A MATTER OF OPINION

The good news is that a disciplined investor can use a combination of criteria to beat 'the market.' The bad news is, the outperformance is not going to be dramatic.

Quantitative Measures and What Really Works Within a Stock Portfolio

By James B. Cloonan

In my previous article in this series on managing your own mutual fund [October 1996], I began a discussion of quantitative measures that are often used as decision criteria. These criteria are listed in Table 1.

My discussion focused on the details of these quantitative measures, and in that column I focused on market capitalization, earnings per share, share price, and changes in those measures over time.

Here are the other commonly considered quantitative criteria:

Book Value is usually compared to price, appearing as part of the ratio of price to book value (price per share divided by book value per share). There is strong research support indicating that this is a criterion that will enable an investor to outperform the market, and price-to-book-value ratio is one of the criteria used in the Beginner's Portfolio, a simplified approach to building and maintaining a stock portfolio, which I discussed at the beginning of this series (in the August 1996 issue). This is obviously a value measure. A ratio of less than 1.0 indicates that the price of the stock is less than the company's worth, as measured by book value.

Some analysts look for stocks with a better (lower) than average price-to-book-value ratio. The price-to-book-value average for the S&P 500 is currently about 4.0. The Beginner's Portfolio criteria looks for a ratio in the lower 10% of companies, which is below about 0.70.

While using low price-to-book-value ratio as a criterion has increased returns enough to beat the market, there are limitations to the use of this measure. First, book value can only be measured quarterly, when corporate reports are released. Clearly, buying something below the book value seems like a bargain, and paying more than its book value seems silly. The problem is that "book value" is based on current accounting principles, and items of real and substantial value often do not appear on the balance sheet. Such items include: customer loyalty, distribution networks, patents, copyrights, research, and a host of other good-will items that are ignored. While some of these are tenuous, others have real value in the marketplace and investors would pay cash for them. In a successful company, replacement cost is the true economic value of assets that can be used in production.

In addition, the valuation of hard assets such as land is often arbitrary. All of this can work negatively, as well, causing book value to be overstated. Plants and equipment may be worthless in a dying industry or when new technology has caused them to become obsolete. Work in progress and inventory may also be worthless. One of the qualitative approaches I will examine in the future is an effort to ascertain true value relative to accounting book value.

The price-to-book-value ratio works because on average over a number of companies and a number of years, accounting book value is a close-enough estimate of economic value, but there are exploitable exceptions.

Cash Flow and changes in cash flow are a respected measure of a company's ability to survive bad times and to take advantage of opportunities. This variable is usually measured by the ratio of price to cash flow. Low values are considered good. However, there is no substantial research evidence that this criterion will make much difference overall, although it may help in evaluating some individual companies.

Sales Revenue can be used as a mea-

Table 1.
Quantitative Screening:
Commonly Used Variables

- Market Capitalization
- Earnings Per Share, EPS Growth
- Share Price, Price Changes
- Book Value
- Cash Flow, Cash Flow Changes
- Sales Revenue, Sales Growth
- Profit Margin, Changes
- Dividends, Dividend Growth
- Assets (Relative to Liabilities)
- Liabilities (Relative to Assets)

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sure of a company's growth over recent years. While earnings growth that exists as a result of cost-cutting alone cannot sustain itself, sales growth can indicate future prospects. Unfortunately, not all sales are profitable and the concept that "I can lose $0.05 per item and make it up on volume" won't lead to higher earnings. While it doesn't hurt to look at sales growth, it does not seem to have much predictive power.

The price-to-sales-per-share ratio, however, seems to be one of the strongest quantitative criterion in stock selection. Recent evidence is so persuasive that I added this criterion to the Beginner's Portfolio. As you might expect, the price/book and price/sales criteria will tend to choose a high proportion of the same stocks. Stocks with a price-to-sales ratio of less than 1.5 appear to be bargains, but 1.0 seems to be a more effective cut-off and the Beginner's Portfolio uses a 0.54 cut-off.

While the price-to-sales ratio proves to be an excellent predictor as an overall portfolio screen, in individual stocks it can lead one astray. For instance, a very high margin business will be overlooked. This often includes innovative and growing companies. Clearly, a company that nets $0.25 on each dollar of sales is worth more than one times its sales per share. The price-to-sales screen works because of the average margin over a wide range of stocks.

Profit Margins and their changes over time are important in the prediction of earnings. However, except for comparing companies in the same industry, profit margin has not been shown to be an effective criterion on its own. Estimates of profit margin changes are more difficult to find than estimates of earnings, and less valuable.

Dividends, or rather the dividend yield (dividend divided by price), is often cited as a way to pick winners and/or reduce portfolio volatility. There seems to be little evidence that high dividend yield does either. Think of the great interest in dividend reinvestment plans. The corporation pays a dividend and reinvests it for you in corporate stock without a commission. Good deal? You have to pay the tax on the dividend. If the company had simply not paid the dividend you would have the same result and deferred the tax. In a high tax environment, it is *generally* better to avoid dividend-paying stocks. If you need income, sell some stock. If there are stocks you like and they pay dividends, try to keep them in an IRA or other tax-deferred account.

Dividends cannot grow unless earnings grow and earnings growth is a better criterion for stock selection.

[For a different point of view regarding dividend yield, see the Stock Analysis Workshop column, starting on page 16.]

Assets, liabilities, balance sheet and the various balance sheet ratios would appear to be prudent evidence of a stock's worth. However, except for book value, the various accounting ratios are of little value in selecting stocks that will outperform the market. Use of these accounting ratios is supposed to reduce risk but, generally, reduced risk means reduced return. While there is some information that can be gleaned from the ratios, the most useful information is already contained in the price-to-book-value ratio.

The Key Quantitative Indicators

So, which stock selection criteria are the most useful? Here are the ones for which there is reasonably strong evidence that they can provide an above-market rate of return:

Company size: Companies with a market capitalization of less than $150 million outperform over the long term; within reason, the smaller, the better.

In the value category: Low price/sales and low price/book value are most effective. Keep both ratios below 1.0.

In the growth area: There is a variety of evidence that positive price movement or relative strength is a significant criterion. However, the best way to measure relative strength or momentum has not been well-researched. Successful growth-oriented advisers tend to be a little mysterious as to their exact measures and their interpretation of data. However, simple interpretations appear valuable. The most common measure of relative strength is the one-year percentage increase in price relative to the one-year increase in the price of other stocks. While there has not been extensive research about the best time period to use, the one-year period seems to add predictive value. My personal preference would be for a shorter period—six months or three months.

When to sell becomes more difficult with relative price as a criterion. I know of no research on choosing sale points when using relative price to choose stocks.

The Bottom Line

The good news is that a disciplined investor using a combination of the criteria that has proven useful can beat the market as well as the vast majority of mutual funds.

The bad news is that such an investor can't use these quantitative, structured approaches in such a way to outperform the market *dramatically*. A reasonable expectation might be to outperform by 4% to 6% a year. Of course, this amount is not inconsequential.

There are several reasons why a quantitative modeling approach is not going to provide returns that are way above the market in the long term. First, the market is not efficient in the academic sense of the word, but it is reasonably efficient. As a result, information available will eventually lead to adjustments in the stock price. The efficiency is higher for large companies with dozens of analysts watching. It is lower for smaller companies and that is one of the reasons smaller companies provide more opportunity.

Another reason that excess returns from purely quantitative criteria will be limited is the availability of powerful artificial intelligence computer systems. There are organizations that input into their computer all the variables (company-specific and eco-

nomic) that can be measured, and run simulations looking for correlations with predictive capabilities. There has been time to test virtually every conceivable strategy over thousands of variables in real time. If there are quantifiable variables or combinations of variables that could lead to really high excess returns, they either have been or soon will be exploited.

A further reason for limits to quantitative selection relates to the weaknesses inherent in each measure. They all go for the average and thereby overlook exciting exceptions.

But excess returns (returns above the market) of 4% to 6% a year are rather significant in terms of investment success. A 6% return doubles the original commitment every 12 years, which means that over an investment lifetime (maybe 36 years) an additional 6% per year return can provide a retirement nest egg eight times as large as an investor in an index fund.

In coming columns, I will discuss qualitative approaches to selection, some hybrid approaches, and the day-to-day practicalities of managing your own 'mutual fund.'

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