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Inverted Asymmetry - Gold Price Outlook

Using our proprietary *real rate, energy proof of value*- model as a guide, we find that, despite an already impressive year to date performance: 1) the USD gold price has less downside risk from current levels than commonly perceived, with skewed upside risk; 2) market participants often wrongly analyze gold as a 'flow commodity' and appear overly focused on central bank guidance of nominal rate paths – just one of three important metrics – and therefore still misunderstand the key drivers of this ongoing "money stock" rerating; 3) given current inflation and real interest rate expectations, data and policy surprises present much more upside than downside risk for gold from current levels; and 4) for gold to fall back below $1,100/toz again, the market would need a somewhat paradoxical environment of collapsing energy prices yet rising inflation, with the FED hiking interest rates.

In our view, a broad misunderstanding or miscategorization of gold as a flow commodity often leads market participants to hold a flat-to-downward bias for the gold price outlook. In this semi-annual outlook report, we present a hypothesis to explain this bias; we apply our unique price framework to explain price cycle inflection points in support of our alternative thesis; and we analyze

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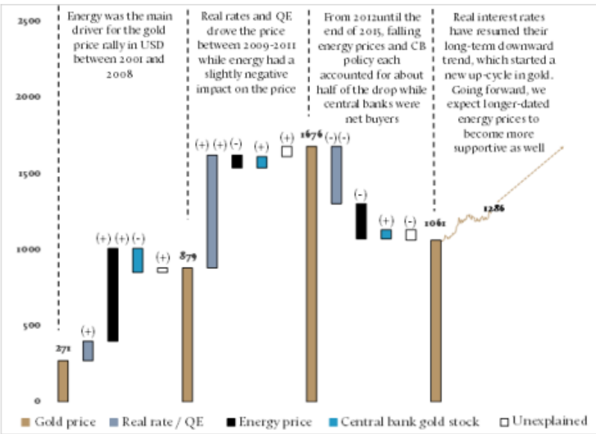
the real upside and downside risks when viewing gold as an alternative money stock rather than as a flow commodity. Ultimately, we believe that the market is still in the midst of an ongoing rerating of gold vs fiat currencies in this age of extraordinary monetary experiments, and that it will become increasingly clear that objective data are becoming detached from the reflexive manipulative-function of central bank forward guidance.

In this environment, gold should be owned and accumulated. In our view, too many investors have been waiting all year for a '$100' pull back and better entry point, but, in this context, nearly every surprise or shock bringing new information to the market presents a downside risk for fiat currencies relative to gold, especially at the zero-bound where the nominal cost of carrying currency risk is higher than the carry for gold. However, despite our confidence from the underlying data, a biased consensus outlook still projects downside asymmetry as we approach the elusive point of FED rate normalization. The objective reality is that this asymmetry is inverted, where there is little downside price risk relative to significant upside. In upcoming reports, we will dive further into the outlook for key variables, including interest rates, inflation expectations, and forward energy prices; however, in this report, we simply present a two-way sensitivity model to show the asymmetry of price risk from current levels.

Exhibit 1: Contribution of each model driver to changes in gold prices since 2001
USD/ozt



Source: Bloomberg, NYMEX, University of Michigan, St. Louis FED, Goldmoney Research

Table 1: Gold sensitivity to long term energy price equilibriums
USD/bbl (vertical), % (horizontal)

Long-dated oil price $/bbl	Real interest rates %								
	1.50	1.00	0.50	0.00	-0.50	-1.00	-1.50	-2.00	-2.50
95	1416	1460	1504	1548	1592	1636	1680	1724	1768
90	1388	1432	1476	1520	1564	1608	1652	1696	1740
85	1360	1404	1448	1492	1536	1580	1624	1668	1712
80	1330	1374	1418	1462	1506	1550	1594	1639	1683
75	1300	1344	1388	1432	1476	1520	1564	1608	1652
70	1269	1313	1357	1401	1445	1489	1533	1577	1621
65	1237	1281	1325	1369	1413	1457	1501	1545	1589
60	1204	1248	1292	1336	1380	1424	1468	1512	1556
55	1169	1213	1257	1301	1345	1389	1433	1477	1521
50	1133	1177	1221	1265	1309	1353	1397	1441	1485
45	1094	1138	1182	1226	1270	1314	1358	1402	1446
40	1053	1097	1141	1185	1229	1273	1317	1361	1405
35	1009	1053	1097	1141	1185	1229	1273	1317	1361

Source: Bloomberg, NYMEX, University of Michigan, St. Louis FED, Goldmoney Research

Inverted Asymmetry: Upside price risk for gold as a money 'stock' is driven by the downside risk in the value of fiat currency; expectations for lower year-over-year gold 'flow' are nearly irrelevant to prices

Market participants often describe the supply and demand outlook for gold as they would for oil or grains, or flow commodities. And with their marginal demand framework, it may appear that a fall in near-term demand for this 'speculative commodity' presents a limitless floor to prices. Or as one trader put it, "gold has a big door in and little door out when fearful investors and gold bugs are the primary demand for this speculative asset [a 'useless commodity' without income or yield], and there is always infinite ETF supply to be dumped onto markets when demand turns and the market goes 'no bid'". And it's no surprise, having worked as senior commodity analysts at a bulge-bracket Wall Street institution, that this is exactly how the big Wall Street banks and the mainstream financial media therefore analyze and report on the gold price outlook.

This perception is emboldened as gold is relegated to the commodity desks, to be analyzed for year over year changes in supply and (gold bug driven) demand flow, further reinforcing the perception of a perpetual 'no bid' risk and unlimited inventories against expanding supply. This is the perceived asymmetry of gold having unlimited downside and an irrational and uncertain upside, driven only by fear or greed, chasing prices higher as a bubble asset or 'Giffen Good' (for which higher prices create more demand).

We believe this consensus analytical framework is wrong and largely irrelevant and can be falsified by both data and logic. Instead, it is our view that the approximately $8 trillion dollars-worth of global gold inventory is actually being valued and demanded by its holders as an alternative yet permanent money stock with potential advantages to fiat currency-based savings depending on the outlook for real yields in one's base saving currency. Gold is simply a liquid real-asset with no time decay, no real cost of carry and no counter-party risk, yet it is scarce, has great elemental utility and an energy-intensive replacement cost.

So what if the greater value-volatility in the market price lies in the debt-based measuring systems sitting in the denominator, the far from permanent or standard units of fiat currency value? In our view, this is the major flaw in the consensus analysis of gold, the bias to project fiat currency as a universal, stable, and standard measurement against the uncertain animal spirits of gold commodity demand. This false starting point is also the primary reason that the Wall Street sell-side analyst consensus has missed basically every major price inflection point of the past decade. It is this misunderstanding and misreporting of gold as a short term flow commodity like oil or grains (useful for consumption, but high cost of storage and carry, so not a store of value like gold) leads consensus to perpetually describe gold as either 'about fairly priced', or headed down on an uncertain demand outlook.

Outlook: Risk Asymmetry

Using our *energy proof of value*, 'money stock' framework to model prices (see Gold Price Framework Vol. 1) we review the divers of the dramatic swings and cycles of the past decade and a half; 2) assess the spectacular move in gold prices year to date; and 3) we identify further price risks moving forward. Contrary to the prevailing bias that gold is 'fairly valued' with short-term risks to the downside on the resumption of rate hikes (this same outlook was nearly unanimous nine months ago and has been proven spectacularly wrong), we believe that gold's price risk asymmetry is inverted from the consensus view, with much greater upside risk than downside.

While we are not in the camp that believes current prices are significantly 'wrong', and surprises to our own outlook would of course rationally drive prices lower (or currency higher), but we do believe that, like the central bankers with their underperforming models, many market participants are playing off the wrong playbook. Our view is that there are more market reassessments lurking to drive fiat currency (real rates) lower rather than higher, and we believe that anyone looking to preserve future wealth and purchasing power in a central-bank distorted 'market' should stop waiting for opportunistic entry points and start accumulating gold in a more consistent, stable, and regular manner.

A time for focus in gold and currency markets

While we do not forecast prices – we view gold as a core savings asset to be accumulated with income over time, regardless of exogenous currency fluctuations – it is important to analyze price drivers within a relative value framework. We will examine the cyclical and secular trends impacting our gold-currency framework in later sections, modeling different potential outcomes, but we summarize our view on the current trends as follows:

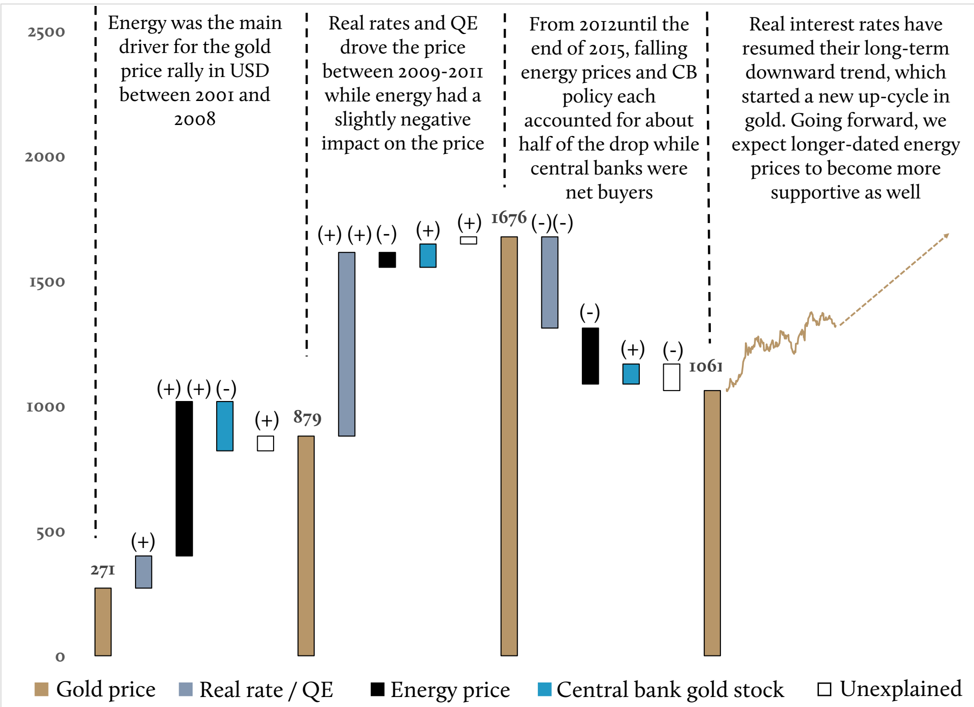
- The market remains overly focused on Central Bank forward guidance and nominal interest rate decisions which, in our view, are only one-third of the story. While this focus cannot be ignored, particularly over the near-term, we caution that inflation expectations and energy price trends are the more important independent drivers over the medium term. Ultimately, we believe the FED is data dependent and biased towards reactive policy with a capped upside to rates, thus real interest rates will be driven by realized inflation developments rather than pro-active nominal rate decisions. Market expectations have already shifted away from "when" rates normalize further to "if" to some extent. But the consensus forecast is still for 2.5% FED funds rate at the end of the cycle and the FED guidance is for 3%. Hence, if the FED lingers behind the inflation curve, the gold price asymmetry lies to the upside.

- In addition to the real interest rate volatility from FED and inflation uncertainties, gold prices have also been shaped by the structural change in global energy markets, with the shale oil and natural gas revolutions driving significant change in marginal energy costs, while also creating inflation and currency feedback dynamics globally. In our view, forward energy prices have now already been tested for their downside, and where they've settled is setting a new baseline for the marginal cost of gold, the key determinate in our gold 'energy proof of value' framework.

Price drivers and exogenous sensitivity analysis

In our white paper on gold pricing (see Gold Price Framework Vol. I: Price Model, October 8, 2015), we introduced a model for understanding the short- and medium-term price movements between gold and fiat currency. We found that the majority of price movements can be explained by just a few key drivers: real interest rate expectations, central bank policy, and changes in long-term energy prices. Utilizing this energy proof of value framework, we analyze USD Gold prices by identifying the likely near-term drivers for real interest rate expectations and forward-energy markets. We summarize our model parameters below and apply the backward looking explanatory model to revisit the past Gold-USD cycles since 2001.

Exhibit 2: Contribution of model driver to changes in gold prices since 2001
USD/oz



Source: Bloomberg, Goldmoney Research

In upcoming reports, we will take a deeper dive into the specific underlying uncertainties in both energy and inflation dynamics, but, first, we simply model potential outcomes as exogenous outcomes in a two way sensitivity model to show why we see upside asymmetry in potential price paths going forward.

In our view, there are two macro trends which are converging, and likely to re-shape USD Gold price trends in the near future.

- Long term energy prices – represented by oil forward prices – have stabilized as they have fallen below marginal cost levels in US shale production (which is not to say that there cannot be another sell-off in spot prices as we highlighted in our latest report: *Something's got to give in the oil market,* May 3, 2016)

- Real interstate rate expectations have already begun to change course as the market is reassessing the FED's ability to raise rates in this cycle (and the FED has subsequently partially confirmed this by lowering its forward guidance). As a result, real interest rates expectations (10 year TIPS yields), which have been rising for almost 3 years, have been trending lower for much of 2016.

Importantly, while neither trend is certain to materialize as we described, we believe that USD Gold would only fall much further (below 1,100 for example) if real interest rates were able to permanently reverse a multi-decade falling trend, while at the same time forward energy prices would have to fall well below the levels tested earlier this year. We view this combined scenario as improbable. The FED will only be able to raise rates further if inflation picks up, which is highly unlikely to happen if energy prices continue to fall. And, conversely, bringing interest rates up several percent while energy prices remain depressed would likely push the US energy sector (which accounts for 15% of the S&P500) well past its breaking point. While the extraordinary conditions that led to triple digit forward oil prices and significantly negative real interest rates are likely behind us for the time being, the gold price reversal cycle has already played out, in our view

Taking into account all variables, we have recently run a full spectrum of scenarios for the future price of gold. The results are shown below in table 2.

Table 2: gold price scenarios
$/ozt, oil price 5-year forward price, 10y implied real USD interest rate

Long-dated oil price $/bbl	Real interest rates %								
	1.50	1.00	0.50	0.00	-0.50	-1.00	-1.50	-2.00	-2.50
95	1418	1462	1506	1550	1594	1638	1682	1727	1771
90	1390	1434	1478	1522	1566	1611	1655	1699	1743
85	1362	1406	1450	1494	1538	1582	1626	1670	1714
80	1332	1377	1421	1465	1509	1553	1597	1641	1685
75	1302	1346	1390	1434	1479	1523	1567	1611	1655
70	1271	1315	1359	1403	1448	1492	1536	1580	1624
65	1239	1283	1327	1371	1415	1460	1504	1548	1592
60	1206	1250	1294	1338	1382	1426	1470	1514	1558
55	1171	1215	1259	1303	1347	1392	1436	1480	1524
50	1135	1179	1223	1267	1311	1355	1399	1443	1487
45	1096	1140	1185	1229	1273	1317	1361	1405	1449
40	1055	1099	1143	1188	1232	1276	1320	1364	1408
35	1011	1055	1099	1143	1187	1231	1275	1319	1363

Source: Bloomberg, Goldmoney Research

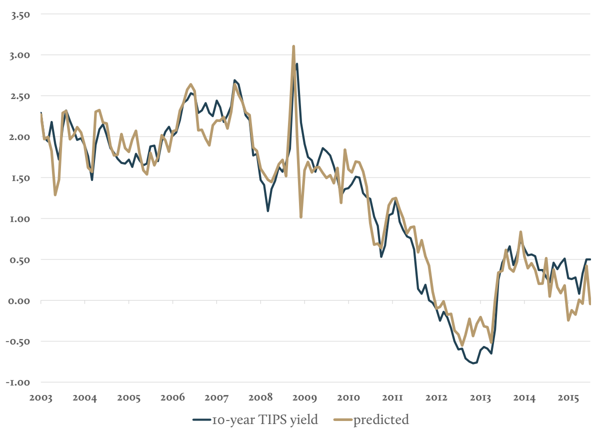
Impact and magnitude of higher real interest rates

As we have described in our framework piece, both COMEX net speculative positions and ETF holdings are driven primarily by real interest rates. To recall, real interest rates are measured as nominal interest rates minus inflation expectations. The easiest way to track real interest rates is via Treasury Interest Protected Securities (TIPS). TIPS pay a nominal interest, but the principal increases with inflation and decreases with deflation. TIPS yields hit a record low in November 2012 at -0.77%, but subsequently recovered to +0.73% by the end of 2015. The 1.50% swing in real interest rates was a major driving factor for the decline in gold vs the USD. According to our model, the move in real interest rates (combined with other central bank policy changes such as 'tapering' of QE) pushed gold roughly $375/ozt lower during the down move from 2012-2015. Since then real interest rates resumed their multi decade trend, dropping to 0.19% at the time of writing. Assuming that current gold prices are in line with current real interest rates and energy prices, we estimate that real interest rates would have to increase by over two percent in order for gold prices to drop sustainably below USD1100/ozt.

Real interest rate expectations rise when either nominal rates increase or inflation expectations decrease. We find that TIPS yields can be modeled very accurately with nominal interest rates (10-year Treasury notes), inflation expectations (University of Michigan inflation expectations consumer survey, composite of 5 year and next year expectations) and the VIX (Chicago board options exchange SPX volatility index). Our regression analysis of 10-year TIPS yields shows an r-squared of 0.92 (see Exhibit 4 and table 3).

Exhibit 4: Real interest rates as measured by 10-year TIPS can easily be predicted…

%



Source: FRED, Bloomberg, Goldmoney Research

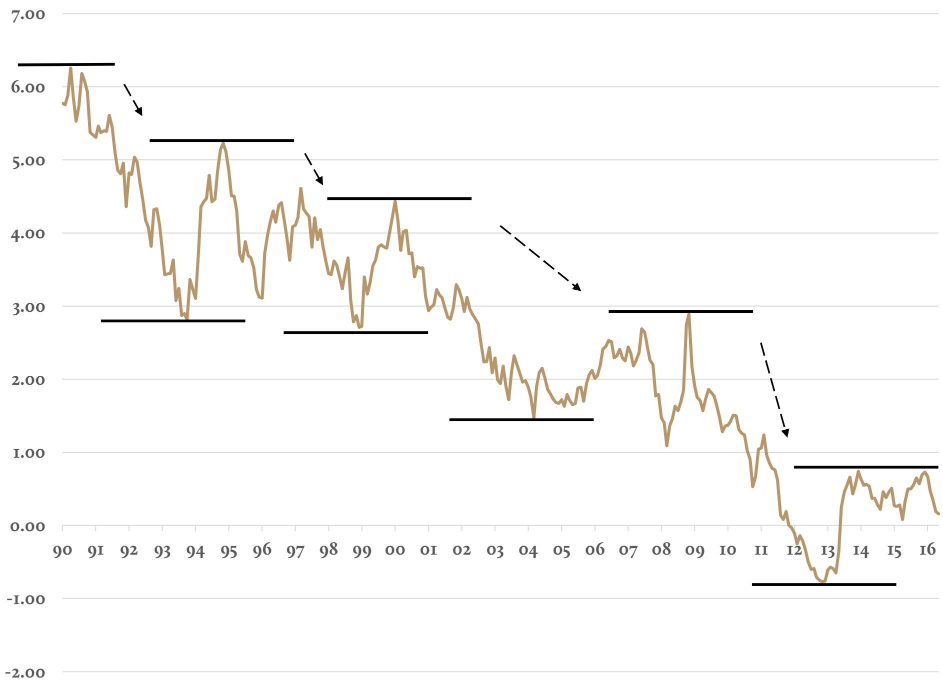
Table 3: …with 10-year Treasury yields and the Michigan University Inflation expectations index

	Coefficients	*t-Stat*
Intercept	-0.95	-2.27
Michigain inflation expectation next year	-0.53	-3.55
10 year Treasury note	0.92	40.46
VIX	0.03	13.04
R Square	0.92	
Adjusted R Square	0.92	
Standard Error	0.26	
Observations	153	

Source: FRED, Bloomberg, Goldmoney Research

For real interest rates to increase by 3% from here (taking gold below $1000, all else equal), 10-year Treasury note yields thus would have to increase by 5% provided inflation expectations remain the same. How likely is that? Real interest rates have been on a downward trend for many decades. Historically, the FED and most central banks have reacted to a recession or severe economic slowdown by lowering nominal interest rates, which has resulted in a perpetual decline in real interest rates. When the economy started expanding again the FED and most central banks typically did not normalize rates quickly but, rather, gradually increased rates over time. But, for the past few business cycles, the FED has never fully normalized rates subsequent to recessions. As a result, every time the US enters a recession, real interest rates start from a lower base and move below the previous lows at the end of the cycle (see Exhibit 5).

Exhibit 5: Once the economy is growing again, the FED never raises interest rates high enough for real rates to recover to previous levels
%, implied real interest rates 1990-2003, 10-year TIPS yields from 2003



Source: FRED, Bloomberg, Goldmoney Research

10-year TIPS yields have averaged around 1.1% over the past 10 years, and around 2% in the 5 years prior to the financial crisis and the unprecedented central bank policy that followed. The last time we saw real interest rates at 3% or higher was in the 1990s. In our view, it is very unlikely that real interest rates will reach these levels at the end of the rate cycle. Even the FED's own median forecast for the end of the cycle FED funds rate is only 3% (down from 4.25% in 2012). Assuming the FED will only raise rates if inflation reaches or exceeds its own target of 2%, that would imply real interest rates at just 1%. And San Francisco Fed President John Williams has already asked his colleagues to rethink the FED's inflation policy by raising the target beyond 2%. The analyst consensus forecast is already lower than the FED's own guidance, just 2.5% terminal rate, which would imply real interest rates at just 0.5% at the peak of the rate hike cycle. And the market is currently pricing in even lower rates. FED fund futures implied probabilities show that market sees only one more rate hike this year (see Exhibit 6).

Exhibit 6: The market revised its expectation for end of 2016 fund rate significantly lower

%, FED fund rate weighted by market probability

Source: Bloomberg, Goldmoney Research

At the beginning of the year, the market overwhelmingly expected that the FED would start raising interest rates at some point and continue through the end of the year. The prevailing view was not "if" but "when" and "how much". While it cannot be ruled out that the FED will hike rates again this year, economic reality has put a damper on the outlook for a normalization of interest rates anytime soon. In fact, it has started to dawn on the market that there is a distinct probability that rates will actually go the other way around. As our colleague Alasdair MacLeod put it aptly in an article last year (See Alasdair MacLeod; NIRP, its likelihood and effect on commodities, October 1, 2015):

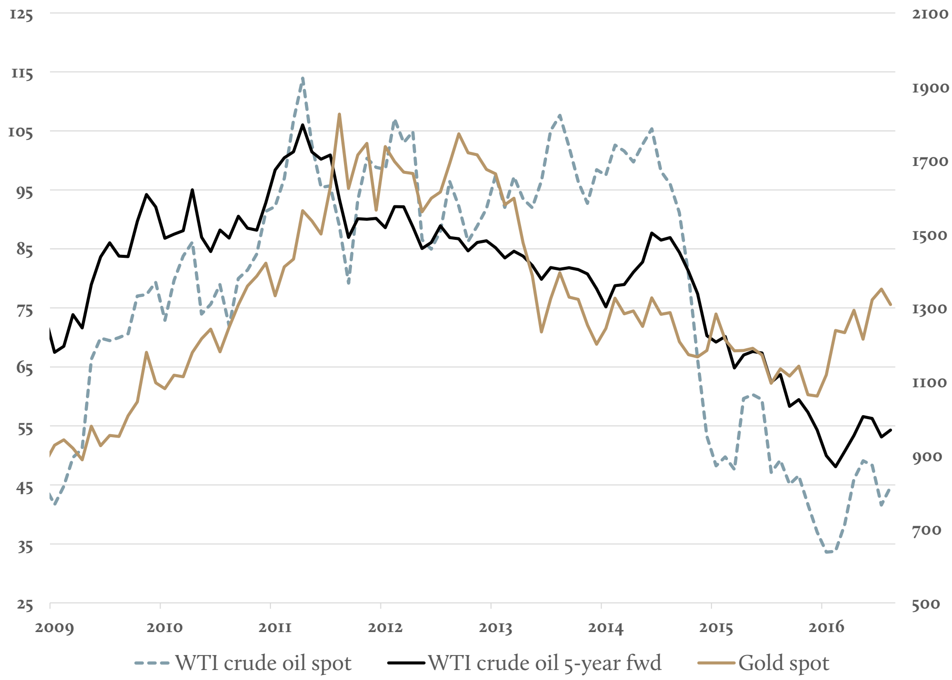
> *"There can be little doubt that negative interest rate policies (NIRP) are now a distinct possibility after the Fed backed down from raising the Fed Funds Rate at their September meeting, having prepared markets well in advance for the event. In fact, many mainstream analysts still expect the Fed will raise rates in the coming months. However, external factors are rapidly changing everything, with China's economy succumbing to a credit crunch, and all the countries supplying China with raw materials suddenly facing a fall in demand."*

Negative interest rate policies would push real interest rates lower, as nominal rates rise and inflation expectations increase; in such an environment we would expect gold prices in USD to move higher.

A renewed drop in longer term oil prices

Long-dated oil prices (which approximate market expectations for the marginal cost of energy production), as measured both by the 5-year ICE Brent and 5-year NYMEX WTI price, have declined sharply since last summer. Longer-dated oil prices initially peaked in 2008 and then sold off sharply as the credit crisis pushed global economic growth sharply lower. In the aftermath of the credit crisis, longer dated oil prices recovered and reached an interim peak at $109/bbl in spring 2011 before they began to decline gradually. This marked the coming on-line of shale oil technology, but it took until summer 2014 before the full impact was felt on the price. From peak (April 2011) to trough (September 2015), 5-year forward WTI prices dropped $48/bbl or 44%. According to our model, this decline has impacted gold prices by 17% or about $260/ozt. Since then, longer dated oil prices have remained relatively stable and have even begun to rise.

Exhibit 7: Forward energy prices (and not spot energy prices) drive gold replacement costs or 'proof of value' over longer technology cycles
$/bbl (LHS), $/oz (RHS)



Source: Bloomberg, Goldmoney Research

The question thus arises, how much more would longer-dated oil prices have to fall to push gold below $1000/ozt? Again, assuming that current gold prices are in line with current real interest rates and current longer-dated energy prices, longer dated oil prices would have to drop another USD30/bbl to under USD30/bbl, all else equal. As for comparison, when oil spot prices fell to nearly USD25/bbl in spring this year, longer dated prices never dropped below USD USD46/bbl. The last time longer dated energy prices were below USD30/bbl was in 2004.

While a renewed sell-off in the oil spot price could also undo the recent recovery in longer dated prices, we believe that the bulk of the down move in longer dated prices is behind us. In the current environment, a large portion of new projects are non-economical to produce and the longer prices stay at these levels, the higher the risk of supply shortages in the future.

The scenario required for gold to drop below $1000/bbl is that which requires a combination of higher real interest rates and lower oil prices. A fall in oil prices would put further downward pressure on short-term inflation, which makes it even less likely for the FED to raise rates. Raising interest rates on the other hand would make financing for US oil producers even more expensive, which, in our view, should have a naturally bullish effect on longer term prices as the all-in cost base increases.

What this analysis has not taken into account is that, besides real-interest rates and longer dated oil prices, there are two other drivers for gold.

The first is net gold purchases by central banks. Historically, central bank net purchases had only a limited impact on the gold price. But central banks have been accumulating gold for the past years, led by the central banks of emerging markets, while developed market central banks have ceased their previous regular selling, something we do not believe will change anytime soon. China, the largest gold producer in the world, will in all probability continue its strategy to diversify its vast foreign exchange reserves into gold. Hence, in our view, the likelihood that gold prices drop sharply from here due to central bank sales is very small.

The second driver is unconventional central bank policy. The introduction of Quantitative Easing (QE) by the FED in 2008 changed how gold prices formed. Historically, they were only driven by real interest rates, central bank purchases (or sales) and longer dated energy prices. QE drove down real interest rates, which in turn pushed gold prices higher. But QE had a positive effect on gold prices beyond its impact on real interest rates; because QE was something fundamentally new, a pre-2008 model would have underestimated gold prices just on real interest rates alone. So any renewed QE, or even more unconventional forms of monetary policy such as the infamous helicopter money, would have an impact on gold prices beyond the two dimensions analyzed in this report.

There are two additional important points, however. First, all new drivers that have emerged have been supportive for gold prices, none of them had a negative price impact. This makes intuitive sense, as unconventional monetary policy is an attempt by central banks to get the same effect of a rate cut without cutting rates. And second, QE (as well as further unconventional forms of monetary easing) is a one-way road. Initially, when QE was introduced, economists argued that, once credit markets are repaired and the economy is back on track, central banks would be able to withdraw this additional money from the system. Today, not even central bankers themselves talk about this. The dance between the FED and the markets over the past two years was entirely focused on potential rate hikes. Nobody still expects that the FED is going to sell the assets on its balance sheets back into the market. The most hawkish scenario is that the FED simply doesn't replace bonds as they mature.

This means that once the QE genie is out of the bottle it cannot be put back. All else equal (real-interest rates, central bank gold holdings and longer-dated energy prices), gold prices are going to remain permanently higher. Real interest rates and high energy prices alone wouldn't have been able to push gold to USD1900/ozt, that required QE. And, as longer-dated energy prices corrected sharply lower and real-interest rates recovered sharply higher between 2012 and 2015, gold prices declined but never fell back to the same levels of a non-QE world again. QE had set the floor higher. Importantly, any further unconventional forms of easing shouldn't be any different. If central banks ever deploy so called helicopter money, widely and openly discussed of late, they won't be able to reverse that either. Hence, whatever new form of unconventional monetary policy central bankers come up with, it can only be supportive for gold prices.

On net, while there is room for more downside for gold prices if either long-dated oil prices decline again or real interest rates move higher, should the FED surprise markets with multiple rate hikes, the bearish effects on gold prices from oil and rates are most likely behind us. The recent months, have certainly cast doubt over the prevailing market view. In our view, lower rates are just as likely as higher at this point. That doesn't mean that the FED cannot raise rates in the near term, but the room for maneuverability is severely limited. The path for gold from here thus becomes increasingly asymmetric.