and French's interpretation of the value premium, these should also be very risky stocks, as the value premium compensates the investor for distress risk. Our work here indicates that this is not the case. In fact, the value premium is not a main driver of returns in the NCAV context. The market risk premium and the small firm effect do explain some of the returns, but the NCAV method generates high excess returns unexplained by any factor we have included.

Based on the failure of the 3-factor model to explain the excess returns, we consider several other factors. We include Carhart's [1997] momentum factor, a long-term reversal factor based on Debondt and Thaler [1985], and two measures of liquidity. Of these, we find only the liquidity factor is important for explaining returns on the net nets strategy. Nevertheless, we are left with an unexplained excess return.

Note that our excess returns are not generated by merger premiums paid to the firms in the NCAV portfolios. In fact, in the whole sample, only 5 firms are delisted because of

mergers. Another 9 are delisted due to liquidation. Thus, exclusion of these firms does not change the estimates of raw or adjusted returns.

In the remainder of the paper, we discuss the NCAV method, how portfolios are formed, and then measure performance in a variety of ways. We then attempt to explain the returns from the NCAV portfolio.

Data and Methodology

We stay faithful to Oppenheimer's methodology, both in the selection of the securities and the simulation of the hypothetical investor's experience. In calculating NCAV, Oppenheimer took the sum of all liabilities and preferred stock and subtracted it from current assets; this result was then divided by the number of common shares outstanding. Oppenheimer's hypothetical investor bought a security if its November closing price was no more than two-thirds of its NCAV. For these firms, Oppenheimer recorded the NCAV, November closing price, number of shares outstanding, exchange the firm was traded on, and whether the firm had positive earnings or dividends over the preceding twelve months.

We form annual equal-weighted portfolios comprised of all firms that meet the NCAV criteria. We assume all stocks are purchased on December 31st, and held for one year. We assume that the hypothetical investor completely liquidates each portfolio before forming a new portfolio. It is possible that subsequent portfolios hold similar firm's shares as previous portfolios, so long as the firm's shares continue to trade at a one-third or greater discount to NCAV per share. Note that we eliminate as outliers any firms whose stock price is less than one percent of the NCAV per share. Exhibit 1 summarizes the annual distribution of stocks by exchange and year.

Insert Exhibit 1: Occurrence of NCAV stocks by exchange and year about year.

The method of forming portfolios described above constitutes an annual rebalancing of the portfolio, which entails transaction fees. We do not adjust our results for the transaction fees for two reasons. First, our benchmark portfolios are also rebalanced annually, and each benchmark contains many more stocks than the NCAV portfolios. Thus, adjusting returns for transaction fees would favor the NCAV portfolios over the benchmark portfolios. Our second reason for not adjusting returns for transaction fees is that fees are small and have been shrinking over time, and so do not have a material impact on returns in low-turnover portfolios.

It is appropriate to note that the method used here for estimating the "net net" current asset value of the firm per share is not the only method available. Rather than impairing the entire current asset account, Graham and Dodd [1934, p. 496] use a range of impairments across asset types. Cash and near-cash assets are estimated to fetch 100% of current value if liquidated, receivables between 75 and 90%, inventories between 50 and 75%, and fixed assets between 1 and 50%. Martin J. Whitman, of Third Avenue Funds, makes further adjustments to the "net nets" calculation (various Third Avenue shareholder letters).

The operational form we use to calculate NCAV is deliberately simplified to handle a large number of firms at once. To employ the original method of Graham and Dodd, or the further adjustments of Whitman, one would need to devote time to analysing each firm's business and the economic environment. The upshot of these differences is that our method likely biases downward our performance results, since it is not as detailed an analysis as one would obtain from a case-by-case valuation. On the other hand, our performance, net of effort involved in identifying undervalued firms, may actually be higher, since our cost of identifying undervalued firms is quite low.

Results

The mean monthly return on stocks meeting the NCAV rule in the period we examined, December 31, 1983 to December 31, 2008, was 2.55%. The mean monthly returns for the NYSE-AMEX and Small-Firm indices were 0.85% and 1.24% respectively. This indicates an outperformance by the NCAV portfolio over the NYSE-AMEX Index of 1.70% per month, or 22.42% per annum and an outperformance over the Small-Firm Index of 1.31% per month, or 16.90% per annum.

Exhibit 2 summarizes the results for the 25-year period of the study. Panel A compares returns of NCAV portfolios with returns on both the NYSE-AMEX Index and the Small-Firm Index. While Oppenheimer uses the Ibbotson Small-Firm Index, we use the smallest decile of stocks traded in the CRSP database. These results cover the period December 31, 1983 through December 31, 2008. Panel B represents the 25-year performance of each exchange's securities versus the NYSE-AMEX Index and the Small-Firm Index. Panel C presents results for nine consecutive sub-periods, eight of which are of approximately equal length, and the final of which is incomplete.

Insert Exhibit 2 Performance measures for the 25-year period about here.

Thirty-month holding periods

Graham suggested that a 30-month holding period was appropriate for the NCAV investment practice, rather than the twelve month period we have assumed thus far. Since the 30-month portfolios overlap each other, we create each using unique stocks. Thus, no two portfolios contain the same company's shares. We assume, as above, that the portfolios are created on December 31st of each year, and then held for 30 months. However, portfolios

created in 2006 have only 24 months of observations, and portfolios created in 2007 have only 12 months of observations. Rather than eliminate these years from the study, we report results with the above caveat in mind.

Like Oppenheimer, we found that the return and wealth advantage of the NCAV portfolios over the market indices is substantial. Exhibit 3 presents the results for NCAV securities purchased on December 31 and held for 30 months. The exhibit provides comparisons with both the NYSE-AMEX Index in Panel A and the Small-Firm Index in Panel B.

The frequency of outperformance is high, since in 22 of 25 portfolios the NCAV securities beat the NYSE-AMEX portfolio. Furthermore, the magnitude of outperformance is extremely large. On average, the NCAV portfolio displays a 2.56% per month margin over the NYSE-AMEX portfolio. This translates to an average of $19,163.52 difference in wealth after the 30-month holding period. It should be noted that the range of outperformance is very wide. In 1988, the NCAV portfolio underperformed the NYSE-AMEX portfolio by $5,189.95, whereas in 1993 the NCAV portfolio outclassed the NYSE-AMEX portfolio by $84,991.27.

When the NCAV portfolio is compared to the Small-Firm Index, the results are similar to those discussed above. The outperformance is smaller in returns (1.86% per month), and wealth ($14,927.98 average), but otherwise similar to the results comparing the NCAV portfolios to the NYSE-AMEX.

The twelve and thirty-month holding periods reviewed thus far show strong evidence in favor of the NCAV method of picking stocks. The continued superior returns resulting from this method are surprising, given that the method has been known and discussed for 75 years. This implies that there are underlying risks that are not recognized in the firms that the

NCAV method chooses. We continue by examining some of those potential risks and their importance in explaining the returns available from the NCAV method.

Insert Exhibit 3 Performance measures for thirty-month holding periods about here.

Do earnings or dividends matter?

To this point, we have not found a factor in that explains the returns on NCAV portfolios. We can use features of the firm, however, to explore the risk-return relationship further. According to Oppenheimer, Graham frequently recommended that it was best to select NCAV securities that had positive earnings and paid a dividend. Oppenheimer's findings seem to contradict this advice. He found that firms operating at a loss seemed to have slightly higher returns and risk than firms with positive earnings. Firms with positive earnings paying dividends provided a lower mean return than portfolios of firms with positive earnings not paying a dividend, but had a lower systematic risk. These findings led Oppenheimer to conclude that choosing only firms that have earnings and pay a dividend will not help the investor.

Our results, presented in Exhibit 4, support Oppenheimer's conclusion. Firms with positive earnings generated monthly returns of 1.96%. By contrast, firms with negative earnings generated monthly returns of 3.38%. Firms with positive earnings paying dividends in the preceding year provided monthly returns of 1.48%, a lower mean return than portfolios of firms with positive earnings with no dividend paid in the preceding year (2.42%), but did have a lower systematic risk.

Insert Exhibit 4 Performance measures by earnings and dividends about here.

The results in this section indicate a rational connection between risk and return. Dividend-paying firms are viewed as less risky because the dividend signals to shareholders that managers believe the future cash flows of the firm are stable enough to accommodate an ongoing dividend.

Degree of undervaluation and performance

Another question an investor may have is: does the depth of discount affect future returns? We have shown so far that the NCAV rule is an extreme form of value investing. A logical question comes up: do the deepest discounted NCAV stocks provide the highest returns in the future? To examine this, Oppenheimer calculated for each security its purchase price as a percentage of NCAV, and divided the population into quintiles according to this variable.

Adopting the same method, we analysed mean returns and risk-adjusted performance. The results are presented in Exhibit 5. Quintile 1 contains the fifth of the firms that have the highest discount, and Quintile 5 contains the firms trading closest to two-thirds of NCAV. With one caveat, our findings generally support Oppenheimer's conclusion: the returns are higher for firms with higher discounts to NCAV. The caveat is as significant as it is perplexing: securities in Quintile 1– those with the lowest purchase price to NCAV – have the lowest returns. As noted earlier, we have eliminated as outliers firms with stock prices less than one percent of the NCAV per share, so we do not believe outliers are driving this result.

Insert Exhibit 5 Performance measures by Quintile of Discount from NCAV/share about here.

In results not reported here, we plot returns for each rank by year. No pattern exists in the ranked returns. Although the returns in rank 2 and rank 3 tend to be the highest, this is not always the case. So, we can say that on average there is a mild positive relationship between the depth of discount and future returns, there is such variability year-over-year that we cannot suggest this is a reliable rule.

Explaining the Excess Returns

We continue our work here by examining potential explanations for the excess returns generated by NCAV portfolios. In the exhibits presented thus far, we have included information about the market risk of the NCAV portfolios. We examine various other common factors that are used to explain returns on portfolios of stocks, including the small firm effect and value premium, as documented by Fama and French [1992]. Since NCAV stocks tend to be small and are deeply discounted, these two factors are likely candidates for explaining the excess returns.

Since a stock, in order to become an NCAV candidate, must have been a recent loser in the stock market, the returns attributed to a portfolio of NCAV stocks could be explained by the long-term reversal pattern documented by DeBondt and Thaler [1985]. Their model demonstrated that excess returns can be generated by purchasing recent losers and selling recent winners, and holding such a portfolio for 3 – 5 years.

Finally, much recent work in asset pricing has been devoted to documenting the liquidity effect. See, for example, Amihud and Mendelson [1986], Datar et al. [1998], Pastor and Stambaugh [2003], and Chordia et al. [2001]. Liquidity is typically considered to be the ease with which one may transact in large amounts of stock without having a meaningful

impact on stock price. Clearly, NCAV stocks are likely to be highly illiquid. Since investors demand a premium for holding illiquid stocks, this factor is a potentially very good explanation of the excess returns on NCAV portfolios. The remainder of this section explores the relative importance of each asset pricing factor insofar as the factors explain the excess returns on NCAV portfolios.

Market Risk

We incorporate market risk by modelling the returns, net of the risk-free rate, on the NCAV portfolios as a function of the market risk premium. In other words, we model the NCAV using the one-factor Capital Asset Pricing Model (CAPM). This model captures the returns on the NCAV portfolio attributable to movements in the broader stock market.

It appears that the NCAV portfolios are somewhat riskier than the NYSE-AMEX stocks, with a beta greater than 1. However, the beta of the NCAV portfolio is not significantly different from 1, indicating that the NCAV portfolio is about as risky as the NYSE-AMEX portfolio. Furthermore the alpha, or excess return net of market-based return, is positive, and economically and statistically significant. This indicates that more than mere market risk explains the returns on the NCAV portfolios.

Astute readers will likely have noticed that most NCAV stocks are from the Nasdaq, indicating a prevalence of small stocks in the portfolios. This is indeed the case. Thus, the question arises: does the small-firm effect explain the excess returns from the NCAV portfolios?

Firm size and return

The small firm effect is well documented (see Banz [1981], and Fama and French [1992]). Essentially, small firms have outperformed large firms historically. Some researchers, like Fama and French, suggest that the small firm effect is a proxy for distress risk, and so investors require some premium to compensate for this risk. Since most of the firms held in the NCAV portfolios qualify as small-cap firms, this premium might explain the outsized returns.

We have already partially explored this theory by examining the returns on a portfolio of small-cap firms, and find that the NCAV portfolios outperform, in raw measures, the small-cap firms. In Exhibit 2, Panel A, we present results from regressing the returns on the NCAV portfolio against the returns on the portfolio of small-cap stocks. The NCAV portfolio appears to be less risky than the small-cap stocks with a beta of 0.77, and offers excess returns (alpha) of 1.50% per month.

To this point, our only method of controlling risk has been the traditional market model, which includes only market risk as an explanation of returns. To more fully explore firm size as an explanation of NCAV returns, we employ the Fama-French three factor model, which adds two factors to the traditional market model. The first factor, SMB, captures the small firm effect by calculating the difference between the returns from a portfolio of the smallest 10% of stocks and the returns from a portfolio of the largest 10% of stocks. The second factor, HML, calculates the difference between the returns from a portfolio of stocks with high book-to-market ratios and a portfolio of stocks with low book-to-market ratios. The value premium is a point to which we will return shortly.

Applying the Fama-French three factor model to our data confirms the importance of the small-firm effect. All three factors are statistically relevant as explanatory variables, but

the small firm effect is the largest factor. However, there is still an economically significant excess return (alpha) of 1.67% per month. Assuming monthly compounding, this yields an excess return of 21.99% per year after controlling for market risk, the small-firm effect, and the book-to-market effect. This indicates that the small firm effect does not explain the yields available from investing in stocks trading at a discount to NCAV. The results are presented in Exhibit 6.

Insert Exhibit 6 Fama-French 3-factor model about here.

Value premium

The Fama-French three factor model also allows exploration of a related effect: the value stock premium. Many studies have uncovered the fact that firms with low book value of equity-to-market value of equity ratios underperform firms with high book-to-market ratios (see Fama and French [1992, 1995, 1996], Lakonishok, Shleifer, and Vishny [1994]). The value premium itself exists, but the reasons for the value premium remain an area of active research (Chan and Lakonishok [2004]).

Firms with low book-to-market ratios are labelled "glamour" or "growth" stocks and those with high book-to-market ratios are labelled "value" stocks. As one can appreciate, a firm trading at a discount to its net current assets is essentially an extreme version of a value stock.

So, the question becomes, since the NCAV portfolios are populated by small value stocks, do those two premiums jointly explain the excess returns offered by investing in said portfolios? The answer is no. As shown in Exhibit 6, the value premium adds a minor amount to the explanation of the results. The excess returns unexplained by market risk, the small

firm effect, and the value premium remain positive and economically significant. Thus it appears that some other factor is at play in the generation of the outsized returns generated by the NCAV investing technique.

It is worthwhile to note that the importance of the three factors is not stable over time. The returns on the NCAV portfolios are generally less risky than the market factor, but in two periods (2001 - 2003, 2007 - 2008) the NCAV portfolio has a market beta greater than 1. The size effect also demonstrates considerable variation. It rose to 1.34 in the 1984 - 1985 period, but dropped sharply to -0.12 in the 2007 - 2008 period. Finally, the value premium is generally negligible, but for the 1992 - 1994 period and the 2001 - 2003 period, when it explained some portion of the NCAV returns.

The time sensitive nature of the returns on the NCAV portfolios indicates a certain level of defensiveness in the returns, but that occasionally there is some pro-cyclicality. The pro-cyclicality of the value premium factor (HML) becomes somewhat sensible when one thinks of it the way Fama and French [1992] frame it: as a distress measure. They contend that firms with high book-to-market ratios are more likely to be distressed firms, and so their prices should be depressed. When the firms recover, the prices shoot up. So, the excess returns are related to distress risk.

The value premium factor is significant in the late the early 1990s and 2000s. These are times in the U.S. when the potential for distress was quite high, so that may explain why the NCAV portfolios increased their sensitivity to the value factor during that period. Again, however, this is not a reliable explanation for the bulk of the time period under examination.

Losers that Win

Debondt and Thaler [1985] documented positive excess returns generated from a contrarian investing strategy: buying stocks that have had negative returns in the long-run, and selling stocks that have recently had positive returns in the long-run. Returns from such a portfolio can be applied in the same method as the HML and SMB factors. The data regarding these returns were obtained from Kenneth French's website, with the factor label LT_REV which stands for long-term reversal.

We apply the long-term reversal factor to our data and present the results in Exhibit 7, Model 2 in Panel A. While positive, the factor is not economically or statistically significant. Therefore, long-term reversal does not appear to explain the excess returns on NCAV portfolios.

Momentum

As a counterpoint to the reversal factor, we also examine a momentum factor (MOM), as documented by Jegadeesh and Titman [1993] and Carhart [1997]. The momentum factor is based on the technique of buying recent winners and selling recent losers. The momentum portfolios have a shorter holding period and the long-term reversal portfolios. The returns from a momentum-mimicking portfolio are also obtained from Kenneth French's website.

Since NCAV stocks are recent losers, we should expect the momentum factor to be negatively related to the returns on NCAV portfolios, and it is. It is also statistically significant – see Exhibit 7, Model 1 in Panel A. What is especially interesting is that inclusion of the momentum factor washes out the significance of the value factor (HML), and

causes it to change sign. This indicates that the momentum factor is an important variable in explaining returns on NCAV portfolios.

Liquidity – Or Lack Thereof

As discussed earlier in this section, NCAV stocks tend to be highly illiquid, and since investors require a premium for holding illiquid stocks, this liquidity premium may explain the excess returns on the NCAV portfolios. While it is generally agreed that liquidity is important and that a liquidity premium exists, just how to measure liquidity remains an area of active research (see Liu [2006]). Due to this ongoing discussion, we calculate to liquidity measurements and then tabulate a portfolio returns based on these liquidity measurements.

Our first liquidity measure is based on Amihud [2002]. We calculate a rolling twelve-month average return to dollar volume ratio. The formula is:

$$ILLIQ_t^i = \frac{1}{Days_t^i} \sum_{d=1}^{Days_t^i} \frac{R_{td}^i}{V_{td}^i}$$

where *i* is the individual stock, *t* is the twelve-month period, *Days* is the number of trading days in the past twelve months, *d* is the day index, *R* is the daily log return on the stock, and *V* is the daily dollar volume in millions.

We calculate this measure for all firms in the NYSE, AMEX, and Nasdaq exchanges beginning from 1983, so that we have measurements for every month starting from 1984 to 2008. We then rank every firm by ILLIQ every month and group the firms into deciles. We calculate the monthly returns for each decile, and then tabulate a monthly liquidity spread. The monthly liquidity spread is the return from going long on the 30% (35%) least liquid

NYSE/AMEX (Nasdaq) stocks and going short on the 30% (15%) most liquid NYSE/AMEX (Nasdaq) stocks. See Liu [2006] for a discussion of this procedure.

The liquidity spread captures the returns from going long the least liquid stocks and shorting the most liquid stocks. The factor is then used to explain the returns from the NCAV portfolios. If indeed illiquidity is a risk for NCAV investors, then this factor should be positively and statistically significant in explaining returns on the NCAV portfolios.

As a robustness check, we employ another liquidity measure. Pioneered by Liu [2006], this measurement is the weighted number of zero-trading days experienced by the stock in the past year. The measurement is calculated as follows:

$$LMx = \left[\#\ of\ zero\ daily\ volume\ in\ prior\ x\ months + \frac{\frac{1}{x-mont\ h\ turnover}}{Deflator}\right] * \frac{21x}{Days}$$

Since monthly measures of volume tend to be very noisy, we continue to use a rolling twelve-month measure of liquidity. Thus, in the formula above, $x = 12$. Turnover is measured as the total volume traded divided by total shares outstanding. We apply the same method of calculating the liquidity spread based on this measure as we did for the ILLIQ measure.

The results of adding in liquidity measures are presented in Exhibit 7, Panel A, models 3 (ILLIQ) and 4 (LM12). While both factors are positive, only ILLIQ is statistically significant. Therefore, we retain that measure as we continue.

We add the liquidity measure in with the Fama-French 3 factors and the momentum factor, which was previously found to be significant, and estimate Model 5. Now we find HML and MOM are insignificant, and so discard these factors and estimate Model 6. The fit of this model is the highest of all those estimated, and so we are confident that the market

risk, small-firm effect (SMB) and liquidity factors (ILLIQ) are the only factors that explain the returns on the NCAV portfolios of the ones we have applied.

Taking a closer look at our results, we notice that inclusion of the liquidity factor reduces by almost half the coefficient on the small-firm factor. This suggests that part of the weight on the small-firm factor is due to the illiquidity of small firms relative to big firms, and thus exclusion of the liquidity factor leads to a biased coefficient on SMB. We also note that inclusion of the liquidity factor ILLIQ has a substantive effect on the estimate of alpha (α).

Before including the liquidity factor, estimates of monthly alpha were around 1.67% to 1.9% per month, which translates to approximately 22 – 25% per year of excess returns, after adjusting for risk. Including the liquidity factor, monthly alpha is around 4.5%, which translates to 70% per year.

The problem remains, however, that our factor estimates are not stable over time. In Panel B, we present estimates of Model 6 for grouped time periods. We see that the excess return varies inversely with the market risk factor and the small firm factor, but positively with the illiquidity factor. Using a Pearson correlation coefficient, we calculate correlations of excess return, market risk premium, small firm premium, and liquidity premium with market performance as proxied for by the S&P 500. We note that excess returns and liquidity premiums are mildly counter-cyclical, while market risk and small firm premiums are strongly pro-cyclical. These results are available upon request.

The January Effect

As Oppenheimer notes, the stocks making up the NCAV portfolios tend to be fairly illiquid. As such, it is important to note the January effect that is present in our results. If the investor is unable to execute the trade on December 31st, as we do in our results, the investor may miss out on the best month of returns.

The January effect in our portfolios accounts for 10% of returns in the year, while the other eleven months account for about 2% each. Thus, the January effect is nearly half of the whole year's return. This does not mean, however, that the January effect drives returns on the NCAV portfolios.

We do not report the results here[1], but in regressions of the excess returns on the three-factor model plus a dummy variable capturing the January effect, the intercept is still positive and statistically and economically significant. What is interesting to note is that the January effect appears to have increased since the 1980s. The January effect in the 1980s accounted for approximately 3.5% of excess returns in the 1980s, but the effect is about 6.5% in the 1990s and 2000s.

Conclusion

The results are as clear as they are compelling: Seventy five years on, Graham's NCAV rule continues to identify securities that generate above-market returns. It appears that NCAV investment opportunities are more abundant after the market has performed badly, and the returns afforded by the NCAV portfolios outperform the market as the economy recovers.

[1] Results are available upon request.

The performance of the NCAV rule is apparently not a feature of the small firm or value effects, nor is it explained away by higher market risk. The chief explanatory factor of excess returns is the liquidity premium, but this too does not erase the positive alpha. The excess returns offered by the NCAV method do not appear to have decreased over time. Thus, the explanation of the excess returns generated by the NCAV strategy remains something of a puzzle.

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Exhibit I: Occurrence of NCAV stocks by exchange and year.

Number of firms that meet the NCAV rule by year and index. The NCAV rule states that if the current stock price is two-thirds or less of the net current assets per share, buy the stock. Net current assets are defined as current assets less total liabilities and preferred stock.

Year	NYSE	AMEX	NDQ	Total
1984	4	3	6	13
1985	6	1	10	17
1986	6	1	12	19
1987	4	0	15	19
1988	4	5	31	40
1989	4	2	26	32
1990	4	2	34	40
1991	6	7	86	99
1992	6	7	55	68
1993	3	3	45	51
1994	5	1	22	28
1995	7	1	28	36
1996	9	1	30	40
1997	8	2	29	39
1998	10	0	32	42
1999	13	4	63	80
2000	12	5	51	68
2001	23	14	114	151
2002	22	11	119	152
2003	19	7	114	140
2004	14	1	28	43
2005	14	1	20	35
2006	12	2	22	36
2007	16	2	18	36
2008	14	2	22	38
Total	245	85	1032	1362

Exhibit II: Performance Measures for the 26-year Period

Monthly returns are presented for the NCAV portfolios against various benchmarks. R_{pt} and R_{mt} are the NCAV portfolio and benchmark returns respectively. Both NCAV and benchmark returns are calculated using equal-weighted portfolios. We also present, under the heading "Risk-Adjusted Measures" the results of market-model regressions, where the dependent variable is the return on the NCAV portfolio, net of the risk-free rate of return. α is the percentage excess return from the market-model estimates per month. β is the estimate of the slope of the market model. t(α) and t(β) are the estimates of the t-statistics for α and β. R^2 is the adjusted R-squared for the model. For all benchmarks, we use returns including dividends, except for the following: S&P 500, AMEX, and Nasdaq. These items are returns without dividends.

	Mean Returns		Risk-Adjusted Measures				
	R_{pt}	R_{mt}	α (%)	t(α)	β	t(β)	R^2
Panel A: Entire Sample							
vs. NYSE-AMEX Index	2.55%	0.85%	1.66%	5.42	1.08	16.16	0.4671
vs. Small-Firm Index	2.55%	1.24%	1.50%	5.73	0.77	21.86	0.6159
Panel B: Securities in Each Exchange vs. Various Benchmarks							
NYSE vs. NYSE-AMEX Index	1.62%	0.85%	0.81%	2.39	0.91	12.36	0.3389
NYSE vs. S&P 500	1.47%	0.80%	0.76%	2.16	0.78	10.89	0.2848
NYSE vs. Small-Firm Index	1.62%	1.24%	0.87%	2.30	0.42	8.12	0.181
AMEX vs. NYSE-AMEX Index	2.41%	0.85%	1.27%	1.76	1.47	8.61	0.2168
AMEX vs. AMEX Index	2.36%	0.65%	1.47%	2.16	1.52	10.62	0.2961
AMEX vs. Small-Firm Index	2.41%	1.24%	1.14%	1.61	0.93	9.54	0.2534
OTC vs. NYSE-AMEX Index	2.67%	0.85%	1.67%	5.97	0.92	17.41	0.4204
OTC vs. Nasdaq Index	2.54%	0.82%	1.53%	6.97	0.96	27.44	0.6430
OTC vs. Small-Firm Index	2.67%	1.24%	1.35%	5.86	0.76	25.78	0.6138

Panel C: Three-Year Periods

vs. NYSE-AMEX Index							
1984 -1985	1.72%	0.95%	0.78%	1.08	0.95	5.65	0.5924
1986 - 1988	4.33%	0.89%	3.51%	3.51	0.80	4.97	0.4204
1989 - 1991	0.67%	0.82%	-0.01%	-0.15	0.76	6.01	0.5150
1992 - 1994	2.79%	1.07%	1.77%	3.13	0.93	5.29	0.4518
1995 - 1997	3.26%	1.78%	0.78%	0.98	1.53	5.79	0.4965
1998 - 2000	3.24%	0.36%	2.90%	2.01	1.18	3.56	0.2720
2001 - 2003	5.02%	1.49%	2.41%	2.54	1.85	9.95	0.7442
2004 - 2006	1.61%	1.34%	0.00%	0.00	1.25	7.77	0.6395
2007 - 2008	-0.12%	-1.95%	0.00%	0.59	0.88	7.57	0.7228
vs. Small-Firm Index							
1984 -1985	1.72%	-0.52%	1.85%	1.97	0.68	3.52	0.3605
1986 - 1988	4.33%	0.43%	3.87%	3.71	0.67	4.46	0.3688
1989 - 1991	0.67%	1.27%	-0.40%	-0.95	0.77	9.02	0.7054
1992 - 1994	2.79%	2.25%	1.54%	3.21	0.48	7.36	0.6146
1995 - 1997	3.26%	1.82%	1.79%	2.43	0.75	5.68	0.4866
1998 - 2000	3.24%	1.16%	2.12%	3.26	0.95	14.07	0.8534
2001 - 2003	5.02%	3.96%	1.78%	1.76	0.81	9.34	0.7195
2004 - 2006	1.61%	1.28%	0.57%	1.17	0.76	7.24	0.6065
2007 - 2008	-0.12%	-2.24%	0.01%	0.68	0.88	4.88	0.5202

Exhibit III: Performance Measures for 30-month Holding Periods

Monthly returns are presented for the NCAV portfolios with 30-month holding periods against various benchmarks. R_{pt} and R_{mt} are the NCAV portfolio and benchmark returns respectively. Benchmark returns are calculated using value-weighted portfolios. We also present, under the heading "Risk-Adjusted Measures" the results of market-model regressions, where the dependent variable is the return on the NCAV portfolio, net of the risk-free rate of return. α is the percentage excess return from the market-model estimates per month. β is the estimate of the slope of the market model. $t(\alpha)$ and $t(\beta)$ are the estimates of the t-statistics for α and β. R^2 is the adjusted R-squared for the model. The purchase date indicates the year in which the stocks were first purchased. We assume purchase took place on December 31st, or the nearest trading date prior to it.

	Mean Returns		Terminal Wealth of $10,000		Risk-Adjusted Measures				
Purchase Date	R_{pt}	R_{mt}	NCAV	Market	α (%)	t(α)	β	t(β)	R^2
	Panel A: vs. NYSE-AMEX Value-Weighted Index								
1983	3.59%	1.76%	$ 28,846.24	$ 16,870.71	2.41%	1.23	0.46	0.91	0.0289
1984	2.17%	2.29%	$ 19,024.26	$ 19,721.77	0.55%	0.30	0.61	1.56	0.0800
1985	5.11%	1.26%	$ 44,591.63	$ 14,569.90	3.87%	1.75	0.97	2.75	0.2132
1986	2.70%	1.31%	$ 22,224.18	$ 14,781.14	1.63%	1.24	0.67	2.97	0.2393
1987	2.96%	1.52%	$ 24,022.08	$ 15,738.10	2.14%	1.79	0.22	0.65	0.0147
1988	-0.25%	1.24%	$ 9,279.61	$ 14,469.56	-1.18%	-0.86	0.50	1.57	0.0812
1989	2.55%	0.79%	$ 21,308.38	$ 12,675.52	1.91%	1.46	0.48	1.59	0.0831
1990	3.02%	1.38%	$ 24,386.01	$ 15,070.11	2.28%	2.47	0.37	1.29	0.0560
1991	5.51%	0.49%	$ 49,961.37	$ 11,576.69	5.29%	2.25	-0.33	-0.30	0.0031
1992	6.70%	0.92%	$ 69,974.49	$ 13,167.46	6.08%	3.66	0.46	0.66	0.0151
1993	7.97%	1.33%	$ 99,867.78	$ 14,876.50	7.12%	1.37	0.48	0.23	0.0019
1994	4.53%	2.25%	$ 37,765.35	$ 19,485.28	4.17%	2.04	-0.05	-0.07	0.0002
1995	3.05%	2.08%	$ 24,662.35	$ 18,552.60	1.46%	1.07	0.70	1.92	0.1167
1996	2.82%	1.94%	$ 23,046.27	$ 17,771.37	2.11%	1.00	0.20	0.46	0.0075
1997	4.87%	1.04%	$ 41,635.13	$ 13,623.69	4.16%	2.20	0.47	1.19	0.0480
1998	4.95%	0.37%	$ 42,575.73	$ 11,165.36	4.54%	2.33	0.27	0.53	0.0098
1999	3.84%	-0.40%	$ 30,959.55	$ 8,869.71	3.22%	1.47	-0.38	-0.72	0.0183
2000	5.63%	-0.47%	$ 51,747.77	$ 8,674.93	6.62%	3.59	1.78	4.59	0.4297
2001	3.08%	0.42%	$ 24,825.46	$ 11,324.71	2.49%	1.81	1.57	4.74	0.4454
2002	4.55%	1.39%	$ 37,992.07	$ 15,118.53	2.31%	1.28	1.68	2.77	0.2153
2003	3.77%	0.92%	$ 30,312.95	$ 13,148.35	2.16%	0.71	1.97	1.47	0.0900
2004	3.82%	1.11%	$ 30,789.33	$ 13,944.09	1.77%	0.97	2.22	2.63	0.1979
2005	0.42%	0.48%	$ 11,326.34	$ 11,536.73	-0.03%	-0.02	0.75	1.76	0.0993
2006	0.24%	-1.55%	$ 10,742.15	$ 6,258.64	0.81%	0.39	0.46	1.22	0.0636
2007	-3.47%	-3.68%	$ 3,470.12	$ 3,251.03	1.85%	0.77	1.43	4.32	0.6511

Panel B: vs. Small-Firm Index

1983	3.59%	0.37%	$ 28,846.24	$ 11,159.45	3.10%	1.68	0.60	1.53	0.0772
1984	2.17%	1.49%	$ 19,024.26	$ 15,571.93	0.91%	0.56	0.75	2.48	0.1806
1985	5.11%	0.74%	$ 44,591.63	$ 12,470.10	4.46%	1.93	0.63	2.05	0.1302
1986	2.70%	0.90%	$ 22,224.18	$ 13,096.47	1.96%	1.48	0.50	2.77	0.2146
1987	2.96%	0.90%	$ 24,022.08	$ 13,103.13	2.21%	1.96	0.47	1.57	0.0810
1988	-0.25%	1.14%	$ 9,279.61	$ 14,032.55	-1.34%	-1.38	0.92	5.59	0.5271
1989	2.55%	2.74%	$ 21,308.38	$ 22,496.99	1.06%	0.87	0.45	3.12	0.2575
1990	3.02%	4.66%	$ 24,386.01	$ 39,156.89	0.79%	1.08	0.44	5.24	0.4948
1991	5.51%	2.88%	$ 49,961.37	$ 23,449.03	2.10%	1.23	1.20	5.58	0.5268
1992	6.70%	1.79%	$ 69,974.49	$ 17,046.00	5.39%	3.35	0.66	1.92	0.1166
1993	7.97%	1.94%	$ 99,867.78	$ 17,820.11	5.97%	1.19	1.04	1.01	0.0351
1994	4.53%	1.98%	$ 37,765.35	$ 17,996.87	3.36%	2.03	0.47	1.64	0.0878
1995	3.05%	1.60%	$ 24,662.35	$ 16,081.11	1.94%	1.69	0.59	3.06	0.2510
1996	2.82%	1.22%	$ 23,046.27	$ 14,394.31	1.61%	1.07	0.98	4.75	0.4459
1997	4.87%	2.35%	$ 41,635.13	$ 20,067.15	3.19%	2.07	0.65	4.18	0.3842
1998	4.95%	2.95%	$ 42,575.73	$ 23,952.55	3.02%	2.49	0.59	6.87	0.6278
1999	3.84%	1.67%	$ 30,959.55	$ 16,436.03	2.80%	1.63	0.52	4.14	0.3797
2000	5.63%	3.37%	$ 51,747.77	$ 27,022.12	2.49%	2.00	0.93	9.27	0.7542
2001	3.08%	3.83%	$ 24,825.46	$ 30,896.14	-0.45%	-0.26	0.92	3.89	0.3509
2002	4.55%	3.65%	$ 37,992.07	$ 29,342.72	1.07%	0.62	0.95	3.88	0.3493
2003	3.77%	1.29%	$ 30,312.95	$ 14,683.06	3.17%	1.03	0.36	0.59	0.0154
2004	3.82%	0.99%	$ 30,789.33	$ 13,425.94	2.94%	1.57	0.82	1.52	0.0762
2005	0.42%	0.36%	$ 11,326.34	$ 11,147.28	0.05%	0.05	1.08	3.27	0.2763
2006	0.24%	-2.24%	$ 10,742.15	$ 5,073.11	0.77%	0.35	0.31	0.81	0.0292
2007	-3.47%	-4.90%	$ 3,470.12	$ 2,215.97	2.24%	0.61	1.16	2.40	0.3651

Exhibit IV: Performance Measures by Earnings and Dividends

Monthly returns are presented for the NCAV portfolios against various benchmarks, and sorted by earnings record and dividend payments. R_{pt} and R_{mt} are the NCAV portfolio and benchmark returns respectively. Both NCAV and benchmark returns are calculated using equal-weighted portfolios. We also present, under the heading "Risk-Adjusted Measures" the results of market-model regressions, where the dependent variable is the return on the NCAV portfolio, net of the risk-free rate of return. α is the percentage excess return from the market-model estimates per month. β is the estimate of the slope of the market model. t(α) and t(β) are the estimates of the t-statistics for α and β. R^2 is the adjusted R-squared for the model. For all benchmarks, we use returns including dividends, except for the following: S&P 500, AMEX, and Nasdaq. These items are returns without dividends.

	Mean Returns		Risk-Adjusted Measures				
	R_{pt}	R_{mt}	α (%)	t(α)	β	t(β)	R^2
Panel A : Entire Sample							
vs. NYSE-AMEX	2.55%	0.85%	1.66%	5.42	1.08	16.16	0.4671
vs. Small-Firm Index	2.55%	1.24%	1.50%	5.73	0.77	21.86	0.6159
Panel B : Positive Earnings During Prior Year							
vs. NYSE-AMEX	1.96%	0.85%	1.14%	4.62	0.93	17.20	0.4966
vs. Small-Firm Index	1.96%	1.24%	1.07%	4.33	0.58	17.28	0.4988
Panel C: Negative Earnings During Prior Year							
vs. NYSE-AMEX	3.38%	0.85%	2.42%	3.92	1.26	9.32	0.2229
vs. Small-Firm Index	3.38%	1.24%	2.11%	3.86	1.03	13.93	0.3923
Panel D: Positive Earnings and Dividends During Prior Year							
vs. NYSE-AMEX	1.48%	0.85%	0.75%	3.06	0.75	14.08	0.3976
vs. Small-Firm Index	1.48%	1.24%	0.80%	2.84	0.34	8.82	0.2043

Panel E: Positive Earnings and No Dividends During Prior Year							
vs. NYSE-AMEX	2.42%	0.85%	1.49%	3.25	1.18	11.78	0.3155
vs. Small-Firm Index	2.42%	1.24%	1.31%	3.09	0.84	14.63	0.4160

Exhibit V: Performance Measures by Quintile of Discount from NCAV/share

Monthly returns are presented for the NCAV portfolios against various benchmarks. Returns are sorted into five quintiles, based on the stock price discount to NCAV. The most discounted stocks are in quintile 1, and the least discounted stocks are in quintile 5. R_{pt} and R_{mt} are the NCAV portfolio and benchmark returns respectively. Both NCAV and benchmark returns are calculated using equal-weighted portfolios. We also present, under the heading "Risk-Adjusted Measures" the results of market-model regressions, where the dependent variable is the return on the NCAV portfolio, net of the risk-free rate of return. α is the percentage excess return from the market-model estimates per month. β is the estimate of the slope of the market model. t(α) and t(β) are the estimates of the t-statistics for α and β. R^2 is the adjusted R-squared for the model. For all benchmarks, we use returns including dividends, except for the following: S&P 500, AMEX, and Nasdaq. These items are returns without dividends.

	Mean Returns		Risk-Adjusted Measures				
Quintile	R_{pt}	R_{mt}	α (%)	t(α)	β	t(β)	R^2
Panel A: vs. NYSE-AMEX Index							
1	1.74%	0.85%	0.97%	3.13	0.78	13.56	0.3795
2	3.60%	0.85%	2.62%	4.45	1.22	11.12	0.2908
3	2.93%	0.85%	1.87%	2.94	1.40	11.81	0.3164
4	2.82%	0.85%	1.93%	3.97	1.04	11.45	0.3030
5	2.36%	0.85%	1.38%	2.74	1.22	12.97	0.3587
Sample	2.55%	0.85%	1.66%	5.42	1.08	16.16	0.4671
Panel B: vs. Small-Firm Index							
1	1.74%	1.24%	0.95%	2.78	0.46	9.85	0.2430
2	3.60%	1.24%	2.45%	4.15	0.90	11.23	0.2950
3	2.93%	1.24%	1.66%	2.62	1.03	11.99	0.3230
4	2.82%	1.24%	1.77%	3.66	0.77	11.75	0.3144
5	2.36%	1.24%	1.26%	2.4	0.83	11.71	0.3130
Sample	2.55%	1.24%	1.50%	5.73	0.77	21.86	0.6159

Exhibit VI: Fama-French 3-factor Model

These are the results of regressing NCAV returns, net of the risk-free rate, on the 3 factors suggested by Fama and French. The 3 factors include the excess return on a market portfolio (equal-weighted CRSP index in this case), the return on a portfolio long on small-cap stocks and short on large-cap stocks (SMB) and a portfolio long on high book-to-market equity stocks and short on low book-to-market equity stocks (HML). α is the percentage excess return from the market-model estimates per month. β is the estimate of the slope of the market model. SMB and HML are estimates of the sensitivity of returns to the SMB and HML factors. t(α), t(β), t(SMB), and t(HML) are the estimates of the t-statistics for α, β, SMB, and HML. R^2 is the adjusted R-squared for the model.

	α (%)	t(α)	β	t(β)	SMB	t(SMB)	HML	t(HML)	R^2
Entire Sample	1.67%	5.72	0.83	12.18	1.08	10.52	0.16	1.89	0.5216
1984 - 1985	0.51%	0.56	0.93	3.54	1.34	2.07	0.38	1.03	0.4942
1986 - 1988	3.43%	3.19	0.77	3.69	0.82	1.86	0.32	0.60	0.3657
1989 - 1991	0.18%	0.25	0.43	2.43	1.14	4.02	0.07	0.17	0.4472
1992 - 1994	1.08%	1.84	0.39	1.69	1.19	5.20	0.85	3.85	0.4897
1995 - 1997	1.53%	1.60	0.81	2.53	0.53	1.74	-0.46	-1.00	0.4151
1998 - 2000	2.73%	2.53	0.60	2.57	1.12	3.54	-0.17	-0.71	0.6081
2001 - 2003	3.01%	2.72	1.19	6.07	0.81	2.80	0.74	2.57	0.7037
2004 - 2006	0.29%	0.42	0.93	2.60	0.83	2.48	0.45	0.89	0.5344
2007 - 2008	0.14%	0.20	1.15	8.24	-0.12	-0.34	-0.29	-1.61	0.7532

Exhibit VII: Multiple-Factor Models

These are the results of regressing NCAV returns, net of the risk-free rate, on the Fama-French model augmented by several factors: momentum (MOM), long-term reversal (LT_REV), and two measures of liquidity: returns as a ratio of dollar volume (ILLIQ) and weighted number of zero-volume trading days (LM12).α is the percentage excess return from the market-model estimates per month. β, SMB, and HML are the coefficients from the Fama-French 3-factor model. t(*) is the t-statistic for the factor listed above the t(*). R^2 is the adjusted R-squared for the model.

Panel A: Full Sample

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
α (%)	0.0190	0.0166	0.0450	0.0181	0.0451	0.0435
t(α)	6.26	5.67	10.17	5.55	10.20	10.44
β	0.7726	0.8322	0.5856	0.7467	0.5704	0.6088
t(β)	10.84	12.09	8.49	6.87	8.09	9.38
SMB	1.0320	1.0663	0.5816	1.0269	0.5767	0.6262
t(SMB)	9.95	9.57	5.18	8.82	5.13	6.08
HML	-0.0068	0.1588	-0.0848	0.1873	-0.1445	
t(HML)	-0.06	1.79	-1.00	2.08	-1.40	
MOM	-0.0021				-0.0008	
t(MOM)	-2.47				-1.02	
LT_REV		0.0004				
t(LT_REV)		0.33				
ILLIQ			1.0352		1.0064	0.9878
t(ILLIQ)			7.99		7.59	8.19
LM12				0.1238		
t(LM12)				0.97		
R^2	0.5297	0.5201	0.6053	0.5215	0.6054	0.6053

Panel B: Liquidity by Grouped Years

	α (%)	t(α)	β	t(β)	SMB	t(SMB)	ILLIQ	t(ILLIQ)	R^2
1984 - 1985	0.0401	2.10	0.8705	4.04	0.1757	0.22	0.9697	1.85	0.5448
1986 - 1988	0.0299	1.32	0.7218	3.85	0.7997	1.66	-0.2084	-0.30	0.3603
1989 - 1991	0.0306	2.62	0.5035	3.86	0.8012	2.87	0.9301	2.89	0.5611
1992 - 1994	0.0438	6.28	0.3793	1.78	0.0360	0.12	1.6723	4.80	0.5664
1995 - 1997	0.0369	3.75	0.9065	4.43	0.3279	1.43	1.4451	3.86	0.5885
1998 - 2000	0.0693	5.73	0.4691	2.88	0.8014	3.93	1.4953	4.59	0.7601
2001 - 2003	0.0887	6.45	0.1524	0.54	0.2762	1.01	2.1456	4.93	0.7969
2004 - 2006	0.0201	1.99	0.6540	1.85	0.4710	1.23	0.6098	1.57	0.5569
2007 - 2008	0.0036	0.25	1.1361	5.02	-0.2582	-0.58	-0.0312	-0.09	0.7214