Metals Strategy: a quick update on PGMs

CONTACTS
Nicky Shiels
Commodity Strategist (Metals)
212-225-6724
Commodities Derivatives
Follow us on Twitter @ScotiaMetals

PLATINUM:

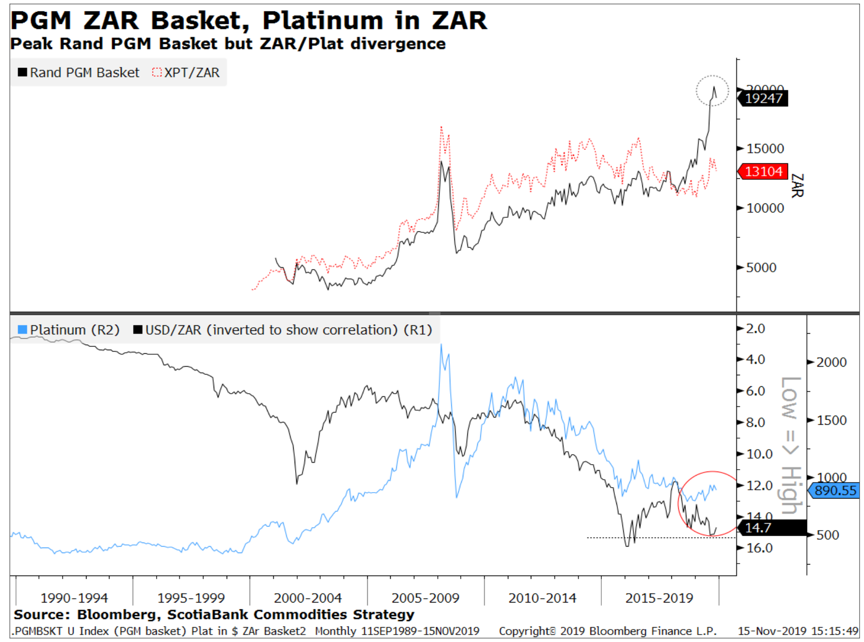
Recent key drivers and themes. Chart deck on page 2

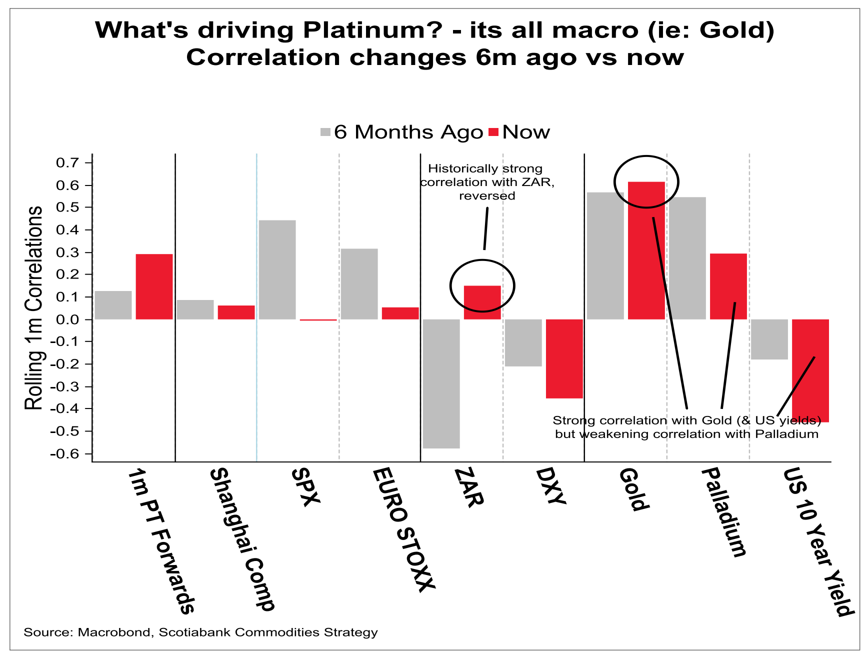
- **Platinum's 2019 revival**, (albeit short-lived but at one point up 25%) is due to Golds statement repricing on the escalating trade dispute and Fed entering a cycle of rate cuts —> platinums current strongest 1month correlation lies with Gold (+0.62) and US 10yr yields (-0.46) and not traditional fundamental drivers like the ZAR (that's reversed, from -0.57 to +0.15) and short-term forwards (+0.29).
- **Supply-side adjustments** (closing, mechanizing or selling deep/old & high-cost shafts) has been delayed due to byproduct (Rhodium & Palladium) outperformance, taking ZAR PGM basket to record highs; S.A platinum exports have surged this year, while a pay-deal between SA producers and AMCu (after 4 months of negotiations) was uncharacteristically stable and professional lowering any future supply-side risk and premium from the markets.
- Theres mixed outlooks from **recent global auto sales**: European passenger car sales have bottomed with strong September (+15% YoY*) print, however Heavy Duty auto sales (particularly heavy PGM loadings) have slumped
- **Investor inflows** accelerated in 2019, mimicking Golds inflows taking combined holdings to 4.7m oz. ETFs accumulated ~960k oz YTD to reach a record ~3.4m oz, while net COT investor added ~1.5m oz. However the strong combined inflows, like in past instances, failed to sustainably prop up prices, reaffirming beliefs that above ground stocks are ample.
- **Substitution talk** has died down from arguably peak chatter over May PT Week, with markets awaiting any official confirmation from any OEM. Auto rhetoric has largely shifted to EV plans, potential auto tariffs and navigating a Chinese slowdown.
- **Structural demand challenges** remain that need to be addressed —> falling-to-flat diesel market share in Europe post VW especially in LDD, subdued Chinese jewelry demand falling for 5 consecutive years with no bottom preditced
- **The market balance** (excluding investment demand!) has swelled from 2018 levels of <500k oz, to almost 900K oz in 2019. However, this year likely represents peak surplus, with SA supply declines (due to worsening Eskom crisis, & closures of loss-making shafts) and rebound in auto demand (driven by LDD in NA, China and developing nations, some substitution and HDD demand globally) likely in the next 2 years.

Outlook: Tactical rallies — which are increasingly outsized given the disconnect between strong investor inflows versus the size of the market, in large part due to continued availability of liquidity and lower rates— continue to exist, especially on Gold rallies. However, above ground stocks, weak auto & jewelry demand and producer-related flows, due to buoyant Rand PGM prices, ensure these rallies remain structurally capped. Seasonal Q1 strength is an upcoming highlight, but the next bull run in the medium term is unlikely unless we begin to see the clues in physical indicators and/or theres a demand-side catalyst (outside of being a cheap proxy for gold/precious exposure) from an OEM on substitution.

	SUMMARY OF INDUSTRY 2018-2019 SUPPLY/DEMAND BALANCES		
	MARKET BALANCE, K OZ		
PLATINUM	**2018**	**2019**	**2020**
WPIC	670	375	
WPIC, ex investment demand	685	1160	
SFA	685	1185	
Metals Focus	349	630	
Metals Focus, ex physical investment	738	962	
JM	372	-127	
JM, ex investment demand	439	731	
Nornickel*	300	-200	50
Nornickel*, ex investment demand	400	600	
BASF	343	855	
GFMS*	467	527	616
Average of ADJUSTED Balances (excluding investment demand):	537	860	333

***Notes:**
GFMS data as of October 2019. Physical Surplus/Deficit adjusting for retail investment
All other balances as of May 2019
Nornickels Platinum balance includes investment (ETF) demand, while their Palladium deficit excludes investor positioning
SFA balances are industrial balances and exclude investment demand (ETFs, net futures positioning, physical investment demand)
JM balances include investment demand
Metals Focus balances include physical investment demand (coin, bar demand) only





PALLADIUM: structural deficit, volatile and 'in vogue' for years to come

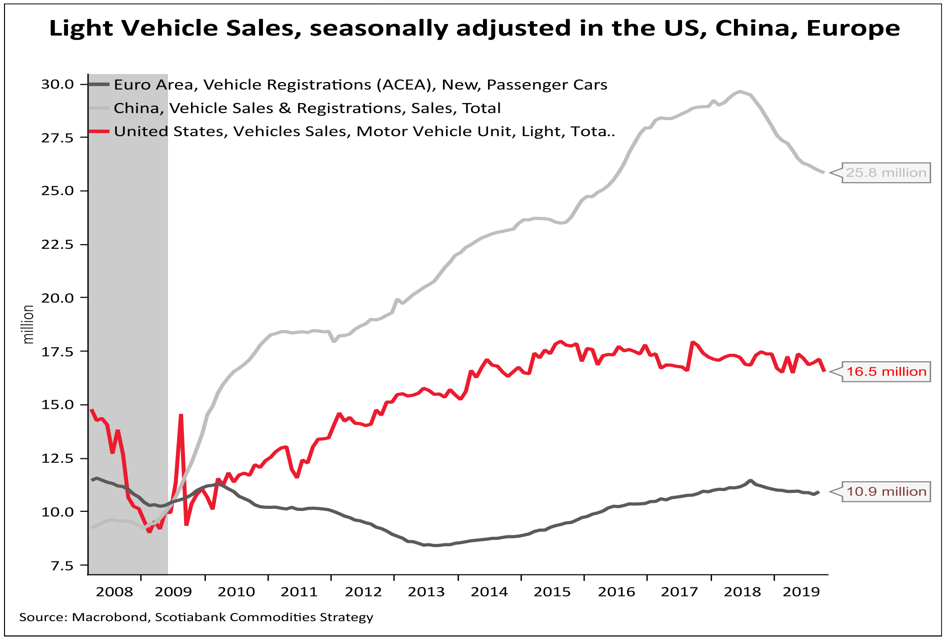
Recent key drivers and themes. Chart deck on page 4

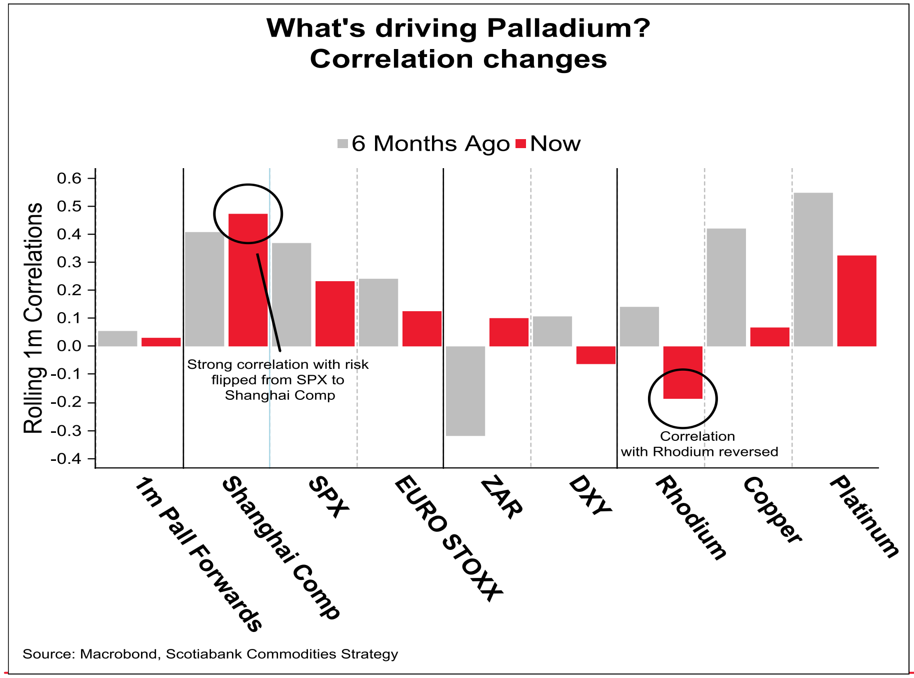
- **Palladiums sustained strength in 2019 (YTD +36%)**, and in light of being unquestionably the best performing metal since 2010, clearly highlights structural deficits and under owned market participants, due to the complexity of catalyst technologies and emission regulations.
- The recent repricing down through a **strong technical uptrend channel**, despite no major change in the fundamentals AND the lack of a reversal in risk appetite/SPX buoyancy, could be explained by Asian investors and sentiment around trade. The correlation between palladium pricing and risk has switched gears from West (SPX) to East (Shanghai Comp), with the latter owning the strongest correlation at +0.47; escalating HK violence and conflicting signals in US/China trade war hit SHComp through 2900 in early November coinciding with Palladiums break through $1700 perhaps reaffirming the influential presence of **Asian investors** in the PGM space.
- **Supply-side adjustments** (increases in primary supply and/or of scrap) is currently not occurring fast enough to offset the increase in auto demand, despite the resurgence in prices. S.A supply is expected to mildly contract over the next few years, while its only until 2021 where Russian production (due to new projects, efficiencies improvements) has a material impact; NA growth is strong but insufficient at current consumption rate and obviously barring a cratering in auto sales and/or a recession
- There a neutral (or uncertain) outlook from **recent global auto sales**: some weakness in US auto sales (dipping to 16.5m units in October) has been offset by the recent slowing decline in Chinese autos sales and tightening forwards (suggesting that slowdown in gasoline vehicle sales need to be more aggressive to impact pricing).
- **Investor flows** have been kind in 2019, by deleveraging metal back to market to supply the structural shortages. Investors have sold a total of 120k oz YTD, driven all by ETFs (whereas COT flows have remained rather range bound at 1.4m oz, basically 50% of peak holdings seen in 20171/8). The strong outflows, unlike in instances across other precious metals, has injected price rises, reaffirming beliefs that (unknown) above ground stocks are out (at least at current prices). Note theres been recent ETF accumulation of ~40K oz since September.
- **The demand response is too small and slow: substitution** outside of autocatalysts in the industrial sector is prevalent, but not fast enough. That's especially occurring in the electronics sector (substitution to cheaper base metals like nickel) and in dental applications but less so in the chemical sector.
- **The market balance** (excluding investment demand!) has shrunk slightly from large deficit levels in of ~850k oz in 2019, to almost ~780K oz in 2019. Attempting to time when peak deficit occurs (by marginal 50-100K oz changes) , is perhaps futile given that, at current growth rates, theres likely to be a structural deficit for the foreseeable medium term at a time when above ground stocks are minimal.

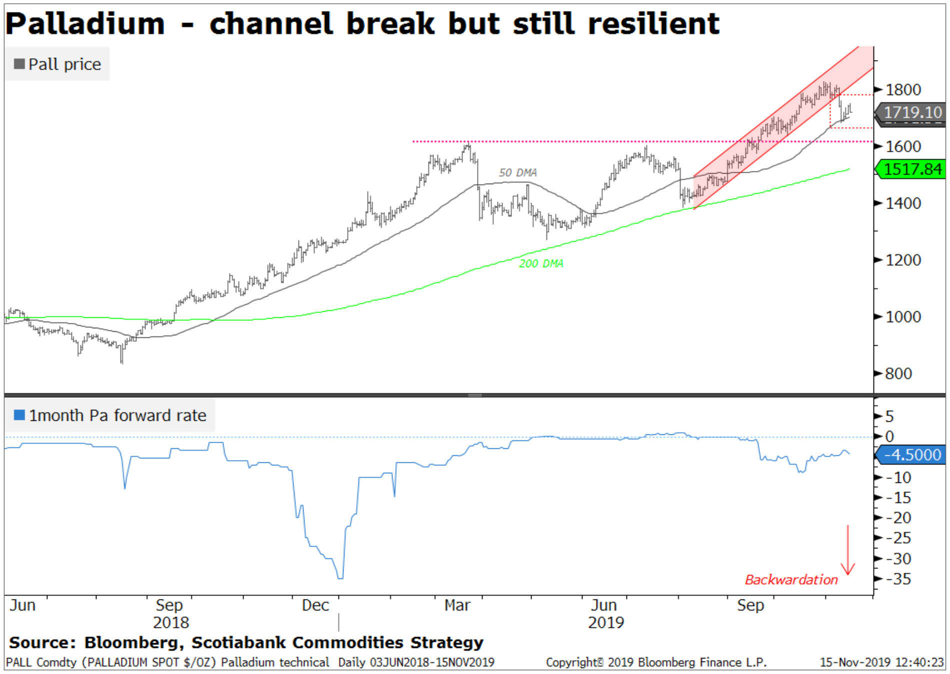
Outlook: The affinity for prices to bust into a new higher ranges persists with current dips below $1700 quickly capitalized on, given the renewed near-term metal unavailability. The rise in auto loadings in 2019 has overwhelmed supply, which shows up in tireless price uptrends, but major and painful intermittent price flush outs while forward rates remain unusually volatile for a precious metal. The mix of participants and trading styles — wary Western investors (the steep drawdowns is a deterrent to participation), mysterious but risk-driven Asian investors, industrial users' switching not substituting *within* Palladium, and hamstrung auto / OEMs to "do whatever it takes" to meet current and future emission regulations (while monetizing WIP inventories), ensures the structural bull market is not without surprises. While prices find a footing ~$1700-1800, any yearend tightness (recall the wild backwardation in Dec 2018) would re-ignite the next price surge, which will continue to remain rather orderly. Overall, the later the business cycle becomes, the more downside risks grow given how susceptible prices are to risk assets and the fact that deficits can't persist in a recession.

	SUMMARY OF INDUSTRY 2018-2019 SUPPLY/DEMAND BALANCES		
	MARKET BALANCE, K OZ		
PALLADIUM	**2018**	**2019**	**2020**
SFA	-830	-385	
Metals Focus	-821	-574	
Metals Focus, ex physical investment	-827	-565	
JM	-121	-809	
JM, ex investment demand	-695	-1119	
Nornickel	-600	700	-900
BASF	-1314	-1426	
GFMS*	-1731	-1870	-1968
Average of ADJUSTED Balances (excluding investment demand):	**-853**	**-777**	**-1,434**

*See sources listed on Page 2 in Platinum S&D







RHODIUM

- Rhodium clearly remains the metals outperformer up a stunning ~240% YTD, at almost $6000/oz, 11 year highs.
- China 6s NOx emission regulation and the increase in loadings due to Euro 6d in Europe have ensured its maintains a sustained consumer bid while (presumably outsized) investor interest has created some whippy price responses.
- Similar to Palladium, Rhodium ETFs have supplied the physical deficit, with ~3200 oz of outflows seen in September & October, while prices remained buoyed up at $5500.
- Fears over the potential oversupply from SA (from Rhodium-rich UG2 ores) which could've dampened the market in 2019 was ill-founded, or too early. It merely highlights the strength of demand.
- Rhodium forwards have remained surprisingly stable during this recent flat price spike toward $6000 (albeit still backwardated at approximately –7%), again suggesting that perhaps speculative interest, not leasing/borrowing, is active.
- Overall, the inherent lack of a clear substitute for Rhodium in reducing NOx emissions, in light of emission regulations and its relative technical supremacy (Rhodium is ~6x more efficient than PD in an autocat system) raises its demand profile. That, coupled with supply-side bottlenecks (it's the last to 'clear' the refining system) ensures continued tight physical balances, and a wariness that needs to be employed given the open-road to $10,000, but also the influx of

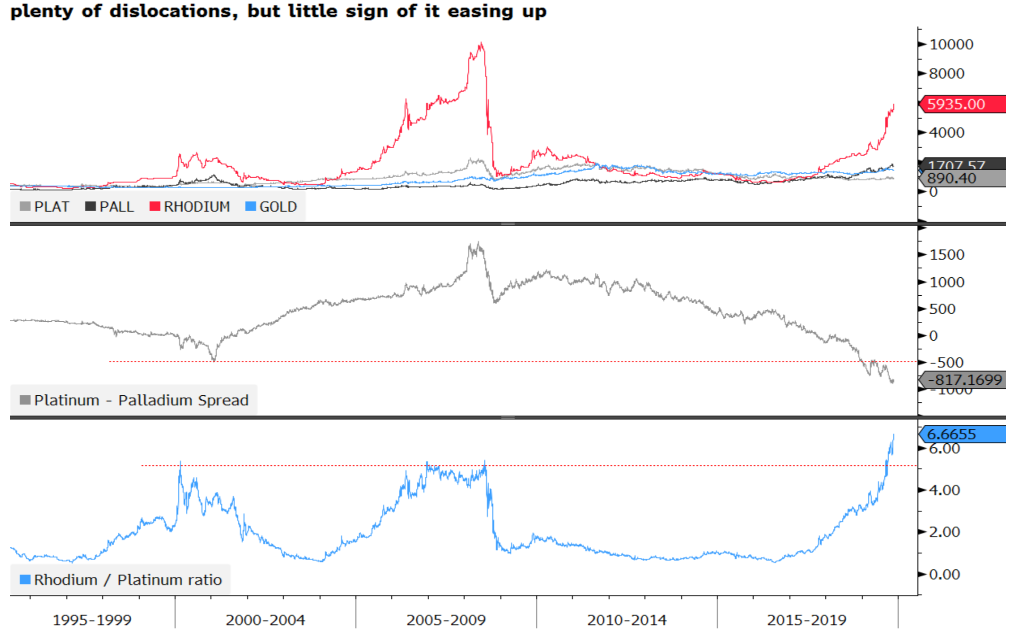
Annual returns of most metals

2010	2011	2012	2013	2014	2015	2016	2017	2018	Average return since 2010	stddev
Palladium 102.80%	Gold 8.93%	Tin 24.01%	Steel 11.73%	Palladium 13.27%	Lead -2.75%	Steel 88.46%	Palladium 54.18%	Palladium 22.94%	Palladium 19.43%	Steel 41.64%
Silver 80.28%	Steel 0.00%	Lead 18.18%	Zinc 2.51%	Nickel 6.91%	Gold -12.11%	Zinc 60.19%	Aluminium 30.81%	Steel 22.64%	Steel 10.27%	Palladium 40.02%
Tin 61.11%	Silver -8.00%	Platinum 12.78%	Palladium 1.70%	Zinc 3.91%	Silver -13.46%	Tin 44.52%	Copper 30.10%	Gold -0.93%	Tin 5.51%	Silver 32.78%
Steel 48.08%	Aluminium -19.93%	Palladium 11.75%	Tin -4.04%	Aluminium 3.80%	Aluminium -17.69%	Palladium 20.72%	Zinc 29.11%	Tin -1.89%	Gold 3.00%	Tin 31.16%
Nickel 35.06%	Palladium -20.95%	Zinc 11.30%	Lead -5.73%	Gold 0.12%	Tin -25.13%	Silver 17.51%	Lead 25.69%	Silver -8.30%	Zinc 2.95%	Zinc 28.40%
Copper 32.58%	Copper -22.44%	Gold 8.26%	Copper -6.58%	Platinum -11.13%	Copper -26.06%	Copper 16.99%	Nickel 22.48%	Platinum -13.52%	Silver 2.80%	Nickel 24.95%
Gold 29.24%	Platinum -22.85%	Silver 6.28%	Platinum -11.13%	Tin -13.53%	Zinc -26.17%	Nickel 15.52%	Gold 12.66%	Nickel -13.58%	Copper -0.14%	Copper 22.30%
Platinum 20.12%	Lead -23.46%	Copper 4.78%	Aluminium -13.50%	Copper -14.00%	Platinum -28.03%	Aluminium 13.67%	Steel 8.16%	Aluminium -16.60%	Aluminium -0.50%	Aluminium 17.54%
Aluminium 11.46%	Zinc -24.85%	Aluminium 3.53%	Nickel -18.23%	Lead -16.00%	Palladium -31.57%	Lead 10.16%	Silver 3.85%	Copper -16.66%	Lead -0.60%	Lead 17.25%
Lead 8.02%	Nickel -26.76%	Nickel -6.54%	Gold -27.33%	Silver -18.10%	Nickel -41.98%	Gold 8.10%	Platinum 2.12%	Lead -19.48%	Nickel -3.01%	Platinum 16.07%
Zinc -5.35%	Tin -29.67%	Steel -7.01%	Silver -34.89%	Steel -20.50%	Steel -59.12%	Platinum 3.46%	Tin -5.81%	Zinc -24.13%	Platinum -5.35%	Gold 15.98%

MACROBOND

PGM pricing

plenty of dislocations, but little sign of it easing up



Source: Scotiabank Commodities Strategy

PLAT Comdty (PLATINUM SPOT $/OZ) Plat Pall Rhod comp2 Daily 13JUN1995-15NOV2019 Copyright© 2019 Bloomberg Finance L.P. 15-Nov-2019 15:32:32

The information contained in this presentation is being provided for information and discussion purposes only. An investment decision should not be made solely on the basis of the contents of this presentation. This presentation is being provided upon the express understanding that no representation or warranty, express or implied, is made, or responsibility of any kind accepted, by The Bank of Nova Scotia, Scotiabank Europe plc, or any of their respective affiliates ("**Scotiabank**"™), their directors, agents or employees with respect to the completeness or accuracy of the information, conclusions and opinions provided herein, or as to the achievement or reasonableness of any projections, targets, estimates, or forecasts and nothing in this presentation should be relied upon as a promise or representation as to the future. Past performance or simulated past performance is not a reliable indicator of future results. Forecasts are not a reliable indicator of future performance.. This presentation has not been prepared (i) by a member of the research department of Scotiabank, or (ii) in accordance with the legal requirements designed to promote the independence of investment research. It is considered a marketing communication for regulatory purposes and is solely for the use of sophisticated institutional investors. This presentation does not constitute investment advice or any personal recommendation to invest in a financial instrument or "investment research" as defined by the UK Prudential Regulation Authority and the UK Financial Conduct Authority, and its content is not subject to any prohibition on dealing ahead of the dissemination of investment research.

The information contained in this presentation reflects prevailing conditions and our judgment as of the date of the presentation, all of which are subject to change or amendment without notice, and the delivery of any such amended information at any time does not imply that the information (whether amended or not) contained in this presentation is correct as of any time subsequent to its date. Scotiabank undertakes no obligation to update or correct any information contained herein or otherwise to advise as to any future change to it. Scotiabank does not provide any applicable tax, accounting or legal advice and in all cases independent professional advice should be sought in those areas.

This presentation incorporates information which is either non-public, confidential or proprietary in nature, and is being furnished on the express basis that this information will not be used in a manner inconsistent with its confidential nature or be disclosed to anyone other than as may be required by law or to those who have been informed of the confidential and proprietary nature of this presentation. This presentation and its contents are strictly confidential to the person to whom it is delivered and may not be copied or distributed in whole or in part or disclosed by such persons to any other person without the prior written consent of Scotiabank. This presentation and the information contained herein remain the property of Scotiabank.

This presentation is not and shall not be construed as an offer, invitation, recommendation or solicitation to sell, issue, purchase or subscribe any securities or bank debt in any jurisdiction or to enter into any transaction. Nothing in this document contains a commitment by Scotiabank to sell, issue, purchase or subscribe for financial instruments, or securities, to provide debt or to invest in any way in any transaction described herein, or otherwise provide monies to any party. Any participation by Scotiabank in any transaction would only be provided in writing after satisfactory legal, financial, tax, accounting and commercial due diligence, as well as being subject to internal approval processes. Any transaction implementing any proposal discussed in this document shall be exclusively upon the terms and subject to the conditions set out in the definitive agreement related thereto.

This presentation is not directed to or intended for use by any person resident or located in any country where the distribution of such information is contrary to the laws of such country. Scotiabank, its directors, officers, employees or clients may currently or from time to time own or hold interests in long or short positions in any securities referred to herein, and may at any time make purchases or sales of these securities as principal or agent. Scotiabank may also have provided or may provide investment banking, capital markets or other services to the companies referred to in this presentation.

™ Trademark of The Bank of Nova Scotia. Used under license, where applicable. Scotiabank, together with "Global Banking and Markets", is a marketing name for the global corporate and investment banking and capital markets businesses of The Bank of Nova Scotia and certain of its affiliates in the countries where they operate, including Scotia Capital Inc., Scotia Capital (USA) Inc., Scotiabanc Inc.; Citadel Hill Advisors L.L.C.; The Bank of Nova Scotia Trust Company of New York; Scotiabank Europe plc; Scotiabank (Ireland) Designated Activity Company; Scotiabank Inverlat S.A., Institución de Banca Múltiple, Scotia Inverlat Casa de Bolsa S.A. de C.V., Scotia Inverlat Derivados S.A. de C.V. – all members of the Scotiabank Group and authorized users of the mark. The Bank of Nova Scotia is incorporated in Canada with limited liability. Scotia Capital Inc. is a member of CIPF. Scotia Capital (USA) Inc. is a registered broker-dealer with the SEC and is a member of the NASD and SIPC. The Bank of Nova Scotia is authorised and regulated by the Office of the Superintendent of Financial Institutions of Canada. Scotia Capital Inc. is authorised and regulated by the Investment Industry Regulatory Organization of Canada. The Bank of Nova Scotia and Scotiabank Europe plc. are authorised by the UK Prudential Regulation Authority. The Bank of Nova Scotia is subject to regulation by the UK Financial Conduct Authority and limited regulation by the UK Prudential Regulation Authority. Scotiabank Europe plc is regulated by the UK Financial Conduct Authority and the UK Prudential Regulation Authority. Details about the extent of The Bank of Nova Scotia 's regulation by the UK Prudential Regulation Authority are available upon request. Scotiabank Inverlat, S.A., Scotia Inverlat