

The Advantages of Quantitative Approaches to Stock Selection

An Interview With Sudhir Nanda

Article Highlights

- A fundamental quant uses the same metrics a fundamental analyst might use to analyze a company, but uses them in a systematic process to rank a large number of stocks.
- Metrics used in typical quantitative strategies include valuation, profitability, capital allocation and momentum. Changing how the metrics are weighted alters what goes into the portfolio.
- When building a stock screen, make sure to use metrics that have some economic significance with consideration given to different types of macro environments.

Sudhir Nanda is the head of T. Rowe Price's Quantitative Equity Group as well as a portfolio manager for the company's QM U.S. Small-Cap Growth Equity (PRDSX) and QM Global Equity Fund (TQGEX) mutual funds. We spoke about his approach and what investor investors can learn from it.

—Charles Rotblut, CFA



capital allocation, like return on equity (ROE). I consider whether the firm is paying dividends, increasing dividends or buying back stock. What are they doing with their capital expenditures? Is it increasing, decreasing? Then I'll look at metrics like earnings quality, earnings estimate revisions and price momentum.

If I compare what a fundamental analyst does to what a quant does, they both look at similar metrics in many cases and come up with a way to figure out which stock is good. A fundamental analyst might cover 20 stocks or 30 stocks and buy one or two. A quant ranks every stock in his or her universe. If I'm looking at, say, the small-cap universe, I'm ranking 2,000 stocks. A fundamental analyst will not be able to cover 2,000 stocks. You need 40 or 50 analysts to cover 2,000 stocks. So to that extent, a quant process is very efficient because it can rank every stock globally. One thing a quant does not do that fundamental analysts do is talk to the management of companies considered for investment.

Most quants will use three or four types of metrics to rank stocks. The first is valuation. That's typically in every quant model, though how valuation is defined could differ. You could use the same valuation metric across your whole universe or you could use different metrics for different industries in your universe. For example, you may use a different metric in health care and a different metric in technology stocks.

The second set of measures captures profitability and capital allocation. We look at metrics like return on equity and stock buyback and dividend policies. These capture what a company's management is doing with its profits.

Charles Rotblut (CR): Could you explain what a quantitative approach to investing is?

Sudhir Nanda (SN): There are a number of different approaches included in the common usage of "quantitative." At one extreme is anybody who is doing high-frequency trading. These investors call themselves "quants." The general public may also call them "quants." That's because they're using automated processes and automated tools rather than having human beings analyze each stock or do portfolio construction.

At the other extreme, there are people like me who I would call "fundamental quants." I use the same sort of metrics that a fundamental analyst might use to evaluate a company, but I use them in a very systematic process for ranking stocks.

For example, a fundamental analyst will look at the price-earnings (P/E) ratio to value a company. They will talk to the management, look at management's capital allocation, and look at other forward-looking metrics about the economy.

As a quant, I use valuation metrics like price-earnings (P/E) and free cash flow yield (free cash flow per share divided by the stock's price). I use metrics that capture management's

The third type of metric that a typical quant model will always have is price momentum and earnings estimate revisions, and maybe even an earnings quality element. Those are the elements we use here at T. Rowe Price in our quant models.

CR: *What about due diligence to see if there is something that models are missing—skeletons in the closet that the screens aren't picking up?*

SN: Even within the quant universe space, there are two different approaches. Some people are using very automated black-box processes. They get all their data, they rank stocks on different metrics and combine the metrics to come up with one composite rank for a stock. Then they have an optimizer determine the portfolio construction and do the trade. That's what the majority of quants might do.

The problem with this is that you are not capturing individual events. What are individual events? There might be a legal issue for this firm, such as an asbestos liability, the CFO may have resigned yesterday, the firm may have made a significant announcement about its future, the company may be going to split into three firms, etc. Those are things you can check for.

At T. Rowe Price, our quant process uses a model that ranks stocks. Instead of having a black-box process, once we have a ranking, we have a human being or a portfolio manager constructing the portfolio and deciding which trades to do. That's a less-automated approach than the fully automated process that many quants use. You'll find that at different quant firms, managers may do anything from fully automated to what I am describing we do at T. Rowe Price.

Before we do a trade, we will

double-check our data with another source. We will check if there is a CFO resignation or another significant event. We may even override a model in some cases. One advantage I have at T. Rowe Price is access to our industry research from our industry analysts. I can actually consult an industry analyst and say, "This significant event has happened for this company. Is that something I should be worried about and override my model?" So there are some common-sense checks before a trade is placed.

CR: *Are there certain metrics you emphasize more than others?*

SN: In regard to the different metrics used in typical quant models like valuation, profitability, capital allocation type and momentum, you can come up with many different portfolios by how much weight you assign to each of them. For example, if I give an 80% weight to momentum, I will come up with a portfolio that trades a lot. Momentum factors tend to be high-turnover factors. If I give an 80% weight to valuation, my turnover will be much lower.

Different quant managers can come up with different portfolios because of the way they decide to weight each of the metrics that are in their models. A lot of times people say all quants are doing the same thing. This may not be reality because they're all sometimes using different metrics. Sometimes they are combining them in different ways and they might be assigning different weights to each metric.

One of the things we do at T. Rowe Price is to place a lot more weight on valuation, profitability and capital allocation, and a lot less on momentum-type metrics. That's because, philosophically, I believe in running lower-turnover strategies rather than high-turnover strategies.

The other thing to remember is that the quant process looks at metrics that have worked in the past. You have to ask, "Do low P/E stocks outperform high P/E stocks historically?" You go back and look at the last the 30, 40 or 50 years' worth of data and make sure you come up with a conclusion that states, "Yes, I can statistically show

Comparing a Quantitative Analyst to a Traditional Fundamental Analyst

Both quantitative and fundamental analysts use a variety of indicators to determine whether a company is an attractive investment. A quant analyst relies predominantly (and sometimes fully) on a computer-driven ranking system, whereas a fundamental analyst will speak to the company's management and let personal experience and industry knowledge influence decisions.

**VS.**

Quantitative Analyst	Fundamental Analyst
Analyzes stocks based on valuation and fundamental metrics	Analyzes stocks based on valuation and fundamental metrics
Ranks potentially thousands of stocks, depending on targeted universe	Covers 20 to 30 stocks
Doesn't talk to management	Talks to management
Relies on ranking system to build portfolios; may override rankings in certain cases (e.g., the resignation of the CFO)	May have rules-based approach, but relies on human judgment to determine what goes into a portfolio

Table 1. Performance of Funds Managed by Sudhir Nanda

	YTD Return (%)	2016 Return (%)	Avg Ann'l Return (%)				Exp Ratio (%)
			Last 3 Yrs	Last 5 Yrs	Bull Mkt*	Bear Mkt*	
T. Rowe Price QM U.S. Sm-Cp Grth Eq (PRDSX)	6.6	11.3	9.0	13.5	369.4	(48.6)	0.82
Small-Cap Stock Category Average	2.5	19.5	5.4	11.0	298.1	(52.2)	1.16
T. Rowe Price QM Global Equity (TQGX)**	6.9	na	na	na	na	na	0.79
Global Stock Category Average	7.1	5.7	4.6	8.8	199.9	(52.1)	1.16

Bold returns are in the top 25% of all funds within in the investment category.

*Bull market defined as March 1, 2009 through March 31, 2017; bear market defined as November 1, 2007, through February 28, 2009.

**Inception date April 15, 2016.

Source: Morningstar; AII's 2017 Individual Investor's Guide to Mutual Funds. Data as of March 31, 2017.

that low P/E stocks outperform high P/E stocks.”

Now that does not mean it's going to work for every stock, and it does not mean it's going to work every year. Essentially, you are doing the same kind of analysis with all these different types of metrics I have described and you are hoping to pick up different metrics that are not fully correlated with each other.

For example, when value works, momentum doesn't work, and when momentum works, value doesn't work. Value and momentum metrics have a small negative correlation, which means they are very good for including in a model and a stock-selection process because one of the metrics will work at a given time.

Keep in mind that not all metrics in a quant model will work every year, but, overall, when you combine them, you have a high chance of outperforming in more years than not.

If I'm looking at the Russell 2000 universe, I might rank stocks from one to 10, just to make it simple. Then I'm hoping that my ones, which are my strong buys, outperform maybe 60% percent of the time, and my 10s, which are things I don't want to own, outperform only 40% of the time. Essentially, you are hoping that you get a 60% chance of outperforming—that's good enough to outperform a typical benchmark. No quant process or fundamental process will work all the time, just as is the case with any investment process. But you're hoping to tilt it in a way that more often than not you will do well.

CR: For an individual investor trying to apply this in a stock screen, should they be looking at doing a composite stock screen where, say, they combine value and momentum in the same screen, or should they consider running separate screens and then applying some type of scoring system to each screen to create a composite score?

SN: I think you can do it either way. What is important about using screens is that you have to make sure you're using metrics that have some economic significance. So you can't just say, "Because it's a full moon day, I'll buy this stock. If it's not a full moon day, I'll buy another stock." Those don't typically have economic significance. So that is one important thing.

Another thing is when you create a screen, you can have a preference and say, "I am a long-term investor. I'll assign more weight to certain types of metrics," or "I'm willing to trade more often. I'll trade on different types of metrics." You can change your weighting depending on what sort of trading pattern you desire and your philosophical beliefs on what works. When I mentioned that we put a lot more weight on valuation, that's my philosophical belief. This belief is actually backed by a lot of academic research that shows, over time, that value stocks outperform.

An individual investor may come up with different weighting schemes. You can do a lot of statistical analysis to come up with weights or you can do a simple equal-weighted scheme. With the latter, you say, "Here are five metrics that I think are good. I'll equal-weight

whether something needs to be tweaked in the scoring system or in what you're screening for?

SN: When we decide which metrics go into a stock-selection model, we look at what has worked over time and in different macro environments. When building a screen or a model, you have to include both up and down markets. You have to include different types of macro environments as much as possible.

Even when we run backtests for our best models, we know that if we look at different rolling 12-month periods, 20% to 30% of the time, my model will not outperform. I'm hoping that in that 20% some components of the model will work. There's a chance that the strategy won't work in some periods. In such cases, the question comes up: Has the environment changed structurally so much that whatever I have found that has worked over the last 40 years is not going to work in the future? If that is true, then something needs to be done with the model.

In any investment process, there will be periods when it's not going to work. I just have to live through that. So you might then say, "All right, value works in some periods and growth works in other periods. I'll have part of my investment in a value-oriented portfolio and part of my investment in a growth-oriented portfolio." These might both outperform over time, but they'll outperform at different points, which means you smooth out your return pattern.

Whether it's a quant process or a fundamental process, there will be

them.” I think that works pretty well for the average person who wants to take a quant approach.

CR: What about periods when the strategy is not working? How do you make the determination that the style of investing, say value, is just out of favor versus questioning

periods when it doesn't work at all. Most of the time, if you have thought through your process properly, you just need to be patient. I think the biggest mistake a lot of individual investors make is getting out of value or growth at exactly the wrong time because all metrics have cycles of outperformance and underperformance.

CR: *Is there a certain point where you say, "Momentum has just turned against the stock," or do you just let the model adjust its scoring?*

SN: You just let the model adjust the scoring. So you assign weights, and you let the model decide what ranks well and doesn't rank well. The idea behind a quantitative process is taking human emotions out of investing. You're saying, "Here is a process and a ranking system that works over time. It will not work sometimes. Sometimes one part of the model will not work. Other times, another part will not work." So you don't want to mess around and switch this off and switch that on, because most of the time you'll make mistakes at the wrong time.

I just follow my process repeatedly because we have tested it and statistically established that historically it's been an effective process. If you're an individual investor, you have to be sure that your screen includes different types of metrics and that it is consistent in terms of economic significance. If so, you just follow the process.

CR: *How would somebody who is using their own screen or building their own screen know when it's time to sell a stock or get rid of a stock?*

SN: This is something important. In my case, I manage a small-cap portfolio with 300 stocks. In a large-cap portfolio, I might own 130 or 140 stocks. Essentially what I am doing is ranking stocks, say, from one to 10, and as the rank declines, say, below six or seven, I'll sell the stock and buy something that ranks well. So I'm constantly refreshing my portfolio by following this process while keeping an eye

toward managing trading costs.

Now if you are somebody who owns only five stocks, then you have a different kind of problem, because that would be a lot of turnover. So then you need to think through it more carefully and say, "This stock has declined in rank. Why has it declined?"

If you said it's declined just because it's become slightly expensive, you may say, "I'll do nothing." If it's become very expensive, then you have to decide if this is a company you can own for the very long term. If so, you might say, "Okay, I'll sit through it," because very good companies occasionally become expensive. They can also become cheap. When they become cheap, you can buy more. When they become expensive, you can trim some of your position, but there's a tax consequence of doing that for an individual investor. If you're using a screen and you own only a few stocks, you will have to constantly make those

decisions. As somebody who owns 300 stocks, I conduct a reasonable cycling of my portfolio. I sell things that become very expensive, because I always have a cheaper alternative to buy.

CR: *I also want to ask you about the industry overall. Is there any concern about the shift toward quantitative strategies leading to a situation where their popularity takes away their advantage?*

SN: The total amount of money being managed with quant strategies is only about 10% or 15% of the total money under management, based on the estimates I've seen. Now in that, most people include smart beta strategies. The conclusion is that quants are still not the majority of the market, number one.

Number two, even most fundamental portfolio managers use some screening tools. If you are, say, managing a global portfolio, there are 14,000 stocks to choose from. You've got to come up with a short list of stocks that you want to spend your time on or have your analysts spend more time on. Essentially what we find is a quant process and a non-quant process may sometimes pick up different aspects of a stock's performance characteristics. So sometimes if you use the best of both, you get a better outcome than just using one of them.

If portfolio managers are using more quant, it's because they are trying to make their processes more efficient. Because a quant ranking will sometimes differ from what a fundamental analyst is saying, it allows them to stress test the analyst's thinking. It's not a replacement, it's just a second viewpoint. It gives a different-shaded viewpoint on a stock so that you can make a more informed decision.

That's something portfolio managers have always done—look at different pieces of information and consider all of the positives and negatives of a stock. It's nothing new, it's just that what I am doing is in a very systematic process whereby I can rank every stock globally.

CR: *Is there anything that I should*

Quantitative Traits

Among the traits Nanda includes in his quantitative models to rank stocks are:

Valuation

Free cash flow yield (free cash per share divided by the stock's price) requires a company to realize positive cash flows after normal business operations and capital expenditures have been covered. It is also harder to manipulate than net income.

Profitability and Capital Allocation

Cash from operations should exceed income before extraordinary items. He also pays attention to return on equity (ROE), whether inventory has been built up, if the dividend is growing, if shares are being bought back and the trend in capital expenditures.

Momentum

Nanda favors nine-month relative strength. He weights momentum less than valuation in his models to reduce portfolio turnover. He also takes earnings estimate revisions into consideration.

have asked you that I haven't?

SN: I think the most important thing I would stress is that when people hear the word “quant,” they think it’s some computer doing crazy things on its own. It’s not, because even when people use very automated processes, there’s a human being who gives the computer instructions on what to do. Humans write a program to do that.

All these processes are driven by human beings and it’s all a matter of how much automation you want, whether you want to meet management or not, whether you want to use metrics that are available in the firm’s financials or whether you want to use all sorts of other metrics.

Our fundamental quant approach involves a very structured way of looking

at stocks and a very systematic way of constructing portfolios. That’s something that is important. A lot of quants spend a lot of time on portfolio construction in addition to stock selection.

I’ll give an example. When I was a professor in my previous life, a friend of mine who was a professor with me said he had a diversified portfolio. I said, “That’s great. Let me look at your portfolio.”

I looked at it. He had a portfolio of 30 technology stocks. He thought it was diversified, but it really wasn’t because there were 30 tech stocks in it. So I think another thing individual investors should look at is whether their portfolios are truly diversified or not. Do they have different types of stocks in their portfolios?

When I say “quant,” it’s really saying, “How do I construct a diversified portfolio that not only maximizes return, but also maximizes return per unit of risk?” So I am not just trying to get you the highest return, I am trying to get a high return given a certain level of risk. That’s something very important not only for a quant, but also for any individual investor: Look at the risk in their portfolios and not just look at the return. ▲

See the online version of this article to learn why Nanda thinks cash flow is a good measure of valuation and how he defines earnings quality. Plus, listen to bonus audio of Nanda’s guidance to individual investors on incorporating quantitative strategies into the stock-picking process.

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be paid from the current cash pool; the higher the number, the more secure the dividend. UnitedHealth’s (UNH) cash to dividend ratio is 4.6, indicating that there is enough cash on hand to cover the dividend more than four times. In the case of General Electric, the company could cover its dividend almost six times with cash, which is a good cushion considering that the company’s free cash flow payout ratio is negative. The cash to dividend ratio may not be applicable for financial stocks, as demonstrated by Goldman Sachs (GS) in Table 1.

Finally, another aspect to consider when determining the continuity of dividends is the number of consecutive years a dividend has been paid. This figure may be listed in the Investor Relations section

of a company’s website, but if it is not you can usually call Investor Relations and ask. The longer the dividend has been paid, the more management will be hesitant to stop paying it.

Conclusion

Screening for stocks with dividend yields above their five-year average can help you find potentially undervalued stocks with downside protection (the dividend payment), provided the dividend is secure and expected to grow, and the firm is financially sound. Some metrics that can be used to determine if a dividend is sustainable is the earnings payout ratio, the free cash flow payout ratio and the ratio of cash per share to

dividend per share.

For a stock with an appreciating price, dividend growth is key. As the stock’s price increases, the dividend yield decreases (holding the dividend payment steady). When the dividend payment is increased, the yield will increase (holding price steady). If a stock’s price goes up in value and the company does not increase the dividend distribution, its yield will not be attractive relative to historical levels.

This is an update to the article “A Dividend Approach to Judging the Value of Stocks” by John Bajkowski in the February 1991 AAI Journal. ▲

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