

## Faux Gold Arbitrage

### Why backwardation in gold does not imply arbitrage

by Tom Fischer  
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*In the past, several gold market commentators have argued that backwardation in gold forwards or, equivalently, negative GOFO rates, should theoretically be impossible as this constituted an arbitrage opportunity. With the London Bullion Market recently having experienced slight backwardation in some maturities, this claim has resurfaced again. In this article, it is explained why the statement is a fallacy that can be attributed to a misunderstanding of basic arbitrage concepts, which will be reviewed in due course.*

The argument of the arbitrage proponents goes as follows: Assume that someone owns gold today and that there is backwardation in the gold market present in the sense that the spot price of gold today is higher than the forward price in, say, one year's time. Then, this person can sell gold today and simultaneously enter a forward contract, earn interest over one year, and buy back the gold at the end of that year at a cheaper price. The result is the same amount of gold, plus a cash profit consisting of the earned interest and the price differential between the sale and the purchase price. As this profit was risk-free, so the argument goes, this constituted an arbitrage, something which should not exist as it should be "arbitraged away". In the following, it will be shown that this supposed arbitrage is none, and hence, jumping to any conclusions about alleged market dysfunctions, manipulations, or failures based on the observation of backwardation could be erroneous and misleading gold investors who read such commentaries.

#### Backwardation

The London Bullion Market Association (LBMA) states in their "Guide to the London Precious Metals Markets" the following about backwardation:

*"Traditionally gold interest rates are lower than dollar interest rates. This gives a positive figure for the forward rate, meaning that forward rates are at a **premium** to spot. This condition is often referred to as **contango**. On very rare occasions when there is a shortage of metal liquidity for leasing, the cost of borrowing metal may exceed the cost of borrowing dollars. In this scenario, the forward differential becomes a negative figure, producing a forward price lower than, or at a **discount** to, the spot price. This condition is known as **backwardation**."* [Original emphasis.]

And:

*"BACKWARDATION A market situation where prices for future delivery are lower than the spot price, caused by shortage or tightness of supply."*

So, not only does the LBMA guide offer a definition, but it also offers an explanation for backwardation. However, there is no mentioning of this constituting an arbitrage opportunity.

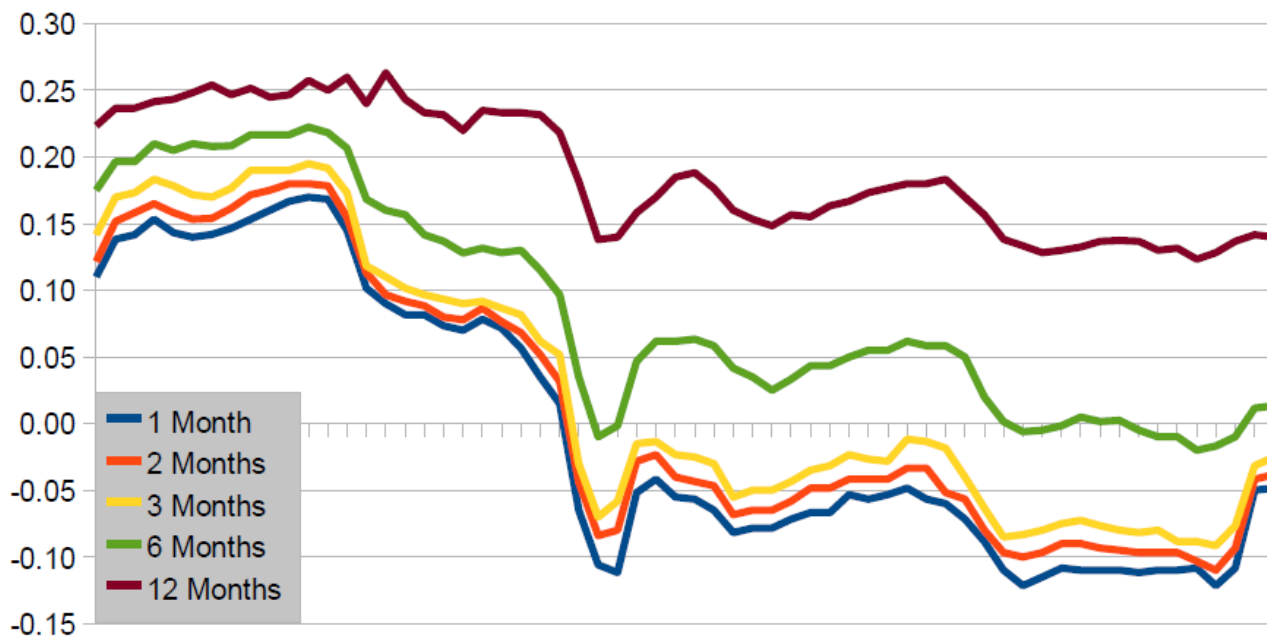
#### An example

Let us assume that someone owns 1,000 ounces (oz) of gold today at a spot price of \$1,500/oz, a total wealth of \$1,500,000. Further, assume that gold is in backwardation in the sense that the 1-year forward price is \$1,470/oz. This means that the 1-year Gold Forward Offer Rate (GOFO) is at negative 2%, since the difference between the forward and the spot price, of minus \$30, equals

negative 2% of \$1,500. For the sake of this example, we generally ignore counterparty risk and any bid-offer spreads. We assume that 1-year LIBOR, as the risk-free rate of interest, is at 1%. Selling now gold at spot, one receives \$1,500,000 and can enter the 1-year forward contract for 1,000 oz. For the sake of the example, we ignore any margin or trading costs that might occur. One invests the \$1,500,000 at 1-year LIBOR. Fast-forward one year. One receives \$1,515,000 from the money market investment. The gold forward has to be honoured and \$1,470,000 have to be paid to receive 1,000 oz of gold. Result: One owns \$45,000 and 1,000 oz of gold. Therefore, so the argument goes, this was arbitrage.

### GOFOs from June 3 to August 28, 2013 (in percent)

Source: LBMA



#### An obvious flaw

Even someone with minimum financial knowledge can spot a mistake in this supposed “arbitrage”: In the example, at the end of the year, the new spot price of gold might have fallen to \$1,400/oz, while our investor had to honour the forward contract at \$1,470/oz. Therefore, in this scenario, a starting capital of \$1,500,000 was turned into \$45,000 plus \$1,400,000, a total of \$1,445,000, and a whopping loss of \$55,000! Arbitrage, however, is a risk-free profit, and there, quite obviously, was risk that lead to a considerable loss. “Wait”, will the arbitrage proponents now say, “you count your wealth in Dollars, but we count ours in gold ounces. We are still better off than at the start of this year, because we have the same number of ounces plus \$45,000 in cash!” This seems to be a valid point. However, does it indeed mean arbitrage?

#### What is arbitrage?

A commonly used definition is that arbitrage in any currency is an investment that outperforms the risk-free rate of return in that currency. Assuming that we can borrow and invest currency at the risk-free rate, this also translates into “making money out of nothing”, or a “free lunch”, as we could borrow money if we do not have any, then outperform the loan's interest (the risk-free rate) by ways of the arbitrage strategy, and finally pay back the loan while keeping the profits over the risk-free return. Now that we have a preciser definition of arbitrage, what answer should we give to our “backwardation implies arbitrage”-proponents?

### **Change of the numeraire: counting wealth in gold ounces**

One fascinating property of arbitrage, as it is defined in mathematical finance, is that it is independent of personal preferences and the numeraire. Hence, if an arbitrage was not possible when counting our wealth in Dollars, it also will not be present if we count our wealth in ounces of gold. Let us now check back with the example: The would-be arbitrageur made \$45,000 in profit over ounces. This stemmed from 1% LIBOR interest on the original wealth plus 2% from the sale to purchase price differential. Expressed differently, LIBOR minus GOFO, which amounts to 3% (recall that double minus is plus), was made on the original amount. People familiar with the workings of the London Bullion Market know what LIBOR minus GOFO is: the (implied) gold lease rate, short GLR. At this (approximate) rate, gold can be borrowed without posting any collateral. In other words, GLR is gold's risk-free rate of interest, and  $\text{LIBOR} = \text{GOFO} + \text{GLR}$  holds. What our would-be arbitrageur hence achieved is just the risk-free rate of return of the currency that he prefers to count his wealth in: ounces of gold. He did not outperform that rate, so he did not achieve an arbitrage. In a sense, he achieved just as much as someone who makes LIBOR on a Dollar deposit, and that is nothing special. This fact becomes even more clear if we ask ourselves whether he could have achieved a “free lunch” without any starting capital. The answer is no, as he would have had to first borrow 1,000 oz of gold to run the “faux arbitrage”, as we can call it now. At the end, he would have had to return that gold plus interest, but the interest would be exactly the \$45,000 he made, as GLR runs at 3% (of originally \$1,500,000). This argument, by the way, works similarly if GLR is not denoted in Dollars, but ounces of gold. So, there is no way out: The arbitrage proponents have made the mistake of not properly changing the numeraire – they have fallen into the “change of numeraire trap.”

### **Backwardation: omnipresent in currency markets**

It is often overlooked that gold is a currency that even has its own three-letter symbol: XAU. To explain the arbitrage fallacy in terms of currencies, and to see that also in other markets backwardation cannot be hedged away in theory or practice, I am looking at the EURUSD currency cross at the time of writing and see a spot price of 1.2936, as well as the June 2018 COMEX contract at 1.3857. This constitutes contango. But, obviously, that means that the inverted currency cross, namely USDEUR, has a spot price of  $1/1.2936 = 0.77304$  and a June 2018 forward price of  $1/1.3857 = 0.72166$ , a very nice backwardation. So, why is this backwardation not arbitrated away? The answer is simple: Contango in one currency cross implies backwardation in its mirrored counterpart. So, if backwardation implied arbitrage, then contango did as well, proving the absurdity of that claim as even the “backwardation implies arbitrage”-proponents would not go that far. In the absence of default risk, the observed contango and backwardation is, of course, simply down to interest rate differentials. If we now replace “Dollars” by “gold ounces” and “Euros” by “Dollars”, the same argument applies, as gold has an own interest rate which is different from the Dollar's: the gold lease rate, GLR. At this point, I want to thank Bron Suchecki of the Perth Mint for first mentioning the currency aspects of this problem to me. On his personal blog, he remarked on backwardation in currencies in this context already back in 2008. It should also be noted that any economic theories, fears of potential currency debasement, or similar, play no role in the arbitrage arguments used here, as we do not discuss what causes the mentioned interest rate differentials. An arbitrageur does not need an economic theory or belief system. All she needs are prices that she can act on.

### **Conclusion**

Backwardation in gold can not be arbitrated away - neither in theory, nor in practice. Otherwise, the global currency markets would constitute one giant arbitrage opportunity that always stayed open, since, for any currency cross, a non-constant FX forward curve will always mean that, for at

least one maturity, one of the two currencies is in backwardation. Backwardation in gold might have many causes and many potential meanings for the future price of this volatile metal. For one, it means that gold's interest rate is higher than that of the Dollar, which is an interesting observation in itself and open to interpretation and, maybe, speculation. Only, backwardation in gold certainly does not provide arbitrage opportunities. In the absence of those, other investment skills than spotting arbitrage will be needed to navigate the precious metals markets.

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