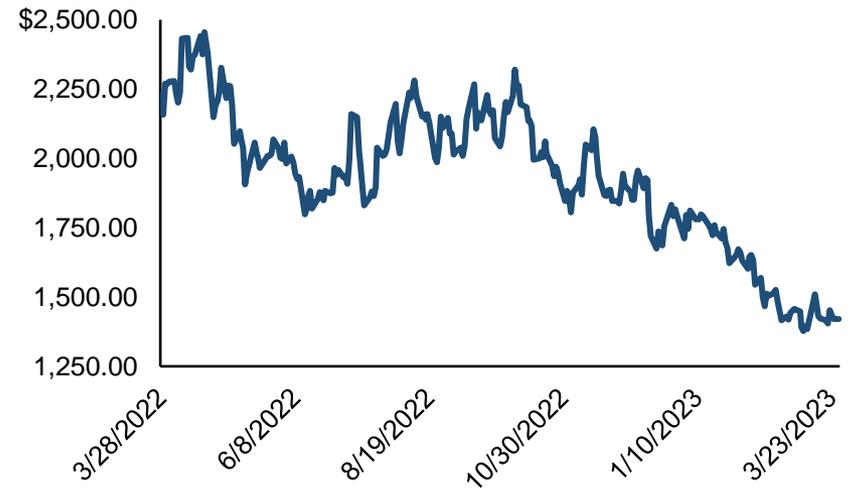


Palladium I One-Year Price Chart



Metals Sector

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Position Details

- Palladium | PAN3
- Underlying Price: \$1,425.34
- Long Straddle
- Expiration Date: July 23, 2023

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- II. Macroeconomic Thesis
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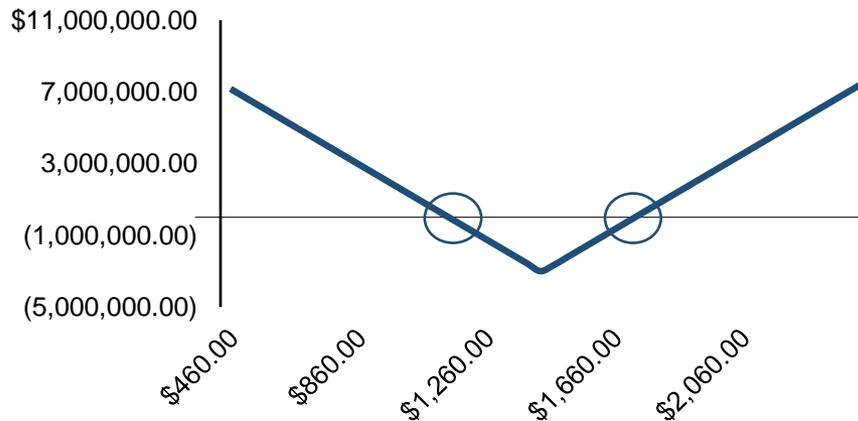
I. Product & Position Overview

Product & Position Overview

Product Description

- Palladium is a precious metal that draws a majority of its demand from its industrial applications. Specifically, palladium is heavily used in the automotive industry as it is a key component in catalytic converters in almost all combustion engine cars
 - Palladium prices are largely driven by economic strength and consumer demand factors
- **Major Countries Involved**
 - Producers
 - Russia | 40.00%
 - South Africa | 30.00%
 - Zimbabwe | 10.00%
 - Consumers
 - China | 26.00%
 - America | 25.00%
 - Germany | 9.00%

Payoff Diagram



Trade Breakdown

- **Long Straddle**
 - This strategy benefits from an increase in volatility in the underlying asset
- **Setup**
 - We Buy – 105.00 ATM \$163.70 Calls | PAN3
 - We Buy – 105.00 ATM \$129.20 Puts | PAN3
 - Max Profit – Theoretically unlimited
 - Max Loss – \$3,075,450.00
- **Expiration**
 - Date: July 23, 2023

Exit Strategy & Potential Hedge Strategy

- **Bull Base & Bear Case**
 - Upper Breakeven- \$1,717.90
 - **\$1,950.00 / \$1,720.00 / \$1,425.00**
 - Lower Breakeven – \$1,132.10
 - **\$900.00 / \$1,130.00 / \$1,425.00**
- **Methodology**
 - The base cases would represent a ~20.00% increase in the underlying and a ~20.00% decrease in the underlying
- **Hedge Strategy**
 - In the event that the underlying does not see the expected volatility, the sector will look to reverse trade

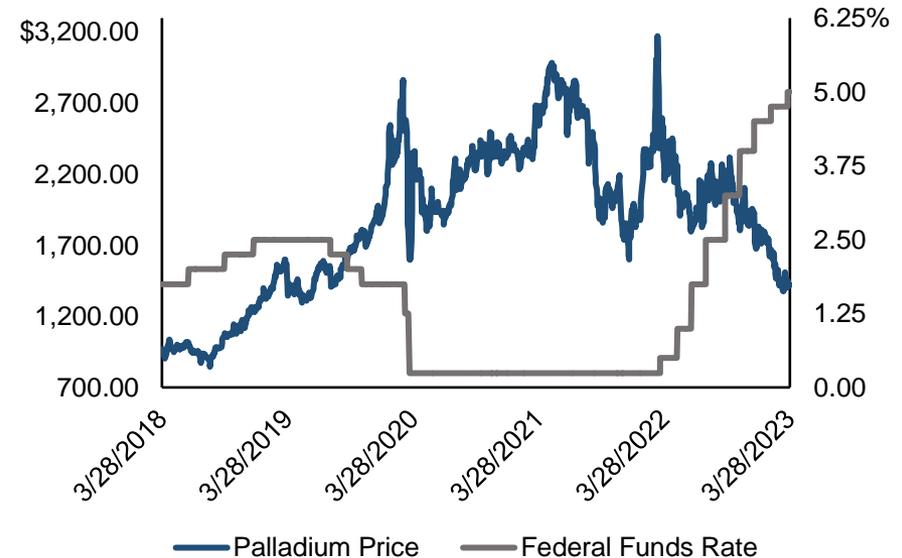
II. Macroeconomic Thesis

Macroeconomic Thesis

Macroeconomic Summary

- **Rebounding Supply Creating Threat of Surplus**
 - Palladium export levels from Russia maintained a steady level despite the trade sanctions placed on them, allowing supply to begin to build up with the slowing economy
 - Norilsk Nickel cut its deficit prediction for 2023 from 800,000.00 oz to 300,000.00 oz in February, and analyst forecasts have continued to fall as predictions for a flip into supply surplus have risen
 - Major South African mines were slowed down due to flood damage in 2022 coming in 460,000.00 oz below expected output, but have recovered to full output for 2023
- **Ongoing Geopolitical Tensions Drive Volatility**
 - Russia recently launched one of the worst missile attacks of the war with Ukraine following a meeting in Moscow between Putin and Xi Jinping, in which he pledged to deepen ties with Russia
 - Further sanctions levied against Russian exports could begin to slow down supply of palladium out of Russia causing market volatility as the world is largely dependent on Russian palladium
- **Recessionary Fear Diminishes Confidence**
 - Despite being part of the precious metals subsector, palladium relies far more on its industrial applications as roughly 90.00% of all palladium is used in the auto industry, making it perform poorly in recessionary climates
 - Unclear consensus on how severe and prolonged a potential economic downturn could be has created a lack of confidence in palladium and strong or poor data could cause sharp price swings in either direction
 - Although automotive demand is forecasted to have healthy growth in 2023 of around a 9.00-10.00% increase from 2022, however a recession would hinder the auto industry's recovery and drive volatility in palladium demand

Palladium Price vs Federal Funds Rate | Five-Year Chart



Market Pros & Cons

- Consumer spending data coming in below forecasted figures
- Early rate cuts stimulate automotive sales driving demand
- Supply levels remain steady and deficit/surplus forecasts stabilize
- Russian sanctions are lowered and negotiations open up



III. Risk Analysis

Risk Analysis

Directional & Magnitude Risk

- **Delta Analysis**
 - This trade has a Delta value of 0.1268
 - This trade benefits from bullish or bearish price movement of the underlying. The delta will swing positive and negative depending on the direction of the underlying
- **Gamma Analysis**
 - This trade has a Gamma value of 0.0017
 - Gamma is minimal for this trade as the call and put options counteract each other

Implied Volatility Risk

- **Vega Analysis**
 - This trade has a Vega value of 7.5067
 - Vega is positive on this trade as the position benefits from higher volatility. Increases in volatility increase the chance of the trade becoming profitable
 - Implied volatility for both position legs is 47.50%

Time Risk

- **Theta Analysis**
 - This trade has a Theta value of (3.6961)
 - Theta is negative in this trade as the potential for the position to end in the money decreases with every passing day. Theta could become positive if the trade were to become deeply in the money

Interest Rate Risk

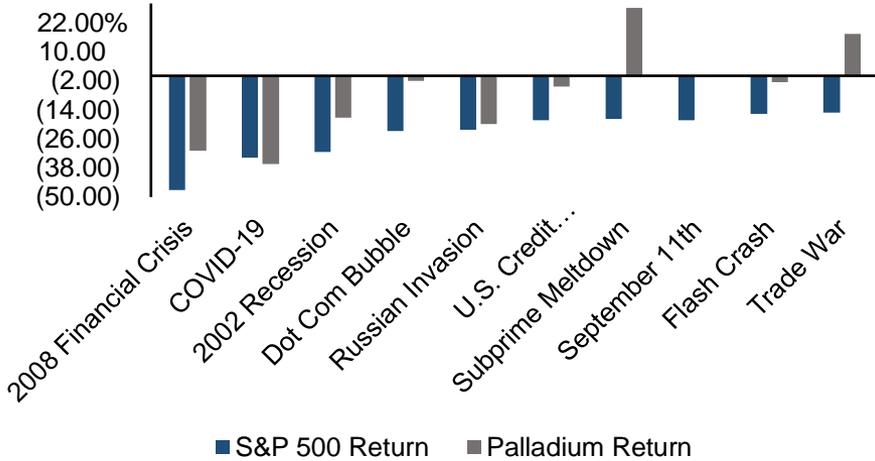
- **Rho Analysis**
 - This trade has a Rho value of (1.3599)
 - Rho is significant in this trade as the possibility for two rate hikes threatens the trade. Higher interest rates tend to have negative consequences for palladium as they interfere with consumption factors



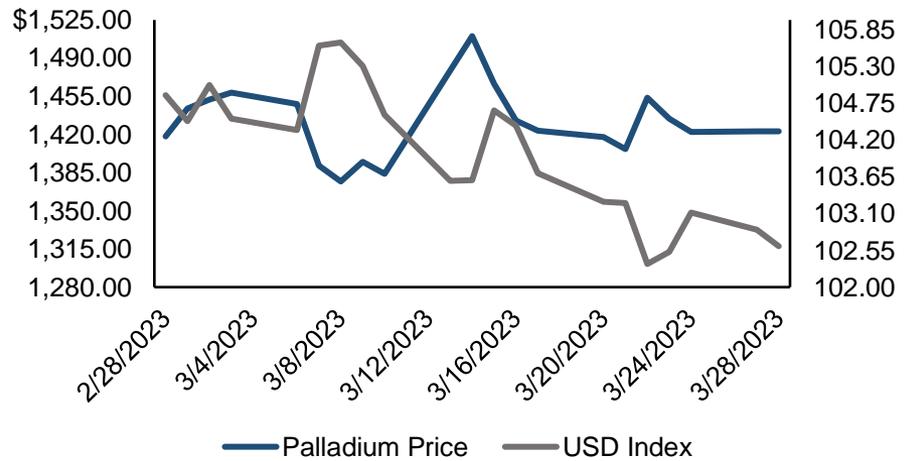
IV. Technical Bias & Fair Value

Technical Bias & Fair Value

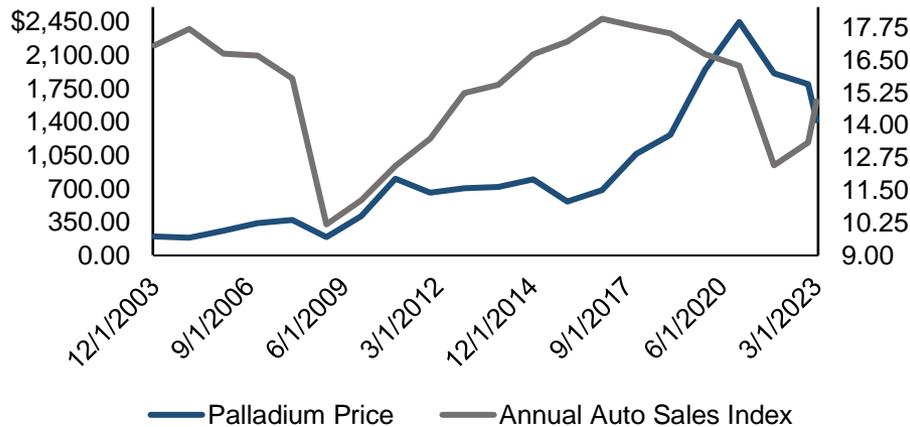
Palladium Returns During S&P 500 Recession | Historical Chart



Palladium Price vs USD Index | One Month Chart



U.S. Auto Sales Index vs Palladium Price | 20 Year Chart



Synopsis

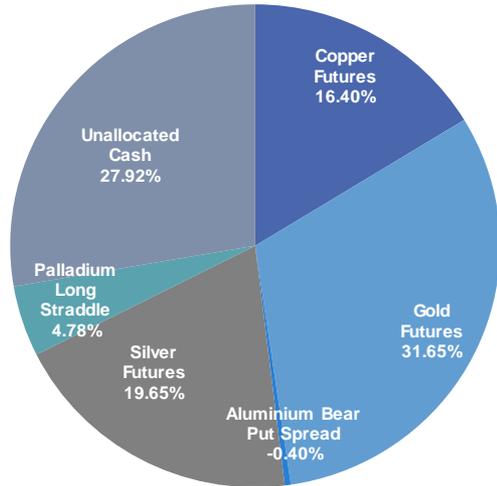
- Historically palladium does not perform well during times of recession. Outliers occur due to diminished supply factors, creating strong bullish pressure that outweighs economic conditions. On average, an economic downturn will cause increased volatility and price dips
- Palladium typically holds an inverse correlation with the value of the U.S. dollar, indicating that, as other central banks continue to hike rates, palladium could experience volatility and bullish movements
- Auto sales have taken a large hit due to the supply chain disruptions caused by Covid-19, followed by the rate hiking cycle taken by the Fed. A recovering automotive market in 2023 would generate enhanced demand for palladium and positively influencing price



V. Capital Allocation

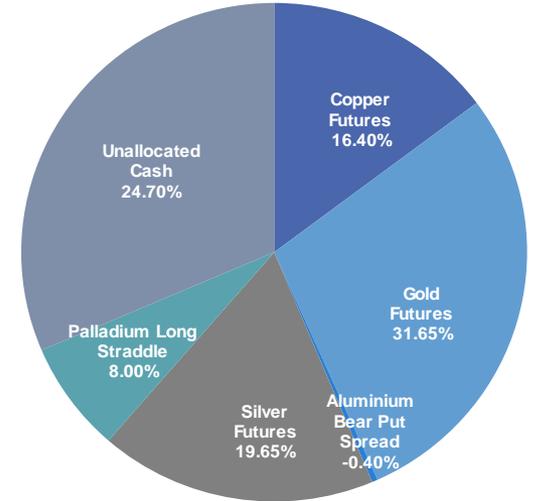
Capital Allocation

Current Portfolio Allocation

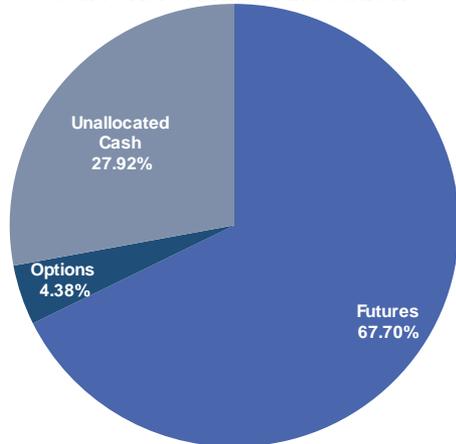


Transaction Summary		
Ticker	Position Change	
	Contracts	Allocation
Aluminium Bear Put Spread	0	\$0.00
Copper Futures	0	\$0.00
Gold Futures	0	\$0.00
Silver Futures	0	\$0.00
Palladium Long Straddle	+ 210	\$3,075,450.00
Allocation Change		\$6.63 mm

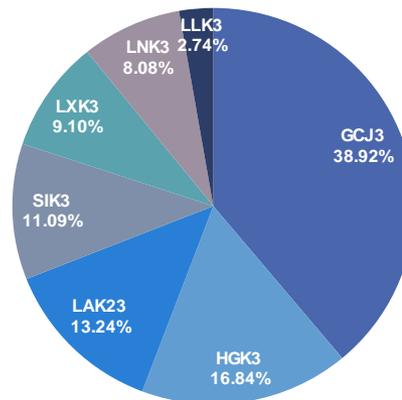
Proposed Portfolio Allocation



Current Position Allocation



Benchmark Allocation



Proposed Position Allocation

