FIRST QUADRANT

MARKET INSIGHT

The Multiple Personalities of Inflation, Part 3: Hedging

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A few years ago, very high inflation seemed a phenomenon of the past. But prices are rising across the globe, with no clear end in sight. Plans now have to figure out how to adjust to an inflationary regime investors haven't experienced in almost four decades. Unfortunately, the solution is not as simple as it may seem. Inflation is not a one-dimensional problem, and there is no one-size-fits-all solution.

At the beginning of this series, we mentioned that inflation is like heart disease. While there is one result, both have multiple causes. You have to treat the right cause if you're going to cure the patient. Likewise, with inflation we have to hedge the correct cause of inflation if our hedge is to be effective.

In Part 1, we introduced the three different drivers of inflation: (1) increased demand, (2) decreased supply, and (3) increased money supply. In Part 2, we looked at historical examples of each type of inflationary driver, and found that markets react very differently to each.

Now, in this paper, we will establish a framework for developing a thoughtful inflation hedge. The approach we take is anchored in two strategic decisions:

1) The driver of inflation to be hedged.
2) The type of inflation hedge we desire.

These two decisions, of course, are interrelated and so must be integrated for a holistic multi-asset hedging approach. We will first consider a generic inflation hedge, which unfortunately has a lot of shortcomings. We will then briefly review each of the inflationary drivers, and discuss potential hedging options for each type. Finally, we will bring all these individual elements together to build a holistic multi-asset hedging strategy.

Generic Inflation Hedges

Investors often talk about hedging inflation in a very general way, basically wanting a portfolio that goes up with CPI or personal consumption expenditure (PCE). Unfortunately, as we've discussed throughout this series, history shows that hedging inflation in a generic way is not necessarily optimal, or even possible. To effectively hedge inflation, you must hedge the driver of inflation. Many "inflation hedges" are only effective for specific types of inflation. Still, we will take a look at candidates for a generic

inflation hedge. Usually, these are indirect hedges. If an investor actually desires to hedge any rise in prices directly, choices are few.

In public markets, there are no real options. The Chicago Mercantile Exchange planned CPI futures after the global financial crisis of 2008/2009, but shelved that idea when there was little interest.

In private markets, there are inflation swaps. Like all swaps, these are an agreement between two parties. Inflation swaps are mostly appropriate if you want to convert a type of asset into a "real return" asset, where CPI or some other inflation measure is a benchmark. For instance, the purchaser of commercial paper can turn a fixed-rate instrument into a floating-rate one. But for a longer-term investment, such as a 10-year sovereign bond, this approach can be problematic. Despite what the textbooks say, long-term bond yields do not automatically rise when there is inflation, as we saw in Part 2. So, while swaps can serve a purpose, they are not necessarily a good way to hedge a portfolio.

Investment lore often assigns general inflation hedging properties to commodities, such as oil and gold. While these assets can hedge against specific types of inflation, using oil and gold as generic hedges can be disappointing, as we will discuss later. Likewise, stocks are also said to be an inflation hedge, but again, this only holds in certain inflation scenarios. It is true that earnings, in aggregate, grow with the economy, but the economy does not always grow with inflation. There are inflationary environments in which stocks can disappoint, such as stagflation.

The bottom line is that a generic inflation hedge is a blunt instrument, even when it works. When it does seem to work, it is often a lucky guess. There are types of inflation that are good for some assets and bad for others. Since the relationship changes over time, it would likely be more worthwhile to target the vulnerability of each asset class for our inflation hedges. As we build a more targeted strategy, the first step is to determine which type of inflation is under discussion, which assets and asset classes are vulnerable to that inflationary driver, and how we can hedge those exposures.

Building Blocks: Hedging Different Inflationary Types

As we have seen, hedging inflation in a generic way is not necessarily optimal, or even possible. You must hedge the driver of inflation rather than just the headline number. Otherwise, your inflation "hedge" can actually make matters worse. For instance, in Part 2 we learned that stocks did well during the energy crisis of 1973-1975, but poorly during the monetary inflation of 1977-1982. The same strategy would not have worked for these different inflationary episodes.

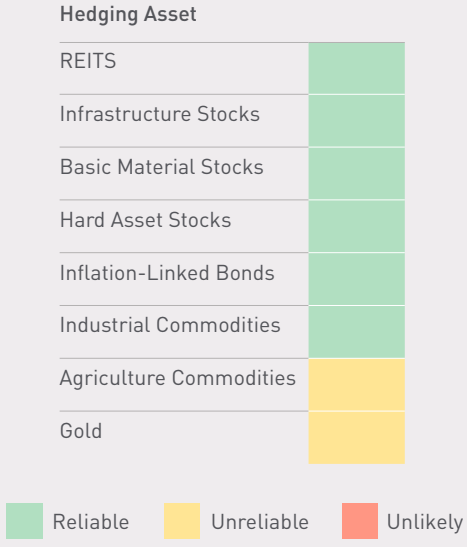
In this section, we will discuss the three types of inflation (demand, supply, monetary) and the appropriate hedging strategy for each.

Demand-Driven Inflation

The first type of inflation occurs when demand increases. Demand-driven inflation can fall into two categories, each of which has its own hedging response. Figure 01 depicts the different hedging assets which will be discussed further on.

The first we will label "idiosyncratic demand." In this case, demand for a specific type of good or service increases for individual reasons. For example, if more people begin to attend soccer games after watching *Ted Lasso*, then the price of

FIGURE 01 - RELIABILITY OF HEDGING INFLATION: DEMAND-DRIVEN



soccer tickets may increase. If the good or service is an integral part of the macro economy, it can have knock-on effects and spread to the broader economy. Oil is the most archetypical asset with this characteristic. On the other hand, if the good is more localized, such as coffee, then increased demand may be bad for coffee drinkers, but not for the rest of the economy.

Hedging against idiosyncratic demand is only useful if the asset under question is an important part of your business or portfolio. Airlines, for instance, routinely hedge oil prices for the next year. But for investors with multi-asset portfolios, hedging against idiosyncratic demand inflation is largely unnecessary, as these types of events can usually be handled with tactical adjustments.

The second type we will call "macro demand." This is the most common form of inflation, and it is driven by general economic growth. As the economy expands, the wealth of consumers and businesses rises and demand for all types of goods and services increases. Macro demand inflation is relatively straightforward for central banks to control, and also somewhat predictable because it is largely tied to the business cycle. On average, macro demand inflation is less than 5%, and in recent years, it's been closer to 2%, the inflation target of most developed-market central banks.

Hedging against macro demand inflation is quite different than its idiosyncratic cousin, since it is tied to the business cycle. There are assets that behave much like the general economy, but can outperform in periods of demand-driven inflation, as we saw in Part 2.

Stocks, as an asset class, generally give positive returns during periods of demand-driven inflation. Certain types of stocks can be especially strong. For example, materials companies benefit directly from a rise in prices for commodities used in production. There are ETFs that specialize in these particular types of companies. In addition, there are firms that own the commodities "in the ground," such as gold mining or timber companies. Then there are more generic equity inflation hedges, like real estate investment trusts (REITs) and infrastructure companies. The major benefit of these stocks comes from their income, which is rent in the case of REITs and tolls in the case of infrastructure. These sources of income historically rise with inflation. In addition, because rising macro demand coincides with strong economic growth, home-building and infrastructure projects may increase, resulting in a rise of asset values.

Like stocks, commodities are growth assets and tend to perform well when strong macro demand is the driver. Commodities, of course, are considered the standard inflation hedge, but there are important nuances that are often overlooked. Industrial commodities tied to energy and base metals are such integral components of most production processes that demand for them rises during manufacturing expansions. Since manufacturing is tied to growth, the value of manufacturing commodities would, in theory, increase as growth accelerates. On the other hand, demand is more consistent for the agricultural sectors, so the prices of agricultural commodities are not as closely connected to the business cycle. Finally, the impact on precious metals is mixed. Some precious metals, such as platinum and palladium, do have industrial uses and may increase with economic growth. But gold is not really a part of industrial production, and gold prices historically have not risen due to macro demand inflation.

From an asset class standpoint, bonds are the most vulnerable to macro demand inflation, and for bond investors, hedging choices are limited. Inflation-linked bonds (TIPS) are a generic hedge, since their principal changes with a specific inflation measure. For example, TIPS are tied to CPI data. But it's important to remember that inflation-linked bonds are only risk-free if held to maturity. During inflationary periods, inflation-linked bonds will do better than nominal bonds, but their yields will still rise if there is a time left to maturity. So a 10-year TIP may outperform a 10-year US T-note, but it may still underperform cash if interest rates rise enough.

Macro demand inflation is textbook. It is what most people think of when they hear the term "inflation." The other two types of inflation are

much more difficult challenges, for central banks as well as investors.

Supply-Driven

The second type of inflation occurs when supply decreases. Supply-driven inflation is rarer than demand-driven inflation, as we saw in Part 2. It is also more difficult to hedge, as shown in Figure 02. Like demand-driven inflation, supply-driven inflation can be either idiosyncratic or macro in nature. To hedge against supply-driven inflation, we need to be concerned about (1) whether the supply issue is idiosyncratic or macro, and (2) how long we expect it to last.

In the idiosyncratic case, short supply of either capital or labor limits production for a good or service, driving up its price. As was the case for demand, inflation for one good can trigger a rise in prices across the broad economy, but the asset must be a crucial part of the economic engine. Again, the first thing that comes to mind is energy. Oil and other sources of energy underlay most of the components of business and daily life in the modern world.

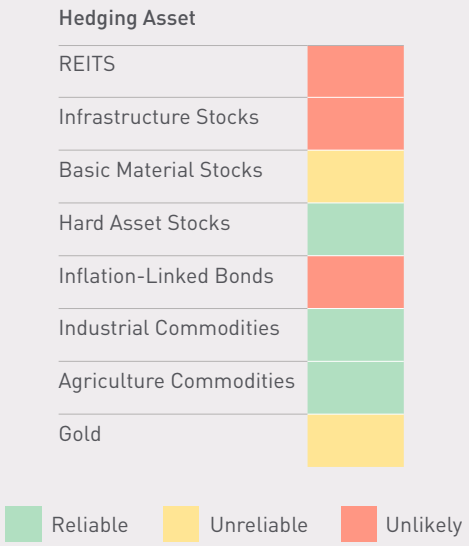
Macro supply shortages are widespread shortages caused by production and/or transport issues across the economy. They are typically caused by exogenous shocks, like geopolitical events or natural disasters. Historically, there have been shortages during war as supply chains are disrupted and the economy is repurposed for the war effort. Natural disasters, such as earthquakes, are another example of exogenous shocks. These events can destroy infrastructure and/or make distribution difficult. And as we've seen in recent history, a pandemic can reduce the labor force or limit production hours, also causing supply shortages.

The duration of the shortage is of chief concern. Supply shortages are typically finite in nature. Once the cause of the bottleneck is resolved, supply chains can be restored and demand and supply should go back towards a normal balance. If the shock is expected to be short-term, then the appropriate hedge varies by type. Idiosyncratic supply inflation can typically be hedged tactically using futures. Macro supply inflation is more challenging to hedge, and if it is short-term, inflation will likely abate before effective hedges can be put in place, so it is advisable to just let it ride.

If the shortage is considered longer-term in nature, then some of the hedges for macro demand inflation can be utilized. Commodities, in particular, tend to be useful during episodes of supply-driven inflation. When the economy is experiencing transportation or supply chain issues, prices rise for physical goods, including industrial and agricultural commodities. The precious metals, like platinum and palladium, with more industrial use may also have some benefit. We have seen this recently with the global chip shortage.

However, stocks and inflation-linked bonds become less useful when the issue is supply rather than demand. Shortages of raw materials and/or labor make production more costly, cutting into profits and reducing the attractiveness of stocks. Also, if the supply shortage results in a slowdown or recession, demand for home purchases and travel will likely fall. As a result, REITs and infrastructure stocks may struggle. It's not all bad news for stocks, though. Companies with a close tie to commodities may become more

FIGURE 02 - RELIABILITY OF HEDGING INFLATION: SUPPLY-DRIVEN



profitable, so stocks or ETFs related to materials, mining, or timber may still offer some protection.

Inflation-linked bonds tend to be less useful if the supply shock is seen as short term. The break-even rate is the bond market's implied forecast of inflation for the duration of the bond. Since inflation-linked bonds have maturities of 2-30 years, many investors may feel that inflation will revert to long-term averages over that period. We have already seen that in the current inflationary period, with break-even rates far below realized inflation. As a result, inflation-linked bonds have only been a modest hedge for nominal bonds in recent times.

While macro demand inflation can be forecasted to some degree, macro supply inflation cannot. In addition, the central banks have far less control over supply than demand, and can only impact supply by encouraging investment. This influence is indirect, and it often takes years for investment to translate into production.

But what really makes supply-driven inflation so challenging is the duration, which is often unknown. As we saw in Part 2, shortages can persist for some time. For example, after the end of World War II, it took years for the economy to shift away from military production and back to consumer goods and services. Such a retooling cannot happen overnight, especially if there is physical destruction from war or a weather event. It is also difficult to forecast whether an isolated event will turn into a larger issue. In the case of oil, the OPEC oil embargo of 1973 was ultimately a short-term phenomenon, but if actual war were to break out and much of the world's oil producing infrastructure were destroyed, we would have longer-term worries.

It is telling that long-term macro demand or supply inflation can be hedged with similar strategies. Both are related to price pressures in the real economy. The last type of inflation is very different in nature and requires a very different type of hedge.

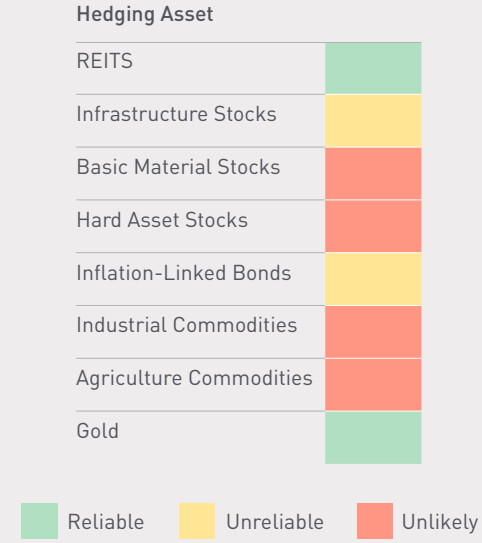
Monetary Inflation

Monetary inflation is when an increase in the money supply translates to an increase in prices in the real economy. Monetary inflation is the least frequent type of inflation, but the most feared and difficult to hedge, as Figure 03 shows. Most episodes of very high inflation have occurred when the money supply got out of control, sending inflation to very high levels. So the most famous examples of runaway hyper-inflation do have unpredictable growth in the money supply as their underlying cause.

While these events have imprinted on the global psyche, growth in the money supply must be accompanied by an increase in the velocity of money in order to create this type of inflation. Money velocity is approximated by the ratio of growth in money supply to growth in GDP. Basically, if the money supply is growing faster than GDP, you have too much money chasing too few goods, and prices rise.

Monetary inflation can also occur when a country experiences a traumatic shock, such as losing a war. If faith is lost in the government, then faith is also lost in the government's currency. When this happens, citizens require more of the currency for transactions, particularly paper currency, causing inflation. We can think of the extra currency required as a type of risk premium, reflecting the possibility that the government may not honor the currency's value. During these

FIGURE 03 - RELIABILITY OF HEDGING INFLATION: MONETARY INFLATION



periods, some countries will actually shift to another currency for transactions rather than their own. For example, Venezuela recently adopted Bitcoin as a currency to combat hyper-inflation, though they did tax Bitcoin transactions at 20%.

Monetary inflation is always a macro event. Hedging against monetary inflation is difficult, but not impossible. Since the currency is being devalued, hard assets have historically been the best inflation hedges. Most of these types of assets are illiquid, such as real estate. Gold is another option, and can be held in surrogate form through futures or ETFs. It is, in fact, during periods of monetary inflation that gold is an effective hedge. Why? Gold is considered immortal. It does not tarnish and lose its quality over time. That is why gold was used to back currency before the fiat currency revolution. Since monetary inflation is typically very high inflation, or even hyperinflation, gold is a common hedge.

One major issue with monetary inflation is that we can only confirm money supply growth as the cause after the fact since critical statistics (such as money supply and GDP) have data delays of up to 3 months in developed economies and longer in many emerging markets. So putting on a hedge for monetary inflation tactically is difficult. In addition, as we saw in Part 2, central banks have historically had a difficult time responding to monetary inflation. In the past, they have done so by raising interest rates dramatically, inducing a recession. The recession is more dangerous to most assets than the inflation itself. During the disinflationary part of this cycle, inflation-hedging assets, such as gold, can lose much or all of their gains, requiring a particularly nimble investment approach.

Having discussed these three distinct drivers of inflation, and the appropriate hedges for each, we can now turn our attention to building out a holistic investment strategy.

An Integrated Hedging Strategy

We have established that the optimal hedging strategy varies depending on the driver of inflation. Unfortunately, we live in a world of uncertainty. Diagnosing the cause of inflation is difficult, even in hindsight. Adding to the challenge, inflation can slowly evolve, but is often triggered by an unexpected shock to the system. In fact, many of the worst bouts of inflation in the past were started by exogenous shocks. And the end is just as uncertain as the beginning, since each inflationary episode we explored in Part 2 lasted longer than many expected. So timing inflation hedges can also be difficult, if not outright impossible in many cases.

Still, investors have options. We know which assets have the potential to be effective in different inflationary regimes. We have the building blocks. Now we just need to put them all together.

Step 1: Identify Each Asset's Effectiveness for Different Inflationary Types

We know we need to hedge the different inflationary drivers, and that different assets offer different hedging properties depending on the type of inflation. The first step to designing an optimal hedging strategy is synthesizing what we have learned so far. In the following matrix, the scale is: (1) a reliable hedge, (0.5) an unreliable hedge, and (0) an unlikely hedge:

TABLE 01: RELIABILITY OF HEDGING INFLATION BY TYPE

	Inflation Type		
Hedging Asset	Demand	Supply	Monetary
REITS	1	0	1
Infrastructure Stocks	1	0	0.5
Basic Material Stocks	1	0.5	0
Hard Asset Stocks	1	1	0
Inflation-Linked Bonds	1	0	0.5
Industrial Commodities	1	1	0
Agriculture Commodities	0.5	1	0
Gold	0.5	0.5	1

Source: First Quadrant, LLC

As we have learned, no one asset hedges all types of inflation. If you focus on only a subset of

assets, and those assets are not effective for the current inflationary type, you may not achieve the inflation-hedging characteristics you desire, or even experience a negative return. So, if there is uncertainty about the current inflationary driver, the most reasonable way for a multi-asset portfolio to position for inflation is to hedge all three types of inflation.

Step 2: Identify the Likelihood of Each Inflationary Type

The next step is to assess how likely each inflationary driver is in the current environment. But how do you actually go about doing this, when we have emphasized how hard it is to identify the true driver?

One approach would be to look at how frequently the different types of inflation have occurred in the past. Unfortunately, we do not have a long enough relevant history to do so in a precise manner. While it is true that we have inflation data going back hundreds of years, the current macro environment only goes back to the "Nixon Shock" of 1972, when the US went to a fiat currency format. Even since then, financial markets have changed dramatically. Many of the securities we take for granted, such as gold and oil futures or inflation-linked bonds, have only been around 40 years at best. So this is a situation that calls for a large amount of subjective judgment informed by theory.

We know that demand-driven inflation is the most common form, because its underlying cause is tied to the regular business cycle. Supply-driven inflation is usually tied to exogenous events and occurs less often as a result. Monetary inflation is rarer still in modern times, since we have a better understanding of its underlying causes and how to measure its occurrence, though we can only know that after the fact.

So, one subjective weighting scheme would be 60% demand, 30% supply and 10% monetary. For each asset in Table 01, we can create an aggregate score by multiplying the probability of each type of driver by its hedging score for that driver. REITs, for example, would have a weighted score of 0.7 (1 * 60% + 0 * 30% + 1 * 10%). If we apply those frequencies to the reliability weights in Table 01, we have the following scores and rankings:

TABLE 02: FREQUENCY-INFORMED INFLATION-HEDGING SCORES

Hedging Asset	Score
Hard Asset Stocks	0.90
Industrial Commodities	0.90
Basic Material Stocks	0.75
REITS	0.70
Infrastructure Stocks	0.65
Inflation-Linked Bonds	0.65
Agriculture Commodities	0.60
Gold	0.55

Source: First Quadrant, LLC

The results are fairly tightly clustered together. The rankings themselves are not that surprising. Hard asset stocks and industrial commodities are good hedges for the two most common drivers of inflation, demand and supply. The others fall in between. Gold has the lowest score, since its hedging capability is primarily tied to monetary inflation, though it does give some benefits in the other two states. But gold is the only asset in Table 01 that may give some benefit in all three states, so perhaps this method penalizes gold too much.

Another methodology would be to weight the list based upon how many types of inflation the asset hedges. In this case, they would all be equally weighted at two types, except gold, which would have a top score of 3.

In both cases, it's clear that unless the investor has a way of identifying the type of inflation that is being experienced, it is advantageous to prepare for all scenarios, holding all of the assets to some degree. The appropriate weights for a specific portfolio would depend upon the composition of the basic portfolio itself, as well as its benchmark. If the benchmark has no inflation-hedging

awareness, such as the traditional "balanced" portfolio of 60% stocks and 40% nominal bonds, then the weighting scheme depends upon the amount of active risk the investor can tolerate. If there is no benchmark, then the weight would subjectively depend upon the appropriate amount of inflation risk based on the investor's tolerance.

In a standard multi-asset growth portfolio, a 20% allocation to inflation-hedging exposures would be reasonable, though the composition of the inflation-hedging portfolio would depend upon the weights of the underlying assets. Inflation hedging can occur within asset classes, or it can be considered an asset class unto itself. Many "risk parity" portfolios take the latter approach.

Finally, this paper series has focused on strategic adjustments to an overall allocation scheme. However, it is possible that a talented active manager can adjust their portfolio to hedge the inflation, or that certain types of macro hedge funds will at least be uncorrelated to the dangers of inflation. Such approaches should also be considered.

The Current Environment

As of this writing (early 2022), we are facing exactly the type of uncertain inflation environment to which we have been alluding. Headline inflation is high across the globe, and it doesn't appear to be slowing anytime soon. The initial cause can be traced back to an exogenous shock, the COVID-19 pandemic. Manufacturing and shipping have been slowed due to shortages of labor tied to illness, but demand has remained high due to fiscal and monetary stimulus by governments. So consumers have money to spend, but the demand far outstrips the available supply.

We can hope that as the pandemic fades, the supply issues will resolve and inflation will return to more manageable levels. So far, though, the current environment has a strong resemblance to the 1947 post-World War II environment – strong demand and broad supply issues. On top of the existing supply disruptions, we now have the Russian-Ukrainian conflict, a new exogenous shock, which is further interfering with global production and distribution.

There is an important difference, though. In 1947, the US government did nothing. This time, central banks and governments implemented massive monetary and fiscal stimulus, causing the money supply to soar. As we have discussed, monetary inflation requires not just a growth in the money supply, but also an increase in the velocity of money to drive up prices. We have not seen this yet. In fact, it has been the opposite. The velocity of money collapsed after the pandemic and is currently at its lowest level since the Fed started measuring it in 1959. On the other hand, we only have GDP growth from the third quarter of 2021. So velocity may be high already, but we don't know it, meaning monetary inflation may be just around the corner.

All of these factors highlight that the driver of today's inflation may be any one of many causes, or perhaps even all of them. This period of extreme uncertainty reinforces our thesis that a thoughtful, integrated approach is needed to address the current inflationary environment.

Finally, as of this writing, inflation is still rising. But it is important to remember that many inflation-hedging assets do poorly during disinflation and deflationary environments, as we saw in Part 2. So while these assets can help hedge inflation, they can also be a drag on the portfolio when inflation is not a concern. Even during high inflation episodes, such as the monetary inflation of the late 1970s, we saw that many inflation-hedging assets did very poorly as inflation subsided, even though headline inflation was still high. So adjusting the hedging assets would be desirable as the inflationary environment again begins to shift. A method for doing so will be the subject of a later paper.

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