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6 November 2012

Online at <https://mpra.ub.uni-muenchen.de/46488/>

MPRA Paper No. 46488, posted 23 Apr 2013 13:20 UTC

Alternative Inflation Hedging Portfolio Strategies: Going Forward under Immoderate Macroeconomics

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First Version: 06/11/2012

Forthcoming in *Alternative Investment Analyst Review - CAIA
2013, (Summer/Fall Issue)*

Abstract

Gone are the days when inflation fears had receded under years of “*Great Moderation*” in macroeconomics. The US subprime financial crisis, the ensuing “*Great Recession*” and the sovereign debt scares that spread throughout much of the industrialized world brought about a new order characterized by higher inflation volatility, severe commodity price shocks and uncertainty over sovereign bond creditworthiness to name just a few. All of which tend to put in jeopardy both conventional inflation protected strategies and nominal unhedged ones: from reduced issues of linkers to negative long-term real rates, they call into question the viability of current strategies. This paper investigates those game changing events and their asset liability management consequences for retail and institutional investors. Three alternative ways to achieve real value protection are proposed.

Keywords: Inflation Hedging, Portfolio Allocation, Alternative Investment, Commodities, Real Rates, Core Inflation, Global Macro, Inflation Pass-through, Strategic Allocation, Portfolio Insurance, Great Recession.

JEL classification: C58, E3, E4, F01, G1, G2, N20, Q02

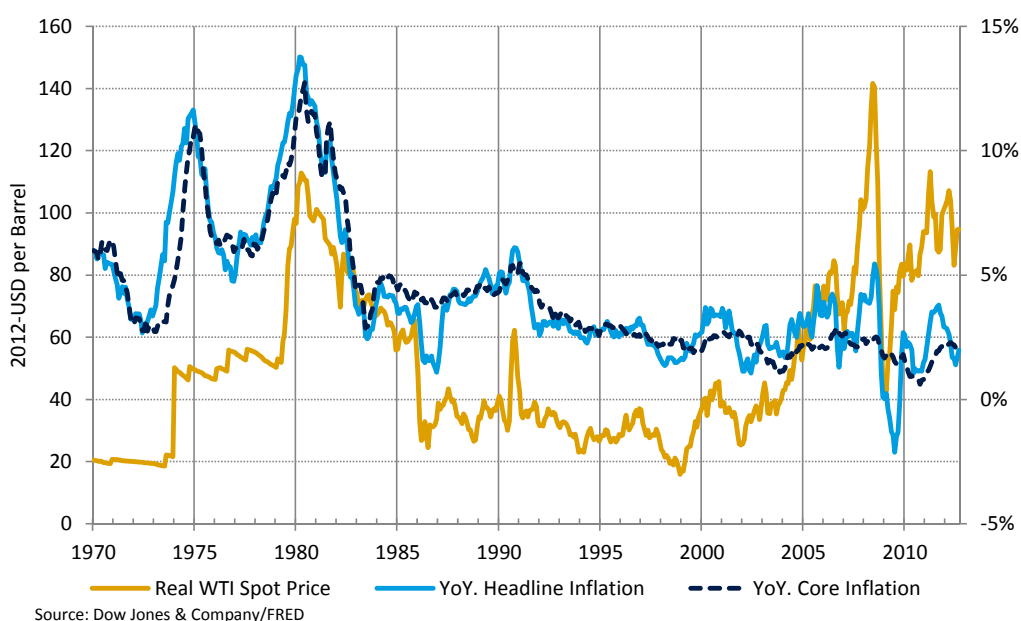
¹ This document presents the ideas and the views of the author only and does not reflect Amundi’s opinion in any way. It does not constitute investment advice and is for information purposes only.

The drivers of inflation hedging

Inflation hedgers worldwide can be divided between those that are compelled by law or contract to do so and those who choose to do so as an investment strategy: in the first category we will find institutional investors such as British pension funds, which have to offer pensioners a guaranteed real value for their retirements, and, in the second category, we will find their American peers which choose to offer real return targets to their investors. As economic realities cannot be written in black and white, we will find a swarm of investors in the middle ground which are somewhat driven by imperative and partly driven by strategy: this last category includes French retail banks hedging their inflation-linked retail savings products or insurers which offer policies that, by law, are guaranteeing real values. As both of these are exposed to short-run inflation liabilities, they have the option not to fully hedge this inflation and therefore keep the risk on their books. This combination of imperative and strategic decisions has generated a massive influx of money into inflation hedging assets which could be defined as “*too many dollars chasing too few [securities]*”. This steady increase in the demand for inflation hedging assets as inflation remains muted overall begs for an answer.

As Volcker’s monetary tightening drive in the late seventies took its toll on the rampant inflationary pressures in the US economy, the “*Great Inflation*” era seemed to have come to a close (Meltzer, 2005). But as investors were ushered into a new era of receding inflation and overall macroeconomic stabilization, the days of cheap oil were numbered: emerging economies were showing signs of economic take-off.

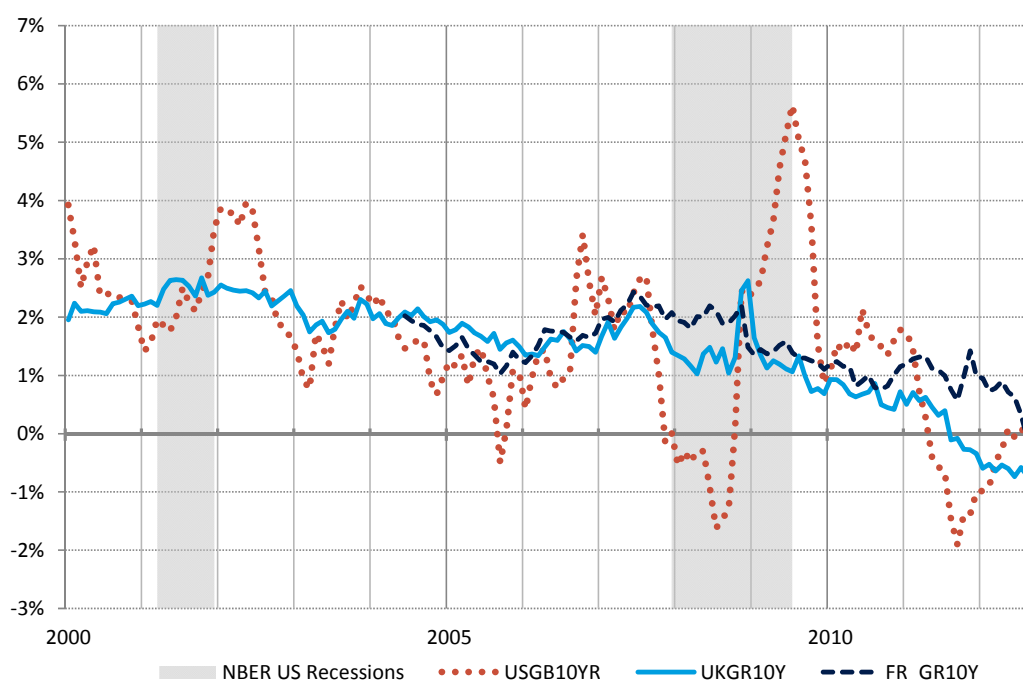
Exhibit 1: Crude oil and inflation over forty years in the US



As those countries transformed their economies and caught-up with more advanced ones, so did their oil consumption. Depressed oil prices in the decades following the oil shocks

(Mabro, 1987) as a result of both economic difficulties (Hamilton, 2011) and large offshore discoveries in the eighties led to a dramatic underinvestment in oil production whose consequences would only be felt at the end of the noughties: an ever rising demand became no match for the growth in production. As the financial cataclysm hit the world's most advanced economies, crude oil prices returned to a high and volatile state, driving inflation upward in most countries and threatening to annihilate any timid sign of economic recovery. Throughout this period, the very nature of inflation drivers had changed as headline inflation indices faced a roller-coaster ride of a very different nature from the one experienced in the seventies (Blanchard & Gali, 2007): core inflation was now flat for every advanced economy (van den Noord & André, 2007) and (Clark & Terry, 2010).

Exhibit 2: Real sovereign 10 year yields for France, the UK and the US



Source: Datastream / Bloomberg / FRED

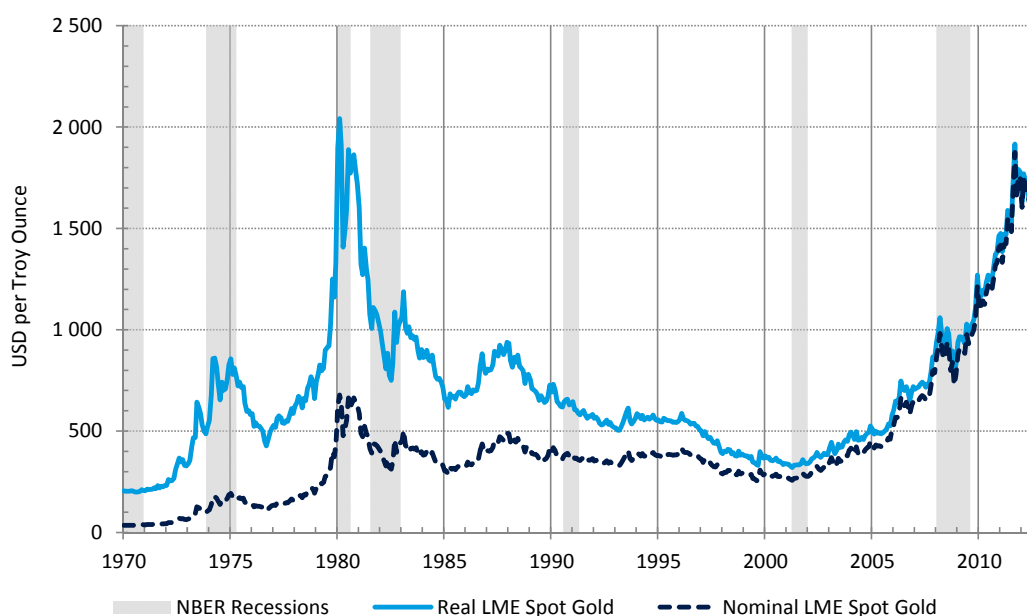
The subprime crisis and the ensuing “*Great Recession*” (Farmer, 2011) have had a lasting impact in the form of depressed economic activity and non-existent wage increases contemporaneously with inflation creeping upward (Levanon, Chen, & Cheng, 2012). While the effects of the non-conventional monetary policies implemented in the wake of the financial crises have not yet shown any clear signs in terms of inflationary activity, negative long-term real rates became a pressing reality for asset liability managers: the dangers posed by ever growing unhedged inflation liabilities seem all the more acute as constantly increasing flows of investors spooked by the surge in inflation and the financial market crash sought inflation protection. There are few reasons for this demand to abate as the populations in advanced economies age while seemingly being unable to reform their increasingly fragile redistributive pension systems, the consequences of which will most probably be an increase in the demand for private pension schemes, which have embedded purchasing power guarantees, synonymous of inflation protection (Zhang, Korn, & Ewald, 2007). As the

prospect of stable and moderate inflation fades, with it vanishes the underpinning of inflation-linked bond issues by sovereign states. As the macroeconomic paradigm shifts and the future of the primary inflation-linked market is challenged, the time to rethink inflation hedging has come.

The conventional portfolio allocation to hedge inflation

Gold has remained largely synonymous with inflation protection for centuries if not millennia. Wars, empires, industrial revolutions, gold standard, stock market and real estate bubbles and crashes came and went but the magic of gold remained largely intact. Unsurprisingly therefore, time passed without burnishing the real value of the yellow metal which to this day maintains its position as the grail of real value (Dempster & Artigas, 2010). But gold itself is not immune to boom and bust phenomena. Even though gold's very long-term inflation hedging properties are undeniable, its propensity to attract feverish investor confidence, especially in time of economic turmoil, makes it a highly unsuitable asset to hedge inflation when it comes to accounting or as a guarantee of purchasing power. While gold remained the asset of choice for state coffers then central banks with infinite horizon, the same logic cannot apply to individual investors as J.M. Keynes famously remarked: "*In the long run we are all dead*". Through one's lifetime, the value of gold will have gone up or down and will take years if not decades before a correction occurs, which is most likely substantially longer than our desired investment horizon.

Exhibit 3: Real and nominal gold prices over fifty years.

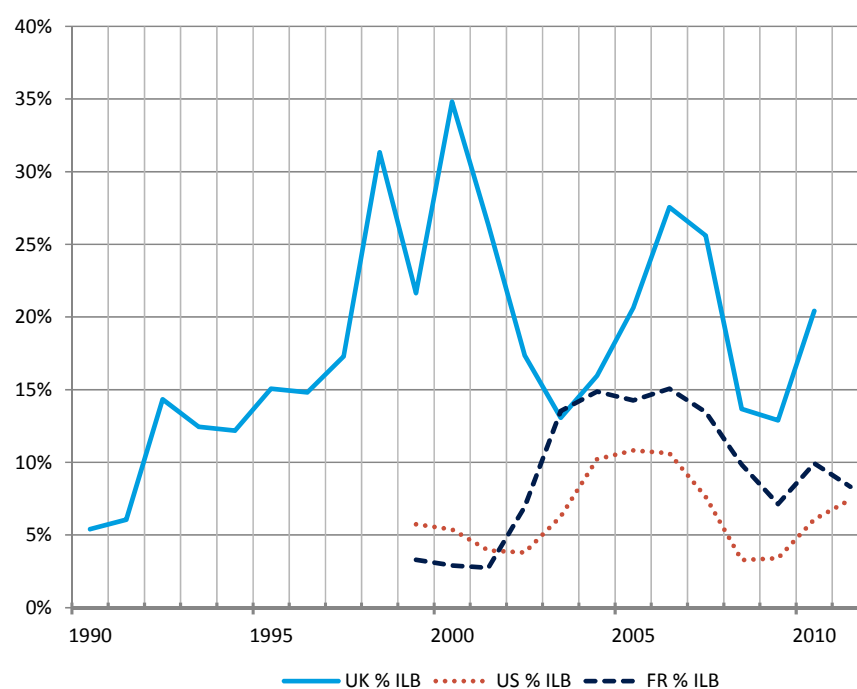


Source: Datastream/FRED

Hardly a week goes by without an article on a new inflation hedging asset class or a new allocation technique. But in truth, there is no more a magic inflation hedging allocation

than there is a silver bullet: inflation is solely linked to explicitly inflation-linked securities such as linked bonds or swaps. All other asset classes have only time-varying hedging capabilities and therefore offer limited protection (Attié & Roache, 2009). Linked bonds have accordingly become the core of inflation hedging literature and make up the bulk of inflation hedged portfolios today (Bodie Z. , 1988). Yet, this one and only solution remains unsatisfactory for many investors: linked bonds are available in limited supply and accordingly suffer from low returns and less than optimal liquidity and depth compared to their nominal equivalents (D'Amico, Kim, & Wei, 2008). This is partly due to the fact that more than thirty years after their introduction in the United Kingdom, the issuance of private linked bonds has remained largely marginal and therefore confined to a few sovereign or quasi-sovereign issuers (Garcia & Van Rixtel, 2007). The problem has become all the more acute as the current sovereign crisis has raised credible questions on the opportunity for sovereign issuers to stick to their real issue policy in the face of rising costs as inflation crept up and long-term real rates, which have turned negative, have become the norm for many large nominal sovereign issuers.

Exhibit 4: The share of linkers in sovereign issues for France, the UK and the US



Source: UK-DMO / FR-AFT / US-Treasury

As good times bring on bad habits, the “*Great Moderation*” era (Stock & Watson, 2003) of the decades preceding the subprime crises was no exception. This period witnessed an exceptional context of low and stable inflation which progressively relaxed the inflationary fears of the seventies and smothered memories of the high and volatile inflation which had characterized it. Rising inflation volatility at the turn of the last decade brought back those fears believed to be long lost and resulted in a new wave of interest in inflation protection. But the most pernicious effect of this new context was yet to come as nominal rates went

down contemporaneously with inflation shooting up: purely nominal un-hedged strategies started to backfire dangerously and required a profound rethink of their use. Moreover, as central banks all over the OECD countries started to implement unconventional monetary tools and expand their balance sheets, there were fears that the problem could only get worse as *quantitative easing* and *Twists* become household names (Baumeister & Benati, 2010). This new investment climate motivated researchers to move into a new era of alternative hedging strategies that would neither be linker based nor dependent on a macroeconomic moderation hypothesis that had shown its limits.

Moving away from linkers with portfolio inflation insurance

One of the most enduring testimonies of the financial meltdown brought about by the subprime mortgage crisis in the US can be found in the elevated level of risk aversion worldwide (Caceres, Guzzo, & Segoviano Basurto, 2010). The ensuing European sovereign crisis only fueled an additional flight to quality syndrome which had gripped investors fleeing the hazardous combination of an equity bear market of historic proportions and the first significant spikes in headline inflation for at least two decades. The combination of both of these factors resulted in increased demand for at least inflation protected investments, if not theoretically nominal and real risk-free products, namely investment grade linkers. But the rise in the demand for them was not to be matched by an equivalent rise in their issuance as sovereign treasuries were themselves battling with rising financing costs precisely as a result of this inflation linkage. The very *raison d'être* of linkers had backfired badly as they turned out to be more expensive to issue than their nominal counterparts in times of rising inflation. This inevitably leads to the return of the question that had plagued inflation protection research in its nascent phase: the availability problem of linkers.

Considering the overwhelming *debt overhang* problem which looms over most sovereign issuers from industrialized countries, it is becoming increasingly clear that inflation will eventually be the last available weapon left in the state's arsenal to fight bulging balance-sheets. Resorbing debt through monetary erosion will probably lead to a revision of sovereign issue policies which could in turn lead to some reduction in the share of linkers in new issues if not an outright reduction in their output. By the look of issues in the last couple of years, this policy shifting is in fact probably already underway. Yet, the foreseeable scarcity of new inflation-linked bonds could be bypassed if we were capable of replicating linkers with purely nominal assets which would also have inflation hedging capacities (Brennan & Xia, 2002). There is a large body of literature *on natural inflation hedging assets* (Amenc, Martellini, & Ziemann, 2009) such as commodities or listed real estate (REITs) which delves into their potential resilience to both expected and unexpected inflation shocks and their ex-ante optimal allocation in inflation hedging portfolios. But none of these alternative asset classes has a guaranteed value at maturity or even a real (and nominal) floor like linkers do. Moreover, as most of the demand for inflation hedging assets comes from asset-liability-management desks, it adds another layer of complexity as they require not only a real floor

but also a certain level of real return to match part of their funding costs. Clearly, not all of these requirements can be met simultaneously, but a mitigation approach can be found in the application of portfolio insurance (Leland, 1980) to our problem.

This asset management classic from the seventies is transposed into real asset protection in the form of the *Dynamic Inflation Hedging Trading Strategy* (DIHTS) derived from *Constant Proportion Portfolio Insurance* (CPPI). This new framework developed in (Fulli-Lemaire, A Dynamic Inflation Hedging Trading Strategy, 2012) envisages the inclusion of strong real return yielding assets with high volatility ones like Equities, Commodities and REITs to hedge a fundamentally low inflation volatility risk. It enables the real upside of these alternative assets to be captured, while significantly limiting the downside risk. The intrinsic limit of this strategy would be the persistence of negative long-term real rates which impede the inception of the strategy. This is unfortunately the case in the current investment environment, in which the combination of low nominal rates as a result of non-conventional monetary policies, coupled with temporarily higher than officially targeted inflation, are yielding negative real rates until very long maturities. This approach has been extended by (Graf, Haertel, Kling, & Ruß, 2012) in their optimal product design under inflation risk for financial planning.

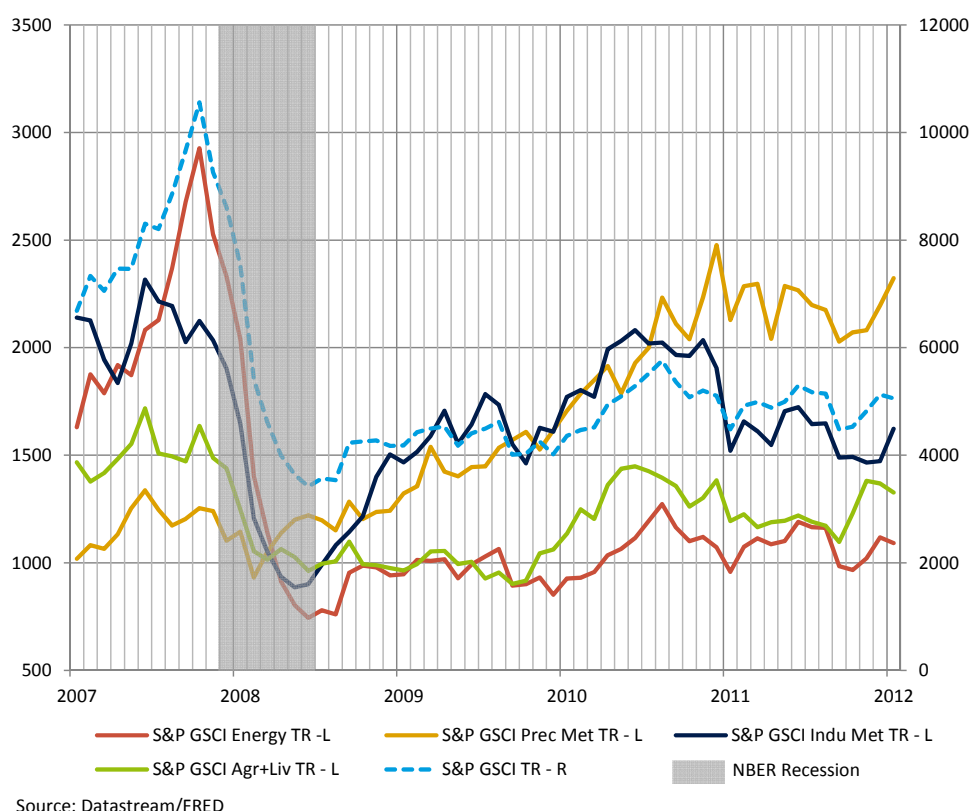
A global macro approach to allocate commodities

The decade long commodity bull-run which came to a close in the summer of 2008 had seen crude oil prices breach the psychological barrier of one hundred dollars a barrel for the first time in current value since the two oil shocks of the seventies (Baffes & Haniotis, 2010). The ensuing “*Great Recession*” brought an abrupt end to a decade which witnessed the rise of emerging countries, whose growing commodity consumption had spurred their prices to reached unprecedented peace-time levels. Commodities had become known as the inflation hedging crisis-robust alternative investment class of choice. By 2012, more than 400 billion dollars of commodities had found their way into investors’ portfolios, a more than tenfold increase in a decade according to a Barclays commodity survey (Barclays Capital, 2012). Their appeal only momentarily waned as losses on commodity investments mounted during the recession-induced global fall in demand and lost their luster as the investment class which had withstood the first part of the financial crisis unscathed. Contrarian’s triumph was short lived as a combination of government intervention to support growth in emerging countries, persistent geopolitical tensions throughout the Middle East and resurging concerns on the timing of *peak oil* rapidly hit back at the bear run and promptly sent the Brent benchmark crude index hovering back above \$100 a barrel. As recession gripped Europe and slowing growth worldwide took their toll on industrial metals, demand for agricultural commodities climbed as droughts, floods, and conflicts damaged crops and stocks. As in all turbulent times, demand for precious metals soared.

The underlying motive behind commodities’ pivotal role in inflation protected portfolio allocations, apart from their obvious high risk-high reward profile, begs for an answer which

is to be found in the nature of the relationship between investable asset classes and inflation. When it comes to inflation linkage, they can be separated into inflation-driving and inflation-driven ones. On the one hand, as commodity price changes feed directly into inflation and, conversely, cash rate hikes counteract it when they are used as monetary policy tools, they both naturally qualify as inflation drivers. On the other hand, since bond investment dwindles under rising inflation or, inversely, real estate investments should go up as rents adjust to inflation, it firmly anchors them in the inflation-driven side of our categorization of investment classes. It is worth noting that equities also mostly behave as inflation-driven assets even if its impact seems particularly investment-horizon dependent: as they are stores of relative value, which entitles their holders to the share of a real assets' cash flows, they should be inflation neutral at the long end as nominal cash flows gradually adjust to inflation over time, but should be negatively impacted in the short run until the inflation adjustment takes place.

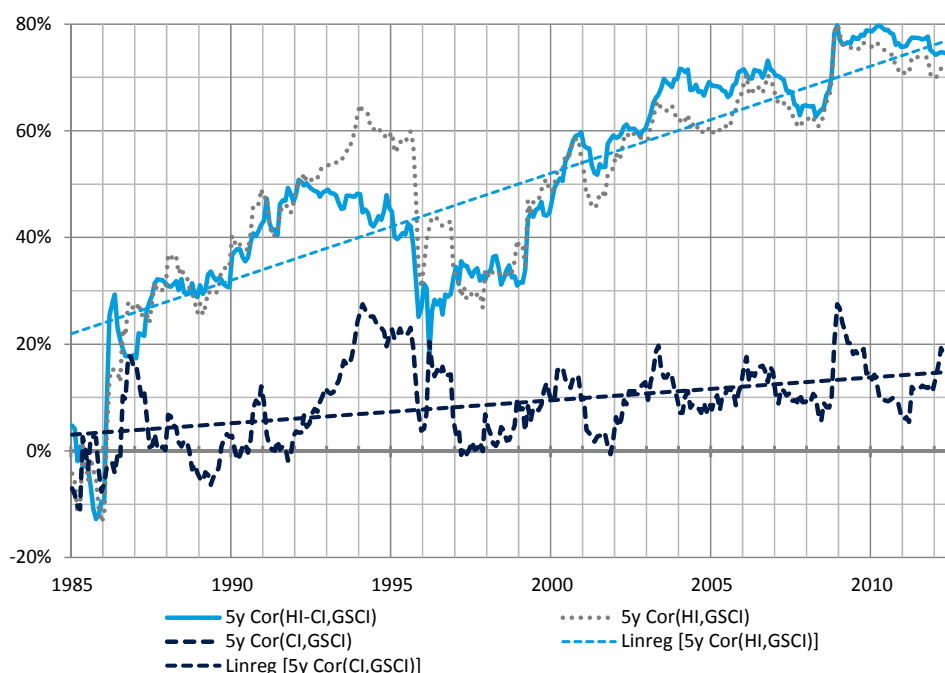
Exhibit 5: Commodities before and after the *Great Recession*



From a portfolio protection point of view, investing in inflation-driving assets seems the prudent choice as they should perform better at hedging inflation risk in both the short and the long end, therefore providing investors with an inflation-protected liquidity option on their investment at any time. Commodities thus arose as the potentially lucrative real-return yielding alternative asset class even if their price variations are significantly more volatile than those of the liability benchmark they are intended to outperform (Bodie Z. , 1983). In this context, are current allocation techniques performing satisfactorily or should we endeavor to

find a radically new approach that would take into account the inflation driving factor? (Fulli-Lemaire, An Inflation Hedging Strategy with Commodities: A Core Driven Global Macro, 2013) goes down this path in applying advances in macroeconomics to achieve an efficient allocation.

Exhibit 6: The evolving correlation between commodities and inflation in the US



Source: Datastream

As commodity prices rose, economic agents' perception of their impact on inflation seems to have amplified. Indeed, their increasing influence on the Consumer Price Index (CPI), a proxy measure for headline inflation, has been extensively documented by econometricians and macroeconomists in the last two decades (Blanchard & Gali, 2007). It appears that around the mid-nineties a macroeconomic paradigm shifting began to unfold in the following way: while the pass-through of exogenous commodity price shocks into headline inflation increased by a half, the equivalent pass-through into core inflation seems to have ceased. While these results should have profound implications for liability-driven commodity investors, there is still a clear gap in the literature on this subject as no one seems to have exposed the financial implications in terms of allocation technique those economists have paved the way for. This is especially true of the link between investable commodities and inflation liabilities: we therefore proceed toward our macro-driven allocation by first evidencing a link between the headline to core inflation spread and tradable commodities. We subsequently intend to exploit this link in three ways: Firstly by devising an efficient strategic allocation using core inflation forecasts to determine the commodities' natural weight in the portfolio as dictated by our macro approach. Secondly by testing a tactical allocation strategy which would time the inflation pass-through cycle to dynamically determine the optimal share of commodities in the allocation. And finally by proposing a strategy to arbitrage core inflation-linked derivatives by cross-replicating them with commodity portfolios. In light of

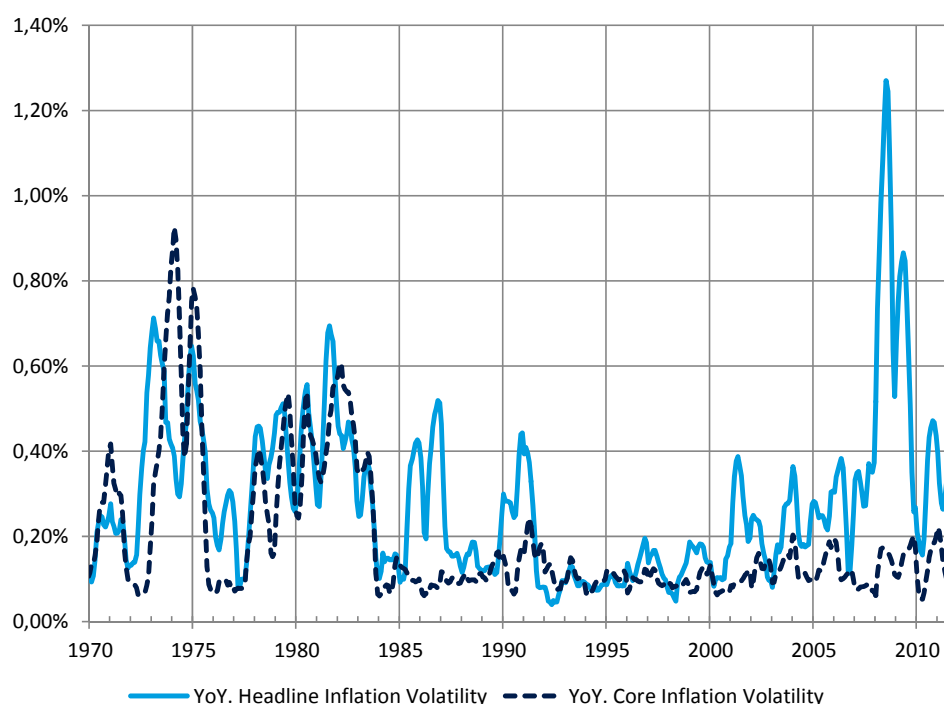
those results, one could still wonder whether headline indexation is suitable for all investors since its mean reverts to core inflation in the medium term. Should some investors opt for a reference swap for their liabilities?

Swapping Headline for Core Inflation

Longer-term investors exposed to inflation during the financial crisis probably felt stuck between anvil and hammer as in the short run, surging commodity prices pushed their inflation-linked liabilities higher while their assets dwindled in mark-to-market as a result of falling equity and other alternative fair values. Meanwhile, persistently low nominal rates and even negative real rates threatened the stability of their balance sheet in the longer run. To a certain degree, this asset-liability gap could be closed with the alternative inflation hedging techniques previously exposed. Yet, deviating from the most plain vanilla assets to embark on the world of either structured solutions as proposed in (Fulli-Lemaire, A Dynamic Inflation Hedging Trading Strategy, 2012) or through a refined use of alternative asset classes as in (Fulli-Lemaire, An Inflation Hedging Strategy with Commodities: A Core Driven Global Macro, 2013) is certainly not risk-free even though it offers a certain degree of risk mitigation. Be it in the portfolio insurance scheme or the pass-through partial hedging technique, both of these solutions incorporate an increased reliance on risky asset classes such as commodities which can at times experience brutal swings in value. The rollercoaster ride that commodity investors have gone through in the last decade is particularly enlightening on the dangers of such endeavors. Considering the macroeconomic paradigm shift exposed in the second chapter, and in particular the muted response of core inflation to exogenous commodity price shocks and the mean reversal of headline to core inflation yielding a lower relative volatility for the latter, it raises the question of whether we should invest in headline inflation-linked investments at all. That is obviously only the case if we can bear to hold our investment for a sufficiently long period of time for the pass-through cycle to operate fully.

In other words, not all inflation hedgers should be treated equals as long-term players with investment horizons that extend beyond that of the expected duration of the mean-reverting process should choose to target core inflation despite their headline inflation liabilities. The pass-through cycle rarely exceeds five years and seems to have even been shortened in the last decade compared to the average duration of pension funds' investment horizons which can extend to several decades. This liability duration criteria therefore draws a wedge between long-term and short-term inflation hedgers as the former should seek core inflation protection while the latter should strive to obtain a headline inflation hedge. The obvious pitfall of this methodology is that to this date, no core inflation-linked asset exists. Deutsche Bank (Li & Zeng, 2012) recently announced the launch of an investable proxy for core inflation which paves the way for an outright core-linked market which would be the equivalent of the headline-linked market that materialized at the turn of the last century in the US, a little over a decade after its British counterpart appeared.

Exhibit 7: The volatility spread between headline and core inflation in the US.



Source: FRED

To make-up for the lack of an investable asset, we could go forward by imagining a core versus headline inflation swap that would see long-term players receive a fixed rate for the spread between headline and core inflation and short-term players be on the other end of the trade (Fulli-Lemaire & Palidda, *Swapping Headline for Core Inflation: An Asset Liability Management Approach*, 2012). Long-term players would most obviously have to roll swaps in order to have a continuous cover which maturity cannot extend beyond the one of short-term players. Since core inflation is particularly sluggish over short horizons, we are particularly focusing on the strategy that would see long-term players invest in linkers whereas short-term players would invest in nominal bonds and both parties would engage on opposite sides of the inflation spread fixed-for-float rate swap. Long-term players would obtain a real rate and a core floor plus a fixed risk premium while short-term players would achieve a nominal return minus a fixed rate and a volatile-inflation-part hedge. They would still remain at risk on the core inflation part which looks like a reasonable risk for short to medium maturities but should benefit from much higher real returns as a result of this accepted risk. This approach would offer both a synthetic core-linked asset for long-term hedgers and offer enhanced returns for short-term hedgers. Their demand for inflation hedges is currently severely curtailed by extremely low real rates at the maturity they could invest in. In essence, it yields an intermediated commodity investment for short-term players which would boost their return on a risk-adjusted basis. The second additional benefit of this new derivative would be the onset of a market curve for core inflation that could be derived from the trading of these swaps and enable easy mark-to-market valuation of other core-linked securities in balance sheets, therefore also easing the way for future issuances of truly core-linked assets in the primary market. The last hurdle these products would face is the potential

disequilibria between the potential demand from long-term and short-term players, the former probably massively outweighing the latter. Any supply and demand market disequilibrium between long-term sellers of headline inflation and short-term sellers of core inflation could be matched by the intermediation of market makers which could price the derivative based on the cross hedging potential of commodities since we have also showed in (Fulli-Lemaire, An Inflation Hedging Strategy with Commodities: A Core Driven Global Macro, 2013) that the inflation spread is highly co-integrated with commodity indices.

Conclusion

As the “*perfect financial storm*” (Blanchard O. , 2009) receded, its aftermath revealed a profoundly changed macroeconomic landscape to which investors have yet to adapt. The risk managers of institutional investors are not exempt as the nature of both their assets and their liabilities have been profoundly altered by those events: the liability side of their balance sheet suddenly appeared more dangerous as the inflation risk surged while their asset side dwindled as a result of dismal market performances and dangerously low real rates. Those joint forces jeopardize their long-term stability and thereby threaten their very existence. This year witnessed pension funds in the UK going under as they were in a stranglehold over the asset-liability gap. It is then high time we rethink inflation hedging before we find ourselves “*stuck between a rock and a hard place*” and this paper provides three possible ways:

The first alternative proposed here consists in adapting current structured solutions in the form of portfolio insurance to provide additional cover for the inflation risk. The (Fulli-Lemaire, A Dynamic Inflation Hedging Trading Strategy, 2012) offers a way of completely relaxing our dependency on linkers. Though its deployment is currently curtailed by the extremely low if not negative real rates currently prevailing throughout industrialized countries left in the investment grade club as a result of the flight to quality phenomenon currently gripping fixed-income markets. A make-up solution could be found in a partial relaxation of the dependency on linkers by devising a CPPI based on real bonds, thereby offering enhanced real returns with an inflation floor as in the iCPPI of (Graf, Haertel, Kling, & Ruß, 2012). This hybrid class of structured products would not be constrained by the level of real rates and would reduce the share of linkers as compared to the current fully hedged portfolio strategies. It would ideally complement the DIHTS when market conditions hinder its inception.

The second alternative explored here aims at exploiting current advances in macroeconomic to allocate commodities in inflation protected portfolios. As the impact of commodities on headline inflation increased while its linkage with core inflation seem to have disappearance altogether in the early nineties, it generates opportunities for strategically optimizing our commodity investments depending on the pass-through cycle of headline inflation mean reverting to its core anchor as espoused by (Fulli-Lemaire, An Inflation Hedging Strategy with Commodities: A Core Driven Global Macro, 2013).

The third and last alternative proposed here consists in drawing a wedge between long-term and short-term inflation hedgers in order to differentiate their optimal hedging investment between headline and core linked assets. Following the premises of a core-linked inflation market born out of the issuance of the first investable US core inflation proxy by Deutsche-Bank (Li & Zeng, 2012), (Fulli-Lemaire & Palidda, Swapping Headline for Core Inflation: An Asset Liability Management Approach, 2012) propose a swap to optimally transfer the reference mismatch between our two classes of investors. It would be a make-up solution for the lack of outright core-linked assets for long-term investors and a way to enhance the real return of short-term investors at the same time. Were such core-linked markets to develop, we would have to rewrite the current asset liability management practices to reflect this shift. We could in particular envisage shifting long-term liabilities such as pension contracts towards a core benchmark since a regime change would at worst bring core inflation back more closely in line with its headline counterpart as it was previously.

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