Gold - The Gold Mining Sector

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Introduction

Last fall we developed a model to value gold based on the observation that gold behaves like a zero coupon bond whose value is determined by the growth of money supply (M2) and the change in real interest rates. Based on a 7-year mean reversion timescale, the model predicted future returns with a coefficient of determination equal to 0.92. This impressively high predictive power reversed our prior belief that the value of gold is unknowable. In this letter, we provide an update on the current valuation level of gold relative to our model, extend the model to value the gold mining sector, and conclude with a chart of selected asset class performance year-to-date.

Current Valuation Level of Gold

When we published last fall, our model data spanned from May of 1972 through the end of August, 2021. By August, real interest rates had declined to -4% pushing the model's predicted

value of gold very high (when interest rates fall, bond prices go up; similarly, when real interest rates fall, the value predicted by the gold model goes up). Relative to our model, gold was 50% undervalued at the end of August. We have added the data for the next six months into our model, which now extends through the end of February, 2022. During this time, real interest rates fell to -6%, their lowest level in the 50-year data set. While the price of gold did go up during this 6-month period, it has not kept up with the value increase predicted by our model. <u>As of the end of February, 2022, gold was 61% undervalued relative to our model - the most undervalued level seen in our data set</u>. Historically, gold has appreciated at 19% annualized for the next 7 years when starting in the most undervalued decile, where it resides today. To refine our estimate of the future expected return, we turn to a simple version of Bayesian updating: start with a prior estimate (outside view), add the estimate based on our model (inside view), and then divide by 2 because we equally weight the probability of the prior and the new data. In this case, we select 7% as our prior, based on the fact that gold has appreciated at an annualized rate of 7% over the 50-year period of our data set so the simple outside view would be to assume it will perform the same in the future. This leaves us with: (7% + 19%) ÷ 2 = 13%. Even with this Bayesian update, we are still hesitant to expect such high returns, but we are nonetheless very bullish on gold, especially relative to stocks and bonds which currently have much lower expected returns.

Gold Mining Sector

Because the profitability of gold mining companies is significantly influenced by the price of gold, we decided to test if our gold model would be predictive of returns in the gold mining sector. In Figure 1 we plotted the 7-year annualized return of the gold mining sector versus gold's valuation decile relative to our gold model.

Figure 1 | 7-Year Gold Miner Annualized Return vs Gold Valuation Decile
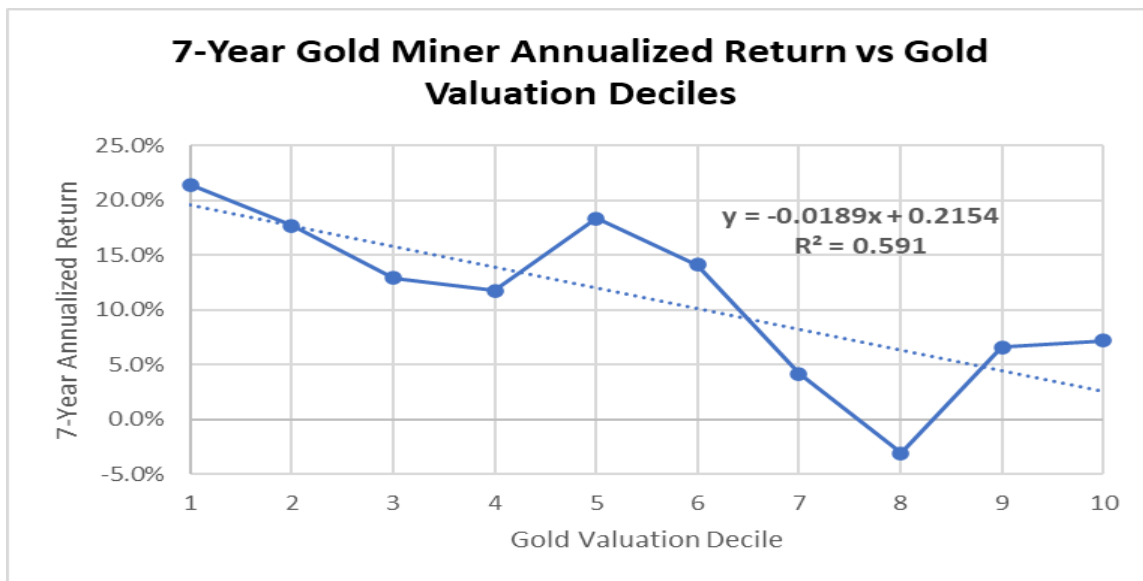
While the R^2 of 0.59 was not as high as it was for physical gold (0.92), it is still relatively predictive given that multiple factors other than the price of gold (such as the cost of equipment and labor) affect the price of gold mining companies. During the last 50 years, when gold has been in the most undervalued decile relative to our gold model, the 7-year annualized return for the gold mining sector has been 21%. Using the same Bayesian updating outlined above (selecting 7% as our prior because the gold mining sector has grown at 7% annualized during our 50-year data set) we calculate: (7% + 21%) ÷ 2 = 14%. Again, we are reluctant to predict such stellar returns, but we are certainly bullish given the highly constructive set of conditions.

To see if the gold mining sector is a reliable hedge against a general stock market decline, we analyzed the performance of gold miners during the 10 times in the last 50 years when the S&P 500 dropped more than 10% on a monthly basis (Table 1).

Table 1 | Gold, Gold Mining, and Long Dated Treasuries during S&P 500 drawdowns > 10%

Date of Top	Date of Bottom	Drawdown (Months)	S&P 500	Gold	Gold Mining	Long Treasury	Annualized CPI
1/1/1973	9/30/1974	21	-42.6%	128.0%	101.5%	-4.0%	10.5%
1/1/1977	2/28/1978	14	-14.1%	35.3%	44.4%	-1.0%	6.9%
12/1/1980	7/31/1982	20	-16.9%	-44.9%	-39.9%	12.6%	8.2%
9/1/1987	11/30/1987	3	-29.5%	8.3%	-15.7%	2.5%	3.5%
6/1/1990	10/31/1990	5	-14.7%	4.3%	-14.0%	1.6%	8.0%
7/1/1998	8/31/1998	2	-15.4%	-7.6%	-24.9%	6.5%	1.5%
9/1/2000	9/30/2002	25	-44.7%	17.3%	88.8%	31.4%	2.3%
11/1/2007	2/28/2009	16	-50.9%	20.5%	-22.9%	20.7%	1.2%
10/1/2018	12/31/2018	3	-13.5%	8.3%	8.0%	5.5%	-1.9%
1/1/2020	3/31/2020	3	-19.6%	5.4%	-22.2%	38.2%	1.8%

Average		11.2	-26.2%	17.5%	10.3%	11.4%	4.2%
Average: CPI < 4.2%		8.7	-29.0%	8.7%	1.9%	17.5%	1.4%
Average: CPI > 4.2%		**12.0**	**-17.7%**	**24.5%**	**18.4%**	**1.8%**	**6.7%**

On average, gold miners do protect against stock market declines, especially during periods of high inflation. That said, their batting average is considerably worse than physical gold and long Treasuries. Gold miners had a positive return during 40% of the stock market drawdowns and only held up better than the market 70% of the time. Physical gold and long Treasuries were much more reliable, delivering a positive return in 80% of the stock market drops, and gold outperformed the market on a relative basis 90% of the time while long Treasuries outperformed the market during 100% of the 10%+ market sell offs. When it comes to dependable hedges against market declines, physical gold and long Treasuries are the most reliable. Gold miners currently have a high return potential, so they certainly deserve a place in a diversified portfolio, but they should be viewed as a risk asset intended to drive returns, rather than a hedge asset to protect against a market decline.

Asset Class Year-To-Date Performance

Last fall we were concerned that stocks were overvalued and that the interest rates on bonds did not offer promising returns. At the same time, our analysis gave us confidence that the return prospects for gold were good, if not great. While performance over any 4-month period is of low statistical significance, it has nonetheless been encouraging to see that gold (GLD) and gold miners (GDX) have performed well while the S&P 500 (SPY) and long Treasuries (TLT) have struggled (Figure 2.)
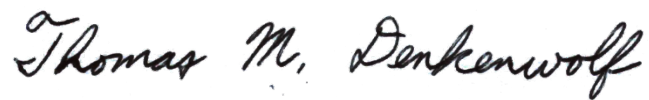
Figure 2 | Gold (GLD), Gold Miners (GDX), S&P 500 (SPY), and Long Dated Treasuries (TLT) Year-To-Date Performance:
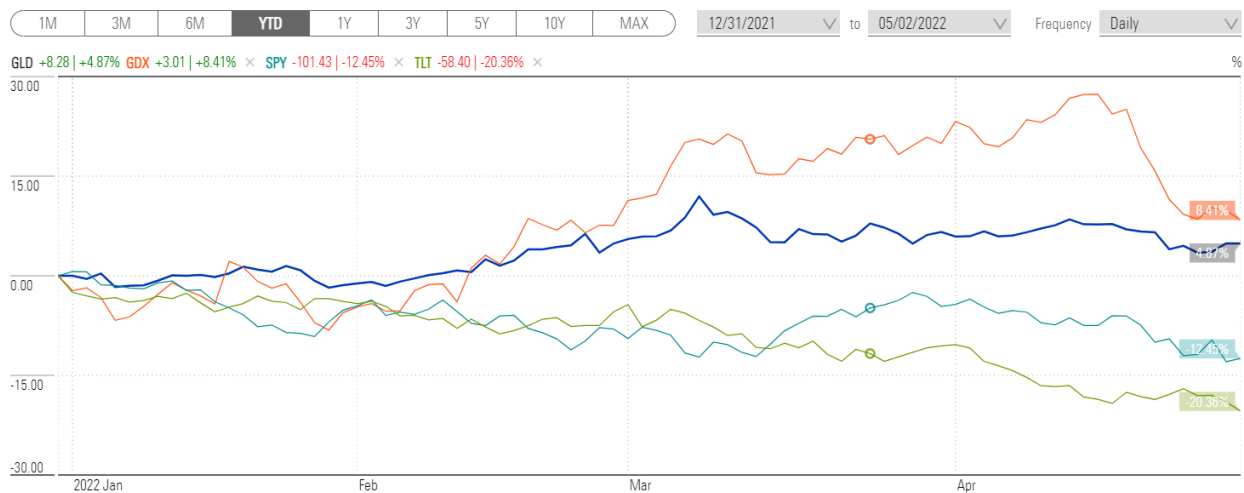
Conclusion

After updating our gold model, we find that despite gold's recent rise, it remains extremely undervalued relative to our model's predicted value for gold. Extending our original work, we find that our gold model is predictive for the gold mining sector, albeit, less so than for physical gold. Nonetheless, based on the current undervaluation of gold, our model predicts very strong returns for the gold mining sector. While the return prospects for gold miners are good, their extreme volatility and lower predictability drive us to place them in the 'return enhancing risk bucket' rather than the 'protective hedge bucket.' Looking forward, high inflation and rising interest rates will likely continue to be a headwind for stocks and bonds for at least the next few months. During this challenging time in the market, we are happy that we sharpened our pencil on gold last year to give us the confidence to significantly overweight this previously out-of-favor and lesser understood asset class.

Best,

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