

PLATINUM PERSPECTIVES

Palladium's inelastic supply and continued market tightness is driving platinum substitution

The spectacular increase in the price of palladium since 2016, particularly during 2019, attracted widespread interest from investors, industrial users, and market commentators. Our latest ***Platinum Essentials*** analyses in detail the palladium market and its underlying value and price drivers.

COVID-19 brought palladium's multi-year price surge to an end in February. The pandemic has dramatically increased global risk, prompting a flight to cash, depressing asset classes from precious and industrial metals to equities. However, palladium's 43% peak to trough price fall in February/March, more dramatic than other precious and industrial metals, bar rhodium (-60%), has been driven more by physical purchasing for vehicle manufacture in China than by investors.

Chinese automaker physical palladium purchases were key to 2019's price surge, driven by the implementation of strict China 6 emissions standards. **In January/February 2020, Chinese passenger car production fell 48% year-on-year and stopped automaker palladium purchases. However, in March Chinese automaker output returned to pre-COVID-19 levels, resulting in spot buying to meet higher current loadings and a rapid price rebound.**

Changes in investor positioning in palladium, in futures and physically-backed ETFs, were not significant in palladium's 2019 price rise, nor in the March 2020 collapse. The fall in NYMEX money manager length, from its peak in 2018, and steady palladium ETF sales since 2015, had little impact on palladium's steady price rise. Palladium's limited liquidity, and hard to determine value, price floors and ceilings kept investors away.

The COVID-19 pandemic prompted a flight to cash with gold sales initially used to cover equity margin calls



Money managers cut long positions as Pd rallied in Jan/Feb; limited changes when prices fell in March



Because over 90% of palladium mine supply is as a by-product to platinum and nickel mining, mining investment decisions typically follow the platinum and nickel markets. Consequently, palladium supply is unresponsive to the palladium price. Palladium mine supply has fallen by 6.3% over the last decade, with no new supply expected until 2025.

Palladium's primary use (>80%) has been historically as a cost-effective alternative to platinum in automotive applications. The platinum price sets the long-term "value" of platinum's next best alternative product in automotive catalysis; palladium, now interchangeable on a 1:1 mass basis.

The current sharply contrasting palladium and platinum prices, and extreme palladium market tightness, suggests demand rebalancing is inevitable, if not already underway.

Trevor Raymond
Director of Research
+44 203 696 8772
traymond@platinuminvestment.com

David Wilson
Manager, Investment Research
+44 203 696 8786
dwilson@platinuminvestment.com

Brendan Clifford
Manager, Investor Development
+44 203 696 8778
bclifford@platinuminvestment.com

World Platinum Investment Council
www.platinuminvestment.com
64 St James's Street
London SW1A 1NF

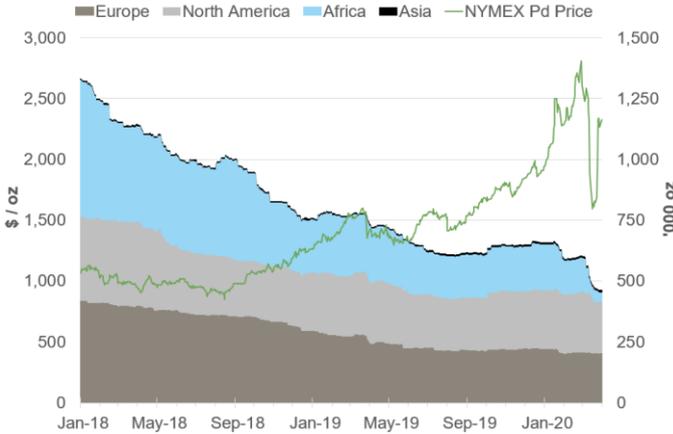
April 2020

Palladium's ongoing sustained deficits maintain the impetus for platinum substitution

Platinum's attraction as an investment asset arises from:

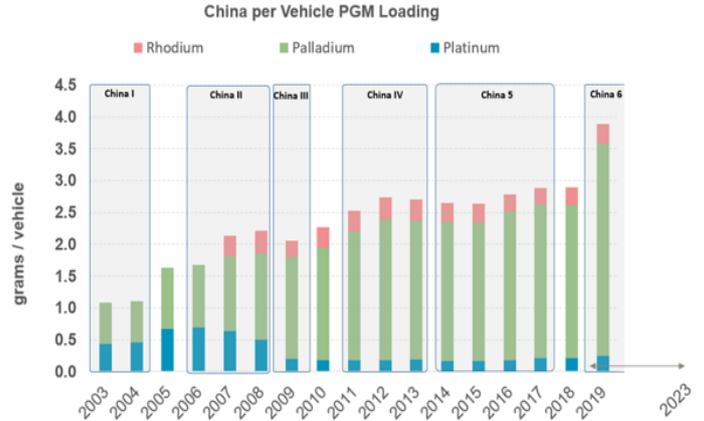
- Supply is relatively constrained with limited investment in new platinum group metal (PGM) mines
- Platinum price is near all-time lows relative to gold and at record lows relative to palladium
- Total PGM demand growth should continue due to increasingly restrictive emissions rules
- Market balance and price mismatches between palladium and platinum is driving substitution
- Investment demand has surged as institutions act on low price and strong demand growth potential

Figure 1: Palladium ETFs divested consistently since 2015, a trend which accelerated in 2020, -30% YTD



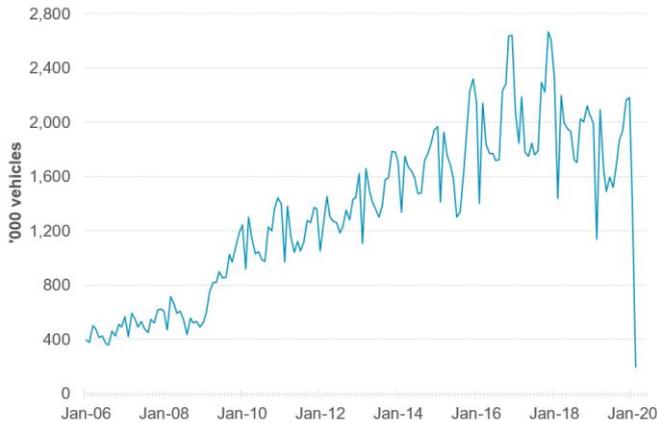
Source: Bloomberg, WPIC Research (Data as of Mar 31st, 2020)

Figure 2: Automotive Pd demand rose by 10% (895 koz) due to the implementation of China 6 standards in 2019



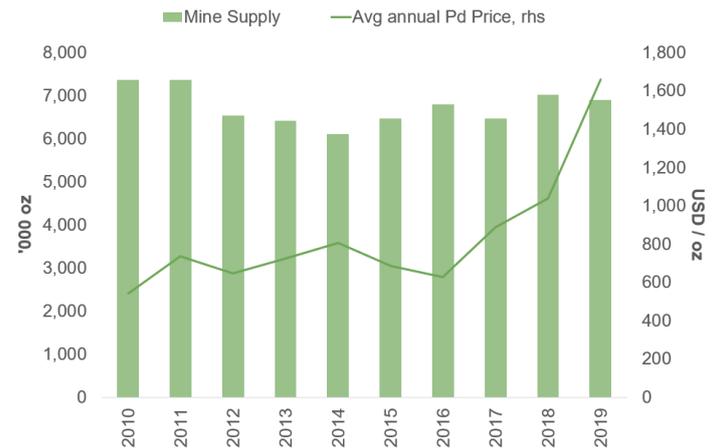
Source: Johnson Matthey, WPIC Research

Figure 3: Chinese Jan/Feb-20 car output fell 48% yoy. In March car production is back at pre-COVID-19 levels with car sales stimulus and spot buying in China



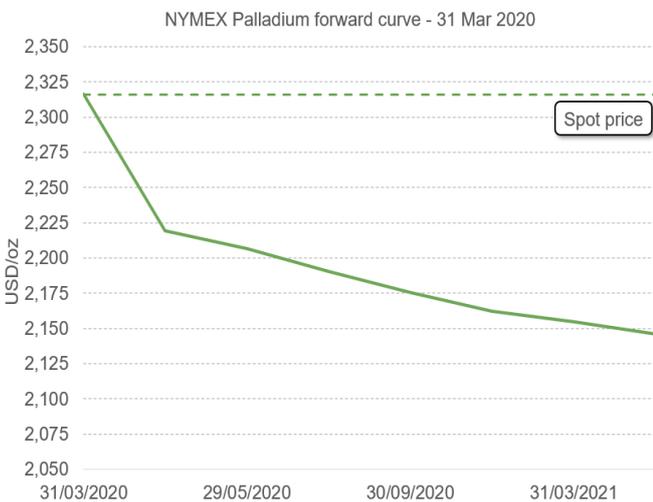
Source: China Automotive information Net, WPIC Research

Figure 4: Palladium's price rally has not incentivised new mine supply, volumes have fallen by 6.3% since 2010



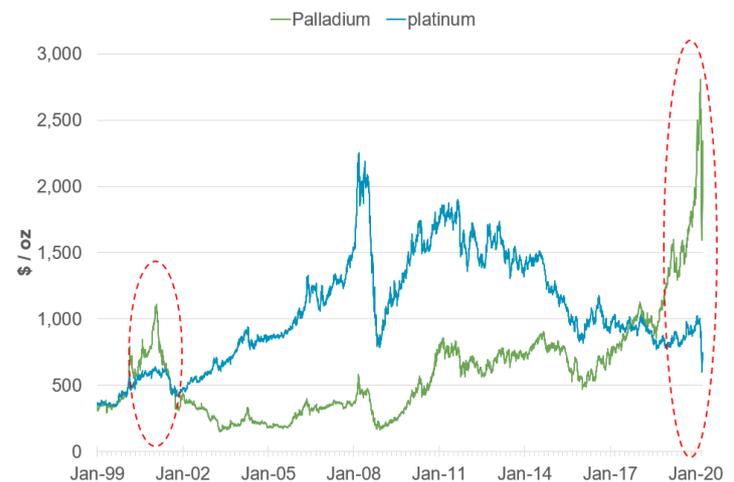
Source: Johnson Matthey, Bloomberg, WPIC Research

Figure 5: Pd forward curve: in backwardation for 35 months, highlighting the severe lack of ingot and sponge



Source: Bloomberg, WPIC Research

Figure 6: Palladium's continued price premium to platinum enhances the financial incentive for substitution. Like 2008 Pt for Pd substitution but more severe due to China 6



Source: Bloomberg, WPIC Research (Data as of Mar 31st, 2020 – Pd premium to Pt: \$1,621/oz)

IMPORTANT NOTICE AND DISCLAIMER: This publication is general and solely for educational purposes. The publisher, The World Platinum Investment Council, has been formed by the world's leading platinum producers to develop the market for platinum investment demand. Its mission is to stimulate investor demand for physical platinum through both actionable insights and targeted development: providing investors with the information to support informed decisions regarding platinum; working with financial institutions and market participants to develop products and channels that investors need.

This publication is not, and should not be construed to be, an offer to sell or a solicitation of an offer to buy any security. With this publication, the publisher does not intend to transmit any order for, arrange for, advise on, act as agent in relation to, or otherwise facilitate any transaction involving securities or commodities regardless of whether such are otherwise referenced in it. This publication is not intended to provide tax, legal, or investment advice and nothing in it should be construed as a recommendation to buy, sell, or hold any investment or security or to engage in any investment strategy or transaction. The publisher is not, and does not purport to be, a broker-dealer, a registered investment advisor, or otherwise registered under the laws of the United States or the United Kingdom, including under the Financial Services and Markets Act 2000 or Senior Managers and Certifications Regime or by the Financial Conduct Authority.

This publication is not, and should not be construed to be, personalized investment advice directed to or appropriate for any particular investor. Any investment should be made only after consulting a professional investment advisor. You are solely responsible for determining whether any investment, investment strategy, security or related transaction is appropriate for you based on your investment objectives, financial circumstances and risk tolerance. You should consult your business, legal, tax or accounting advisors regarding your specific business, legal or tax situation or circumstances.

The information on which this publication is based is believed to be reliable. Nevertheless, the publisher cannot guarantee the accuracy or completeness of the information. This publication contains forward-looking statements, including statements regarding expected continual growth of the industry. The publisher notes that statements contained in the publication that look forward in time, which include everything other than historical information, involve risks and uncertainties that may affect actual results. The logos, services marks and trademarks of the World Platinum Investment Council are owned exclusively by it. All other trademarks used in this publication are the property of their respective trademark holders. The publisher is not affiliated, connected, or associated with, and is not sponsored, approved, or originated by, the trademark holders unless otherwise stated. No claim is made by the publisher to any rights in any third-party trademarks

WPIC Research MiFID II Status

The World Platinum Investment Council (WPIC) has undertaken an internal and external review of its content and services for MiFID II. As a result, WPIC highlights the following to the recipients of its research services, and their Compliance/Legal departments:

WPIC research content falls clearly within the Minor Non-Monetary Benefit Category and can continue to be consumed by all asset managers free of charge. WPIC research can be freely shared across investment organisations.

1. WPIC does not conduct any financial instrument execution business. WPIC does not have any market making, sales trading, trading or share dealing activity. (No possible inducement).
2. WPIC content is disseminated widely and made available to all interested parties through a range of different channels, therefore qualifying as a "Minor Non-Monetary Benefit" under MiFID II (ESMA/FCA/AMF). WPIC research is made freely available through the WPIC website. WPIC does not have any permissioning requirements on research aggregation platforms.
3. WPIC does not, and will not seek, any payment from consumers of our research services. WPIC makes it clear to institutional investors that it does not seek payment from them for our freely available content.

More detailed information is available on the WPIC website:

<http://www.platinuminvestment.com/investment-research/mifid-ii>