Quantix COMMODITIES | Commodities Research

# The Different Forms of Commodity Inflation: Scarcity or Debasement?

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Commodities have long been considered a potential hedge against inflation and for most investors there is a clear rationale. There are many papers, written by either academics or asset managers, as to why this is the case, which often use data sets spanning decades or centuries to make the authors' point.

What is not clear, however, and *arguably the most important part of any discussion on the topic*, is the most effective way to use commodity markets to achieve that inflation protection. To answer this question, investors must dig a little deeper and first clarify exactly what they are concerned about when they think about inflation.

In this paper, we define the different types of commodity inflation (scarcity and debasement) and examine the implications on commodity futures curves, the very different potential hedges for each, the capacity for the commodity markets to absorb additional capital, and finally the role of Gold.

Lastly, we offer what we believe is a practical solution to the problem: combining industry standard practices with the deep Quantix expertise to design a solution that seeks to i) provide as high a degree of sensitivity to inflation as the standard commodity indices and ii) use forward-looking active management to generate significant additional returns above a static implementation.

## *What is Inflation?*

For most people, whether inside or outside financial markets, the most basic definition of inflation is rising prices. As commodities are a major component of many aspects of people's every-day lives (from energy to food to construction to precious metals), the theory states that they will likely appreciate in an environment where prices increase or even potentially have been the driver themselves of the rising prices. Therefore, owning them protects you against such price increases.

In reality, it is significantly more complicated than that. For starters, the inflation that most investors experience relates to total expenses which includes both goods and services. While commodities are highly correlated with the goods component, services are more a function of labor costs which may fluctuate due to a completely different set of variables.

However, let's focus on the goods component, where the price of commodities is far more relevant and examine the question of how to best deploy commodities if your goal is to hedge against inflation.

***Scarcity vs Debasement***

We will start with the fact that commodity prices that are all denominated in a defined currency. For the majority of liquid traded commodities, and all of the commodity futures contracts in the major commodity benchmarks of the Bloomberg Commodity Index ("BCOM") or S&P GSCI Index ("SPGSCI"), that currency is the US Dollar. Therefore, commodity prices are reflections of the relative value of that commodity to the dollar. For example, how many dollars are required to purchase one barrel of WTI Crude Oil or one bushel of Chicago Wheat.

Like any ratio, its value is a function of both the numerator and the denominator. In other words, commodity prices can go up because the commodity is becoming more valuable or because the currency is becoming less valuable (or potentially both). Though the term inflation may be generically used to describe price appreciation in both of these scenarios, there are significant differences in the drivers of price change in each, which have serious implications on how commodities may be used as a hedge.

1. **Scarcity drives "unexpected inflation"**

   If the commodity itself is the primary driver of the price appreciation (the numerator is rising), it is usually the result of scarcity. This scarcity can be brought on by either rapidly rising demand (economy overheating) or rapidly declining supply (shock to production infrastructure). In either case, associated appreciation in commodity prices for these causes is correlated with "unexpected inflation".

   In these environments, the price impact is most acute in the front of the commodity futures curve as there is an immediate need for the commodity driven by the current scarcity. Therefore, in order to hedge against this type of inflation, investors should look for exposure at the front end of the curve while keeping in mind the cost of carry (see below).

   Demand driven scarcity associated with a strong economy is typically better hedged by broad based indices whereas supply shocks tend to be sector specific.

2. **Currency oversupply can lead to debasement**

   If a weakening currency is the primary driver of the price appreciation (the denominator is falling), it is usually the result of an oversupply of the currency. This oversupply is often the result of central bank activity intended to inject more money into the economy. The term best used to describe this phenomenon is "debasement".

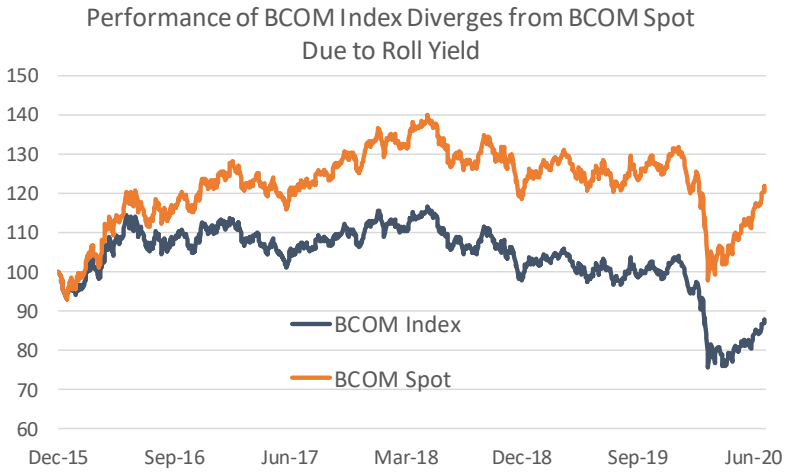
   In these environments, commodity prices may rise without any scarcity in the commodity. As a result, the price appreciation is not driven by the front of the commodity futures curve but by deferred contracts as the expectation is that the commodity will cost more in the future.

While headline commodity prices may be rising in each of the above scenarios, there are key differences in return expectations between different commodities and different parts of the commodity futures curve. In addition, to effectively implement an inflation hedge by owning commodities, the shape of the commodity futures curve also needs to be considered.

***The Shape of the Futures Curve Has a Significant Impact on Return Expectations***

In recent newsletters I have written about how commodity spot prices and commodity indices are not the same thing due to the unique structure of the commodity markets. The "carry" associated with the need to roll positions from one futures contract to the next (in order to avoid physical delivery) can cause significant differences in returns between spot prices (which are not investable) and commodity indices.

This is demonstrated in the chart on the right, as the BCOM Index which includes this carry, materially underperforms spot prices from Jan-16 to Jun-20.




*Source: Quantix Commodities, Bloomberg. As of June 2020.*

If a commodity futures curve is "backwardated" (prompt prices higher than deferred prices), rolling positions in that commodity to maintain exposure creates a positive yield which means an index will outperform spot prices. The reverse is true if commodity price curves are in contango (deferred prices are higher than spot prices).

During periods of scarcity, commodity futures curves tend to be in backwardation which implies that prompt-rolling indices which hold and roll exposure in the front of the curve are a better hedge for "unexpected inflation" caused by a rapid increase in demand or decrease in supply.

However, if commodities are expected to rise due to debasement concerns, this is typically accompanied by a contango in commodity price curves, and there is potential for disappointing performance from prompt-rolling indices due to negative carry. In extreme scenarios, the impact of the negative roll-yield can overwhelm the spot price appreciation and a prompt-rolling index may actually decline even while the spot prices of commodities are rising.

***Effective Inflation Hedges in a Debasement World***

As debasement concerns are centered on an expectation of higher prices in the future, a better hedge in this scenario is selecting a commodity with the lowest cost of carry. If the supply/demand fundamentals of the commodity are not pointing to a scarcity but an investor is expecting the commodity will cost more in the future the investor is essentially willing to "store" that commodity until a future date. In fact, commodities are often referred to as a "store of value" or "store of wealth" in these situations.

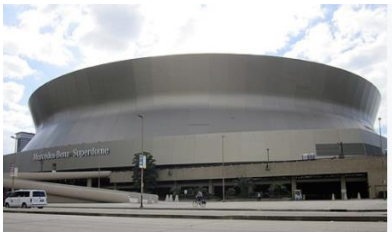
Unfortunately, most commodities are not well suited for this purpose. In the modern world, most commodities have a streamlined connection between producers and consumers, and storage only accounts for a small fraction of the time and cost of the supply chain. As a result, it is not practical to use the commodity as a longer term store of wealth because of the higher cost associated with storing them.

In the table on the next page, I compute the space required to store $1B of various commodities. While space alone is not the sole driver of storage costs it is a good proxy and the sheer volume required to store the relevant amounts of physical commodities points to the challenges in using them as a "store of value".

**Figure 1**: Space Required to Store USD1bn of Each Commodity

## SPACE REQUIRED FOR $1 BILLION OF VARIOUS COMMODITIES

| | Volume (ccf) | Log10 Volume |
|---|---|---|
| REFRIGERATOR | 21 | 1.32 |
| Gold | 27 | 1.43 |
| Silver | 3,578 | 3.55 |
| Nickel | 259,196 | 5.41 |
| Copper | 583,093 | 5.77 |
| Zinc | 584,125 | 5.77 |
| Lead | 1,589,940 | 6.20 |
| Aluminum | 7,427,331 | 6.87 |
| Cotton | 15,983,935 | 7.20 |
| Coffee | 21,318,573 | 7.33 |
| Coccoa | 37,431,005 | 7.57 |
| Lean Hogs | 53,185,427 | 7.73 |
| Gasoline | 113,626,716 | 8.06 |
| Heating Oil | 116,162,718 | 8.07 |
| Gasoil | 124,918,368 | 8.10 |
| SUPERDOME | 125,000,000 | 8.10 |
| Soybeans | 128,099,174 | 8.11 |
| Brent | 131,691,925 | 8.12 |
| WTI | 141,261,693 | 8.15 |
| Sugar | 159,059,364 | 8.20 |
| Soymeal | 171,522,004 | 8.23 |
| Bean Oil | 178,546,859 | 8.25 |
| Wheat | 225,352,113 | 8.35 |
| KC Wheat | 262,433,862 | 8.42 |
| Corn | 346,368,715 | 8.54 |
| Liquid Natural Gas | 643,997,939 | 8.81 |
| Feeder Cattle | 26,209,386,282 | 10.42 |
| RHODE ISLAND | 33,788,620,800 | 10.53 |
| Live Cattle | 41,704,164,672 | 10.62 |



*Note: Livestock reported in square feet necessary to feed required animal heads*

*Source: Quantix Commodities, Bloomberg. As of 10-Sep-20.*

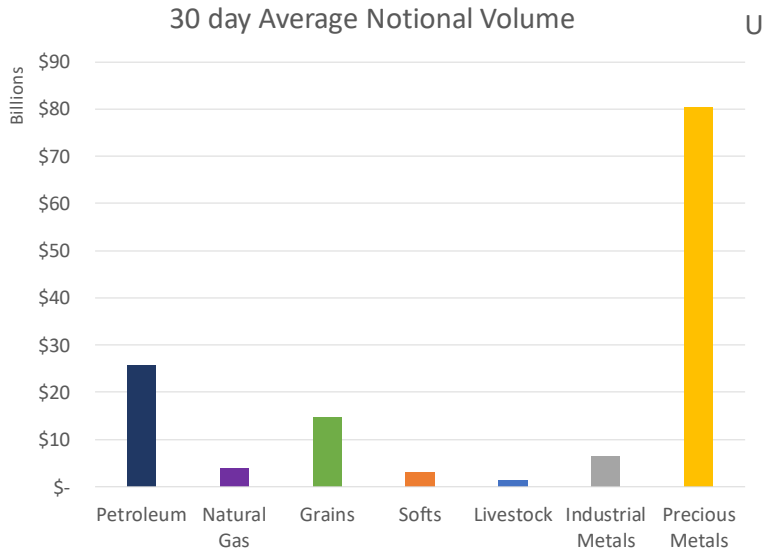
Investors may argue that if they buy a futures contract then physical storage is not as much of a concern. However, these derivatives ultimately converge to physical markets and physical constraints will apply and be factored into prices.

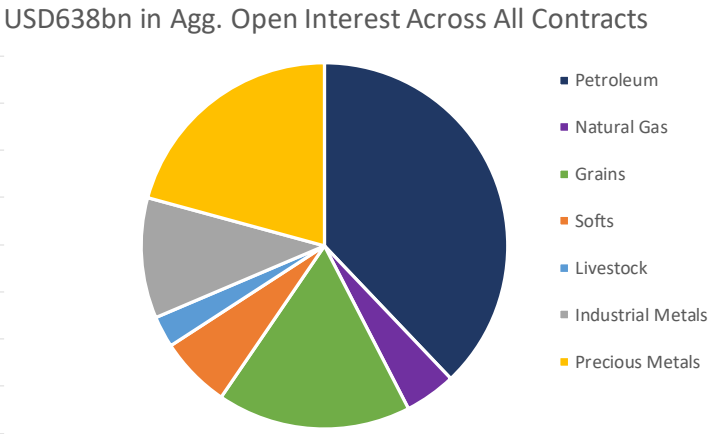
**The implication of this analysis is that gold is really the only commodity that is a practical and suitable inflation hedge in a debasement world.**

***The Potential Capacity of the Commodity Markets***

The link to physical markets is also a key concept in evaluating the capacity of commodity markets as an inflation hedge. Too often, investors only analyze the current size of derivative markets in determining hedge capacity without evaluating what those markets could do in times of stress.

For example, current Average Daily Volume in liquid commodity future contracts is USD135bn, with more than half in Precious Metals. We estimate the current Aggregate Open Interest in these contracts to be approx. USD638bn, as of Sep-20, broken down by sector in the pie chart below.

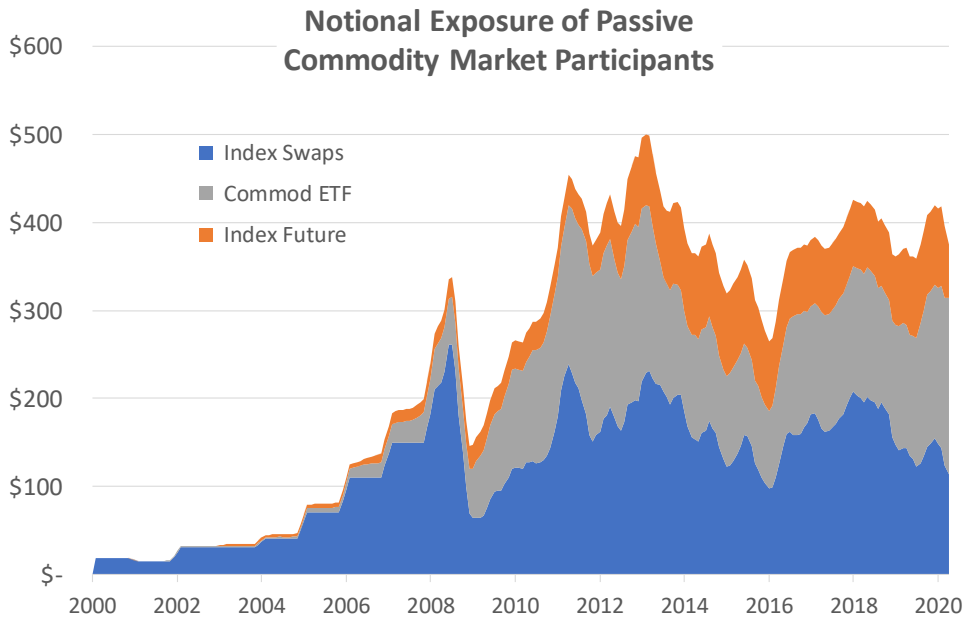



*Source: Quantix Commodities, Bloomberg. As of 10-Sep-20.*

Given this analysis of the current size of derivative markets, even without testing the extremes, there is historical precedent for at least an incremental $50B to be put to work in broad based commodity indices.

On a volume basis, although more than half is in Precious Metals, there is substantial liquidity available across all sectors. While Quantix would recommend a more strategic execution plan, given current liquidity conditions, we believe that $1B per day could be deployed without any noticeable disruption.




*Source: Quantix Commodities, Bloomberg. As of June 2020.*

In addition to the overall size, this additional capital would be a small proportion of the passive market. As demonstrated by the chart above, the notional exposure of passive participants has ranged between $300-400bn since 2011.

However, because a fundamental link between derivative and physical markets exists, the true capacity for hedging in derivative markets could potentially be far greater. Actual physical markets for benchmark commodities are much larger than the open interest of benchmark contracts as seen in the table on the right. While there may be logistical issues to overcome regarding physical delivery at some exchange points, derivative markets have plenty of room to grow given the size of physical commodity markets.

The ability of the derivative markets to absorb additional inflows will be dependent on the whether the world is facing true commodity scarcity. If that is the case, additional investor buying could be satisfied by low-cost producers hedging (i.e. selling to the investor) and if there is a genuine scarcity, consumers would then be forced to pay more to the investor in the future to get access to that commodity.

However, if there is no true supply/demand imbalance, any investor buying will incentivize greater production without any growth in the offsetting consumer demand, which means that the additional commodity will need to be stored.

| Commodity | 2019 World Production Average (USD mm) |
|---|---|
| **Crude Oil** | $1,237,579 |
| **Natural Gas** | $101,944 |
| **Wheat** | $97,411 |
| **Corn** | $91,839 |
| **Soybeans** | $68,758 |
| **Coffee** | $19,661 |
| **Sugar** | $45,933 |
| **Cocoa** | $10,910 |
| **Cotton** | $40,698 |
| **Lean Hogs** | $55,120 |
| **Aluminum** | $106,044 |
| **Copper** | $123,548 |
| **Nickel** | $19,864 |
| **Zinc** | $32,819 |
| **Gold** | $119,218 |
| **Silver** | $12,830 |

*Source: S&P Dow Jones Indices, S&P GSCI Methodology, May 20. 2019 World Production Average is average of last five years, using price as of 01-Jan-19.*

***The Role of Gold and the Link between Physical and Futures Markets***

As we demonstrated earlier, Gold is the only physical market where the commodity can be stored in any practical way as most commodities are consumed. Gold is also unique in that over 50% of its use is as a store of wealth and 98% of all the gold ever mined is still reasonably accessible. As a result, we would argue the true size of the tradable Gold market is circa. $10 trillion.

Financial investors can tap into this market directly by trading OTC physical gold in London as well as COMEX gold futures in New York. There are mechanisms in place to fairly efficiently maintain the physical arbitrage required to link the physical market and the futures market. For example, as investors flock into products related to COMEX gold, EFPs ("Exchange For Physical") expand and incentivize the movement of gold into COMEX warehouses.

This is probably the purest and most logical example of how the link between derivatives markets and physical markets can create greater capacity. In any case, this example illustrates the potential capacity for investment in the overall commodity markets is much larger than exchange contract volume or open interest.

***A Practical Way for Investors to Safeguard their Portfolios Against Potential Inflation***

Many investors struggle with the practical implementation of potential inflation hedges, how to choose which asset class to allocate to, and how to benchmark performance. This is partly because the standard measure of inflation, the Consumer Price Index ("CPI"), is not investable, and partly due to the uncertainty of how inflation will impact asset prices. This uncertainty has been compounded by the extraordinary monetary policies of central banks since 2008.

This paper assumes that investors have concluded that commodity futures should play a role in their portfolio as a potential inflation hedge, and there is a volume of both academic and practitioner work to help in that decision. A natural starting point in the asset class is a passive exposure to one of the two most-used benchmarks, either the BCOM Index or the S&P GSCI Index.

However, passive exposure in commodity futures markets is not the same as passive exposure in other asset classes due to the requirement to constantly roll to the next futures contract, simply to maintain exposure and avoid physical delivery. Therefore a 'simple' passive implementation can often be affected by negative roll yield associated with investing in the front of commodity curves, eroding returns while waiting for the potential inflation to materialize.

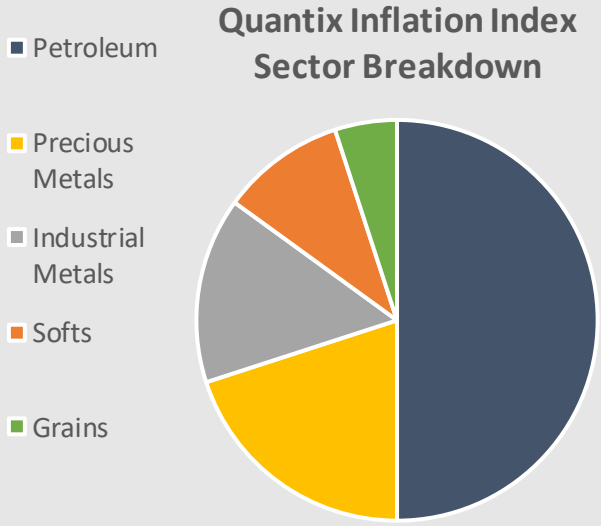
The Quantix team has drawn on their experience implementing inflation hedges for some of the largest allocators in the world to design a solution that seeks to i) provide as high a degree of sensitivity to inflation as the standard commodity indices and ii) use forward-looking active management to generate significant additional returns above a static implementation.

As the primary driver of inflation (scarcity or debasement) is often not obvious in advance, we have designed the Quantix Inflation Index to aim to perform in either scenario. Through thoughtful selection of commodity weights combined with a strategic rolling methodology we believe the QII will provide superior inflation protection to current popular commodity benchmarks in most inflationary environments going forward.

**The Quantix Inflation Index ("QII")**

*Step 1:* Quantix uses industry best practice to integrate sectors from each major commodity index, that are commonly believed to have the greatest sensitivity to potential inflation. Certain sectors, such as Petroleum, have a much higher pass through cost (for example Gasoline is 60% of the pump price) than others such as Softs (the cost of Cocoa is pennies on the dollar of a chocolate bar).

*Step 2:* Choose which commodities to populate each sector. Quantix excludes those with negative historical correlation to inflation and includes those that Quantix believes have the highest absolute return potential, analyzing both fundamentals and volatility (giving more 'inflation bang per buck').




Source: Quantix Commodities

*Step 3:* Target a higher expected total return by implementing what we believe is an optimal expression of each commodity, whether substituting different commodities (owning Brent Crude Oil rather than WTI Crude Oil) or holding the position at different points on the futures curve.

**Seeking to Outperform Benchmark Indices with Greater Inflation Sensitivity**

The hypothetical QII backtest would have historically delivered on the two primary objectives.

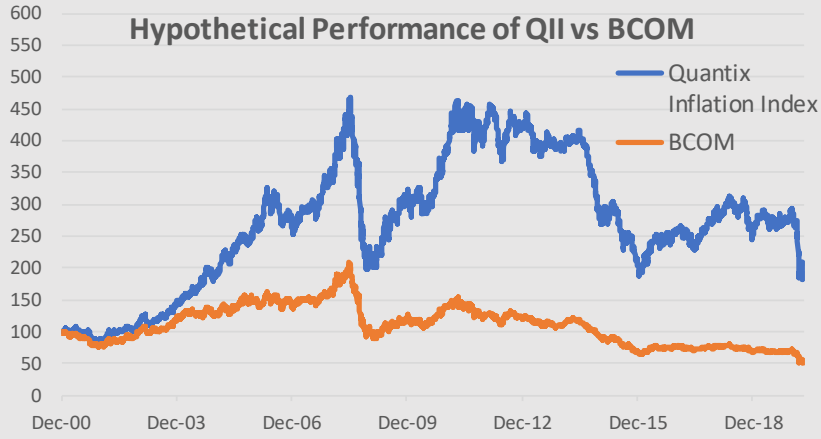
*A Greater Sensitivity to Inflation than Benchmark Indices*

- QII has historically had a higher correlation to US CPI than BCOM (0.76 vs 0.69) and approximately the same as the energy-heavy SPGSCI (0.77).
- QII has a higher correlation to *unexpected inflation* than either BCOM or SPGSCI (0.39 vs 0.22 or 0.31 respectively)

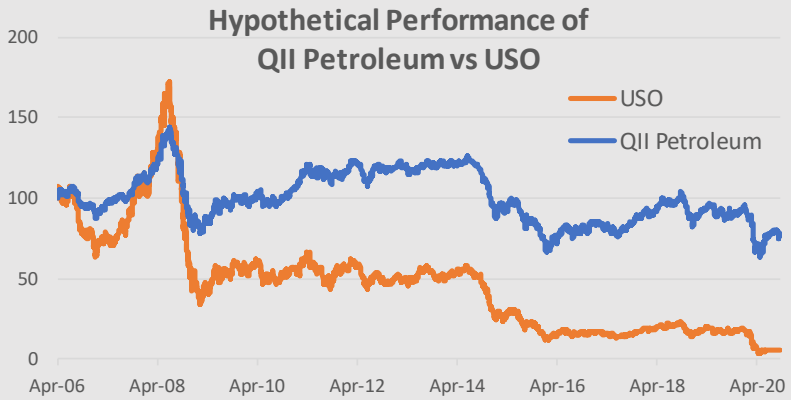
*Seeking to Outperform Benchmark Indices*

- Over the past 20 years, the QII hypothetical backtest significantly outperformed both BCOM and the SPGSCI, by 7% and 10% annualized (gross of fees & expenses)
- The same is true in individual sectors; the QII Petroleum hypothetical backtest outperformed USO[1], by 16% annualized (gross of fees & expenses) since the inception of the ETF in 2006

[1] USO is the United States Oil Fund ETF.




Source: Quantix Commodities, Bloomberg. Hypothetical returns of Quantix Inflation Index are gross of all fees and expense. Date range: Dec-00 to Sep-20




Source: Quantix Commodities, Bloomberg. Hypothetical returns of Quantix Inflation Index Petroleum are gross of all fees and expense. Date range: Apr-06 to Sep-20

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# Appendix

***Biography***

Don has 25 years of experience in the commodity markets. He left Goldman Sachs as a partner in 2018 after 20 years in the commodity group. During that time, he managed the Global Investor Product Desk from 2007-2013 and was Global Commodities COO from 2013-2015. From 2015 until his departure, he was Head of Commodity Trading for all of EMEA. In addition, he was the lead Crude Derivatives trader from 1998-2006, member of LME User Committee, member of CFTC Market Advisory Committee and speaker at the Position Limit Hearing in 2008.

Don has an MS in Mechanical Engineering from Stanford University and an MBA from Duke University.

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Investment and trading risks in general. An investment in the fund is speculative and involves a high degree of risk. No guarantee or representation is made that the fund's investment objectives will be achieved. An investor should not make an investment, unless it is prepared to lose all or a substantial portion of its investment.

Leverage and concentration risks. The fund's portfolio, which is under the sole trading authority of the general partner/investment manager, is primarily concentrated in commodities and this lack of diversification may result in higher risk. A portion of the trades executed may take place on non-U.S. Exchanges. Leverage may be employed in the portfolio, and is inherent in certain portfolio investments, which can make investment performance volatile.

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