Global Asset Management

Respecting risk

The RBC Global Equity team

How clarity over intended risk sources helps investors target superior outcomes through portfolio construction

Executive summary

It is commonly understood that there is no return without risk, but risk is often not well understood. In this foundational paper, the RBC Global Equity Team explores some of the important differences between the two main groups of equity risk – stock-specific and common – and shows how stock-specific has the potential of greatest risk-adjusted returns for the skilled investor. Although risk sources are often poorly defined, making accessing pure stock-specific risk problematic, the paper proposes an approach whereby investors who are clear about their intended risk sources can use diversification to manage residual exposures to unintended risk sources. For the true stock picker, the returns from the resulting portfolio should be driven by alpha. For the asset owner, the uniqueness of alpha generated returns offers useful diversification opportunities within a broader asset mix.

When those of us who invest in equities speak of 'the market' we are using a shorthand to describe the market capitalization-weighted average of all the stocks traded. But if one were to look closely, the number of stocks whose experience actually matched that of 'the market' on any given day would be tiny. Most, in fact, would rise or fall to a degree that differed from the average.

This dispersion in share price movement may be attributed to two distinct causes: first, those that are unique to the stock and secondly, those that are shared with other stocks. A good example of an issue that is unique to a stock might be a change in management or the launch of a new innovation. No other company shares this particular characteristic. Shared issues, however, are exogenous and common to other companies. It could be the country of incorporation, the type of industry, the company's size or the sort of raw materials it buys.

Pick your factor

With the use of technology it is now possible for investors to associate any set of returns with known shared, or 'common' risks (shown below by the β term) leaving a residual risk that is unique to the return source (ε):

$$R_p = f_1\beta_1 + f_2\beta_2 + \cdots + f_n\beta_n + \varepsilon_i$$

Each common risk, or factor, has its own long-term average with variation in any given period observed around that average. The long-term average may thus be thought of as the premium a holder may incur or receive in order to get access to that particular risk. The only risk for which we know that there is no premium, positive or negative, is ε. This is the sum of all the risks unique to individual companies, often referred to as stock-specific risk or 'alpha', and always has a zero expected return.

Common risks may be accessed in stand-alone investment products, such as exchange-traded funds (ETFs), that give the investor exposure to a particular country or industry. Indeed, in the US today there are more ETFs than there are stocks listed. The ability to isolate common factors effectively increases the breadth of available investment opportunities, giving the investor far more choice than can be obtained from just individual stock market listings. But the ability to separate influences on stocks between issues that are specific and those that are common has some interesting consequences for risk-taking and portfolio construction. Instead of looking at a portfolio containing a certain number of stocks, the investor can instead look at it as containing a certain number of risks, either stock-specific or common, each with a distinct return profile. Instead of considering which stocks they want to own, the key decision for the investor then becomes which risks they want to have exposure to. This becomes a timing decision.

Active & passive approaches to factor investing

Making a positive return from any of these factors, unique or common, will depend on either:

- Being exposed to a factor with a positive average over the long run. This is a passive approach. It will not be relevant to all common factors, just those with a positive long-term average, and will never be relevant to specific factors as these have an average of zero
- Actively picking when to get exposure to a factor. Even if a factor has a zero or negative long-term average, there may

be moments when the return experience is positive. If one could actively time when to take exposure to a factor in order to capture these positive moments, one would be able to transform the observed returns from negative or zero to positive.

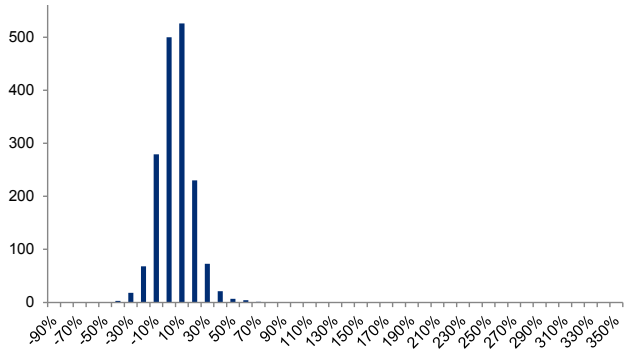
An example of using a passive approach to access a common factor would be owning a market index for the long term in order to capture the equity market risk premium, and accepting that there will be ups and downs around this in the short term. An active approach would be to dip in and out of the index in order to try to time the market, exploiting the volatility in order to get a return better than the equity market risk premium. Done successfully, this approach has the potential to transform returns, but it requires skill.

Sizing the opportunity

The size of the opportunity from actively picking risk exposures will partly depend upon the breadth of the possible outcomes: for two distributions with the same average, the broader distribution will offer the greater opportunity to capture better-than-average returns from exercising skill. The opposite is also true: the narrower the distribution, the lower the size of the opportunity.

The diagrams below show the breadth of returns over one year from different factors. Exhibit 1 shows the return from the 163 separate common factors, excluding the market, identified in the Axioma risk model. Exhibit 2 shows the return that is specific to each of the 1730 individual stocks from the MSCI World index. The standard deviations are also shown. Note how the breadth of the distribution of stock-specific risks is nearly twice that of common factors.

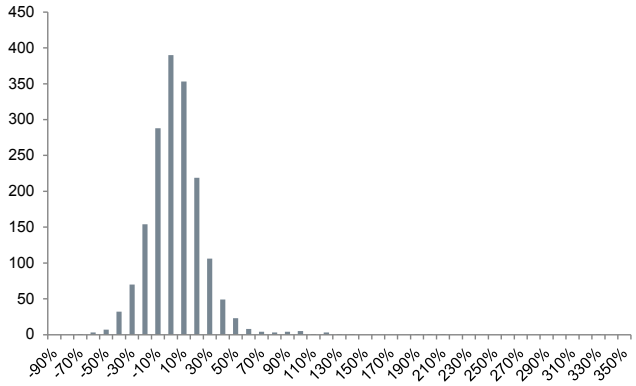
Exhibit 1: Distribution of common ex-market factors



Std Dev: 13.22%

Source: MSCI World Index, Axioma. Attribution of returns for the year ending 31.12.2016

Exhibit 2: Distribution of stock-specific risks



Std Dev: 24.22%

Source: MSCI World Index, Axioma. Attribution of returns for the year ending 31.12.2016

The uniqueness of alpha

The conclusion from these charts is that stock-specific risks offer the investor a bigger opportunity to generate a positive outcome than common factors. This makes stock-specific returns significant for any asset owner with a return objective.

It is worth dwelling on this for a moment. As the graphs above indicate, stock-specific risks account for approximately two thirds of the total dispersion in share prices, making it the biggest risk opportunity set. Moreover, because these risks do not have the same characteristics as common risks that are shared by multiple companies, they are uncorrelated with them. This makes stock-specific risks, or 'alphas', potentially very valuable, not only because in the presence of skill they can be incremental to returns, but also because they help the asset owner diversify the sources of returns.

But care is required. Stock-specific risks may be capable of generating the highest positive returns, but they also have the biggest opportunity for negative outcomes too. This is why skill is so important. It is skill that makes the difference between a positive and negative outcome.

Skill depends upon people, philosophy and process. It is what changes a random experience into a systematic and repeatable risk-taking exercise. Pre-eminent among these is philosophy as it sets the aims or goals of the investor. It represents their view on how attractive investment returns can be earned, and will define which risks the investor expects to be rewarded for ('intended risks') and which they do not ('unintended'). From this flows all resourcing and decision making.

Even with a definition of intended risk, however, there is no certainty. There is still scope for error. We may make a prediction yet we experience variation around that prediction.

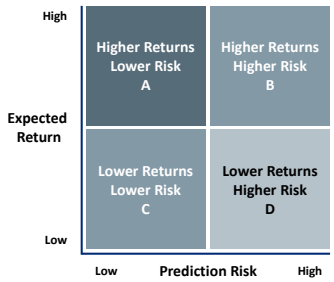
The risk-return trade-off

We reference this trade-off between our expected return and the uncertainty inherent in our prediction in the term 'Sharpe ratio'. It

denotes the amount of return we expect to generate for each unit of risk we take above the risk-free rate. As investors we accept that we have to take risk to generate a return but in a world where there are constraints, be it the amount of capital or the number of opportunities, an investor will get the best outcome by maximising the return for each unit of risk taken.

The exhibit below illustrates a typical investor's preference function. The y-axis shows the expected return from a risk source and the x-axis shows the risk inherent to this expectation. The top left quadrant (A) is superior to all others in that it offers the highest returns with the least amount of risk. The bottom right (D) is the inverse and inferior. Quadrants B and C represent a trade-off between risk and return but may be equivalent in terms of Sharpe ratio.

Exhibit 3:Typical investor's preference function



When constructing a portfolio, the investor will prefer opportunities from A as these give the best risk adjusted returns. After that opportunities from B or C should be considered with D last of all. In this way the investor can construct a ranking of investment opportunities.

Size of the opportunity set

The broader the opportunity set, the more attractive the opportunities at the top of the ranking will be. To illustrate this, let us assume a normal distribution of Sharpe ratios. Let us also assume that the investor is very skilled but is also time constrained, meaning that only the best 20 opportunities can be identified. If these 20 were selected from a fairly narrow opportunity set of, say, 40, then all the positive returning opportunities would be identified, down to the 20th which would likely be near the average. However, if the opportunity set was 400, then only the best 5% opportunities would be selected. This would give a very different outcome. The 20th would be significantly better than the average. So the broader the opportunity set, the better the average Sharpe ratio should be.

Alphas or betas?

The principle that the broader the opportunity set the better applies to all risk sources; alphas and betas. We have shown that there is greater dispersion in alphas than betas, presenting more opportunity. But harnessing this opportunity depends upon an investor's ability to predict the returns associated with a particular risk source. We call this skill. An investor's experience will be determined by the predicted return and the risk that the prediction is incorrect.

Because skill varies between investors it is impossible to say that selecting a stock-specific risk source is always going to be superior to a common risk source. It depends on the investor. However, using the data-set from exhibits 1 and 2 it is possible to describe when the best alphas will be better than the best betas.

Comparing the average return from the top quintile of alphas and betas shows that alphas returned an average of 124% and the betas 45%. For the betas to have a superior Sharpe ratio, therefore, the accuracy of the prediction has to be 124/45, or 2.78 times as good. Alternatively, an investor must be significantly better at picking the best betas before it makes sense for him to give up picking alphas.

This would suggest that in an investment strategy involving the active timing of risk one would expect to see a large proportion of stock-specific alphas towards the top of the ranking.

Diversification can also improve expected outcomes

However, there is another way in which the Sharpe ratio of a portfolio can be improved, independently of skill, and that is diversification.

A portfolio of independent risk sources will have a lower risk than one individual risk source due to the effect of diversification.

Combining risks changes the expected outcome at a portfolio level. The variance of a portfolio of independent risks is the sum of the weighted variances of each risk. If each risk is equally weighted in a portfolio and we assume each risk has the same variance, then the variance of the new portfolio is that of the risks divided by the square of the number of holdings.

$$\sigma_p^2 = \sum \omega_i^2 \sigma_i^2 = \frac{1}{N^2} \sum \sigma_i^2$$

Example: take a two-risk portfolio, equally weighted, where both risks have a standard deviation of 1 and mean expected return of 1. The expected return of this portfolio is also 1, and we can express the variance as follows:

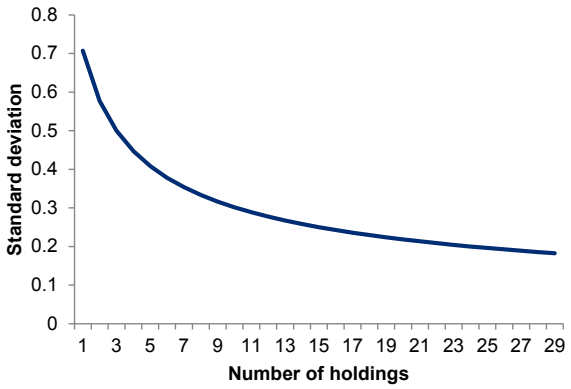
$$\sigma_p^2 = (0.5^2 x 1^2) + (0.5^2 x 1^2) = 0.5$$

Therefore the standard deviation is the square root of 0.5, or 0.71. This is clearly lower than the standard deviation of each of the individual risks in the portfolio. Diversification has enabled us to create a new, more efficient, investment that has the same expected return as each individual holding, but a lower risk than the component parts and thus higher Sharpe ratio. Intuitively, some of the prediction errors of the individual risks cancel each other out so a portfolio of independent risks has a lower overall risk.

We repeat the example below for equally weighted portfolios of different numbers of independent risk sources, each with a

standard deviation of 1 and expected return of 1. Along the x axis is the number of risk sources and on the y axis is the standard deviation of the portfolio.

Exhibit 2: Distribution of stock-specific risks



Source: MSCI World Index, Axioma, RBC Global Asset Management

The standard deviation of the portfolio declines with each risk source added. Although the incremental benefits eventually become marginal it would still make sense to diversify because of our assumption that every risk source has the same Sharpe ratio. However, this assumption is unrealistic in a real world of constrained time and resources and there will come a point when the marginal risk source adds very little diversification but is denying capital and attention from risk sources with a better risk adjusted return. We begin to encounter an opportunity cost from excess diversification.

Defining risk sources

Although measuring the Sharpe ratio of every risk source and combining the best ones sounds like a comparatively simple framework to construct efficient portfolios, in practice there is a significant complication: independent risk sources are poorly defined in the marketplace. For example, indices that seek to replicate a particular common factor may have different approaches. One provider may express a value style factorin terms of a price to earnings multiple whereas another may prefer to weight price to book. In addition, stock-specific issues inherent to every company cannot be accessed independently of other common risks. It is not possible to go to a broker and place an order for 200 units of alpha in a given company. One can only buy shares in the company which brings with it stock-specific alpha but also some systematic factor exposures, or betas.

Diversifying unintended risks

Diversification can help us here as well. Assuming we have the skill to select stock-specific risks, then a portfolio that focuses on these intended risk sources should deliver the best risk-adjusted returns. Shared common factors become an unintended by-product. Although one cannot buy an alpha without it coming with some unwanted betas, in practice their impact on the returns of the portfolio can be minimised through diversification.

The more sources of unintended risk there are, the smaller the portfolio's exposure to each unintended risk source, and the less likely that their return will be significant to the overall portfolio. In addition, through diversification, the variation in returns will also be reduced. It is for these reasons that quantitative investment strategies will own small positions in a large number of companies – so that impact of any stock-specific issues are negligible and do not influence the purity of the common risk source they are trying to isolate.

Unlike stock-specific alphas, however, common risks in aggregate may not have a zero expected return. A well-diversified portfolio of common risks will, therefore, deliver the weighted average of the respective common risk premia over the long term. If the common risks are combined in proportion to their weighting in the market opportunity set, one will end up with the market premium.

This means that even the most risk-aware long-only stock picker will only be able to diversify common risks so far. The portfolio may have an excess return that is determined by alphas, but there will also be an inherent market-beta exposure.

This may be acceptable to an investor who wants the equity market exposure of the asset class, but for those who do not there is a simple solution. If the long-only assumption is relaxed so that the investor can short the market, the market-beta exposure can be removed entirely, albeit with a small cost to excess returns from the shorting fee. This will leave the alpha-determined excess return.

This should be of interest to the asset owner who is looking for sources of uncorrelated returns. The uncorrelated nature of alphas offers potentially valuable diversification benefits to asset owners seeking to combine risk premia, and produce an efficient portfolio that maximises returns for an acceptable level of risk.

Conclusion

There is no return without taking risk and investors have multiple risk sources to choose between. Only those that fall within the investment philosophy have a positive expected return. Risks with a positive return premium may be accessed passively but superior returns are possible by actively taking risk as long as skill is present. Even then, efficient execution requires the risk-taker to understand the risks inherent to the expectations so that the best risk- adjusted opportunities can be identified. The broader the opportunity set, the more attractive the risk-adjusted return will be for a given number of best ideas. Combining these in a balanced portfolio can further improve outcomes through diversification. In practice, however, it is often not possible to select intended risks without collateral unintended risk. Diversifying sources of unintended risk will reduce the exposure of the overall portfolio. Stock-specific risk has unique uncorrelated properties that can be accessed using this approach and which can provide asset owners with valuable diversification benefits to their asset mix.

ABOUT THE AUTHORS

Dag Wetterwald
Senior Portfolio Manager
RBC Global Equity

Dag is part of the Global Equity team at RBC Global Asset Management based in London. The team runs high-conviction portfolios investing in select global companies that have strong competitive dynamics, including environmental, social and governance credentials. Dag has over 25 years of investment experience. He holds a Masters in Finance from the London Business School and a MSc in Economics from the University of Oslo.

Jeremy Richardson
Senior Portfolio Manager
RBC Global Equity

Jeremy is part of the global equities team at RBC Global Asset Management based in London. The team runs high-conviction portfolios investing in select global companies that have strong competitive dynamics, including environmental, social and governance credentials. Jeremy has over 20 years of investment experience and is a qualified chartered accountant.

GUK/18/004/JAN20/A

RBC Global Asset Management

For more information, please contact us at:
rbcgamukmarketing@rbc.com
www.rbcgam.com