Essential Beta and Risk Factor Exposures

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Allocating to "risk factors" rather than asset classes has become a fashionable topic of discussion in the media. However, risk factor exposures are already embedded in every portfolio. The real questions are not whether a portfolio is allocated to risk factors, but first, whether the exposure to risk factors is captured through conventional exposures that carry the risks of crowded trades; and second, whether the allocations to risk factors are purposeful or inadvertent. In this paper, we are going to address the latter of those two questions in the context of Essential Beta (EB).

EB's strategic allocation to risk factors is part of its design, although we have not discussed this part of the process in the past to keep the underlying asset class positions as transparent as possible. This short paper discusses the risk factor methodology in EB for those investors who find the view of risk allocation compelling.

For EB, risk factor allocation underlies the asset allocation across both markets and uncertainty states. In "Risk Cascades: Anticipating Resilient and Fragile Markets" (Risk Cascades, FQ Perspectives, January 2015), we discussed how the FQ Market Risk Index (MRI) measures fundamental risks to anticipate changes in the macro risk environment. "Fundamental risks" is our term for risk factors, so that these indicators are not confused with "risk premia" or excess returns (to cash yields) that investors are expected to be compensated for taking those risks. Fundamental risks always increase the risk-of-loss but they may not necessarily have excess returns associated with them. For instance, there is no excess return associated with extreme valuation risk. The MRI is one way to determine when fundamental risks are increasing so a portfolio can be positioned to reduce such risks.

Up to this point, we have not used the "risk factor" or "fundamental risk" terminology to describe capital exposures, because expressing the portfolio in such terms disguises the underlying asset allocation. We believe that speaking in terms of the actual holdings of the portfolio offers more transparency than discussing fundamental risk exposures. The reason follows.

Many fundamental risks are created as factors through long and/or short exposures to combinations of asset classes or strategies, such as momentum. In Risk Cascades, we identified six fundamental risks: Real Global Growth, Real Interest Rate, Inflation/Deflation, Liquidity, and Extreme Valuation. Of these five, the first three are commonly referred to as risk factors and can be expressed in asset class terms. Liquidity (the ability to transact in an orderly way) and Extreme Valuation are market environment risks which can only be described in statistical terms. Below, we illustrate how fundamental risk exposures can be derived from a long only asset allocation using Real Global Growth as an example.

Real Global Growth is a commonly used fundamental risk. Real Global Growth is typically defined as equity market exposure since

TABLE 01: FUNDAMENTAL RISKS AND EB ASSET CLASSES

Asset Classes	Real Interest Rate	Fundamental Risks				
		Real Growth Rate	Liquidity	Inflation	Deflation	Extreme Valuation
Global Bonds	●			●		
Inflation-Linked Bonds	●				●	
Commodities		●			●	
Credit		●	●		●	●
Equities		●	●		●	●

Source: First Quadrant, .LP.

corporate earnings increase with the business cycle and equity prices grow with those earnings over the long term. Real Global Growth can be broken down further:

1) Global Large Cap Growth (GLC): global large cap equity exposure plus the large cap equity exposure in long small cap and emerging market equity exposure, all in local currency.

2) Global Small Cap Growth (GSC): global small cap exposure less global large cap exposure, both in local currency

3) Emerging Market Growth (EM): emerging market equity exposure less global large cap exposure, both in local currency

Because small cap and emerging market equities both have market betas to large cap, the large cap exposure must be subtracted out of those sub-asset classes and added back into the large cap exposure.

Given long risk exposures to these three equity markets, one can easily derive a portfolio's fundamental risk exposures using the above asset class calculations. For example, if a long equity portfolio had a capital allocation of 50% GLC, 25% GSC and 25% EM, then the corresponding fundamental risk exposures would be 100% GLC, 25% GSC, and 25% EM. Represented algebraically this would be 1.00*global large cap + 0.25*(global small cap – global large cap) + 0.25*(emerging market equity– global large cap).

In other words, having a leveraged portfolio which allocates risk 100% to Global Large Cap

Growth risk factor, 25% to Global Small Cap Growth risk factor and 25% to Emerging Market Growth risk factor is in reality just an unlevered asset allocation of 50% global large cap stocks, 25% global small cap stocks and 25% emerging market stocks. The former identifies risk factor exposures, while the latter specifies in which asset classes the money is actually invested. There are advantages to each approach, but it is really up to the client to determine which portfolio attribution is most useful.

In **Risk Cascades**, we describe how fundamental risks map into the MRI factors. We can also map the same fundamental risks onto the EB asset classes (Table 01).

Applying the algebraic methodology described above across all the fundamental risks to the table above, we can show EB's fundamental risk exposures over the different MRI states. We add Credit to the fundamental risks since it is commonly included with risk factors in addition to asset classes.

Looking at EB through this lens, we can see that during the resilient, expansionary period (when the MRI is 0.00), EB allocates most risk to Real Global Growth (all three types described above), Credit, and Industrial Materials Inflation. We often refer to this state as the "cyclical growth state", so it should be no surprise that our allocation to these fundamental risks is large when MRI is 0.00. In this state, the allocation to Real Interest Rate risk is small. As the MRI increases to a reading of 1.00, which represents the fragile, recessionary economic state, the

allocation to Industrial Materials Inflation, Real Global Growth and Credit drop dramatically while exposure to Real Interest Rates, which are now a deflation hedge, increases to significant levels. Exposure to Food Inflation, in the form of agricultural commodities, changes little over the regimes since the demand for food (and its risk-of-loss) does not depend upon the business cycle. For the other fundamental risks, exposure is based upon the risk-of-loss to the underlying asset class in that particular state. For instance, when the MRI indicates Credit risk increases (MRI>0.50), EB's exposure to Credit risk decreases.

Finally, while the fundamental risk allocations above reflect the impact of EB's options hedge on volatility as well as changes in correlations over time, they do not reflect tail-risk hedging effects. Tail Risk is another risk dimension managed in EB as explained in "Reshaping as well as balancing risk in Essential Beta" (FQ Insights, September 2012).
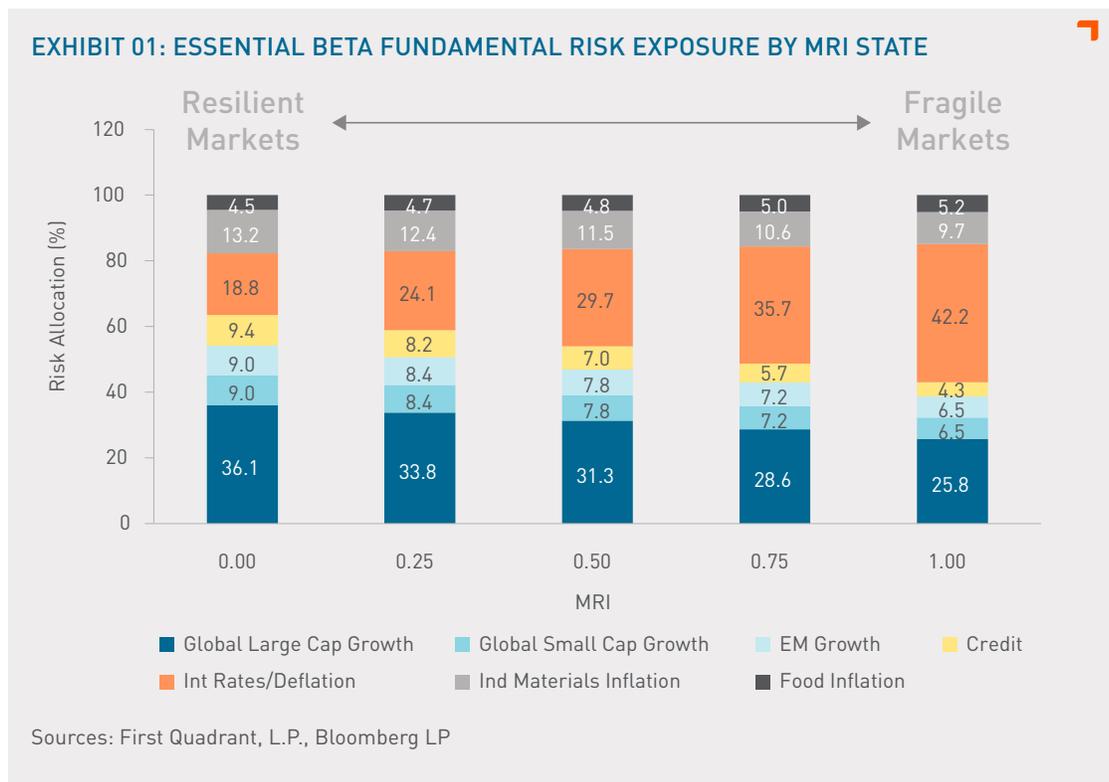
Currently, the MRI is at 0.25, so our primary fundamental risk exposure is to Real Global Growth (cyclical growth assets) while Interest Rate risk allocation is low. This reflects a risk environment where the bond downside risk is high, while this risk is muted for cyclical growth assets. For instance, a correction of -10% or so is always possible for cyclical growth assets, but a bear market of -20% or more is unlikely. The MRI is signaling a resilient phase where the markets usually bounce back quickly from any such correction.

EB allocates to "risk factors" or fundamental risks, but we have avoided these terms since transparency is an important element of the strategy. Replacing asset class exposures with risk factor exposures reduces the ability to easily understand our actual holdings. However, the fundamental risk exposures, which ultimately underlay the asset class exposures, have always been a part of the process. This paper is for those who are interested in thinking of a multi-asset diversified growth portfolio, such as EB, in those terms.

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EXHIBIT 01: ESSENTIAL BETA FUNDAMENTAL RISK EXPOSURE BY MRI STATE

Sources: First Quadrant, L.P., Bloomberg LP