By Daniel Morris, Chief Market Strategist I Frederic Abergel, Senior Quantitative Analyst

QUANTITATIVE INVESTING: USING FACTS FOR SECURITY SELECTION

Daniel Morris: Hello and welcome to the BNP Paribas Asset Management Talking heads podcast. Every week, Talking heads will bring you in-depth insights and analysis on the topics that really matter to investors. In this episode, we'll be discussing quantitative investing. I'm Daniel Morris, chief market strategist, and I'm joined by Frederic Abergel, senior quantitative analyst. Welcome Frederic, and thanks for joining me.

Frederic Abergel: Hi Daniel. Very happy to be here and share some thoughts with you on quantitative investing...

Daniel Morris: As an introduction, returns for almost all asset classes were negative in 2022, with few exceptions. There was nowhere to hide. And even if things hopefully will be better this year, there are still plenty of risks out there. That makes us think even more about some of the characteristics we'd like to have in a portfolio. For example, ever more diversification to try to mitigate downside risk. How can we protect portfolios? Quantitative investing can be at least a partial solution to some of those problems. To start out, for non-specialists, can you give us a brief description of what quantitative investing is and what are the factors or signals you look for? And then how do you turn that into an investment strategy?

Frederic Abergel: I'll start with a standard opposition between facts and beliefs. Traditionally, investment is all about beliefs. You think that some assets will gain or outperform for some reason and you transform these beliefs into investments. Quantitative investing is more about facts.

What I'm talking about facts for quantitative investing it is statistical facts. That is what other people would call market anomalies or features that you can identify looking at the market, looking at the assets, looking at the balance sheets or capital structure of a company. These facts statistically on average will outperform or underperform. Quantitative investing means looking into a host of time series of data, either market data or balance sheet data, or opinion and sentiment data, news data, et cetera, and try to extract from these data investment signals that are consistently positive over the years. I like the word signal because that is really what you want to do. Someone is signalling you to buy or sell something. It's more traditional to call them factors. Some of them have been identified guite a long time ago. What they are is essentially a way to violate the efficient market hypothesis. Many people have identified factors that if you apply them to a universe of stocks, will rank the stocks according to their performance. For instance, you can think of the momentum factor. The momentum factors is essentially saying that a stock that has been outperforming over the last year, say, will tend to continue to outperform. Similarly, underperformers will tend to continue to underperform. So this gives you some predictive power over the future. Another factor that is well known as well is the low risk anomaly. Assets that have low volatility tend to outperform other stocks that are more volatile. These are typically factors that come from market data. Other factors come from balance sheet data. Typically, quality or value stocks are determined according to their earnings ratio or their relative value respective to their cash flows. We continue to look for new factors: data from sentiment analysis, what people think is positive or negative of a company, and also data coming from the supply chain, the interaction between a company and its suppliers or its customers. Now, how do you turn a signal into a strategy? Well, the basis is rather simple. You rank your investment universe. So assuming that you are looking at the S&P 500 components, and vou're looking at the momentum factor, you are trying to rank the stocks according to whether they have a high positive momentum and all the way down to a low negative momentum. That way you are able to build what we call a long-short portfolio, which is buying the winners and selling the losers. This is the efficient way of building a portfolio from a signal based on a factor. Of course, a long short strategy is not always possible. Many of our customers have constraints on the funds that we sell them: they must be long-only funds, for instance. So we cannot sell the losers. But it's important to realise that we first start with a view of the world, we then rank the universe into good stocks or good assets and bad assets. In between, there's a continuum of assets.

Daniel Morris: You've talked about how you go about determining what stocks you want to invest in. At the same time, with any portfolio, risk management is a crucial part of good portfolio management. For example, most investors understand you need to look at concentration risk. What is the role of risk management for a quantitative investment strategy?

Frederic Abergel: The risk model plays several important roles and rather different ones in building a quantitative investment strategy. Going back to the long-short portfolio, it is to allocate to each stock a weight in a portfolio. These quantities are based upon risks. If you want to buy a stock that is highly



The sustainable investor for a changing world ranked in terms of, say, the momentum factor or the quality factor, but it has a lower Sharpe ratio as a stock with a similar ranking, but smaller volatility, the role of the risk model is to allocate to each stock according to the risk that you are targeting for your portfolio. For a long-only portfolio, you cannot short-sell a stock, but you can always buy a stock that is negatively correlated with another stock. That's another capability that is offered by the risk model which you wouldn't be able to foresee just by looking at the ranking in terms of the factor. The role of a risk model is also to measure risks. It's quite important that the diversification can be put in place by allocating to a wide enough universe, so that the portfolio is not concentrated on too few stocks. Typically, in a universe like the S&P 500, the risk model that we will use in the portfolio construction will allocate weights that are more or less the same to every stock in the universe. By construction, you will have a rather diversified portfolio. Now let me focus on the specific role of a risk model for multi-factor investing, so a multi-factor portfolio that is not based on only one single factor, say, a pure momentum strategy or a pure value strategy, but rather a combination of factors that in the end tend to avoid you being stuck with a factor that has not performed for a long time and to allow you to benefit from different uncorrelated factors. We have recently developed a methodology based on the cross-sectional factor-based risk model that is new and efficient for our multifactorial investment strategies.

Daniel Morris: We've talked about how you use a risk model to construct a portfolio. How do you analyse the performance of a multifactor portfolio?

Frederic Abergel: The simplest way is to look at a back-test. Assuming that you have defined a theoretical portfolio allocation, you take as a long time series as you can, maybe 30 years of history of the universe in which you are going to invest. Then you look at the performance of such strategies. You look at the information ratio, so performance divided by risk. You look at the outperformance over the benchmark, not absolute performance. The back-testing approach will give you an idea of whether there is something to be gained in following this strategy. However, this is not sufficient because a back-test is just one path. What you want to do next is to look at the sliding information ratio. Say you have a window of a year, and you shift this window along your back-testing period, and you look at the performance of the portfolio, you ask what has been the risk of the portfolio, what is the Sharpe ratio, etc. This will give you a full year of history in which you can measure the performance of the portfolio. This will give you much greater confidence in the realisation of the strategy and whether it is actually efficient and not too risky. Once you have that, you can go further. You should look at extreme events, whenever the performances is very negative. You don't care so much about very positive extreme events because they are positive. Like drawdowns, very negative extreme events are not welcome. You identify the returns that are, say, smaller than two or three times the standard deviation. You can then assess whether they happen too often with respect to your initial hypothesis, unfortunately, or they happen, but not too often. This is a third and more in-depth analysis of the performance of a multi-factor portfolio which is important.

Daniel Morris: Frederick, thank you very much for joining me.

Frederic Abergel: Well, thank you, Daniel. It was a pleasure.

