

Reshaping as Well as Balancing Risk in Essential Beta

FQ Insight

by Ed Peters

Introduction

First Quadrant has been using a “risk parity” approach for some time as a component of our Essential Beta strategy. The methodology used to balance risk has been previously described in several articles. However, we have never set risk *parity* as the goal of the portfolio, but rather as a means to an end. The goal is to produce hedged global economic growth by reducing the risks which could impede that growth and so generate an equity-like return at lower volatility. The standard risk parity approach allocates risk equally across stocks and bonds by leveraging bonds so they have equal risk to equities. The leveraged bonds is expected to naturally hedge against economic decline, deflation and equity downside risk commonly referred to as “tail-risk.” Equities, REITS, TIPS and commodities hedge against normal inflationary pressures. So risk parity presents a theoretically ideal method for achieving our goal, since it is designed to achieve true risk diversification and provides growth in different market environments.

Unfortunately, this standard approach has led to heated debates about the leveraged bond component. Specifically, is now the time to lever bonds with nominal bond yields in developed markets at all-time lows? While this debate has raged over the last three years, most risk parity managers have delivered equity like returns at reduced risk and a low correlation to equities during the bull market that followed the Great Recession. However, there are several scenarios in which diversification is not enough. In these scenarios, diversification fails even between “risky” assets, such as stocks and commodities, and defensive assets, such as sovereign bonds. Such events include hyper-inflation and sovereign credit crises in large developed markets. Since Essential Beta is an adaptive market portfolio, we feel that these potential scenarios should also be addressed.

This brings us to the realm of tail-risk hedging: specifically, option strategies that reshape the return distribution of the portfolio and are designed to protect against any significant market decline regardless of the cause. While there are some managers who offer “tail-risk hedging” as part of their process, such investment strategies typically have a high cost when managed separately and simply bolted onto an existing portfolio as an overlay. We believe that a properly structured options strategy need not have a high cost if it is an integral part of a dynamic asset allocation strategy. In this article, we describe how our approach works and how using options for direct tail-risk hedging can be combined with the indirect tail-risk hedging properties of bonds. In this way, Essential Beta is expected to go beyond basic risk parity by reshaping as well as balancing risk.

The Function of Bonds

Bonds serve one general purpose in traditional balanced portfolios: diversification, which is intended to broadly lead to risk reduction. A typical balanced portfolio consists of a set of cyclical growth assets (such as stocks, commodities, infrastructure, etc) to which bonds are added to reduce overall volatility, but this also results in lower returns. Although government bonds seem to be the best diversifying agent, in a misguided attempt to compensate for lost returns, corporate bonds often are used instead of government bonds because of their higher yield - despite the damaging fact that they have a significant positive correlation with equities during bear markets.

Government bonds can serve two other functions. First, government bonds have historically had a negative correlation with cyclical growth assets during significant drops in the market and, as a result, have been able to supply a natural, though indirect form of tail-risk hedging. The tail-risk hedging bonds offer is called “indirect” since unlike options (which offer “direct” tail-risk hedging) they are not guaranteed to pay off on all occasions. Second, bonds generally deliver a positive return during the recessionary phase of the business cycle when deflation pressures build, making them a counter-cyclical growth asset. However, the low volatility of government bonds reduces this growth effect so that their return contribution becomes barely noticeable in a traditional multi-asset portfolio. Using longer duration government bonds in the context of a “risk parity” portfolio can address this limitation. By leveraging government bonds so that their volatility matches “cyclical growth assets”, they are able to serve all three functions in a meaningful way.

While bonds may serve all three functions in a risk parity portfolio over the course of a business cycle, they do not necessarily serve all these functions all of the time. This is a critical problem with taking a static, non-adaptive long-run approach to risk parity. Markets, in fact, rarely behave in long-run average ways. Rather than having one stable point at their average, markets more often have multiple stable regimes that exist on either side of their average. The media often simplistically describes this effect as “risk on” and “risk off”.

So how does this relate to an adaptive notion of risk parity? During economic recessions when equity markets typically experience high volatility, bonds can potentially serve all three functions of risk reduction, tail-risk hedging, and delivery of a positive total return simultaneously, and we believe their leveraged allocation in risk parity portfolios is what allows them to demonstrate these characteristics. However, during the expansionary low risk periods, when deflation risk is virtually non-existent, leveraged bonds may increase certain kinds of portfolio risk. While bonds in this

environment provide indirect tail-risk protection (against exogenous shocks such as terrorist attacks) and reduce overall volatility, significant inflation risks also exist, which increase the downside risk of bonds. We believe that there are more efficient and direct ways to hedge equity tails in such low risk times, specifically through equity index option strategies.

Tail-risk Hedging

In previous papers (Darnell, Falcon and Fannon (2010), Falcon and Fannon (2010) and Darnell (2010)), we outlined a dynamic put-spread collar strategy that coupled with a leveraged equity position may generate an equity-like return with smaller draw-downs than a traditional equity portfolio. We originally suggested that such a strategy would be a good place to park capital committed to private equity while waiting to be called, or used as an asset class in its own right. We have found that applying such an option strategy to a multi-asset portfolio potentially allow us to deliver similar downside protection to a standard risk parity portfolio without having to lever bonds during the expansionary, low volatility phases of the business cycle.

Our approach toward constructing the put spread collar is dynamic. It is achieved by buying an out-of-the-money put and financing the put position by selling both an out of the money call and a further out of the money put. The options are exchange-traded equity index options and the strikes are set as a percentage of the implied volatility for the next quarter. This dynamic put spread collar is designed to hedge most, but not all, of the downside risk. However, even in a large downdraft, a significant portion of the downside is hedged at a low cost. Note that by choosing not to *fully* hedge the downside, we also avoid giving up all of the upside. In fact, we will see that adding tail-risk hedging allows us to take a larger position in growth assets so the resulting strategy has more upside potential, while also protecting a significant portion of the downside.

Essential Beta allocates assets over the business cycle based upon the FQ Market Risk Index (MRI) as described in Peters (2009b). During periods of low market risk, Essential Beta increases the allocation to cyclical growth assets to keep the risk up. Alternatively, it lowers the allocation to such assets in the higher risk periods to keep the risk from exploding upward. The allocation to countercyclical assets such as bonds goes in the opposite direction. We believe this allows the portfolio volatility to remain highly consistent, rather than riding market risk up and down over the business cycle. The optimal “risk parity” allocation (as in the current version of Essential Beta) has a risk budget of 38.5% in stocks, 42.5% in bonds, 4% in high yield and 15% in commodities. The current version of Essential Beta uses capital weights of 27% stocks, 130% bonds, 3% high yield and 23% com-

modities in order to achieve the target risk allocation in the high risk environment.

We would like to stress that the addition of the put spread collar is not merely an overlay on the portfolio that Essential Beta would hold in its absence. While the methodology is unaffected, the impact of the put spread collar on the risk profile of the stock, bond and commodity assets changes the capital allocations. The addition of any diversifying asset will affect the optimal mix of the other assets in a portfolio, but the way the tail-risk hedging strategy changes the asset allocation is subtle in most regimes.

In the high volatility regime, the put spread collar portfolio reduces the risk of the cyclical growth assets. To keep their risk budget stable, the notional allocation to stocks, high yield bonds and commodities increases. Because the put spread collar has such a high negative correlation with cyclical growth assets and a low volatility itself, we can calculate the notional value of the put spread collar so that it does not add risk to the total portfolio. Using this zero risk budget approach results in a 40% notional allocation to tail-risk hedging and the following capital weights: 31% stocks, 7% high yield, 143% bonds, and 23% commodities. The total leverage of the portfolio has increased with a notable increase in the capital allocation to stocks and high yield. Bond allocations have also increased. However, the resulting portfolio still looks similar to Essential Beta and the risk budget remains the same.

Target capital allocations change in a more meaningful way in the low volatility period. In the low volatility, expansionary regime, equity, high yield and commodity volatility drops dramatically but the returns of cyclical growth assets are historically the strongest in these periods. The MRI is designed to anticipate economic risks. Risks that are not anticipated by the MRI would be exogenous shocks making tail-risk hedging particularly important. Bonds are the tail-risk hedging component of most risk parity portfolios, but bonds may have a significant inflation risk, especially if we experience a steadily rising inflation environment like the 1950s. So it would be appropriate to shift the goal of the target portfolio from “risk parity” to (1) achieving the total risk target and (2) hedging cyclical growth asset tail-risk. The current low risk portfolio is 50% stocks, 12% high yield, 108% bonds, and 42% commodities. The new version of Essential Beta would have a target option value of 100% of the cash value. The capital allocation across the assets becomes 70% stocks, 30% high yield, 70% bonds, and 42% commodities. The options portfolio covers 100% of the net asset value during this phase.

Overall leverage is similar to the current version of Essential Beta but the capital allocations have changed. While the

entire portfolio remains leveraged, no single asset in the portfolio is leveraged. Equity and high yield allocations have increased while the bond allocation has dropped. The risk allocations to high yield and commodities remain the same at 4% and 15% respectively. However, the equity risk allocation has increased to 60% while the bond risk has dropped to 21%. The capital allocations of the portfolio are still based upon risk, but “parity” is no longer the rule. Instead, it is the total risk target which is the goal of the portfolio combined with a reshaping of the return distribution to reduce potential negative growth asset tails.

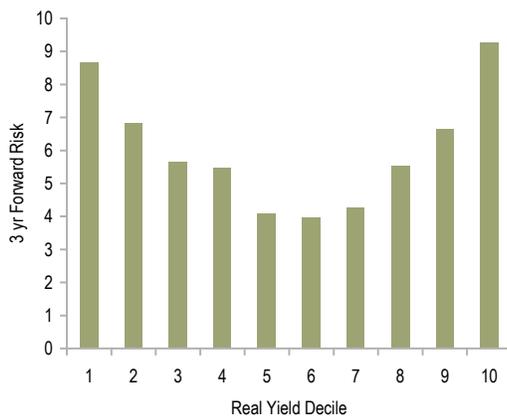
The result is a portfolio which, based upon the historical simulations, gives a similar return and volatility profile as the current version of Essential Beta, but has a lower correlation to bonds in the growth oriented, inflationary phases of the business cycle. Due to direct tail-risk hedging, there is a reduction in equity correlation as well. Finally, the portfolio approaches tail-risk hedging depending upon which method has the lowest cost. During periods of high volatility, when options are expensive, bonds carry more of the tail-risk burden. However, in the low volatility periods, options are a lower cost alternative to bonds which have more downside risk in those periods. Since Essential Beta allocates assets by looking at the relationship between the business cycle and market uncertainty through the MRI, we believe it is a natural extension to incorporate options within the process.

The portfolio still transitions its weights from high to low volatility based upon the five states in the MRI. So equities transition from 31% in the Very High Risk regime to 70% in the Very Low Risk regime according to the MRI, while the options exposure transitions from 40% to 100% and bonds from 143% to 70%.

The portfolio is positioned for those rare occasions when the correlation of the three primary asset classes becomes significantly positive. In a recent survey in the magazine *aiCIO*, many prospective risk parity investors feared “correlations going to one.” There are two basic circumstances when this could occur in a multi-asset risk parity portfolio: (1) Hyperinflation and (2) a sovereign credit crisis. Like most risk parity managers, Essential Beta invests in the highest quality sovereign bonds, so a credit crisis is unlikely but possible. In a hyper-inflation environment, central banks raise interest rates to very high levels to cause a recession and wring out the inflationary pressures in the economy. In such periods (such as 1983), all three asset classes will experience losses and there is no tail-risk hedging from bonds while an options portfolio would still hedge the portfolio against declines. So incorporating tail-risk hedging in a risk parity portfolio will also hedge against the case where risk parity’s primary hedging tool (diversification) fails.

Finally, there is evidence that once real yields become negative then bond volatility tends to rise in the subsequent 3 year period. In Figure 1 we have taken 10-year US treasury note returns and ranked them into deciles based upon real interest rates (nominal rates adjusted for CPI inflation) from 1953 – 2012, a period of 60 years. The chart shows the annualized volatility for each decile:

FIGURE 1: ANNUALIZED VOLATILITY FOR EACH DECILE
(Simulation: January 1953 - June 2012)



Source: First Quadrant, LP, Global Financial Data

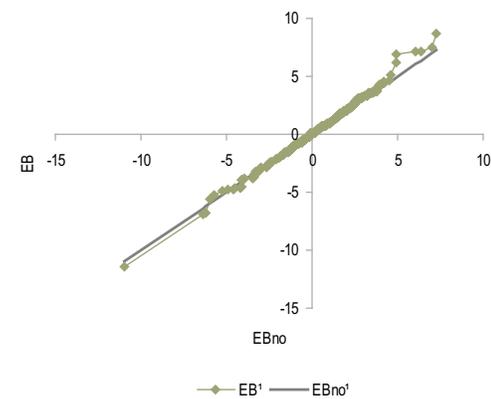
The first two deciles correspond to periods where real bond yields are negative. Deciles 5 and 6 are for periods when real yields range 2% - 3%, which is their average over this period. Deciles 9 and 10 correspond to hyper-inflation when Fed tightening caused real yields to rise in excess of 4%. The y-axis is the annualized volatility in the subsequent 3 year period. We can see that deciles 1 and 2 have significantly higher volatility than deciles 5 and 6 and are similar in this regard to deciles 9 and 10. Based upon this observation, it is likely that a back-up in bond yields from negative real levels may result in bonds having significantly higher volatility. Since this increased bond volatility is likely to happen in the economic expansionary state, the lower allocation to bonds in that period may still result in a balanced risk to stocks and bonds, in contrast to what was said above about the lack of risk parity experienced in the low volatility state. Since 10-year bonds from the US, UK, and Germany are all at negative real levels, we are likely to experience higher volatility in bonds during the expansionary phase of the next business cycle.

Historical Simulations

For simplicity, the simulation will refer to the current version of Essential Beta without the addition of options as “EB_{no}”. We tested this over the 24 year period from 1988 – 2011 on a monthly basis. The tail-risk hedging strategy uses S&P 500 options which are traded on the Chicago Mercantile exchange.

First, we look at the returns of the two simulations relative to one another. We would expect that, for the most part, the returns should be similar except in the tails. When we plot EB_{no} vs. EB we obtain the relationship depicted in Figure 2.

FIGURE 2: EB_{no} vs. EB
(Simulation: January 1988 - December 2011)

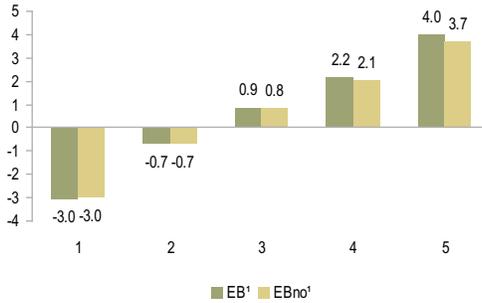


Source: First Quadrant, LP

We can see from Figure 2 that the relationship between +/- 4.75% finds the two versions of EB giving similar returns. The monthly standard deviation of both versions of EB is approximately 2.50. So within approximately 2 standard deviations the two versions of EB are fairly similar. But in the tails, EB gives a higher return. On the other hand, at extreme downside, EB slightly underperforms EB_{no} because of the selling of the deep out of the money put. Contrary to the way most think of put spread collars, EB has higher returns than EB_{no} at the upper extremes. This is due to the higher weight in cyclical growth assets during bull markets in both the high and low volatility regimes.

However, when we look on a quintile basis in Figure 3, EB has more upside and similar downside than EB_{no}.

FIGURE 3: EB VS. EB_{no} RETURN QUINTILES¹
(Simulation: January 1988 - December 2011)



Source: First Quadrant, LP

However, even more striking is the change in the relationship to bonds in the high and low volatility periods. Here, we define high and low volatility regimes as we do in the MRI, namely when the three month moving average of the VIX is above and below its long-term median of 19.

TABLE 1: CORRELATION WITH WGBI BY VOLATILITY REGIME
(Simulation: January 1988 - December 2011)

	EB'	EB _{no} '
High Risk Regime	0.42	0.39
Low Risk Regime	0.33	0.56

Source: First Quadrant, LP, Global Financial Data

We can see from Table 1 that in the high volatility regime EB and EB_{no} have similar relationships with the Citi World Government Bond Index (WGBI). However, in the low volatility growth environment, EB has a significantly lower correlation. Since this is the period when interest rates are likely to back up as economic growth becomes stronger and inflationary pressures build, this would be potentially beneficial to the portfolio if that scenario occurred.

Finally, when we look at long-term performance in Table 2, EB does outperform EB_{no} adding 222 basis points over the last 10 years and 101 basis points over the full 24 years. But that is not the goal of the simulation. The goal is to have a similar return with a lower correlation to bonds in periods of economic growth.

TABLE 2: EB VS. EB_{no} EXCESS RETURN T-BILLS SIMULATION¹
(Simulation: January 1988 - December 2011)

	MSCI World	EB'	EB _{no} '
1988	20.58	9.34	7.89
1989	16.29	4.65	1.53
1990	-28.80	-13.03	-13.59
1991	11.31	12.90	16.76
1992	-4.26	10.12	4.41
1993	18.66	33.52	28.61
1994	-4.23	-12.20	-14.14
1995	14.41	6.87	19.54
1996	11.94	9.62	8.29
1997	17.68	2.85	5.20
1998	16.25	-3.48	1.59
1999	23.38	0.00	0.06
2000	-15.50	5.53	2.91
2001	-17.74	-0.92	-5.04
2002	-25.41	15.49	8.27
2003	24.49	21.30	18.55
2004	10.64	24.18	20.36
2005	13.35	22.08	18.86
2006	11.30	14.88	11.56
2007	0.52	8.39	10.12
2008	-39.89	-4.86	-8.76
2009	26.37	15.05	12.60
2010	10.49	17.50	17.16
2011	-5.01	5.82	8.73
10 Yr Return (annualized)	0.43	13.67	11.45
10 Yr Risk (annualized)	15.35	9.77	9.12
10 Yr Sharpe Ratio	0.03	1.40	1.26
24 Yr Return (annualized)	2.73	8.13	7.12
24 Yr Risk (annualized)	14.40	8.97	8.53
24 Yr Sharpe Ratio	0.19	0.91	0.83

Source: First Quadrant, LP, Global Financial Data, Ibbotson

We can see that overall EB performance is comparable or better than EB_{no} with some exceptions. The most notable is 1994 – 1995. While the loss during the surprise interest rate hike of 1994 is smaller, the recovery in 1995 is also noticeably smaller. The lower exposure to bonds did help the portfolio in the most significant bond bear market since 1988. However, the recovery in 1995 was also muted because the stock market essentially went up with low volatility causing more significant losses in the option strategy. This is the type of period where we can expect the tail-risk hedging to detract from return. Likewise, the significant bull markets of 1997

and 1998, which were primarily centered in US equities, also caused the options strategy to be a drag on performance due to the cost of rolling.

On the other hand, EB did significantly better in the bear market of 2000 – 2002 as well as the bull market of 2003 – 2007. During the credit crisis of 2008, losses were cut in half to a -4.86% loss vs. -8.76% for EB_{no}. EB also outperformed in the bull market of 2009 – 2010.

Overall, as demonstrated above, the goal of having similar return characteristics with a lower correlation to bonds during the low volatility cycle has been achieved, albeit in the context of the simulation. Extrapolating from our simulation results, if markets continue to function as they have in the last 24 years, then EB may have similar characteristics to EB_{no} and give equity like returns with lower volatility and a low correlation to equities. However, if we have hyper-inflation or a sovereign credit crisis in the primary markets which would result in a high downside correlation between the three asset classes, Essential Beta would still have downside protection in place. In addition, if we were to have a prolonged back up in bond yields from the record low nominal levels that exist at this writing, Essential Beta would have less exposure to bonds but would still have the protection embedded in tail-risk hedging for exogenous shocks.

Conclusion

The goal of Essential Beta is to generate an equity-like return at lower volatility and exhibiting a low correlation to equities by participating in global economic growth. We use risk parity techniques in order to achieve those goals. But it is clear that while risk budgeting is a superior method to capital budgeting, risk parity may not be optimal all of the time. In particular, risk parity will fail during periods of hyper-inflation and a sovereign credit crisis when the downside correlation of stocks, bonds and commodities (as well as credit) becomes positive. In addition, there is a possibility of a prolonged back up in bond yields with yields currently at historically low nominal levels. We believe that tail-risk hedging strategies using options are an effective way to protect the portfolio against these events. However, rather than bolt them on as an overlay, which over the long run will produce negative returns, we believe it makes more sense to integrate the option hedging strategy within the portfolio and adjust the allocations to account for the change in asset class risk contribution that the addition of options produces. Additionally, using options for tail-risk hedging reduces the need for bonds in the low volatility, higher growth environment.

Risk budgeting is still crucial though. In addition, options add another dimension to the risk control oriented nature

of Essential Beta. The goal is still to deliver returns, but we now hedge risk in two dimensions. We not only seek to fully diversify risk, but also reshape the distribution by reducing the tails. We believe combining options with bonds for tail-risk hedging when costs are most appropriate will result in superior returns in the long run.

Finally, it is important to remember that tail-risk hedging does not make Essential Beta more complicated. It might only seem more complicated when comparing EB to EB_{no}. By itself, EB has all the transparency of EB_{no}. The strategy attribution will now have another column called “**Tail-Risk Hedging**” but otherwise the process remains unchanged. Essential Beta is designed to handle multiple market and economic scenarios. Adding options strategies to Essential Beta seeks to allow the portfolio to be adaptive so it can better control many types of risk while enhancing returns in the long run.



Endnotes

¹ Essential Beta simulation is supplemental information. Please see Simulation Disclosures: Essential Beta – Simulated Performance (Gross and/or Net of Fees) and Essential Beta Strategy Composite Information and Essential Beta Strategy disclosures found at the end of this presentation for information concerning this simulation, the live composite, and the effect of fees on the performance.

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Essential Beta – Simulated Performance (Gross and/or Net of Fees) *Unless otherwise noted, performance figures do not reflect the deduction of investment advisory fees. These fees are described below. The returns shown will be reduced by the advisory fees and any other expenses the advisor may incur in the management of an investment advisory account. Simulated performance is no guarantee of the future results in a live portfolio using the strategy. Potential for profit is accompanied by possibility of loss.* **General Disclosures:** Hypothetical or simulated performance results have certain inherent limitations. Unlike an actual performance record, simulated results do not represent actual trading. Also, since the trades have not actually been executed, the results may have under or over compensated for the impact, if any, of certain market factors, such as lack of liquidity or positions need to be rounded based upon contract size when futures trades are being executed. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. Further, backtesting allows the security selection methodology to be adjusted until past returns are maximized. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. Unless otherwise noted, performance returns for one year or longer are annualized. Performance returns for periods of less than one year are for the period reported. Simulations are constructed on the basis of historical data and based on assumptions integral to the model. The simulated performance in this presentation will differ from live performance that would have been experienced using the strategy during that time period for the following reasons: • The simulated performance was derived from the “backtesting” or the retroactive application of FQ’s current proprietary model as of June 2012. • The simulated performance includes the use of TIPS throughout its history; however they were not available until 1997. A live portfolio managed before 1997 would not have included TIPS. • The simulation assumes that we adjust the risk and capital allocated to each sub-strategy on a monthly basis after the close on the last day of each month, whereas the live product may not adjust the allocations exactly at that time due to intra-month market movement and risk regime shifts. • The simulation assumes that the strategy and sub-strategy guidelines are constant through the life of the portfolio, whereas, the guidelines for live portfolios may have changed over the life of each portfolio. • The simulation assumes fixed transaction costs whereas live portfolio transaction costs will be variable. • The simulation uses a synthetic long duration zero coupon bond for each bond country allocation. The cash return for the synthetic bond can vary by broker. • The simulation assumes all trading takes place once a month (on the last day of the month) whereas live portfolios may trade often during the month. **Disclosures Specific to Simulation:** This simulation was created in June of 2012 and updated every month end or quarter end. The simulation is constructed with the goal to diversify risk in a portfolio by strategically allocating risk to several sub-strategies/asset classes including, without limitation: Developed Market Equities; US Small Cap Equities; Emerging Market Equities; Real Estate Investment Trusts (“REITS”); Diversified Commodities; US Treasury Inflation-Protected Securities (“US TIPS”), Long Duration Zero Coupon Synthetic Bonds (“Synthetic Treasuries”), High Yield, and Options. The simulation replicates the hypothetical return of TIPS between 1988 and 1996 through the combination of ten year interest rates and the 12 month trailing CPI. From 1997 onward actual TIPS returns were used. The simulation assumes Synthetic Treasuries are created by using futures on various developed country sovereign bonds. The simulation additionally attempts to balance risk relative to country and sector weightings. The simulation targets overall portfolio risk allocations based on pre-determined indicators of market risk which may change over time. All income is reinvested monthly, no external cash flows are assumed. **Investment Management Fees:** Simulated performance results presented are net of investment management fees and gross trading costs. The FQ investment management asset-based fee schedule for this strategy, which is negotiable, is as follows: \$0–\$100 million, 0.40%; \$100–\$350 million, 0.35%; and more than \$350 million, 0.20%. Asset-based fees are charged incrementally. **Market Impact on Returns:** Stocks, bonds, and commodities markets had exceptional performance from 2009-2011. The Essential Beta Strategy participated in these returns throughout the period by holding long positions within all three markets.

The MSCI World IndexSM is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets. The MSCI World IndexSM is a registered trademark of Morgan Stanley Capital International.

The Citigroup World Government Bond IndexTM is a market capitalization weighted index consisting of the government bond markets. Citigroup World Government Bond IndexTM is a trademark of Citigroup.

The strategy is not managed to a specific benchmark but is compared to the benchmarks shown for illustrative purpose.

COMPOSITE INFORMATION

Essential Beta Strategy	Total Return Gross	Total Return Net	Composite 3-Year Standard Deviation Gross (Annualized)	Benchmark 3-Year Standard Deviation (Annualized)	Number of Portfolios ⁴	Composite Dispersion (%)	Total Composite Assets ^{3,4} (Millions USD)	% of Firm Assets ⁴	Total Firm Assets ⁴ (Millions USD)	Total Essential Beta Strategy Assets ^{1,4,7} (Millions USD)	Actively Managed AUM ^{1,4,5} (Millions USD)	Total Firm Assets (Including Notional Values) ^{1,4,6} (Millions USD)
2009 (Mar-Dec)	+23.9%	+23.3%	-	-	<5	-	6	0.1	7,867	89	17,342	17,427
2010	+18.1%	+17.8%	-	-	<5	-	277	3.2	8,558	380	18,713	18,789
2011	+8.9%	+8.7%	-	-	<5	-	514	6.5	7,967	619	16,725	16,725
2012 (Jan-Aug) ²	+6.4%	+6.3%	8.2%	-	<5	-	308	3.7	8,422	878	17,474	17,474

See additional disclosures for important information concerning this composite. ¹Supplemental Information. ²All performance and AUM data is preliminary. ³Includes market values for fully funded portfolios and the notional values for margin funded portfolios, all actively managed by First Quadrant. ⁴At end of period reported. ⁵Includes market values for fully funded portfolios and the notional values for margin funded portfolios, all actively managed by First Quadrant and non-discretionary portfolios managed by joint venture partners using First Quadrant, L.P. investment signals. First Quadrant is defined in this context as the combination of all discretionary portfolios of First Quadrant, L.P. and its joint venture partners, but only wherein FQ has full investment discretion over the portfolios. ⁶Includes market values for fully funded portfolios and the notional values for margin funded portfolios managed by First Quadrant and non-discretionary portfolios managed by joint venture partners using First Quadrant, L.P. investment signals. First Quadrant is defined in this context as the combination of all discretionary portfolios of First Quadrant, L.P. and its joint venture partners, but only wherein FQ has full investment discretion over the portfolios. ⁷Includes other Essential Beta composite assets, including those based in foreign currencies.

Essential Beta Strategy Past performance is no guarantee of future results. Potential for profit is accompanied by possibility of loss. **GENERAL DISCLOSURES:** First Quadrant, L.P. claims compliance with the Global Investment Performance Standards (GIPS[®]) and has prepared and presented this report in compliance with the GIPS standards. First Quadrant, L.P. has been independently verified for the period 1995-2011. Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. The Essential Beta Strategy composite has been examined for 2010. The verification and performance examination reports are available upon request. First Quadrant ("FQ" or the "Firm") is defined as the combination of all discretionary portfolios of First Quadrant, L.P. and its joint venture partners, but only wherein FQ has full investment discretion over the portfolios. First Quadrant L.P. is a registered investment adviser and is an affiliate of Affiliated Managers Group, Inc. A complete list and description of the Firm's composites is available upon request. **COMPOSITE DETAILS: Composite Description:** (Creation Date: March 2010) The portfolios in this composite invest in the Essential Beta strategy targeting an 8-10% tracking error. The strategy seeks to provide long-term market returns through exposure to essential markets in order to participate in global economic growth. The strategy includes exposure to global equity, global sovereign bonds, and commodities primarily through futures contracts, and may also use Exchange Traded Funds (ETFs) and physical securities when liquid futures contracts are not available or are illiquid. The strategy will also include exposure to commodities and Treasury Inflation Protected securities (TIPS) to hedge against inflation. Portfolios in the composite have a target risk level of between 8% and 10%, which is balanced among the asset classes. This is a total return strategy which is not managed against any benchmark or universe. Presenting the composite returns with no benchmark demonstrates clearer accountability by removing the distortions caused by blending strategy specific total and benchmark returns. **Portfolio Criteria:** There is no minimum balance requirement for a portfolio to be included in a composite. The strategy utilizes leverage at FQ's discretion. The returns presented reflect this leverage. **Calculation Methodology:** Valuations and returns are computed and stated in U.S. dollars. One portfolio within the composite (March 2009 through March 2010) used the daily valuation method to calculate the time-weighted monthly portfolio return while the other portfolio (February 2010 to present) uses a dollar-weighted rate of return formula to calculate the monthly return. Annual portfolio returns are calculated by linking the monthly returns. The dispersion of a composite is calculated using the asset-weighted standard deviation formula. Only portfolios managed for the full calendar year are included in the dispersion calculation. Where a composite contains five or fewer portfolios, a measure of dispersion is not statistically representative and is therefore not shown. The three-year annualized standard deviation measures the variability of the composite and the benchmark returns (if applicable) over the preceding 36-month period. The standard deviation is not presented for periods in which 36 months of historical composite returns are not available. Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. **Derivatives:** The underlying investment process composing this composite uses derivative instruments in both long and short positions to achieve desired returns. Derivatives are financial instruments whose value is derived from another security, an index or a currency. Futures contracts are derivatives that specify a purchase or sale of an asset at a specified price on a specified date in the future. Forward contracts are derivatives that allow the purchase or sale of currency in the future at a currently agreed-upon rate of exchange. There is a risk that a derivative may not perform as expected, thereby causing a loss or amplifying a gain or loss for a portfolio. With some derivatives there is also the risk that the counterparty may fail to honor its contract terms causing a loss for a portfolio. **Investment Management Fees** Performance results presented net of investment management fees are based upon the actual average-weighted management fee charged each portfolio in the composite. These net of fee results also reflect the effect of any negotiated fee arrangements, which are different than FQ's fee schedule. All performance results presented include trading commissions. The FQ investment management asset-based fee schedule for this strategy, which is negotiable, is as follows: \$0-\$100, 0.40%; \$100-\$350, 0.35%; and more than \$350, 0.20%. Asset-based fees are charged incrementally. For example, a \$200 million dollar portfolio will be charged 0.40% for the first \$100 million, and 0.35% for the next \$100 million. **Market Impact on Returns:** Stocks, bonds, and commodities markets had exceptional performance from 2009-2011. The Essential Beta Strategy participated in these returns throughout the period by holding long positions within all three markets.

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