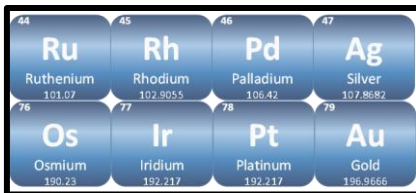


Precious Metals Basket Market Overview Since 2019



⁴⁴ Ru Ruthenium 101.07	⁴⁵ Rh Rhodium 102.9055	⁴⁶ Pd Palladium 106.42	⁴⁷ Ag Silver 107.8682
⁷⁶ Os Osmium 190.23	⁷⁷ Ir Iridium 192.217	⁷⁸ Pt Platinum 192.217	⁷⁹ Au Gold 196.9666

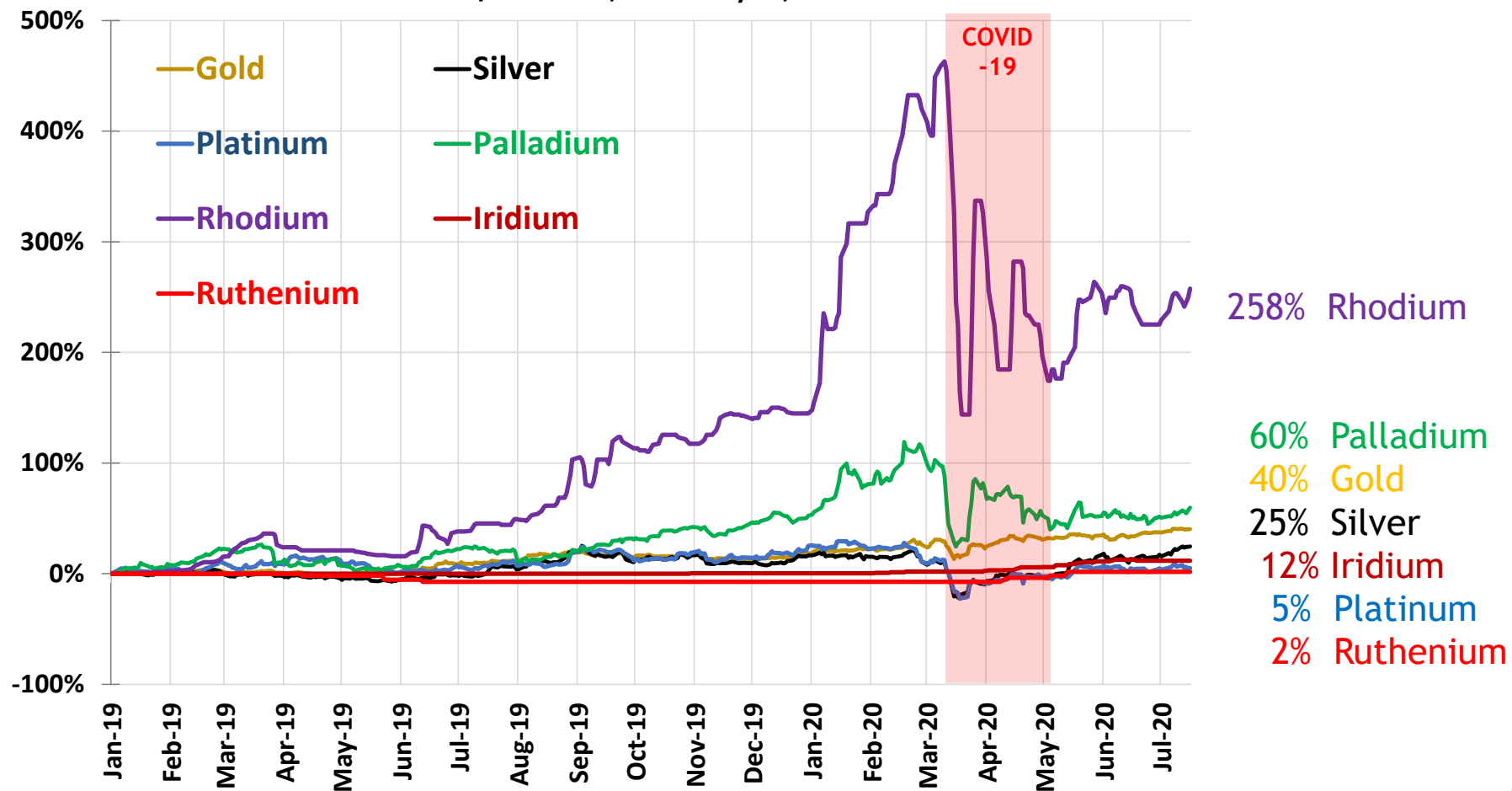
July 18, 2020

By: Precious Metals Commodity Management LLC

Basket Fix Comparison Since January 2019

Comparative Fix Change - Jan 2019 Baseline

BASF USD/Toz - Jan 1, 2019 - July 17, 2020



Ru	Rh	Pd	Ag
Ruthenium	Rhodium	Palladium	Silver
101.07	102.80	106.42	107.86
Os	Ir	Pt	Au
Osmium	Iridium	Platinum	Gold
192.22	192.22	192.22	192.22

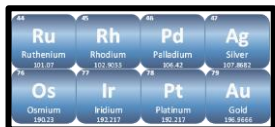
Precious Metals Commodity Management LLC

July 18, 2020

Since January 2019

- ▶ **Rhodium (+258%)** and **Palladium(+60%)** has enjoyed the biggest climb due to their structural deficit serving primarily the auto emission control catalyst materials markets.
- ▶ **Gold (+40%)** and **Silver (+25%)** have enjoyed a boost more recently in 2020, especially post the March-April 2020 COVID-19 market impact.
- ▶ PGM Minor **Iridium (+12%)** is on the climb in 2020 due solely to industrial demand and South African Mining disruptions.
- ▶ **Platinum (+5%)** has enjoyed a bit of an investors driven boost in demand, but is also suffering from mining disruptions.
- ▶ **Ruthenium (+2%)** has had an up and down ride.

Let's quickly look at each one and key ratios and relationships.



Ru Ruthenium 44 101.07	Rh Rhodium 45 102.9055	Pd Palladium 46 106.42	Ag Silver 47 107.8682
Os Osmium 76 190.23	Ir Iridium 77 192.222	Pt Platinum 78 195.084	Au Gold 79 196.9665

Precious Metals Commodity Management LLC

July 18, 2020

3

Gold

Minimal March-April 2020 COVID-19 Impact. V-shaped recovery was very quick followed by continued climb. Gold has much more upside potential.

Supply Highlights: Gold is a finite resource who's mined quantities will decline over the next decade.

Demand Highlights:

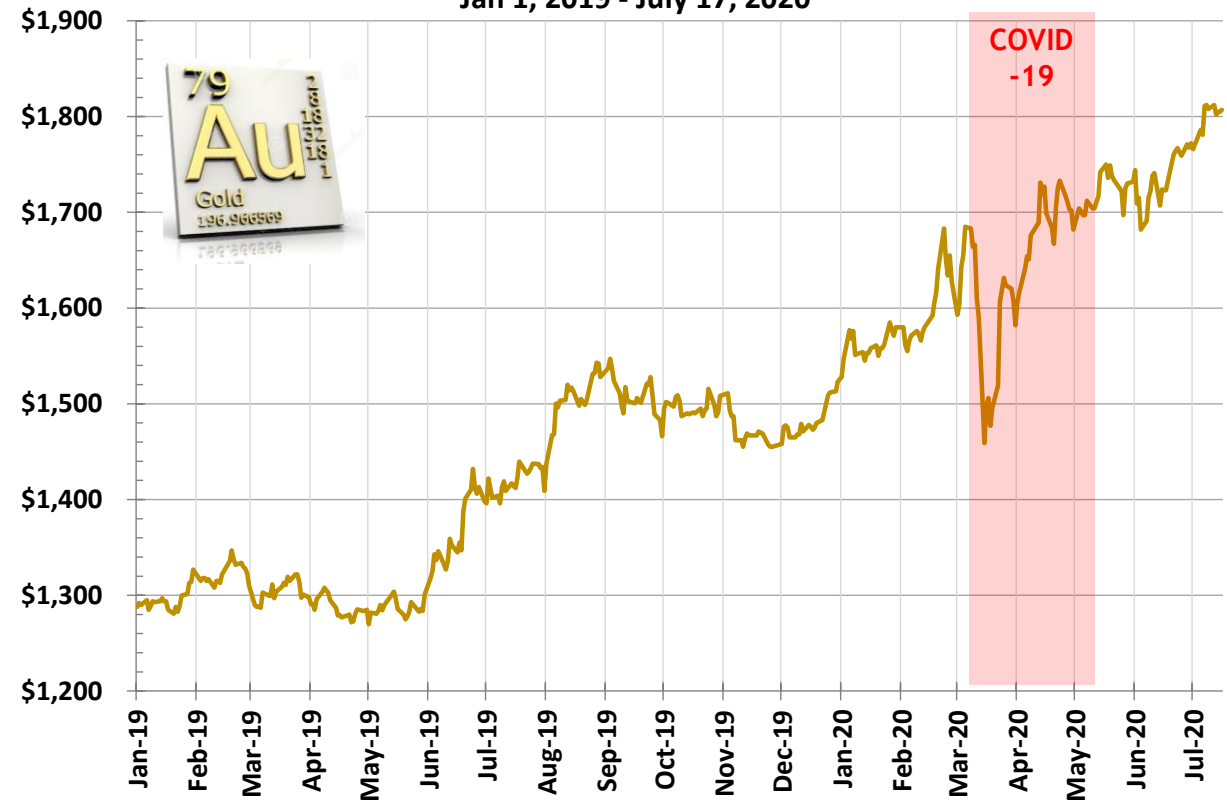
- ~44% **Investment** - keeps climbing in 2020. One short-term risk is that some central banks could liquidate positions to offset COVID-19 driven declining revenues.
- ~40% **Jewelry** - significant China/India 2020 Jewelry demand drop as gold prices climb.
- ~16% **Industrial** - including electronics, medical, drug therapy, and many more.

<small>44</small> Ru <small>Ruthenium</small> <small>101.07</small>	<small>45</small> Rh <small>Rhodium</small> <small>102.9053</small>	<small>46</small> Pd <small>Palladium</small> <small>106.42</small>	<small>47</small> Ag <small>Silver</small> <small>107.8682</small>
<small>76</small> Os <small>Osmium</small> <small>190.23</small>	<small>77</small> Ir <small>Iridium</small> <small>192.222</small>	<small>78</small> Pt <small>Platinum</small> <small>195.084</small>	<small>79</small> Au <small>Gold</small> <small>196.966569</small>

Precious Metals Commodity Management LLC

Gold Fix (BASF USD/Toz)

Jan 1, 2019 - July 17, 2020



July 18, 2020

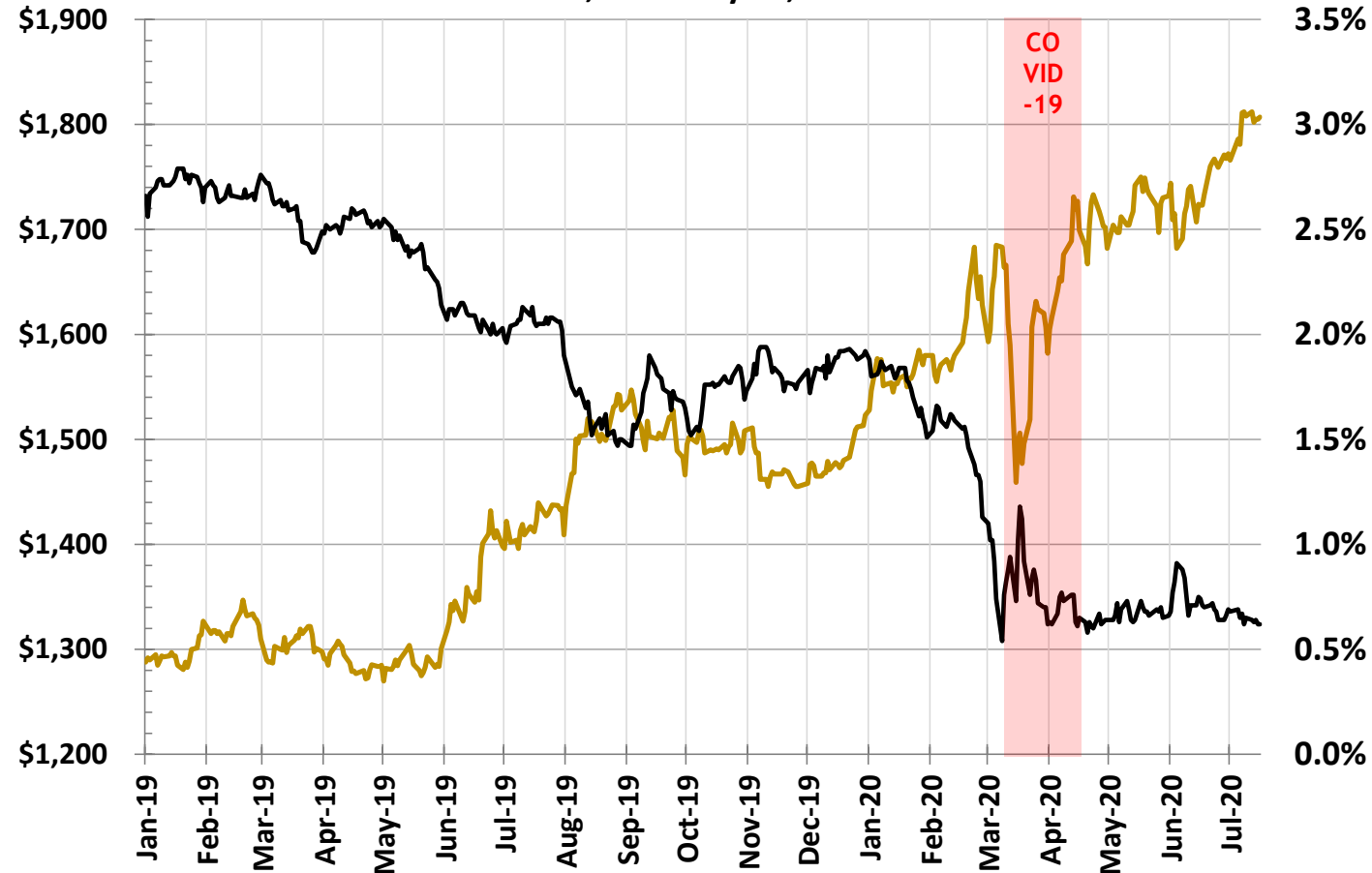
10-year Treasury Yield vs Gold Fix

Gold \$/Toz

Gold Fix & 10-Year Treasury Yield

Jan 1, 019 - July 17, 2020

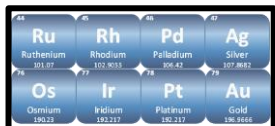
10-Yr.
Treasury



This inverse relationship with Gold and 10-year treasury bond rates has always been strong.

Are negative bond yield rates possible? Yes, occurring already in a number of countries

Gold has plenty of further upside based on global monetary policies as a result of COVID-19



Precious Metals Commodity Management LLC

July 18, 2020

5

Silver

Dramatic March-April 2020 COVID-19 Impact. Longer V-shaped recovery and recent climb.

Silver has more upside.

Supply Highlights: COVID mining disruptions in numerous countries will continue in Q3/4 2020.

Demand Highlights:

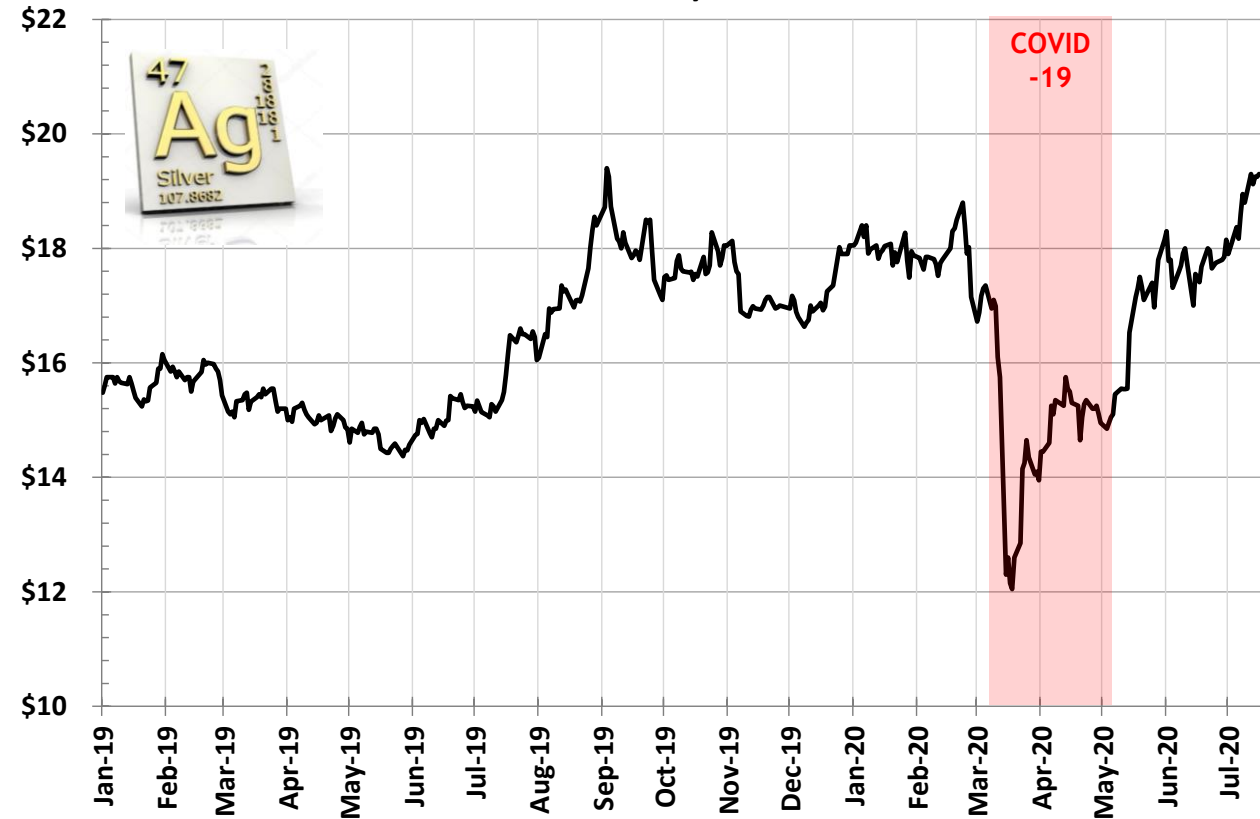
- ~25% Investment - climbing June/July 2020
- ~20% Jewelry
- ~55% Industrial - including Solar PV, electronics, printed electronics, ethylene oxide catalyst, solder materials, automotive.

Ru Ruthenium 44 101.07	Rh Rhodium 45 102.9053	Pd Palladium 46 106.42	Ag Silver 47 107.8682
Os Osmium 76 190.23	Ir Iridium 77 223.837	Pt Platinum 78 195.084	Au Gold 79 196.9665

Precious Metals Commodity Management LLC

Silver Fix (BASF USD/Toz)

Jan 1, 2019 - July 17, 2020

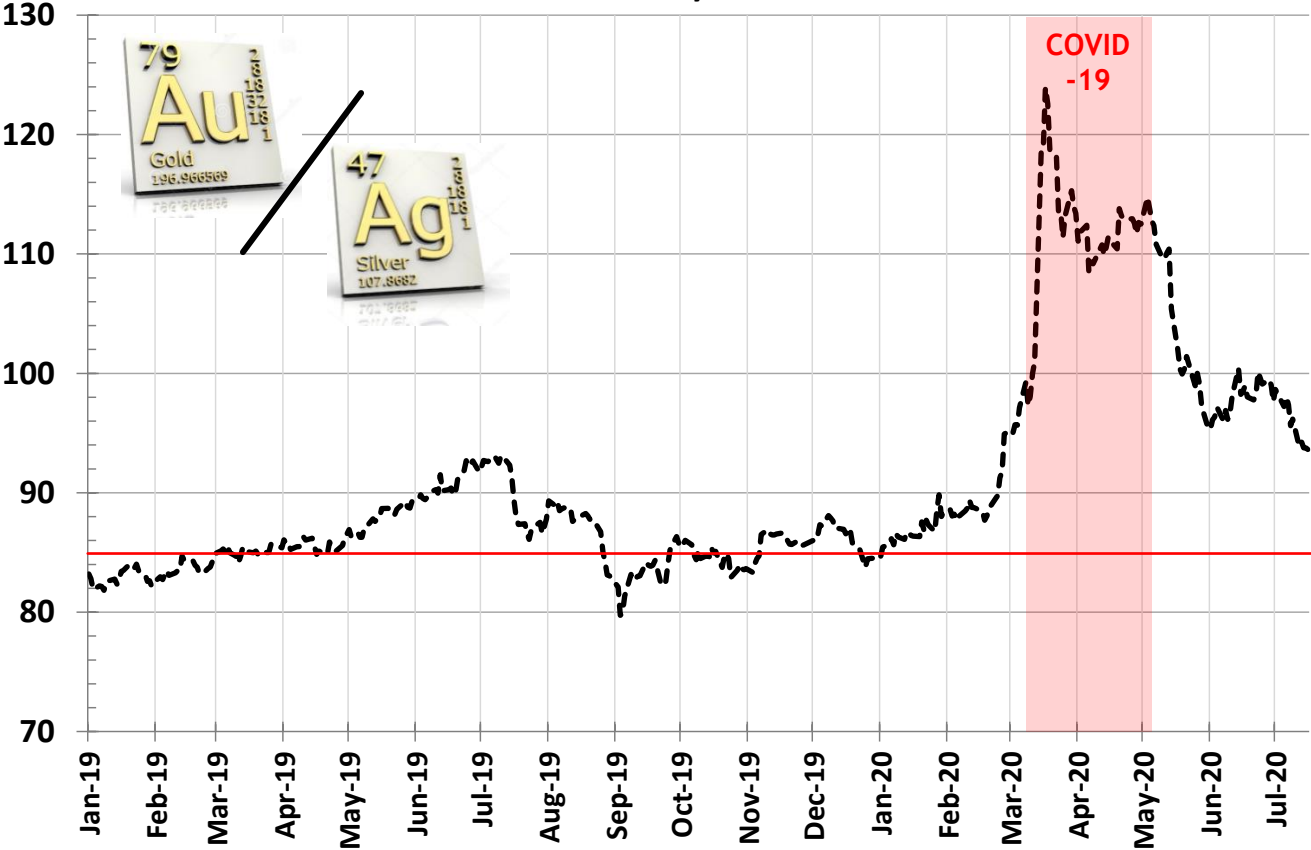


July 18, 2020

Gold/Silver Ratio

Gold/Silver Ratio (BASF USD/Toz)

Jan 1, 2019 - July 17, 2020



Dramatic March-April 2020 COVID-19 Impact as gold climbed. Now in June & July Silver gains finally bringing sanity to this ratio.

Today Au:Ag is still above of its long term historical normal range of 20 to 85.



Ru	Rh	Pd	Ag
Ruthenium	Rhodium	Palladium	Silver
101.07	102.9053	106.42	107.8682
Os	Ir	Pt	Au
Osmium	Iridium	Platinum	Gold
192.22	223.217	195.084	196.966899

Precious Metals Commodity Management LLC

July 18, 2020

Platinum

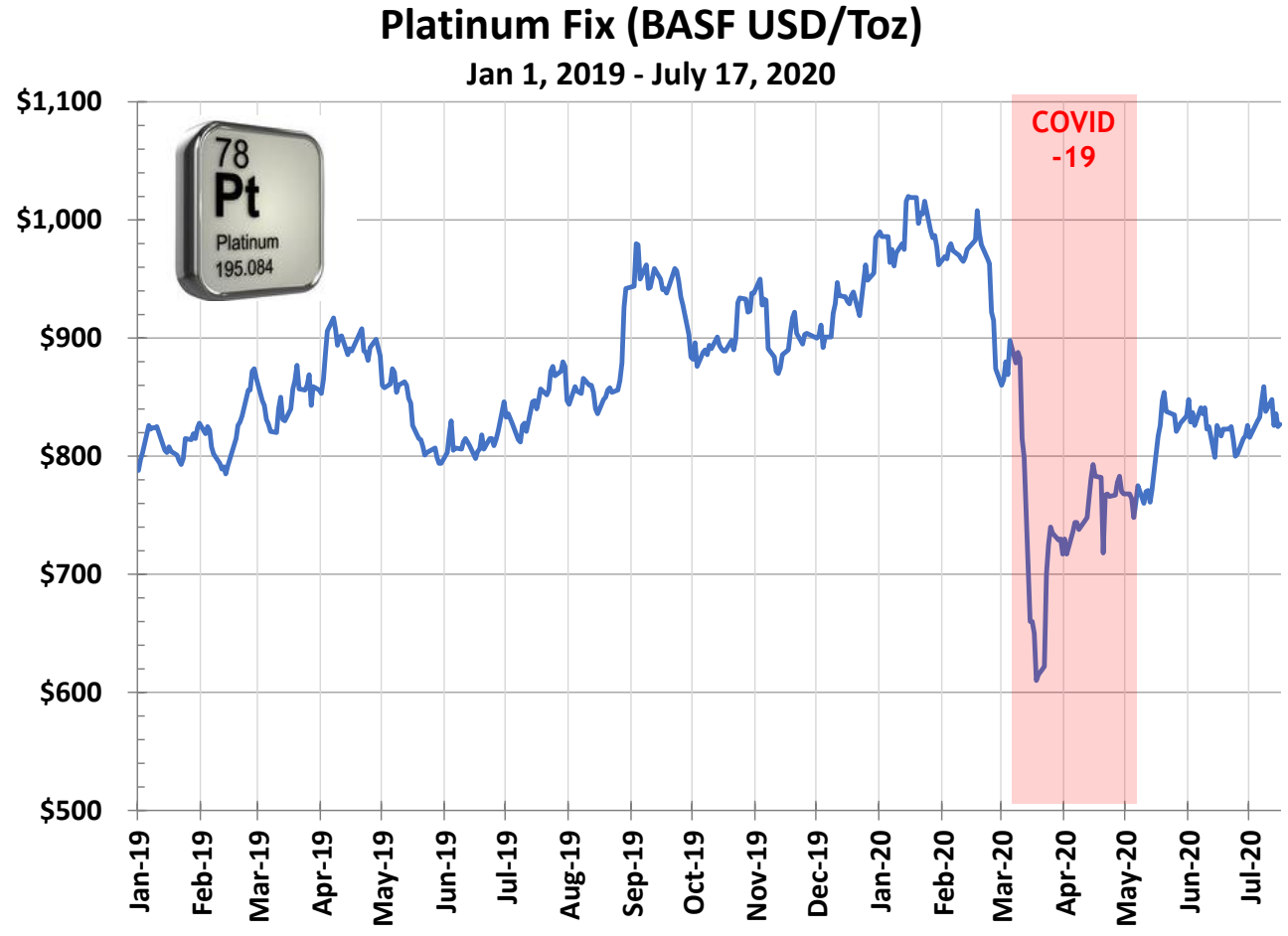
Dramatic March-April 2020
COVID-19 Impact.

L-shaped recovery.

Supply Highlights: Clearly COVID
related impacts in 2020 will limit
supply.

Demand Highlights:

- ~25% Jewelry - is down in 2020
- ~25% Investment
- ~50% Industrial including 36%
for auto catalyst materials,
electronics, electrochemical,
petroleum, and medical



Ru Ruthenium 44 101.07	Rh Rhodium 45 102.9053	Pd Palladium 46 106.42	Ag Silver 47 107.8652
Os Osmium 76 190.23	Ir Iridium 77 222.17	Pt Platinum 78 195.084	Au Gold 79 196.9665

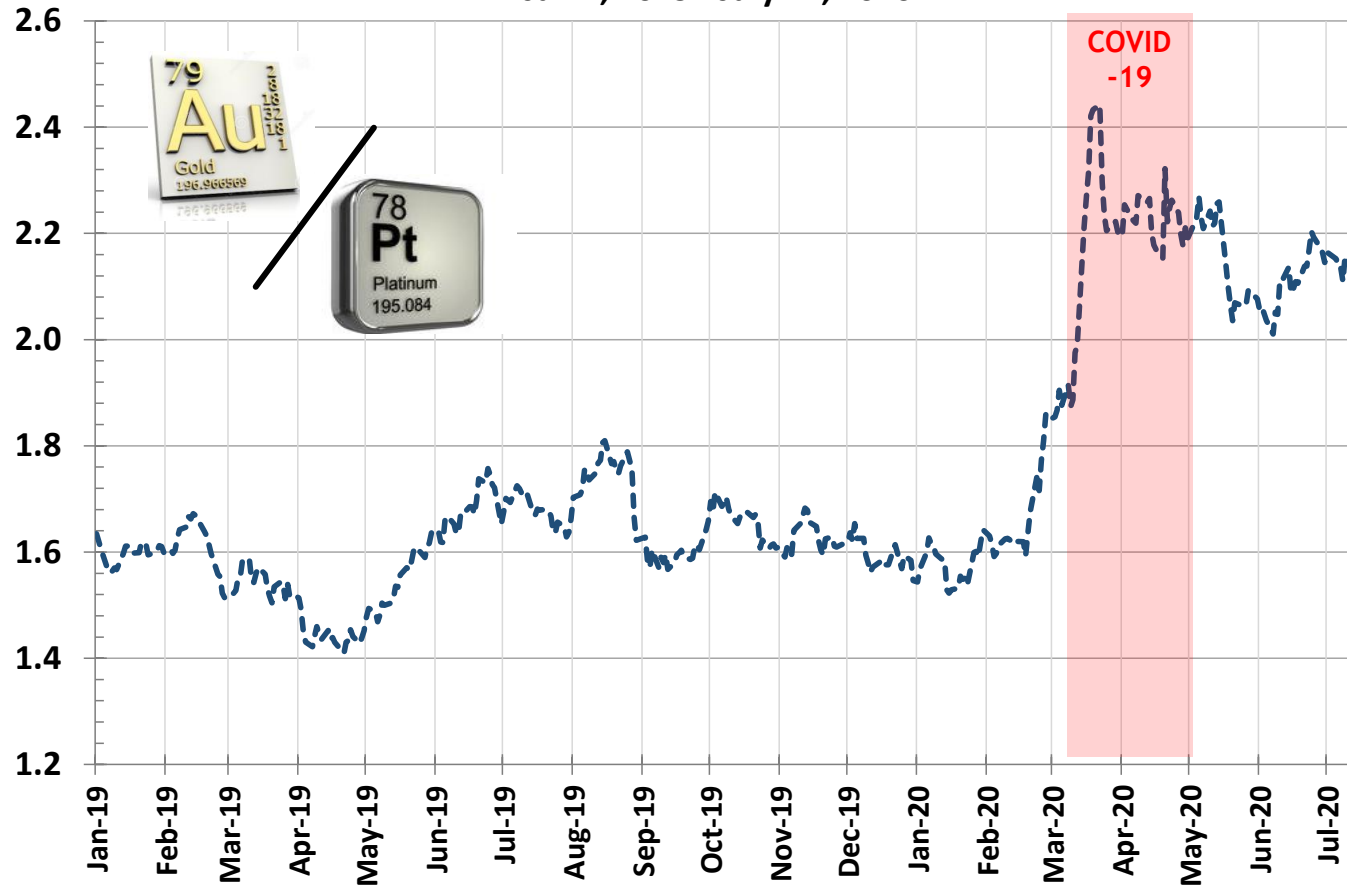
Precious Metals Commodity Management LLC

July 18, 2020

Gold/Platinum Ratio

Gold/Platinum Ratio (BASF USD/Toz)

Jan 1, 2019 - July 17, 2020



Dramatic March-April 2020 COVID-19 Impact.

Gold and platinum headed in different directions around the COVID-19 timeframe.

Ru	Rh	Pd	Ag
Ruthenium	Rhodium	Palladium	Silver
44	45	46	47
Os	Ir	Pt	Au
Osmium	Iridium	Platinum	Gold
76	77	78	79

Precious Metals Commodity Management LLC

July 18, 2020

Palladium

Dramatic March-April 2020 COVID-19 Impact.

L-shaped recovery. Full recovery is very dependent on global auto sales response as Pd projected to remain in supply deficit for a few more years.

Supply Highlights: Clearly COVID related impacts in 2020 will limit supply. Recent Nornickel diesel spill impacts on Q3 output are very unclear.

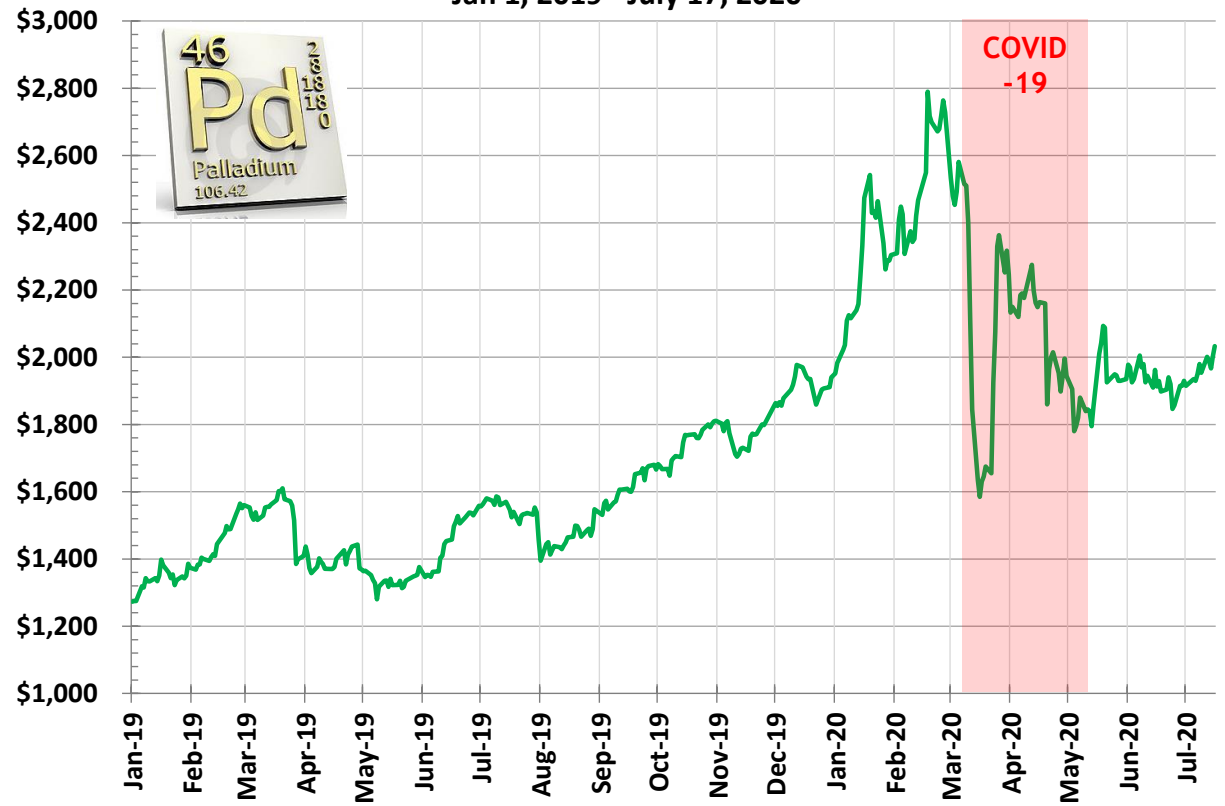
Demand Highlights:

- ~20% Jewelry - is down in 2020
- ~10% Investment
- ~70% Industrial including huge % auto catalyst materials, electronics, electrochemical, petroleum, and medical

Ru Ruthenium 44 101.07	Rh Rhodium 45 102.9053	Pd Palladium 46 106.42	Ag Silver 47 107.8682
Os Osmium 76 190.23	Ir Iridium 77 192.222	Pt Platinum 78 195.084	Au Gold 79 196.9665

Palladium Fix (BASF USD/Toz)

Jan 1, 2019 - July 17, 2020



Precious Metals Commodity Management LLC

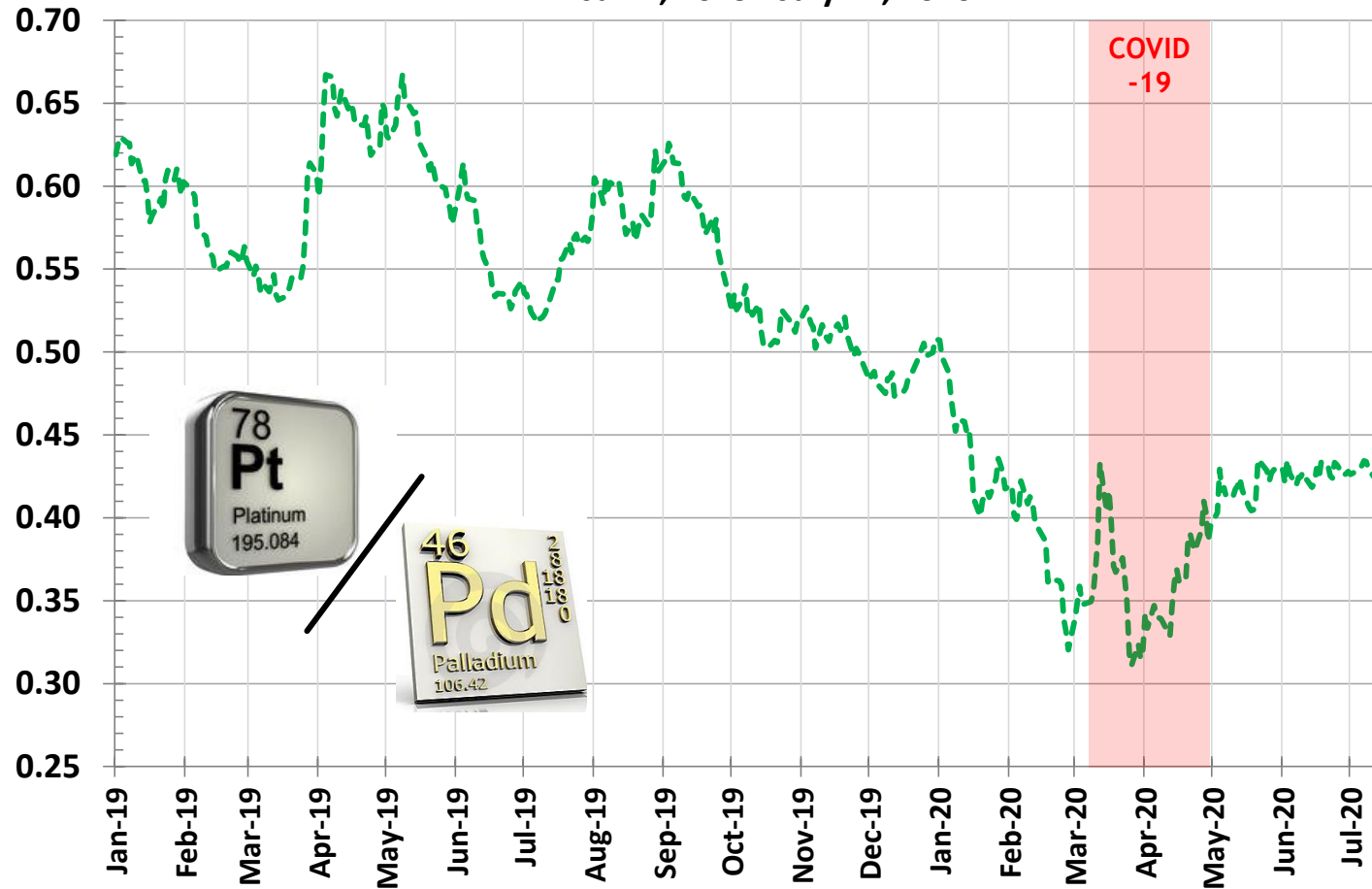
July 18, 2020

10

Platinum/Palladium Ratio

Platinum/Palladium Ratio (BASF USD/Toz)

Jan 1, 2019 - July 17, 2020



Small March-April 2020
COVID-19 Impact.

Platinum holding near
bottom resistance
levels while palladium
poised to begin climb
again.

Ru	Rh	Pd	Ag
Ruthenium	Rhodium	Palladium	Silver
44	45	46	47
101.07	102.905	106.42	107.865
Os	Ir	Pt	Au
Osmium	Iridium	Platinum	Gold
190.23	222.17	195.084	196.966

Precious Metals Commodity Management LLC

July 18, 2020

11

Rhodium

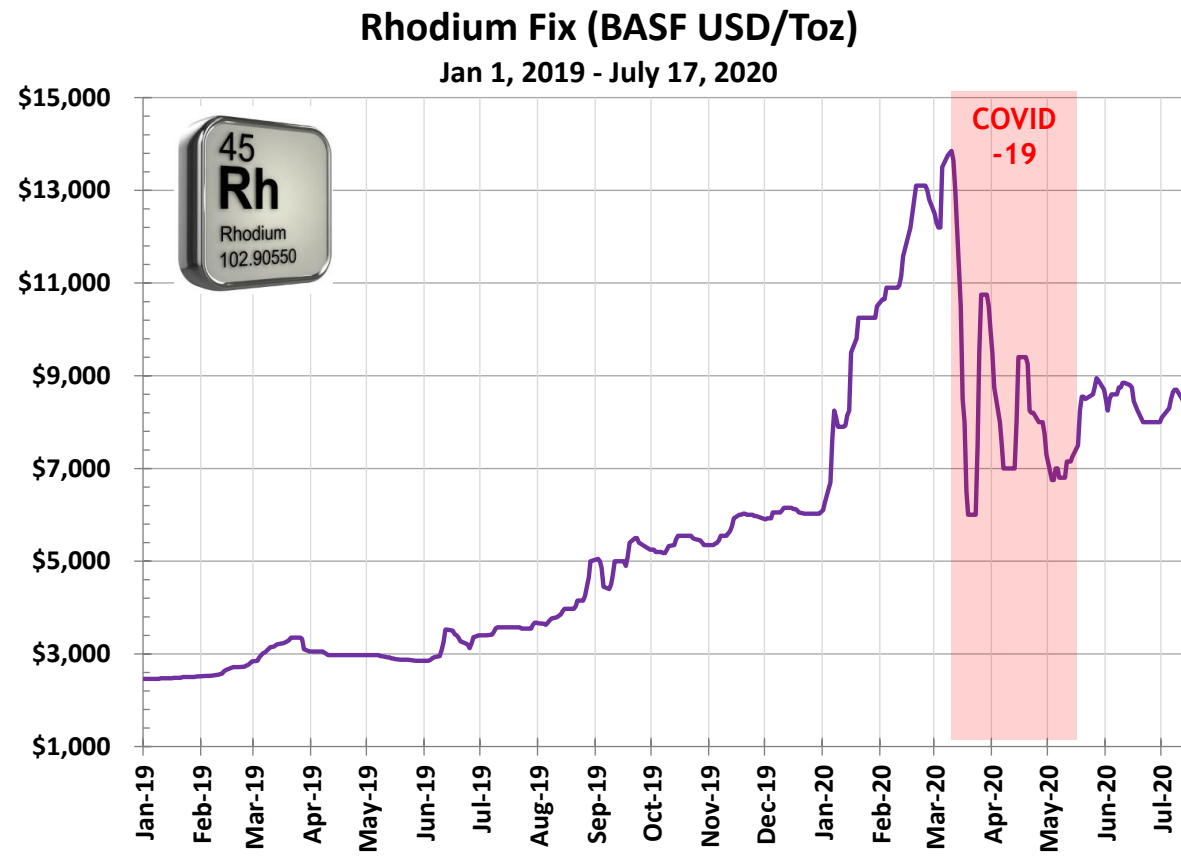
Dramatic March-April 2020 COVID-19 Impact. Response post COVID-19 is paced by global auto sales.

L-shaped recovery.

Supply Highlights S. African PGM Western Limb mining declines dramatically hurt future mined supply.

Demand Highlights -

- **Automotive Demand** is currently weak although with recovery will remain in **structural deficit**: Emission Control Catalyst /NOx Control - with little sign of design alternatives staged.
- **Glass Production**: Pt/Rh alloys used in glass and glass fiber production systems.



Ru	Rh	Pd	Ag
Ruthenium	Rhodium	Palladium	Silver
101.07	102.9055	106.42	173.86
Os	Ir	Pt	Au
Osmium	Iridium	Platinum	Gold
190.23	222.17	193.17	193.17

Precious Metals Commodity Management LLC

July 18, 2020

12

Iridium

Zero March-April 2020 COVID-19 Impact.
2020 climb independent response to supply/demand fundamentals.

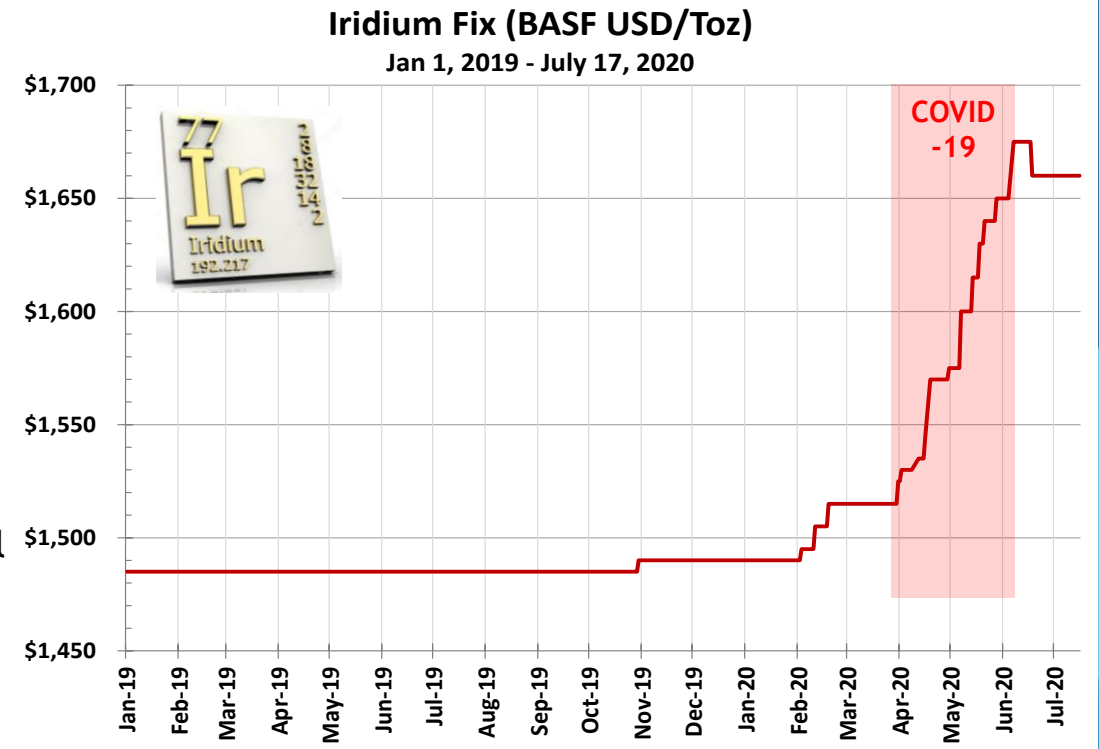
Supply Highlights - S. African PGM Western & Eastern Limb mining declines likely to reduce future mined supply. Near term continued COVID-19 mining disruptions will further impact Iridium supply.

Demand Highlights -

- **Electronics demand is strong:** Crucibles for LED's, OLED IrCl Materials, and SAW/BAW Filter demand will explode with 5G expansion.
- **Automotive Demand is currently weak:** Iridium and Pt/Ir Tipped Spark Plugs
- **Electrochemical Demand is going to grow long-term:** Chlor-Alkali Industry, Waste Water Treatment, Hydrogen Electrolysis Catalyst Materials, Marine Ballast Waste Water Management
- **Chemical Demand is also growing:** Acetic Acid
- **Medical Demand Is Growing:** Radioactive Isotopes for medical imaging.

Ru Ruthenium 44 101.07	Rh Rhodium 45 102.9055	Pd Palladium 46 106.42	Ag Silver 47 107.8682
Os Osmium 76 190.23	Ir Iridium 77 192.217	Pt Platinum 78 195.084	Au Gold 79 196.9665

Precious Metals Commodity Management LLC



July 18, 2020

Ruthenium

Positive March-April 2020 COVID-19 Impact. 2020 climb due to supply/demand fundamentals.

Supply Highlights - S. African PGM Western Limb mining declines dramatically hurt future mined supply.

Demand Highlights -

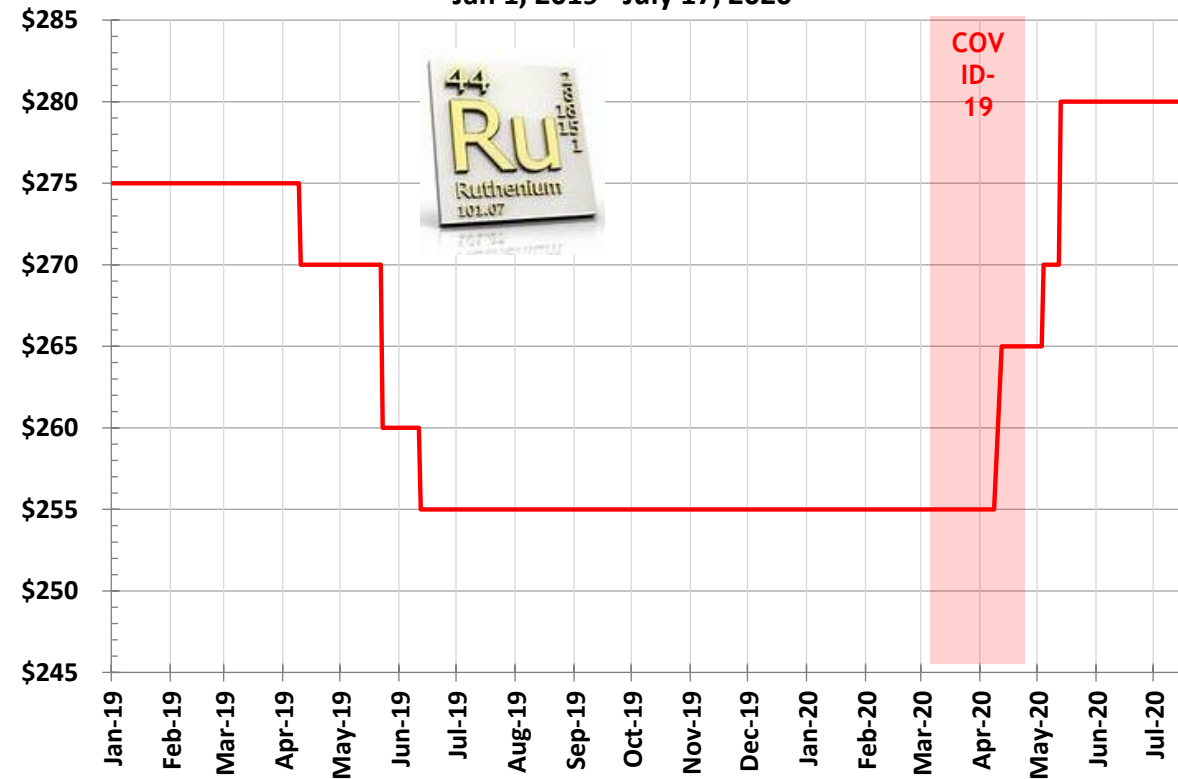
- **Electronics demand is strong:** Thick Film Resistors, Data Storage HDD's, MEMS Sensors, and future Non-Volatile memories including SST-MRAM.
- **Automotive Demand is currently weak:** Ruthenium Spark Plugs and Electrochromic Coatings
- **Electrochemical Demand is going to grow long-term:** Chlor-Alkali Industry, Waste Water Treatment, and Hydrogen Electrolysis Catalyst Materials
- **Chemical Demand is also growing:** Caprolactam / Nylon 6 Filament, Acetic Acid, Fertilizer/Ammonia Catalyst.

Ru Ruthenium 44 101.07	Rh Rhodium 45 102.9055	Pd Palladium 46 106.42	Ag Silver 47 107.8682
Os Osmium 76 190.23	Ir Iridium 77 192.222	Pt Platinum 78 195.084	Au Gold 79 196.9665

Precious Metals Commodity Management LLC

Ruthenium Fix (BASF USD/Toz)

Jan 1, 2019 - July 17, 2020



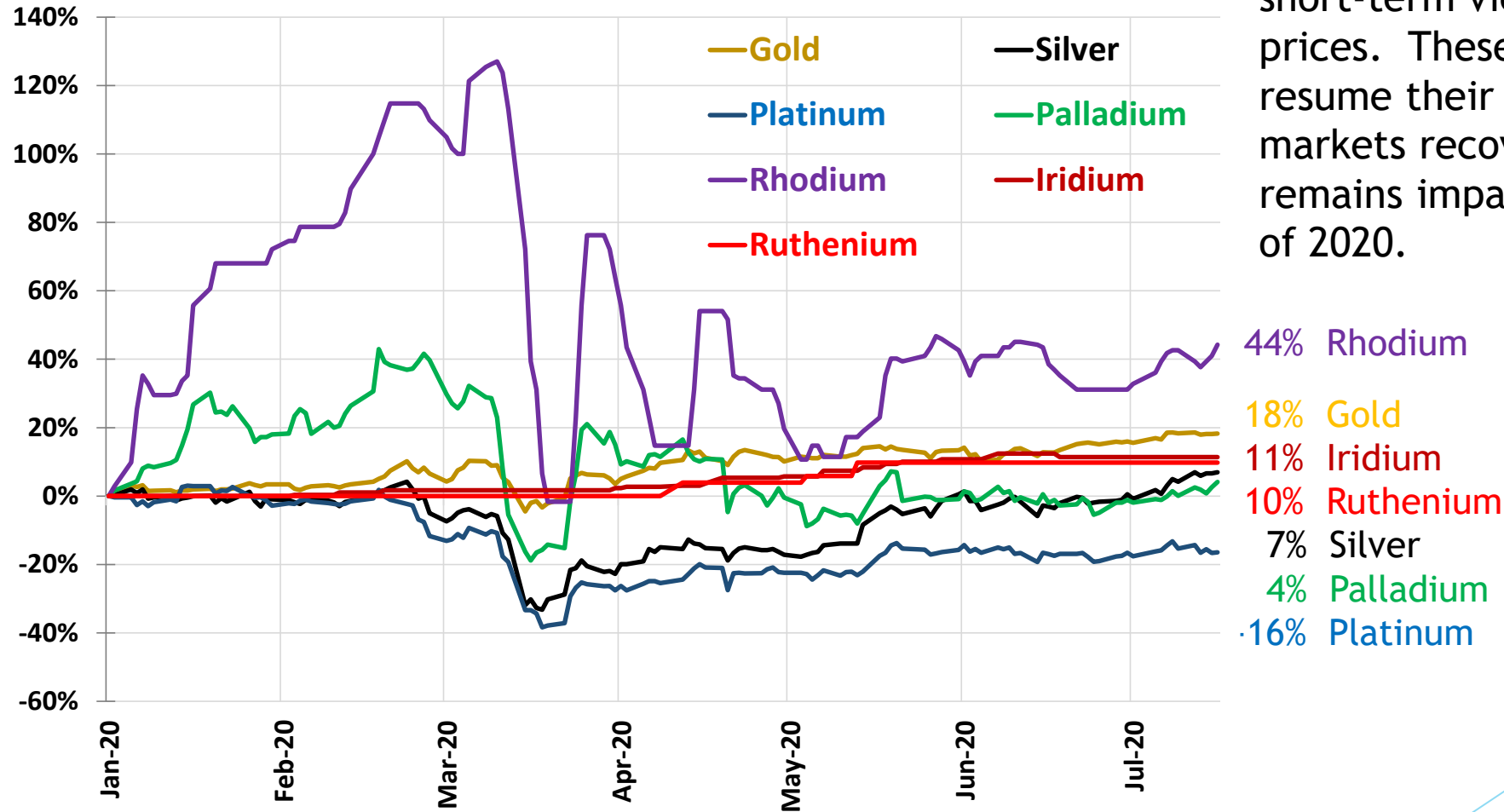
July 18, 2020

14

Precious Metals Basket 2020 YTD

Comparative Fix Change - Jan 2020 Baseline

BASF USD/Toz - Jan 1, 2020 - July 17, 2020

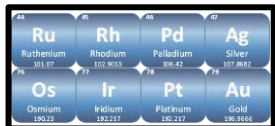


Don't be deterred by the short-term view of the basket prices. These should largely resume their trajectories as markets recover and mining remains impacted through 2H of 2020.

Ru	Rh	Pd	Ag
Ruthenium	Rhodium	Palladium	Silver
91.07	102.90	90.42	177.86
Os	Ir	Pt	Au
Osmium	Iridium	Platinum	Gold
95.03	92.17	93.27	183.55

2020 2nd Half Outlook

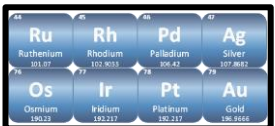
- ▶ **Rhodium and Palladium:** Continued recovery of global auto sales will begin to put more pressure on Rhodium and Palladium, resuming their structural deficit positions. Recall the S. African mining sector is struggling to maintain 75% of the previous baseline output due to COVID-19 protocols. Much of the mining sector work in progress has been processed leaving remaining Q3/4 2020 supply wholly depending on the rate of mining.
- ▶ **Gold:** Continued climb of Gold as weakening of currencies and global monetary policies continue to react to the COVID-19 pandemic. Further US stimulus is expected, and further reduction in the 10-year treasury rates.
- ▶ **Silver:** Additional upside to Silver and further investment spurs additional gains. Silver will benefit from investment perception of growth in the Solar PV segment which accounts for a full 10% of the global supply. Further impacts to mined supply are continuing.
- ▶ **Iridium:** Demand has resumed quite nicely, again putting pressure on mined supply from S. African. Expect to see both climb. SAW and BAW filter demand for 5G as well as new marine ballast waste water treatment demand will help keep pressure on this PGM Minor metal.
- ▶ **Ruthenium:** Industrial demand has resumed quite nicely, again putting pressure on mined supply from S. African. Expect to see both climb.
- ▶ **Platinum:** Look for a fairly flat remainder in the platinum price through December. Newly announced Green Hydrogen Electrolysis projects and future auto catalyst Pd → Pt design swaps should help support platinum demand beyond 2020.



Ru Ruthenium 101.07	Rh Rhodium 102.9055	Pd Palladium 106.42	Ag Silver 107.8682
Os Osmium 190.23	Ir Iridium 222.17	Pt Platinum 195.084	Au Gold 196.9665

Disclaimer

- ▶ Precious Metals Commodity Management LLC works to ensure the accuracy of the information and materials contained in this report, but makes no warranty as to accuracy, completeness for any particular purpose. PMCM LLC accepts no liability whatsoever in respect of reliance placed by the user on information and materials contained in this report, which are utilized expressly at the user's own risk.
- ▶ A decision to invest in any regulated precious metal related products or any other regulated products, securities or investments should not be made in reliance on any of the information or materials in this report. Before making any investment decision, prospective investors should seek advice from their financial, legal, tax and accounting advisers, take into account their individual financial needs and circumstances and carefully consider the risks associated with such investment decisions. This report does not, and should not be construed as acting to, sponsor, advocate, endorse or promote any regulated precious metal related products or any other regulated products, securities or investments.



<small>44</small> Ru Ruthenium <small>101.07</small>	<small>45</small> Rh Rhodium <small>102.9055</small>	<small>46</small> Pd Palladium <small>106.42</small>	<small>47</small> Ag Silver <small>107.8682</small>
<small>76</small> Os Osmium <small>190.23</small>	<small>77</small> Ir Iridium <small>192.222</small>	<small>78</small> Pt Platinum <small>195.084</small>	<small>79</small> Au Gold <small>196.9665</small>

44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver
76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold

Precious Metals Commodity Management LLC

PM Market Research, Hedging Strategies, Thrifting Strategies, Trading Support, Risk Management

Utilizing extensive experience in the Precious Metals Commodity markets to help clients make better decision, reduce costs, drive thrifting activities, improve trading performance, reduce risks, create and implement hedging strategies.

M F METALS FOCUS

Heraeus

The Global Source
THE SILVER INSTITUTE

DE NORA

**RED FOX
RESOURCES**

**GENTEX
CORPORATION**

**PLATINUM
GROUP
METALS**

IRF



CORMETECH
RELIABILITY. DELIVERED.

44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver
76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold

Precious Metals Commodity Management LLC

July 18, 2020

18

Overview:

Precious Metals Commodity Management LLC

<https://www.PreciousMetalsCommodityManagement.com/>



**Providing a Wide Range Of Consulting, Market Reports & Insights,
Coupled With Supply Chain Expertise**

Consulting Services

- Market Research - client specific market reports
- Supply Chain Development
- Total Cost Of Ownership Reporting Systems
- Thrifting - Mapping cost down plans
- Risk Mitigation - construction of a system/process
- Trading - demonstration, training, and facilitation
- Hedging - establishing systems to reduce market risks
- Forecasting - providing foundation to trading activities
- Strategy Development - training industrial users on how to put it all together
- Industry contacts - making the right connections

Market Reports

- Supply & Demand Fundamentals:
 - Gold, Silver, Platinum, Palladium, Rhodium, Ruthenium, Iridium
- Subscription Service to Quarterly Deep Dive Reports on select metals.
- Price Forecasting
- Industrial Demand Details
 - Auto Catalyst Demand
 - Fuel Cell Technologies and Electrolysis
 - Semiconductor
 - Flexible / Printed Electronics & Automotive Electronics
 - Hard Disk Drive
 - Advanced Pharmaceutical Ingredients
 - Catalyst - Petrol, Ammonia, Fertilizer
 - Chlor-Alkali & Water Treatment
 - Secondary Refine Market & Capacities.

Supply Chain Expertise

- Thin Film Deposition Materials
 - PVD, ALD, CVD, MOCVD
 - Processes & Vendors
- Evaporation Materials & Precursors
- Fuel Cell Catalyst Materials
- Mesh Products
- Bonding Wire
- Solder and Brazing Materials
- Cardiovascular & Embolism Wire
- Die Attach & Thick Film Pastes
- Thick Film Resists
- Compounds
- Screen Printing
- Wet Chemistries
- Catalyst Products & Compounds
- Grains & Flakes
- Bullion, Coins, Minting Processes
- Shields, Chamber Sweeps, Scrap Recovery Processes
- Secondary Refine Processes

Ru	Rh	Pd	Ag
Ruthenium 101.07	Rhodium 102.9055	Palladium 106.42	Silver 107.8682
Os	Ir	Pt	Au
Osmium 192.22	Iridium 192.225	Platinum 195.084	Gold 196.9665


Precious Metals Commodity Management LLC

July 18, 2020

19


Quarterly Subscription Reports

Precious Metals Commodity Management LLC




THE RUTHENIUM REPORT
Quarterly Deep Dive Analysis Package

By: Precious Metals Commodity




THE IRIDIUM REPORT
Quarterly Deep Dive Analysis Package

By: Precious Metals Commodity



THE PALLADIUM REPORT
Quarterly Deep Dive Analysis Package

By: Precious Metals Commodity



THE RHODIUM REPORT
Quarterly Deep Dive Analysis Package

By: Precious Metals Commodity



THE PLATINUM REPORT
Quarterly Deep Dive Analysis Package

Fourth Quarter
October 2019

By: Precious Metals Commodity Management LLC



THE SILVER REPORT
Quarterly Deep Dive Analysis Package

Fourth Quarter
October 2019

By: Precious Metals Commodity Management LLC

Ru	Rh	Pd	Ag
Ruthenium	Rhodium	Palladium	Silver
101.07	102.9055	106.42	107.8682
Os	Ir	Pt	Au
Osmium	Iridium	Platinum	Gold
190.23	223.217	195.084	196.9665

Precious Metals Commodity Management LLC

July 18, 2020

20