

Commodities: Hedging Inflation Is Easy, You Need Returns

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BEN COLLINS PhD
Director, Investments



SCOTT TILLEY
Director, Marketing
and Client Relations

Given the poor performance of commodities over the last several years, investors who have used commodities as a hedge against inflation may now be questioning whether the cost of that protection is too high. Fortunately, the relationship between commodities and inflation is quite robust, meaning that investors have significant flexibility to shape the risk and return characteristics of their commodity portfolios without significantly altering their inflation-hedging properties. In this paper, we will examine several ways that investors can aim to improve risk management and return generation in their commodity allocations, likely controlling the effective “costs” in the future while still providing the desired inflation hedge.

We first review the common indices and their limitations as investments, namely a lack of diversification, no risk management, and low return. We next discuss the approaches that First Quadrant has developed to address those limitations. Finally, we provide analysis to show that both goals, returns and inflation hedging, are compatible. Specifically, historical correlation to inflation can be achieved while also incorporating these techniques for managing risk and return.

Traditional Indices are Inefficient

The S&P GSCI (GSCI) and Bloomberg Commodity Index Total Return (BCOM) are two of the more popular commodity indices often used as benchmarks for the asset class. For several reasons, however, those indices are suboptimal for investors looking for a comprehensive inflation hedge. The most obvious shortcoming is that GSCI weights commodities according to their worldwide production, which results in nearly 90% of the risk coming from energy commodities. BCOM addresses this by placing limits on sector and individual commodity capital

allocations, but still has delivered about half of its risk in energy.

Volatility management is another important feature missing from commodity allocations that follow GSCI and BCOM. Exposure targets in the indices are set at the beginning of the year without regard to the risk levels associated with each sector and are allowed to drift throughout. Realized volatility then varies substantially with changes in the market environment; for example, the annualized volatility of BCOM varied between 6% and 20% over the last 25 years, as seen in Figure 01.

Finally, commodity allocations need to achieve their goal of hedging inflation shocks with the most positive return impact possible. GSCI and BCOM have strong correlations to inflation rates, between 0.4 to 0.5 (see Figure 02), but do not deliver any returns above inflation when averaged over their history. As the mean return of the two series is not a part of the correlation calculation, it is easy to overlook. However, the difference between the mean inflation return and the mean return of the commodity allocation itself is very

Commodities trading involves substantial risk of loss.

Past or simulated performance is no guarantee of future results. Potential for profit is accompanied by possibility of loss.



important when gauging the effectiveness of the allocation as an inflation hedge.

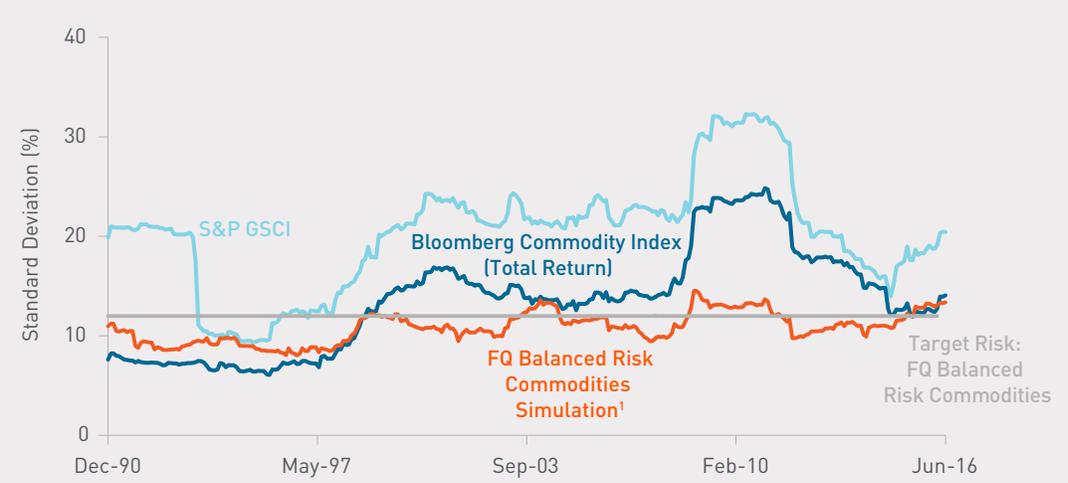
Addressing the Issues

To address the lack of risk management in the indices and create what we believe is a better portfolio for long-term commodities exposure, we use a customized approach that provides a more even exposure to risk across different inflationary channels and targets a constant risk level over time. Drawing from the risk-parity style of portfolio construction, we balance risk across commodity groups representing different inflation channels. Energy and industrial metals sectors belong to an industrial inflation group; grains, softs, and livestock belong to a food inflation group; and precious metals represent financial inflation. Inside of the different inflationary groups, we evenly allocate risk across the sectors, and then across the commodities inside each sector. This hierarchical structure achieves a much more balanced distribution of risk across the commodity complex, where each asset's relationship to inflation has been taken into account explicitly from the beginning. We believe that it makes more sense to start with the inflationary drivers as a baseline instead of production weightings, which are not derived from any expected investment outcome. Further, the diversifying power of commodity holdings comes from the fact that each of the sectors behaves differently from each other and differently from the other asset classes.

Concentrating the portfolio into one sector, as is done in GSCI and BCOM, tends to reduce the beneficial effects on both fronts.

To improve upon and stabilize the delivery of risk over time, we use a combination of two measures. The first is a proprietary assessment of the overall risk environment called the Market Risk Indicator (MRI). The risk environment of all markets can be divided into two regimes: a "fragile" state, where reaction to sentiment tends to dominate over fundamentals and volatility tends to be high, and a "resilient" state, where markets behave according to a more normal mix of market drivers and more easily absorb unexpected shocks, often leading to lower volatility. We compute our allocations for each state separately to account for the difference in volatility and correlations in the two regimes. The second risk management measure computes the trailing risk of the portfolio and balances it back towards a target if it is too high or low. This anchors the risk of the portfolio to what has been realized by the markets in recent history. The combination of both measures is designed to more effectively manage the risk over time compared to BCOM and GSCI. Figure 01 shows the risk delivered by GSCI, BCOM, and our approach, called Balanced Risk Commodities (BRC), simulated with a risk target of 12% (while we have been managing Balanced Risk Commodities as a live strategy since 2009, we show a simulation here in order to provide a longer-term perspective).

FIGURE 01 - TRAILING 3-YEAR RISK (JANUARY 1988 - JUNE 2016)



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

In addition to a more well-behaved risk profile, the BRC simulation outperforms the indices by almost 3% per year. The combination of the risk control and a more even allocation of risk across sectors not only enhances the return characteristics but reduces the volatility drag and lessens the drawdowns. We do not add any higher-yielding collateral, but we do use a model to choose the optimal tenor for the most positive expected roll yield contribution. BRC, in our view, represents the best allocation strategy for long-term positioning and is an attractive option for more passive investors.

Active Management May Further Enhance Returns

We believe commodities are very rich with opportunity to seek incremental returns through active management. By examining dislocations of the fundamental supply and demand balances and selectively over- or under-weighting individual commodities relative to a baseline allocation, there is potential to generate returns that can outpace inflation on longer timescales and help meet return targets. We use a systematic approach to active commodity investing based on fundamental drivers. Investment ideas are grounded in the supply and demand drivers of each commodity, and then implemented across the asset class in a fully risk-controlled and optimized manner. We have been employing this active approach in commodities since 2010, following the same principles that FQ has used for investing in other global markets throughout

its 25+ year history. This active component can be incorporated into long-only commodity index portfolios, such as BCOM, to enhance the return potential while controlling tracking error to the benchmark. It can also be combined with FQ's BRC approach depending on investor guidelines and preferences.

Inflation-Hedging Characteristics are Retained

Above we have outlined several types of capabilities for enhancing commodity allocations that we argue will improve the return characteristics of the allocation but will not eliminate the inflation-hedging properties. We now present calculations to demonstrate that result. In addition to GSCI and BCOM index returns, we will use simulations of three portfolios: BRC, an "active BRC" portfolio that allows a 5% tracking error deviation to express the fundamentally driven shorter-term views, and a "Dynamic Commodities" strategy that also allows for a 5% tracking error around the BCOM index.

Figure 02 shows the correlation of the monthly CPI changes to each of those return series. We use the shorter-term monthly fluctuations because those are closest to the kind of inflation shocks, or "unexpected" component of inflation, that investors are most commonly trying to hedge with commodities exposure.

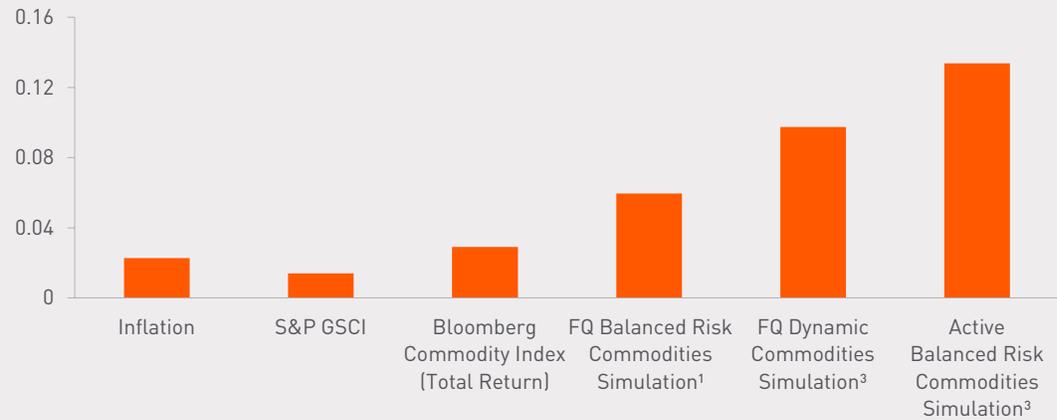
These correlations are all strong. The energy sector has been the most correlated sector with monthly CPI numbers historically, so the excessive allocation to energy risk by GSCI and

FIGURE 02 - CORRELATION
(DECEMBER 1991 – JANUARY 2016)



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

FIGURE 03 - ANNUALIZED MEAN RETURN
(DECEMBER 1991 – JANUARY 2016)



Sources: First Quadrant, L.P., Datastream, Bureau of Labor Statistics, US Department of Labor.

BCOM create a higher average correlation to CPI compared to the BRC-based portfolios. The BRC-based portfolios, on the other hand, contain a much more diversified exposure to future periods of inflation achieved through a broad variety of channels.

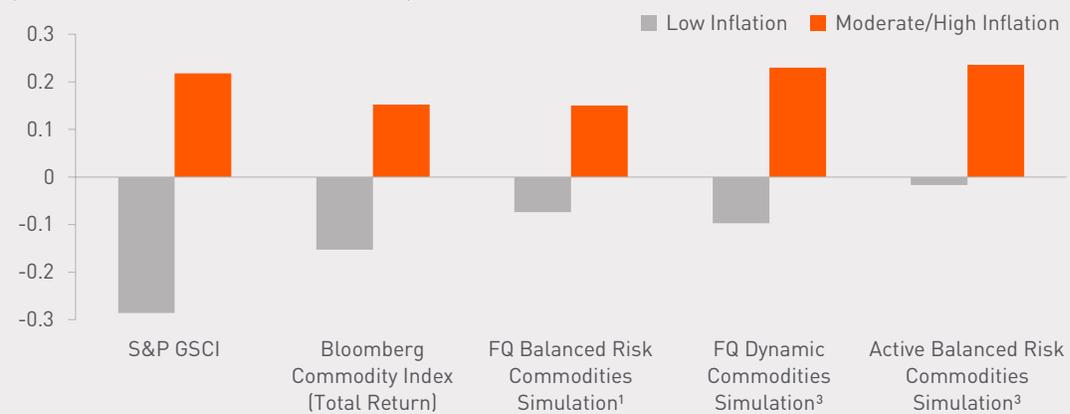
In addition to achieving similar inflation-hedging characteristics, it is possible to increase the expected return. Figure 03 highlights the long-term returns for each of the portfolios relative to inflation. As noted above, neither GSCI nor BCOM meaningfully outperformed inflation during this time period. However, BRC delivered improved returns, due to a combination of better diversification and better risk management. Adjustments to

target weights of BCOM and BRC based on our fundamental views add even more return.

Additionally, we examine the performance of the portfolios under different inflationary regimes. We have previously published some work on this topic² and apply a similar methodology to the simulated portfolios presented here, examining how each behaves in either a low inflation state of less than 2%, or in a moderate to high state of greater than 2%. The 2% boundary reflects the typical inflation target for developed market economies. Unfortunately, in this historical sample, there is not a time when inflation is very high.

Figure 04 shows that in the low inflation regime, all portfolios underperformed their

FIGURE 04 - ANNUALIZED MEAN RETURN BY INFLATION REGIME
(DECEMBER 1991 – JANUARY 2016)



Sources: First Quadrant, L.P., Datastream, Bureau of Labor Statistics, US Department of Labor.



averages, though BRC and the actively managed BRC and BCOM portfolios experienced significantly smaller losses. When inflation is above target, all of the commodity portfolios tend to do well. In this regime, BRC performed about as well as BCOM, though both trailed GSCI. The Active BRC and FQ Dynamic Commodities portfolios, however, benefitted further from their active tilts and delivered additional return over GSCI. Another important note is that GSCI and BCOM have different realized volatility levels than BRC and Active BRC. By managing their volatility, BRC and Active BRC have the capacity to deliver their returns in a more consistent manner across time, and because we are implementing with derivatives, the risk targets of those portfolios can be simply adjusted up or down according to client preferences.

Solutions

Commodity allocations are often considered the best liquid hedge for unexpected inflation, but they are accompanied with significant challenges for increasing the return potential and taming their volatility. We have presented techniques in this paper that show that these challenges can be met without reducing their appeal as an inflation hedge. Those techniques can be used in three possible solutions whose appropriateness depends on the client's specific objectives.

The first is a better long-only portfolio that uses a balanced allocation to achieve greater diversification inside the asset class and exposure to a broader set of inflationary drivers. It also varies exposures across time to target a more controlled delivery of risk. This approach aims to provide an improved risk-adjusted return with similar inflation-hedging characteristics to the traditional BCOM and GSCI indices. The second solution aims to enhance the returns on commodity allocations that are more constrained to BCOM or GSCI. For those portfolios, we can

use our proprietary active management approach to selectively under- and over-weight around the longer-term strategic allocation to take advantage of the shorter-term fundamental opportunities. This process tends to produce returns that are uncorrelated with the underlying commodity beta and add incremental value when it is needed most. Finally, a third option is to combine both of the approaches and implement our active short-term positioning around the risk-balanced long-term portfolio.

All three of these solutions are expected to improve the return experience and risk characteristics in periods of both low and moderate inflation. The best option will depend on the specific needs and objectives of individual clients. Although investors' recent experience with simpler forms of commodity exposure has been difficult, the primary goal of owning a liquid inflation hedge is not at odds with the goal of achieving stable risk and positive returns, and in fact, commodity futures are a natural place to find both.



Endnotes

¹FQ Balanced Risk Commodities is based on simulated data in order to capture longer-term historical periods. Balanced Risk Commodities simulation is supplemental information to the live composite. Please see **Balanced Risk Commodities – Simulated Performance** (Gross of Fees) and **Balanced Risk Commodities Strategies Composite Information and Balanced Risk Commodities Strategy** (Gross of Fees) disclosures found at the end of this publication for information concerning this simulation, the live composite, and the effect of fees on the performance.

²"FQ Insight: Essential Beta and Inflation Regimes by Ed Peters and Bruno Miranda".

³FQ Active Balanced Risk Commodities and FQ Dynamic Commodities is based on simulated data. Please see **FQ Active Balanced Risk Commodities and FQ Dynamic Commodities Simulated Performance** (Gross of Fees) disclosures found at the end of this publication for information concerning these simulation.



Balanced Risk Commodities (Total Return) – Simulated Performance 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 under or over compensate for the impact, if any, of certain market factors, such as lack of liquidity or security positions that need to be rounded based upon contract size when live futures trades are 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. The simulated performance used in this presentation will differ from live performance experienced using the strategy for the following reasons: • The simulated performance was derived from the “backtesting” or the retroactive application of First Quadrant’s current proprietary model. • The simulation assumes that we adjust the risk and capital allocated to each sector or sub-sector 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 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 simplistic transaction costs, which is a function of trade volume, calibrated to recent market data. The transaction costs ignore market impact, whereas in live trading, liquidity will affect transaction costs. • 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. • The simulation uses the Ibbotson 30 Day T-Bill as proxy for cash whereas a live portfolio may invest cash other instruments. Disclosures Specific to Simulation: This simulation was created in January 2015 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 commodities. Allocations are made to commodities within the following sectors: 1) Energy: WTI Oil, Brent Oil, Natural Gas, Gasoline, Gasoil, Heating Oil, 2) Softs: Coffee, Sugar, Cocoa, Cotton, 3) Grains: Corn, Hard Red Winter Wheat, Soft Red Winter Wheat, Soybeans, Soybean Meal, 4) Industrial Metals: Copper, Aluminum, Lead, Zinc, Nickel, 5) Precious Metals: Gold, Silver, Platinum, Palladium and 6) Livestock: Live Cattle, Feeder Cattle, and Lean Hogs. The simulation balances risk across these so that each commodity has an equal risk footing in the portfolio. The simulation also attempts to balance risk relative to commodity weightings. The simulation targets overall portfolio risk allocations based on pre-determined indicators of market risk which may change over time. No cash returns or cash flows are assumed in the construction of the simulation; however the Ibbotson 30 Day T-Bill is added to the monthly performance stream to represent a total return strategy. Capital gains are assumed to be fully reinvested. **Investment Management Fees:** Performance results presented are net of investment management fees and trading costs. The FQ investment management asset-based fee schedule for this strategy, which is negotiable, is as follows: \$0–\$100 million, 0.50%; \$100–\$350 million, 0.30%; and more than \$350 million, 0.15%. Asset-based fees are charged incrementally. For example, a \$200 million dollar portfolio will be charged .50% for the first \$100 million, 0.30% for the next \$100 million. Assuming a 0.40% advisory fee based upon a \$200 million portfolio size with no increase in the asset value over a five year period, the compounded total return of a portfolio would be reduced by 0.40%, 1.19% and 1.98% for the one-, three- and five-year periods, respectively. Incentive fee arrangements are available and negotiable. **Market Impact on Returns:** Commodities markets had exceptional performance from 2009-2012. The Balanced Risk Commodities Strategy participated in these returns throughout the period by holding long positions.

Balanced Risk Commodities Strategy Composite	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 Firm AUM (Including Notional Values) ^{4,5} (Millions USD)
2011 (Apr - Dec)	-11.4%	-11.7%	-	-	<5	-	250	3.1	7,967	16,725
2012	-4.3%	-4.7%	-	-	<5	-	321	4.1	7,891	17,104
2013	-13.4%	-13.7%	-	-	<5	-	142	1.5	9,702	17,284
2014	-7.4%	-7.8%	12.5%	-	<5	-	150	1.3	11,522	23,092
2015	-24.6%	-24.9%	13.0%	-	<5	-	97	1.1	8,937	20,309
2016 (Jan - Aug) ²	+4.7%	+4.3%	12.9%	-	<5	-	56	0.6	9,576	21,393

See additional disclosures for important information concerning this composite and the effect of fees. 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, including both active mandates and those with both active and passive components, all 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.

Balanced Risk Commodities 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 1995-2015. The verification reports are available upon request. 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. Verification does not ensure the accuracy of any specific composite presentation. 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** (Creation Date: May 2011) The investment objective of the Balanced Risk Commodities Strategy is to generate total returns in excess of inflation over a market cycle. The strategy intends to invest in a broad range of commodities that balance risk along three dimensions: across sectors, within sectors and across time. 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 the 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. Individual contributions and withdrawals are only permitted to occur on the first business day of each month. Monthly investment results for the portfolio are calculated using a time-weighted rate of return formula. Annual portfolio returns are calculated by geometrically 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. As this composite contains five or fewer portfolios for a full year, 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 strategy utilizes derivative instruments 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 allow the purchase or sale of currency in the future at a currently agreed upon rate of exchange. Put and call options contracts are derivatives, which permit the owner, depending on the type of option held, to purchase or sell an asset at a fixed price until a specific date. An option to purchase an asset is a call, and an option to sell an asset is a put. There is a risk that a derivative may not perform as expected, thereby causing a loss or amplifying a gain or loss for the 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 management fee charged each portfolio in the composite, and are net of any performance-based fees. 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 (assets managed in millions) for this strategy, which is negotiable, is as follows: \$1–\$100, 0.50%; \$100–\$350, 0.30%; and more than \$350, 0.15%. Asset-based fees are charged incrementally. For example, a \$400 million portfolio will be charged 0.5% for the first \$100 million, 0.30% between \$100 and \$350, and 0.15% for the remaining \$50 million. **Market Impact on Returns:** Commodities markets had exceptional performance from 2011-2012. The Balanced Risk Commodities Strategy participated in these returns throughout the period by holding long positions within these markets.



Additional Disclosures and Index Definitions

FQ Active Balanced Risk Commodities and FQ Dynamic Commodities Simulated Performance 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 under or over compensate for the impact, if any, of certain market factors, such as lack of liquidity or security positions that need to be rounded based upon contract size when live futures trades are 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. The simulated performance used in this presentation will differ from live performance experienced using the strategy for the following reasons: • The simulated performance was derived from the "backtesting" or the retroactive application of First Quadrant's current proprietary model. • The simulation assumes that the 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 simplistic transaction costs, which is a function of trade volume, calibrated to recent market data. The transaction costs ignore market impact, whereas in live trading, liquidity will affect transaction costs. • The simulation assumes all trading takes place daily at the market close whereas live portfolios will trade during the day. **Disclosures Specific to FQ Active Balanced Risk Commodities Simulation:** This simulation was created in March 2016. The simulation is constructed with the goal to diversify risk in a portfolio by strategically allocating risk to several commodities. Allocations are made to commodities within the following sectors: 1) Energy: WTI Oil, Brent Oil, Natural Gas, Gasoline, Gasoil, Heating Oil, 2) Softs: Coffee, Sugar, Cocoa, Cotton, 3) Grains: Corn, Hard Red Winter Wheat, Soft Red Winter Wheat, Soybeans, Soybean Oil, Soybean Meal, 4) Industrial Metals: Copper, Aluminum, Lead, Zinc, Nickel, 5) Precious Metals: Gold, Silver, Platinum, Palladium and 6) Livestock: Live Cattle, Feeder Cattle, and Lean Hogs. The simulation balances risk across these so that each commodity has an equal risk footing in the portfolio. The simulation also attempts to balance risk relative to commodity weightings. In addition, the simulation incorporates a 5% risk allocation to a suite of multi-factor active models which seek to take advantage of market opportunities by over- or under-weighting individual commodities relative to the strategic allocation. The simulation targets overall portfolio risk allocations based on pre-determined indicators of market risk which may change over time. No cash returns or cash flows are assumed in the construction of the simulation. Capital gains are assumed to be fully reinvested. **Market Impact on FQ Active Balanced Risk Commodities Simulated Returns:** Commodities markets had exceptional performance from 2003-2006 and 2010. The Active Balanced Risk Commodities strategy participated in these returns throughout the period by holding long positions. **Disclosures Specific to FQ Dynamic Commodities Simulation:** This simulation was created in August 2016. The simulation is constructed with the goal of providing broad long-only commodity asset class exposure similar to the Bloomberg Commodity (BCOM) Index. It also incorporates a multi-factor model to take advantage of market opportunities by over- or under-weighting individual commodities relative to the strategic allocation with the goal of enhancing the returns of the portfolio. The tracking error target associated with the model-driven exposures relative to BCOM is of 5%. Allocations are made to commodities within the following sectors: 1) Energy: WTI Oil, Brent Oil, Natural Gas, Gasoline, Gasoil, Heating Oil, 2) Softs: Coffee, Sugar, Cocoa, Cotton, 3) Grains: Corn, Hard Red Winter Wheat, Soft Red Winter Wheat, Soybeans, Soybean Oil, Soybean Meal, 4) Industrial Metals: Copper, Aluminum, Lead, Zinc, Nickel, 5) Precious Metals: Gold, Silver, Platinum, Palladium and 6) Livestock: Live Cattle, Feeder Cattle, and Lean Hogs. No cash returns or cash flows are assumed in the construction of the simulation; however the Ibbotson 30 Day T-Bill is added to the monthly performance stream to represent a total return strategy. Capital gains are assumed to be fully reinvested. Bloomberg Commodity Index (Total Return), formerly the Dow Jones-UBS Commodity Index Total Return, reflects the returns on a fully collateralized investment in Bloomberg Commodity Index which is a broadly diversified index composed of futures contracts on physical commodities. The index currently has 22 commodity futures in seven sectors. No one commodity can compose less than 2% or more than 15% of the index and no sector can represent more than 33% of the index as of the annual weightings of the components. Bloomberg is a trademark and service mark of Bloomberg Finance L.P., a Delaware limited partnership, or its subsidiaries. All rights reserved. **Market Impact on FQ Dynamic Commodities Simulated Returns:** Commodities markets had exceptional performance in the years 2000, 2003, 2004, 2005, 2009, and 2010. The Dynamic Commodities strategy participated in these returns throughout the period by holding long positions. **Investment Management Fees for FQ Dynamic Commodities Strategy:** Performance results presented are net of investment management fees and trading costs. The FQ investment management asset-based fee schedule for this strategy, which is negotiable, is as follows: \$0-\$100 million, 0.65%; \$100-\$350 million, 0.55%; and more than \$350 million, 0.50%. Asset-based fees are charged incrementally. Incentive fee arrangements are available and negotiable. **Investment Management Fees for FQ Active Balanced Risk Commodities Strategy:** Performance results presented are net of investment management fees and trading costs. The FQ investment management asset-based fee schedule for this strategy, which is negotiable, is as follows: \$0-\$100 million, 0.75%; \$100-\$350 million, 0.65%; and more than \$350 million, 0.60%. Asset-based fees are charged incrementally. Incentive fee arrangements are available and negotiable.

For index definitions and trademark language used in this publication, please visit <https://www.firstquadrant.com/index-definitions> for further information.

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