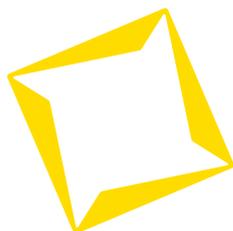




GFMS PLATINUM & PALLADIUM SURVEY 2014

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The cover of GFMS Platinum & Palladium Survey 2014 features a 500 gramme Valcambi minted Palladium bar and a 500 gramme Tanaka minted Platinum bar and on the back cover a back side of a 100 gramme Valcambi minted Platinum bar and a 100 gramme Tanaka minted Platinum bar.

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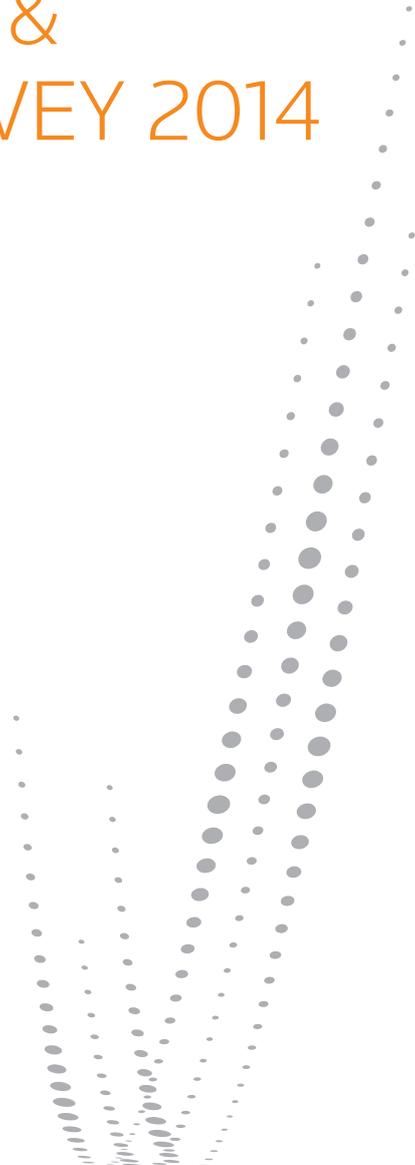
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The estimates shown in *GFMS Platinum & Palladium Survey* for the main components of mine production, scrap, fabrication, investment and stock movements are calculated on the basis of a detailed supply/demand analysis for each of the markets listed in the main tables. In the vast majority of cases, the information used in these analyses has been derived from visits to the countries concerned and discussions with local traders, producers, refiners, fabricators and central bankers. Although we also make use of public domain data where this is relevant, it is the information provided by our contacts that ultimately makes *GFMS Platinum & Palladium Survey* unique. We are grateful to all of them.

NOTES

UNITS USED:

troy ounce (oz) =	31.1035 grammes
tonne =	1 metric tonne, 32,151 troy ounces

- Unless otherwise stated, all statistics on supply and demand are expressed in terms of fine metal content.
- All references in this publication to “ounces” refer to troy ounces.
- Unless otherwise stated, US dollar prices and their equivalents are for the PM fixes of the London Platinum and Palladium Market.
- Throughout the tables, totals may not add due to independent rounding.

TERMINOLOGY:

“-”	Not available or not applicable.
“0.0”	Zero or less than 0.05.
“dollar”, “\$”	US dollar unless otherwise stated.
“4E”	Four elements: platinum, palladium, rhodium and gold (3PGE+Au).
“6E”	Six elements: 4E plus iridium and ruthenium (5PGE+Au).

Estimates of **supply** include mine production and the recycling both of scrapped autocatalysts and old jewellery, but exclude contributions from above-ground stocks, such as supplies from stocks controlled by state institutions in Russia.

Demand estimates are net of recycling with the exception of autocatalyst and jewellery, where gross demand is shown - i.e. the total amount of metal absorbed to these two sectors. Estimates of recycling from scrapped autocatalysts and jewellery are shown separately as part of supply given their scale and potential for change. Estimates of demand exclude the movements of any above-ground stocks held within the specified industries, for example any changes in stocks held by the automotive industry.

By simple arithmetic, this leaves either a **“Physical Surplus or Deficit”** (in previous publications “Gross Surplus or Deficit”) before any movements in above-ground stocks are considered. This is a critical measure of the underlying fundamentals of platinum and palladium and indicates the extent to which fabrication demand may have depended on the release of above-ground stocks, or otherwise. At the same time, this also indicates the change in global above-ground stocks.

Unless otherwise stated, all references to **“above-ground stocks”** of platinum and palladium refer to stocks of refined metal, of a form and quality accepted as good delivery in the London and Zurich market and the world’s principal commodity exchanges. Our supply/demand tables also show **“Estimated Movements in Stocks”**. These specific movements relate only to above-ground stock holdings for which reasonable estimates of movement can be made and attributed. A listing and breakdown of these appears in the more detailed tables in the Appendices section of this Survey.

Having allowed for the Estimated Movements in Stocks as defined above, the **“Net Balance”** (previously “Residual Surplus or Deficit”) is arrived at by deduction. A negative Net Balance implies the extent to which other **above-ground stocks**, including those held by financial institutions and/or investors, were released to meet fabrication demand. Conversely, positive Net Balance implies the extent to which these other **above-ground stock** holdings were augmented. However, this should not be construed as indicating the change in global above-ground stocks. For this, please refer to the reported Physical Surplus or Deficit.

1. SUMMARY AND OUTLOOK

INTRODUCTION

The attention of the platinum group metals (PGM) markets for much of 2013, and even more so in 2014, has focused on events in the South African mining sector. This, coupled with events in Ukraine and their possible implications, especially for palladium, has provided steady news flow of supply-side fears to underpin prices.

While the South African strikes will contribute to a substantial platinum deficit in 2014, the platinum market returned to a substantial physical surplus of 0.49 Moz (15.1 tonnes) in 2013. This was obviously a key factor in the weakness of the platinum price last year, as it dropped to the lowest annual average since 2009. Crucial to the return to surplus was a substantial contraction in demand for the metal, to the lowest level since the wake of the global financial crisis.

Underlying this were changes to demand in a number of the smaller sectors of the market, as a modest increase

in jewellery demand and a small decline in usage in autocatalysts meant that these two elements almost cancelled each other out. Demand from the glass and petroleum sectors both shrank by approximately 50%, the fall spurred by a lack of new capacity and an increased level of closures which also dragged on these net totals. Retail investment was down by more than 40%, with a sharp fall in its largest market, Japan, due to yen weakness and higher local prices.

We estimate an increase of approximately 0.35 Moz (10.9 tonnes) in industry stocks. We readily acknowledge that there is substantial uncertainty around the exact figure, but our research indicates that consumers were prepared to increase inventory in 2013, due in part to increasing fears over the possibility of a widespread strike in the South African platinum mining industry. This helped to keep prices in a sideways range in the second half-year, aided in part by the dramatic take up of Absa's NewPlat ETF, which launched in April 2013. Indeed, the hefty absorption of platinum into this fund, with almost

WORLD PLATINUM SUPPLY AND DEMAND

(000 ounces)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Supply										
Mine Production										
South Africa	4,961	5,054	5,447	5,075	4,676	4,570	4,729	4,729	4,187	4,272
Russia	840	960	948	917	830	793	785	818	804	765
North America	374	358	366	324	342	294	238	389	340	339
Others	239	251	262	267	309	359	411	458	473	565
Total Mine Production	6,413	6,624	7,024	6,584	6,156	6,016	6,164	6,394	5,805	5,941
Autocatalyst Scrap	770	804	829	903	999	782	889	977	901	982
Old Jewellery Scrap	230	340	349	541	906	447	450	526	427	406
Total Supply	7,413	7,768	8,201	8,028	8,061	7,245	7,502	7,897	7,132	7,329
Demand										
Autocatalysts	3,485	3,708	3,886	4,017	3,502	2,502	2,936	3,068	2,947	2,913
Jewellery	2,400	2,134	2,026	1,868	1,647	2,316	1,927	2,087	2,268	2,286
Chemical	361	331	315	361	338	272	463	473	435	495
Electronics	345	366	404	397	292	243	248	219	196	169
Glass	528	503	449	431	507	91	505	338	323	165
Petroleum	180	149	190	174	219	187	197	157	185	99
Other Industrial	443	452	476	494	491	434	493	505	547	555
Retail Investment	49	22	-22	23	452	313	95	312	282	161
Total Demand	7,790	7,665	7,724	7,765	7,449	6,359	6,863	7,159	7,183	6,843
Physical Surplus/(Deficit)	(377)	103	477	263	612	886	640	738	(51)	486
Identifiable Stock Movements	165	13	0	(394)	(402)	281	(574)	(145)	(237)	(1,242)
Net Balance	(212)	115	477	(132)	210	1,167	65	593	(288)	(756)
Price (London PM Fix, US\$/oz)	845.52	896.57	1142.55	1,302.81	1,577.53	1,203.50	1,608.98	1,721.87	1,551.48	1,486.72

Source: GFMS, Thomson Reuters

0.4 Moz vaulted ahead of the launch, was instrumental in (temporarily, at least) stemming the price fall of the first few months of the year.

Macroeconomic factors and the gold price were also instrumental with respect to platinum, and to a lesser extent palladium, prices at different times last year. In particular, the second quarter saw prices fall in sympathy with tumbling gold on concerns that quantitative easing would be coming to an end sooner than many had expected. Platinum returned to a premium over gold in late April, affecting jewellery demand.

In stark contrast to platinum, the **palladium** industry continued to be characterised by large scale deficits, even before the strike action in South Africa and concerns over palladium supply from Russia. This was not driven by supply, which actually rose by 2% last year to equal its second highest total, but by demand, which rose to its highest level in our 15-year data series.

This record demand was posted in the face of higher annual average prices and continues to be driven by robust autocatalyst demand. In fact, continued growth in markets that favour palladium use in autocatalyst, and

substitution away from platinum, means that demand in this sector in 2013 was some 56% higher than just four years previously. This more than offset a drop in jewellery offtake to a ten-year low, and an 8% drop in electronics demand, spurred by continued thrifting and a reduction in PC sales. Finally, above-ground stock changes were smaller than in prior years as Russian sales were at their lowest since 2003. Palladium ETF holdings were unchanged on a net basis in 2013, in contrast to the growth in 2012 and gains in the first months of 2014.

PLATINUM IN 2013

- *Total platinum supply grew by 2.8% last year on the back of a recovery in mine production and a robust increase in autocatalyst recycling, partially offset by lower jewellery scrap flows.*
- *Global platinum demand fell by 4.7% , mainly on the back of a disappointing performance from the glass, petroleum and retail investment sectors.*

Platinum **mine production** recovered slightly in 2013, by 0.14 Moz (4.2 t), as production grew in Zimbabwe from an ongoing expansion and release of process inventory at Ngezi, and South African production crept

WORLD PALLADIUM SUPPLY AND DEMAND

(000 ounces)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Supply										
Mine Production										
South Africa	2,468	2,591	2,857	2,677	2,365	2,465	2,636	2,682	2,392	2,353
Russia	2,841	3,133	3,164	3,049	2,701	2,677	2,722	2,704	2,627	2,580
North America	1,039	930	1,024	995	908	688	726	959	953	934
Others	283	300	310	329	407	476	518	513	528	575
Total Mine Production	6,630	6,953	7,355	7,050	6,381	6,305	6,602	6,857	6,500	6,442
Autocatalyst Scrap	487	627	744	950	1,190	1,062	1,285	1,482	1,426	1,601
Old Jewellery Scrap	74	103	234	185	192	116	179	248	260	290
Total Supply	7,192	7,683	8,333	8,185	7,762	7,484	8,066	8,588	8,186	8,333
Demand										
Autocatalysts	4,014	3,990	4,433	4,790	4,484	4,024	5,277	5,535	6,070	6,271
Jewellery	1,022	1,363	1,281	1,281	1,295	1,110	798	676	651	579
Dental	721	598	591	645	661	661	664	660	650	630
Chemical	286	311	401	376	353	300	349	356	366	398
Electronics	1,066	1,121	1,219	1,275	1,347	1,240	1,447	1,485	1,458	1,336
Other Industrial	78	78	86	91	88	80	100	103	109	109
Retail Investment	127	255	135	45	94	170	80	61	37	38
Total Demand	7,314	7,716	8,145	8,504	8,323	7,585	8,715	8,875	9,340	9,361
Physical Surplus/(Deficit)	(123)	(34)	188	(319)	(561)	(101)	(650)	(287)	(1,154)	(1,029)
Identifiable Stock Movements	1,064	1,858	1,613	620	899	593	(289)	1,332	(48)	50
Net Balance	941	1,824	1,802	301	338	492	(939)	1,045	(1,202)	(979)
Price (London PM Fix, US\$/oz)	230.22	201.08	320.00	354.78	352.25	263.22	525.24	733.63	643.19	725.06

Source: GFMS, Thomson Reuters

higher following a disastrous year for output in 2012. While labour relations in South Africa remain tense, last year the PGM mining industry did not see a repeat of the major industrial unrest that marred 2012; this was instead deferred to early 2014. The country thus saw a small rise in aggregate throughput and metal-in-concentrate production. However, South African production costs have continued to rise in rand terms, and the industry (and hence global supply) still finds itself in a precarious position; especially so given the strike action we have seen so far in 2014.

Supply from platinum **autocatalyst scrap** rose by 9% to 0.99 Moz (30.5 t) last year. The rise reflected healthy increases across all regions, following a year of notable declines in 2012, and thus reinstating the post-recession recovery path. Collectors in Europe witnessed an increase in the number of Diesel Particulate Filters returned for recycling. Autocatalyst material originating from South Africa also expanded, as, with a lack of emission regulations, some locals have been dismantling autocatalysts in order to monetise the PGM content. Recycling from our 'Other Regions' also increased substantially, albeit from a low base, pushing its share of global platinum scrap to 14%.

Supply of platinum **jewellery scrap** eased by 5% in 2013 to an estimated 0.41 Moz (12.6 t), with a 9% drop in recycling from Japan accounting for the bulk of the drop. This fall, despite a rise in the average yen platinum price, suggested that consumers held on to assets in expectation of yet higher prices. Elsewhere, jewellery scrap from China rose only at the margin, while North America recorded a double-digit increase in scrap.

Platinum **autocatalyst demand** fell by 1.2% to 2.91 Moz (90.6 t) last year. Demand increases from China and to a lesser extent North America proved unable to completely offset the continued negative trend in Europe, the largest

PLATINUM SUPPLY & DEMAND COMPARISON



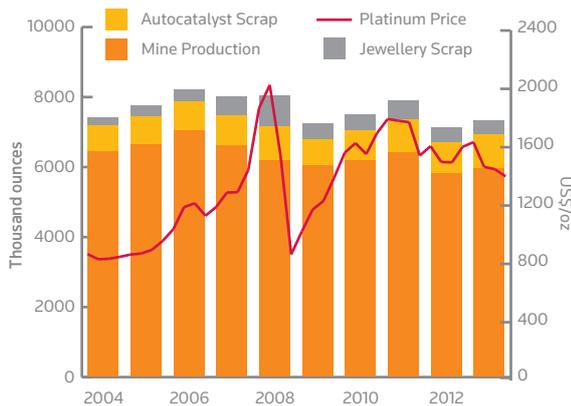
Source: GFMS, Thomson Reuters

market for platinum autocatalyst demand. In all regions, substitution continued with palladium usage making further inroads in the traditional platinum-based light and heavy duty diesel segments. Stricter emissions legislation in Europe bolstered demand, but thrifting efforts continued, combined with a wider adoption of the non-PGM containing Selective Catalytic Reduction after-treatment solution.

We estimate that platinum use in the **chemical** sector grew by 14% in 2013, taking platinum use in the sector to 0.50 Moz (15.4 t), the highest level on our records, which date from 1999. Growth was chiefly augmented by expansion in the production of paraxylene and nitric acid, with Japan and China recording sizeable gains. By contrast, total platinum use in other industrial applications fell markedly; **petroleum** demand slumped 46% last year, while platinum used in the **glass** sector fell almost 50% due to only a few new installations. **Electronics** demand eased 14% due to slower PC sales and increased production of Solid State Drives.

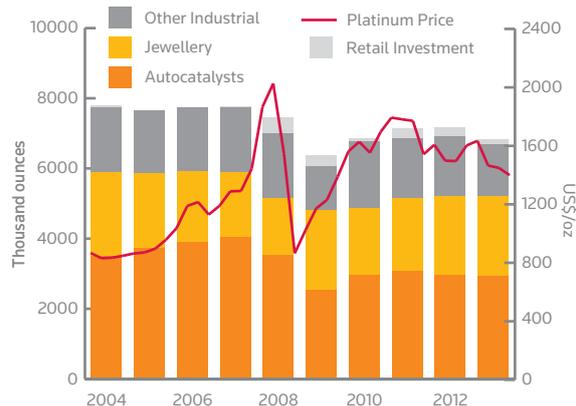
In 2013, global platinum **jewellery fabrication** edged up by less than 1% to reach an estimated 2.29 Moz (71.1 t). Demand growth last year was mainly driven by North

WORLD PLATINUM SUPPLY



Source: GFMS, Thomson Reuters

WORLD PLATINUM DEMAND



Source: GFMS, Thomson Reuters

American countries as weaker prices and an improving economy encouraged restocking and consumption activities in this region. Chinese demand rose by barely 1% last year, as gold demand soared following the acute drop-off in price, which in turn dampened demand, while European demand retreated over 10% year-on-year.

Retail investment eased to an estimated 0.16 Moz (5.0 t), led by losses in Japan, due to sustained yen weakness in throughout the year that saw the local platinum price rise strongly. Elsewhere, demand was also sharply lower with sizeable falls in Europe and North American markets.

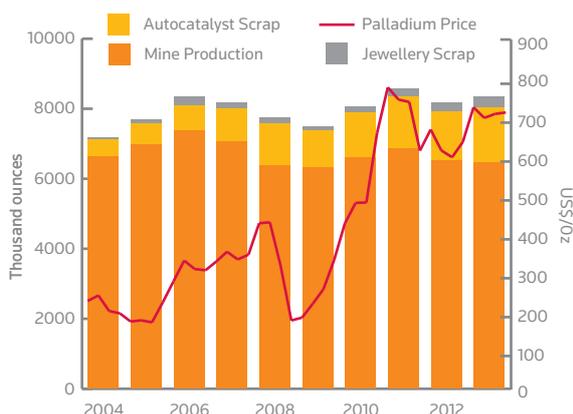
PALLADIUM IN 2013

- *Supply of palladium grew by 1.8%, driven higher by a 12% jump in recoveries from spent autocatalyst, primarily from the United States. Conversely mine production contracted marginally.*
- *The marginal 0.2% increase in global palladium demand was largely due to healthy gains in chemical and autocatalyst, which outweighed losses in most other industrial areas, in particular jewellery.*

Palladium **mine production** fell for a second consecutive year to 6.44 Moz (200.4 t), a drop of 1%, as output contracted in South Africa, Russia and Canada. In South Africa, the three largest producers recorded a drop in refined outturn, partly due to process inventory effects, while palladium output fell in Russia and Canada, primarily due to planned processing of lower grade ores by Norilsk Nickel and North American Palladium. A slight offset was provided from additional volumes recovered from Ngezi in Zimbabwe, although this did not outweigh losses in the three largest countries.

Palladium supply from **autocatalyst recycling** steamed ahead in 2013, increasing by 12.3% to 1.60 Moz (49.8 t).

WORLD PALLADIUM SUPPLY



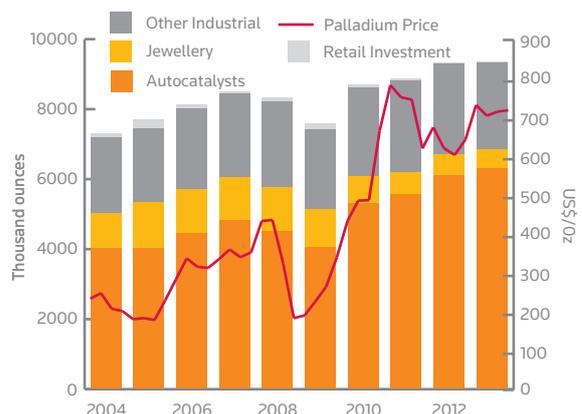
Most of the rise was due to solid gains in the gasoline-dominant vehicle markets of North America and our “Other Regions” category. Indeed, particularly in case of the latter, despite its recycling markets still being in their infancy, China recorded healthy gains last year. Elsewhere, in Europe, increases were recorded, reflecting higher vehicle recycling rates. Palladium recovery from spent autocatalysts in Japan also rose, mainly due its advanced recycling supply chain and high recovery rates as vehicle registrations actually fell last year, following a significant rise in 2012.

Jewellery scrap receipts jumped 12% in 2013, reaching a new historical high of 0.29 Moz (9.0 t). Scrap flows benefited from the 13% increase in the average palladium price, which encouraged liquidation from consumers and across the supply chain. China accounted for the bulk of the rise, driven by a sizeable increase in inventory remelt, with these gains offsetting falls in Japan and Europe.

Palladium demand for **autocatalyst** was boosted by continued substitution for platinum in diesel applications, combined with strong sales growth in some of its key markets, especially in the gasoline-dominant vehicle markets of North America and China. Following an exceptional increase in 2012, demand from Japan fell slightly, whereas the European market also continued to show weakness. Nevertheless, demand rose by 3.3% to 6.27 Moz (195.1 t) last year.

Palladium used in industrial applications recorded a mixed outcome in 2013, with a net 4% fall to an estimated 2.43 Moz (76.9 t). Demand for the largest industrial segment of **electronics** retreated by 8%, due to a slowdown in PC shipments and increased flow of recycled material. **Dental** demand also slipped, reflecting the higher price plus societal changes, while the **other industrial** segment remained broadly unchanged. The only growth was in **chemical**

WORLD PALLADIUM DEMAND



applications, which rose 9%, thanks largely to an expansion in purified terephthalic acid (PTA) production.

Jewellery demand slumped by 11% to a ten-year low of 0.58 Moz (18.0 t), led by a sizeable fall in China, which saw its share of global demand drop to 44% (from over 70% a decade earlier), as palladium struggled to penetrate the wider market in an environment where gold jewellery dominates retail sales. Demand from North America eased by 4%, while European offtake was steady. Finally, **retail investment** demand picked up marginally in 2013, led higher by North America where expectations of higher prices drove purchases. There was also a surge in palladium investment in ETFs in March and April 2014, partly reflecting east European tension.

OUTLOOK FOR 2014

We believe that the sustainability of the South African platinum sector's strike is waning, with the mining companies evidently keen to get the workforce back to the mines. The industry, having previously taken a hard stance in recent weeks, improved its offer in late April, but at the time of writing it remains to be seen whether this has been balloted to AMCU membership. Workers have been away from work for 14 weeks on a 'no work, no pay' basis, and there is increasing evidence that miners want to return to work and as a consequence AMCU's rank-and-file support is waning and its share or representations receding. Furthermore, it has been widely observed that a key factor to this disruption has deep-seated political motivations, which may have less cause to perpetuate following South Africa's general election in early May.

We estimate that, through to late April, more than 0.60 Moz (18.7 t) of platinum production has been lost and that even if an agreement is reached imminently, further losses will accrue as a result of absenteeism, underground 'safe-start' preparation, re-training and ramp-ups, which we expect to exceed 0.30 Moz (9.3 t), with associated total losses to palladium concomitantly lower at around 0.45 Moz (14 t) in total. We are unconvinced that the market fully appreciates the challenges associated with bringing production back online in a timely fashion and do expect that these shortfalls will have a positive influence on price.

The spike in the premia of both platinum and palladium in sponge form over ingot reflect a tightening market and of industrial customers keen to maintain inventory for near-term use. Palladium has also been tightened by the highly successful launch of two South African rand-

denominated palladium ETFs, which by 23rd April had accumulated holdings in excess of 0.41 Moz (12.9 t).

Price dynamics in the event of a resolution are likely to be fluid. We see clear event risk and price downside around successful resolution but remain mindful that the rate of metal marketed by producers (and therefore the impact on physical supply) has only really started to attenuate in recent weeks. We believe that the producers ended 2013 with a position of finished metal inventory above 'normal' operational levels and have been able to begin to release this to customers during April to meet delivery needs. Market shortfalls seem likely in the case of both metals for several months after any resolution. The price impact relative to the severity of market events has been benign in early 2014, but we expect to see further price upside as metal supplies remain constrained into the second half.

The events between Russia and Ukraine in early 2014 have provided additional concerns around supply, in that there is a chance that western diplomatic measures could see a broader emplacement of sanctions on Russia that may threaten the continuity of export of platinum and palladium. Although our base case expectation is that such measures will not occur, we fully recognise that these events will continue to provide a risk premium, especially to palladium.

While mining volumes are suffering in 2014, the recycling of autocatalyst (and in the case of platinum, jewellery) scrap will increase. However, the incremental volume will only have a mild palliative effect on overall supply.

On platinum's demand side, the pronounced weakness seen for several of the smaller sectors in 2013 is not expected to be repeated this year which, coupled with moderately firmer autocatalyst demand based on economic recovery in the key European and US markets, will see demand grow solidly. In combination we forecast platinum to swing back to a physical deficit in excess of 0.70 Moz (22 tonnes), more than unwinding the surplus recorded in 2013.

Palladium's demand side outlook sees continued growth. Offtake for autocatalyst, particularly in emerging markets, will be the dominant factor. We expect palladium to remain in deep physical deficit in the order of 1.30 Moz (42 tonnes); metal that will need to be released by investors in order to for the market to clear, suggesting that, barring the unlikely event of major disinvestment, prices will remain well bid.

2. PLATINUM & PALLADIUM PRICES

- *Platinum prices started 2013 on a strong note, mainly due to supply-side problems. Amplats announced, just before its 2012 financial results, a labour restructuring plan consisting of an initially planned reduction of 14,000 jobs.*

- *Despite the difficulty of the decision for the management and the tough implications for the employees, the news was well received by the market and the platinum price rallied to an annual high of \$1,736/oz in February.*

- *With the September 2012 strikes at Amplats' Rustenberg and Amandelbult still fresh in mind, investors expected similar labour unrest to occur, which led to heavy short covering and added longs on NYMEX.*

- *Following 10 months of trading at a discount, the platinum price switched back to a premium over gold, reaching an annual high of \$183/oz in August, the highest level since 2011.*

- *Palladium followed a firmer path during 2013, not only on the back of supply related issues but also inspired by improved market conditions in the US, led by positive employment and house sales data as well as vehicle sales.*

- *The palladium price rose to a monthly average of \$756/oz in March 2013, before contracting again thereafter. However, continued supply-related woes out of Russia and South Africa forced the price up again, this time also supported by the announced launch of two new ETFs.*

- *The platinum:palladium ratio fell over much of 2013, bottoming at 1.86 by year-end. Although PGMs followed the strong price correction in gold, palladium held up relatively well compared to platinum, reflecting its robust fundamentals.*

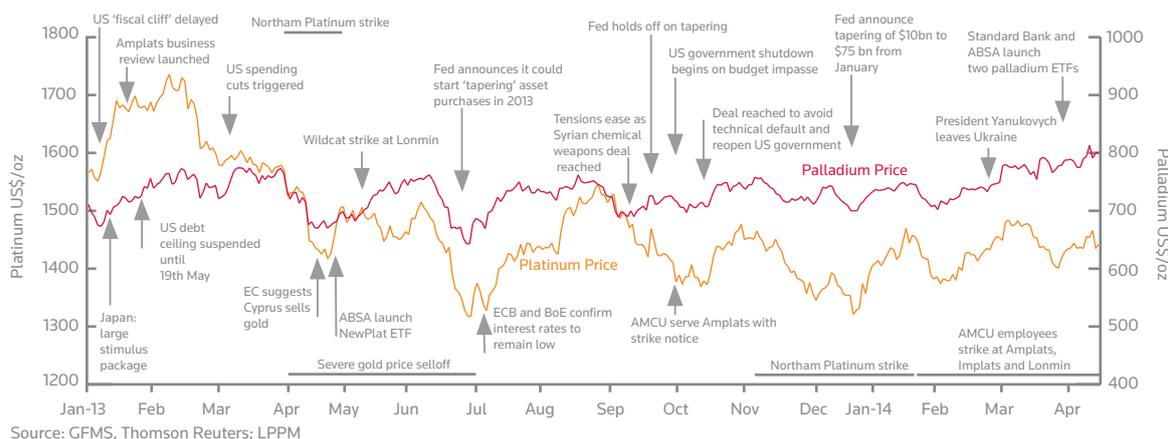
INTRODUCTION

Last year, despite its robust market fundamentals, both platinum and palladium were unable to completely escape the doldrums of the gold market, where investors decided to allocate their funds to higher yielding assets and liquidated much of their holdings. Following a brief recovery across the precious metals spectrum, prices again came under pressure driven by the Fed's announcement of tapering in combination with a strengthening dollar. However, despite increased volatility, platinum held up reasonably well and recorded an average decline of only 4% whereas palladium only witnessed some delay to its upward momentum, steaming ahead with an average increase of 13%.

Both platinum and palladium can largely thank their strength to their industrial uses and particularly their exposure to the automotive market. Last year global automotive production rose a healthy 3.6% mainly driven by solid gains in China and to a lesser extent North America. Despite China still lagging European and North American emission legislation standards, and hence having lower PGM loadings, the increase in the light duty segment was strong enough to offset weakness in the mature markets of Japan and Europe.

The other overarching factor contributing towards platinum's and palladium's strong market fundamentals is their concentration of supply to countries with unstable political and social environments such as South Africa and Russia. Indeed, particularly in case of the former, the labour restructuring announcement by the largest producer Amplats with the resultant output disruptions supported both metal prices last year.

LONDON PLATINUM AND PALLADIUM SPOT PRICES



PLATINUM VOLATILITY* & TRADING RANGES

(p.m. fix)	2012	2013
Volatility	19.2%	17.1%
High (US\$/oz)	1,729	1,736
Low (US\$/oz)	1,390	1,317
Trading Range	21.9%	28.2%

*20-day rolling average
Source: GFMS, Thomson Reuters; LPPM

PALLADIUM VOLATILITY* & TRADING RANGES

(p.m. fix)	2012	2013
Volatility	26.4%	21.9%
High (US\$/oz)	722	774
Low (US\$/oz)	565	643
Trading Range	24.4%	18.1%

*20-day rolling average
Source: GFMS, Thomson Reuters; LPPM

PLATINUM

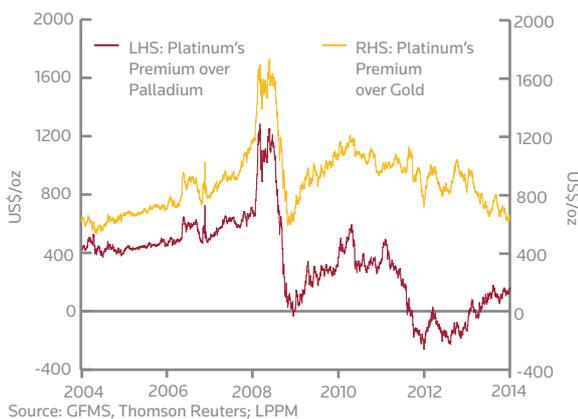
In 2013, platinum prices started the year on a strong note, for reasons largely related to supply-side issues. One of the most striking events was Amplats' labour restructuring proposals announced just before its 2012 financial results, which revealed an unprecedented loss. The labour restructuring plans proposed to axe 14,000 jobs, resulting in increased labour unrest. With the September 2012 strikes at Amplats' Western Limb mines still fresh in mind, investors expected a similar response to the planned job cuts from the unionised workers. As a consequence, heavy short covering emerged and fresh longs were added on NYMEX. To put this in perspective, speculative longs in January 2013 stood at 52 thousand contracts (0.26 Moz) and by mid-February this had accumulated to 64 thousand contracts (3.2 Moz), the highest on record. This sentiment was reflected in the price action, which recouped the previous quarter losses and touched a 17-month high at \$1,736/oz in February.

The rally in platinum prices, however, turned out to be short lived and a more pronounced price decline emerged in the following months which extended into the end of June. Indeed within five months, the price had declined to the lowest level since October 2009, representing a loss of 24% from the 2013 annual high of \$1,736 in February. At \$1,487, the average platinum price for 2013 was the lowest in four years. This was also a function of the rally in the US dollar against other major currencies,

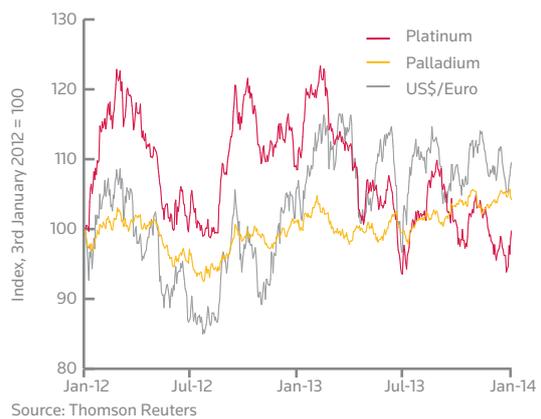
driven by the Fed's plans to reduce their bond purchases. The measure stood in sharp contrast with monetary policies of other major developed central banks, such as Japan and Europe, which were fighting deflation pressures. As a result, the platinum price in various other currencies, such as the South African rand, Japanese yen or Turkish lira, witnessed substantial increases. Indeed, the average price in Yen terms gained 17% against the US dollar to the highest level since 2008, opposite to the 7% drop in Euro terms over the same period.

One of the important developments in the platinum price last year was the switch to a premium over gold, following 10 months of trading at a discount. Indeed, starting the year at a discount of \$128, platinum moved to a premium against the backdrop of emerging supply disruptions in South Africa. This was coupled with growing investor interest in the launch of the NewPlat ETF in April and continued inflows of other platinum-backed ETF holdings, with investors buying into the price decline; a sharp contrast to the heavy disinvestment that gold ETFs were experiencing at the same time. At this juncture, the acceleration of the platinum price outpaced that of gold, which pushed the premium over gold to \$183 on 9th August, the highest level since September 2011. The price differential was also reflected in the platinum/gold correlation, as the surge in the former pulled down the correlation to 60% in first quarter of 2013 as opposed to 73% in first quarter of the prior year. However, following some increased volatility in the third

PLATINUM'S PREMIUM OVER PALLADIUM AND GOLD



PLATINUM, PALLADIUM AND THE DOLLAR



PGM PRICES: SOUTH AFRICAN RAND



PGM PRICES: JAPANESE YEN



and fourth quarter, the platinum/gold correlation ended the year near 69%.

The combination of supply-side disruptions, growing investor interest in platinum ETFs and the global macroeconomic climate (each of which will be discussed in chapters that follow) played a crucial role in determining metal prices and availability. The continued low lease rates in 2013 were an indication of ample supply which was also reflected in lower price volatility. Indeed, the annualised 20-day price volatility of 17.1% last year was below the 19.2% reading of 2012. On a monthly average, January registered the highest volatility at 19.4% whereas the lowest was recorded at 13.9% in November.

PALLADIUM

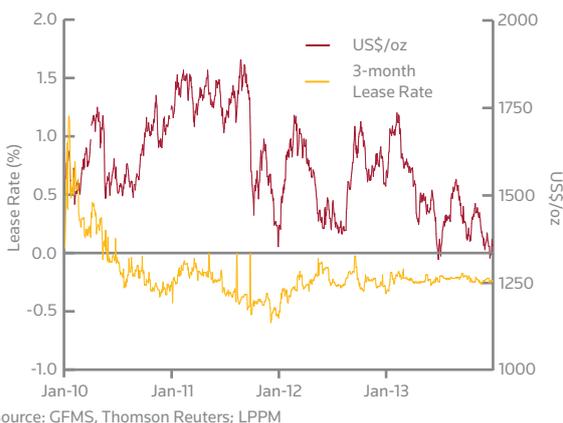
Over the last quarter of 2012, palladium rose on the back of expectations that the automotive sector in the US and China would improve. Supply concerns carried over into the New Year and caused the rally to extend beyond the high of 2012. The market started off on a positive note as many market participants were expecting a recovery across precious metals after upbeat US housing and jobless data in mid-January boosted the appetite for

commodities. It was on this note that prices rose to over \$756 on 30th January, palladium's highest level since September 2011. Expectations of supply shocks over the following months from Russia and South Africa set the tone for the rest of the year, but a further price rise was challenged by growth concerns in Europe and Japan, and ETF liquidations.

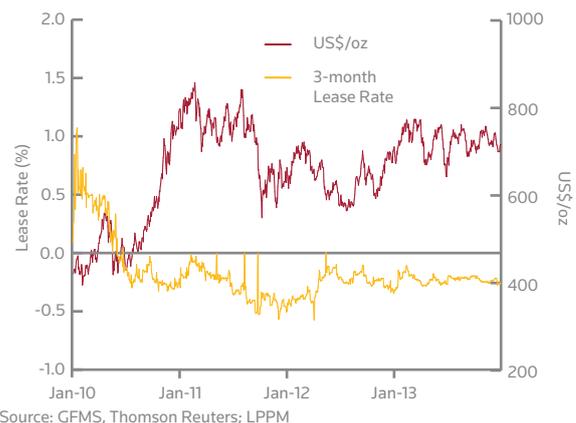
In early February 2013 palladium hit a 17-month peak after fears that the deficit would escalate. The excessive pollution in Beijing prompted speculation that the Chinese government would increase emission regulations for automobiles and boost demand for auto catalysts. However, prices retraced to \$722 over the second half of the month as the dollar index reached new highs. A stronger retracement was seen in platinum, which brought the ratio to a low of 2.11, a level not seen since November 2002. A second rally took prices to a high of \$774 on March 11th, which tested for a second time the upper bound of the symmetrical triangle that would continue to form over the following nine months.

In April, palladium posted its largest monthly drop since September 2011 after prices fell below \$721, a key support level. Over the remaining course of the month, the sell

PLATINUM LEASE RATE



PALLADIUM LEASE RATE



PLATINUM PRICES IN VARIOUS CURRENCIES

	US\$/oz	Rand/kg	Yen/g	Euro/kg	Yuan/kg
2012	1,551.48	408,669	3,978	38,804	314,724
2013	1,486.72	459,544	4,663	35,987	343,152
Change (yoy)	-4.2%	12.4%	17.3%	-7.3%	9.0%

Source: GFMS, Thomson Reuters

off took prices to \$670 before rebounding. The strong recovery in May was due to a fall in output at Norilsk, which added to supply concerns from South Africa and Russia. In South Africa, tensions over wage negotiations began to build again as the rand reached new highs. This helped to boost interest in ETFs. Nevertheless, on 11th June, after the ratio of gold to palladium reached its lowest point since March 2011, palladium's second descent began.

Platinum group metals stumbled over the first half of June as supply fears eased after the AMCU delayed plans to strike at Lonmin. Prices retraced below April's low to \$629, reaching the lower boundary of the symmetrical triangle for a third time since the last quarter of 2012. However, prices recovered over the following month as talks about a launch of a palladium ETF by ABSA Capital stimulated the price. Over the same period, the platinum

PALLADIUM PRICES IN VARIOUS CURRENCIES

	US\$/oz	Rand/kg	Yen/g	Euro/kg	Yuan/kg
2012	643.19	169,420	1,649	16,087	130,474
2013	725.06	224,114	2,274	17,550	143,321
Change (yoy)	12.7%	32.3%	37.9%	9.1%	9.8%

Source: GFMS, Thomson Reuters

ratio made a strong descent to 1.90, aided by a rally in the US stock market. By the end of July, palladium closed at \$733.

Over the remaining six months, palladium oscillated between \$680 and \$760 as investors paid close attention to tensions in Syria and a possible US government shutdown in August and September, respectively. Prices were little changed month-on-month as investors focused on the Federal Reserve's plan to scale back its \$85 billion per month bond-buying programme. As gold prices began to shatter, palladium continued to trade in a narrow range as prices approached the apex of the symmetrical triangle.

PRICE DEVELOPMENTS FOR THE MINOR PGMS

Rhodium continued to suffer in 2013, sinking to below \$1,000 for the first time since July 2004, however prices in early 2014 have been staging a recovery. Demand depends on the automotive sector (which makes up 85% of the market) and has shifted from the relatively sluggish European auto industry, to the Far East, principally China. Rhodium began 2013 at \$1,080 and staged steady increases until late March, reaching \$1,265. Late March saw selling coming into the market as industrial users reduced inventory. Prices fell sharply, reaching a nadir at \$975, reflecting the sell-off in the whole precious metals market.

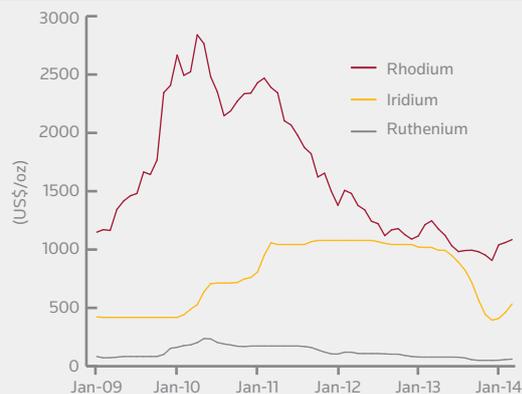
At the same time, supply seemed plentiful and demand remained unmoved and even after traded volumes increased in September, buyers were still holding out for deals below \$1,000. From late December 2013, disruptions in South Africa caused prices and holdings in the rhodium ETF to rebound, prices broke through \$1,000 on the first day of trading in 2014 and reached \$1,165 in early April.

Ruthenium primarily used in electronics, in particular hard-disk drives, saw its price drop by 37% in 2013 to an eight year low of \$57. It started the year at \$90, dropped to \$85 and held steady at that price for the next seven months. From mid-July the price plunged reaching \$57 in late-September and remaining there

for the rest of the year. Early 2014 has seen increased buying interest causing the ruthenium price to rebound, reaching \$72 in April recovering almost 50% of last year's decline.

Iridium prices held stable at \$1000 until mid year before declining significantly, sinking to \$400 in December. This 62% decline, the largest since 2002 was primarily due to oversupply. Demand for iridium is dominated by the electrical and electrochemical industries, in particular spark plugs, high temperature crucibles and LEDs. The start of 2014 has seen increased buying interest, which, in a thin market has driven prices back up to \$580.

MINOR PGM PRICES



Source: GFMS, Thomson Reuters

TECHNICAL OUTLOOK

Platinum is expected to exceed the \$1,700/oz level by the end of this year. This projection is based on the premise that declining mine supply will be more substantial than gains on the demand side, which is estimated to push the market into a 0.70 Moz deficit this year. The estimated 20% decline in South African production is forecast to significantly reduce global platinum supply, which in turn is projected to reach its lowest level in fourteen years. Demand for platinum, on the other hand, is forecast to increase and reach its highest level in six years, mainly resulting from a global economic recovery. When putting this in perspective to our estimated 3.90 Moz of above ground stock, at current levels demand would be covered for just over six months. This is the lowest level in four years and is likely to worsen in the next few years. These factors, we believe, could spur fresh investment buying which is already reflected in the rise of platinum-backed ETF holdings and would support sustaining platinum's premium over gold throughout the rest of the year (and beyond).

Demand growth from industrial segments, more specifically the glass and chemical industries, is estimated to absorb notable volumes too. The

autocatalyst segment, which takes up the largest share of platinum demand, is forecast to rise to the highest level since the previous recession, mainly thanks to the roll out of Euro 6/VI emissions legislation for passenger vehicles and heavy duty diesel vehicles this year and next. In addition, despite its relatively small demand for metal, the petroleum industry is also projected to absorb 56% more platinum in 2014 compared to 2013. Jewellery demand growth, on the other hand, is expected to remain more modest at just 4%, which is the highest level since 2004, supported by growth from Europe and China.

After a rise to \$1,887 in August 2011, the platinum price declined 26% in the following five months. Since then every effort to move higher was countered by strong resistance which created lower lows. This can be visualised from the downward sloping trend line drawn from \$1,887 and connecting the price points at the lower end of the price range. When extending both these lines, we see the formation of a falling 'wedge' pattern, symbolised by the coiling ahead of a possible upside breakout. To support this argument, the momentum indicator RSI continues to hold within the band and has not indicated any negative divergence. For instance, as the price trended higher from the third quarter of 2013, along with higher lows, the RSI also formed a similar

PLATINUM PM FIX



Source: Thomson Reuters

trend. In addition, the peaks of the RSI have always extended beyond the previous high in the price, which underscores the positive momentum in price.

Adding to our analysis we have used a 156 week exponential moving average to show the extent of mean reversion. We used this period because the price has been in a consolidation for nearly three years. As can be observed, the price has found strong resistance near that trading range and thus will need to stay above \$1,503 for a sustained period to build strength for an eventual break through resistance at \$1,600. In case this occurs we expect the price to rally to approximately \$1,700 by the end of December. On the downside we do not see weakness prevail beyond \$1,290.

We expect **palladium** again to outperform the other precious metals in 2014 as the deficit continues to widen amid rising auto sales and tighter emission standards in Europe. The bullish sentiment in the market is in line with our technical view after the upward breakout of the symmetrical triangle on 4th March. The breakout at \$749/oz was followed by a significant uptick in volume in palladium futures. This confirms the continuation of the trend seen between early 2009 and late 2010, while also confirming the validity of the earlier bullish signal in mid-

February, when prices closed well above the 12-month moving average. The widest point on the pattern places a target of \$940 by year-end and \$1,030 in the third quarter of 2015.

Over the remainder of the year, the red line parallel to the support of the symmetrical triangle will act as a resistance, giving form to an upward trend channel over which prices will trade range bound. Likewise, the RSI displays an uptrend and highlights the upside potential of palladium as it lies well below the 70 level line. Should prices in April close above the 100% retracement level, the market could revisit the high of February 2011 at \$860/oz between May and June. A sudden resolution to the wage negotiations in South Africa poses a threat to the rally, as prices could also revert back to the apex of the triangle.

Although the breakout of the symmetrical triangle proved to be a bullish signal, the jump in volatility since February may indicate the rally is not sustainable. As monthly prices continue to hover over the upper bound of the bollinger bands, the MACD trends further into overbought territory. Nevertheless, there is no sign of divergence or loss of momentum, lowering the chance of a price retracement over the coming quarter.

PALLADIUM PM FIX



Source: Thomson Reuters

PLATINUM AND PALLADIUM PRICE CORRELATIONS

Thomson Reuters GFMS believes the study of correlation coefficients to be highly useful, not only as an indication of underlying themes that may influence the market, but also to confirm economic theory with empirical evidence. It must be noted, however, that the existence of either a positive or inverse correlation between two assets is not sufficient in itself to establish direct causality.

The close relationship between platinum and palladium is borne of their chemical characteristics. They are in the same group of the Periodic Table, sharing similar industrial uses, especially as catalysts. The automotive sector dominates, with 43% of gross platinum global usage in 2013 and 67% of palladium. The supply profiles differ, of course, as do the underlying fundamental market balances. Risks to the instability of the South African mining environment, and the expectations for falling Russian palladium inventory sales affected sentiment at different times throughout 2013. On the other hand, differences in the outlook for the auto sector in different geographical regions saw the relationship loosen slightly. Even so, the daily correlations remained the tightest of those assets under consideration.

Platinum typically has a closer correlation with gold than palladium, stemming in part from platinum's proportionately higher jewellery demand. This lies in the markets' history; jewellery was traditionally the largest demand area for platinum (especially in Japan) until the blossoming of PGMs in the auto sector finally propelled that use into the top slot. In the decade to 2002 (the final year before auto catalysts emerged as the principal use), jewellery demand averaged 43% of total platinum offtake; in 2013 the jewellery sector accounted for 33% of platinum demand. Jewellery's role in the palladium market, which burgeoned in the late 1990s and early 2000s, has retreated substantially, accounting for just 6% of gross global demand in 2013, a drop for the fifth consecutive year. The markets' perception of palladium as a metal used in jewellery continued to fall, in favour of its role as an industrial commodity.

Palladium's correlation with oil has always been higher than platinum's with oil. However since the second half of 2013, both of the metals' correlation with oil has dropped substantially, even into negative territory. This was due to individual market fundamentals, as geopolitical tensions in Africa and Middle East had market worried about the supply of oil, and recorded the highest 2013 price in the third quarter.

QUARTERLY CORRELATION COEFFICIENTS

(on log-returns in daily prices)

	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4	2014 Q1
Platinum-Palladium	0.75	0.70	0.75	0.81	0.65	0.67

Platinum

Gold	0.69	0.60	0.75	0.73	0.72	0.53
US\$/Euro Rate	0.39	0.25	0.33	0.40	0.42	0.19
CRB Index	0.33	0.03	0.61	0.20	0.05	0.02
Oil (WTI)	0.26	0.19	0.47	-0.03	0.11	-0.17
Thomson Reuters Base Metals Index	0.53	0.32	0.56	0.58	0.33	0.27

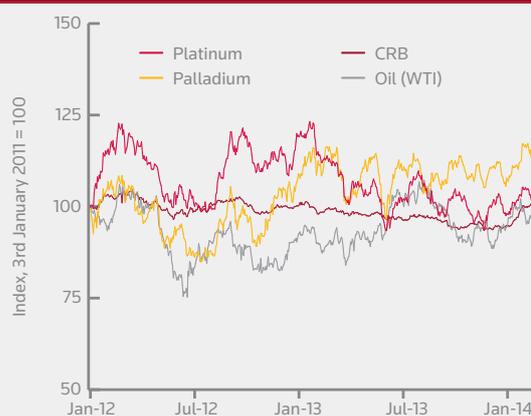
Palladium

Gold	0.58	0.43	0.62	0.62	0.42	0.36
US\$/Euro Rate	0.39	0.33	0.23	0.37	0.42	0.22
CRB Index	0.35	0.14	0.55	0.23	-0.01	0.04
Oil (WTI)	0.42	0.37	0.38	-0.05	-0.04	-0.15
Thomson Reuters Base Metals Index	0.56	0.39	0.50	0.46	0.31	0.27

Source: GFMS, Thomson Reuters

As commodity prices are quoted in dollar terms, fluctuations in the dollar always have a direct impact on commodities prices. In the last year and a half, both platinum and palladium had a similar correlation with the dollar, which significantly decreased in the first quarter of 2014. This was due to a country-wide labour strike in South Africa, where the majority of platinum and palladium is mined. Indeed, South Africa accounts for 72% and 37% of global platinum and palladium production respectively in 2013; any supply disruptions in the country, therefore, significantly affect global PGM production. As a result, the longer the labour strike lasts, the lower the impact of dollar fluctuations is likely to have on platinum and palladium prices. However unlike gold, both platinum and palladium are being viewed as risk assets. Therefore, if demand for gold as a safe haven asset increases, the correlation of PGMs with gold could continue to fall.

PLATINUM, PALLADIUM AND OTHER COMMODITIES



Source: Thomson Reuters

3. INVESTMENT

- *Investment in platinum rose by 13% to 297,000 ounces (9.2 t) in 2013. In indicative value terms, investment demand amounted to approximately \$442 million, up by 23% year-on-year.*
- *Investor interest in platinum was boosted by renewed supply-side concerns revolving around mining sector wage negotiations in South Africa. Nonetheless, platinum investment demand was somewhat restrained by a major shift in investor sentiment towards gold.*
- *Investment in palladium remained in negative territory for the second consecutive year, reaching just over 940,000 ounces (29.3 t) in 2013. In value terms, outflows were equivalent to \$682 million on a net basis.*
- *Considerable selling in the OTC market, along with a smaller degree of long liquidation in the futures market and a lack of fresh buy-side interest from ETF investors for the year as a whole, contributed to last year's selling.*

OVERVIEW

Investor activity continued to play a vital role in determining the direction and scale of PGM price movements last year. Before discussing in detail the trends in platinum and palladium investment in 2013, it is worth making some general observations that apply to both metals. First, it is worth noting the impact on activity in PGMs of the negative shift in investor sentiment towards gold. It was especially evident in the first half of the year, when both platinum and palladium could not escape a massive downdraught in the gold market, with PGM prices posting double-digit losses over the period. That said, supply/demand fundamentals certainly provided some degree of support for both metals. While all the major base and precious metals lost ground in the first half of 2013, palladium was more resilient, reflecting the metal's relatively robust

fundamentals. Moreover, growing concerns surrounding the South African mining sector's wage negotiations helped to support investor interest in platinum and, to a lesser degree, palladium. Meanwhile, investor sentiment was heavily influenced by macroeconomic developments last year. While both platinum and palladium benefitted from the improving outlook for the world economy in the second half of the year, at the same time the uncertainty about the prospects for US monetary policy helped to inform negative market sentiment.

PLATINUM

The investor community as a whole remained on the buy-side of the market last year. Investment in platinum, which is the sum of retail investment, the net change in exchange traded funds (ETFs) and the net balance (i.e. the balance that remains after independently calculating all other areas of supply and demand), totalled 297,000 ounces (9.2 t) in 2013, up by 28% year-on-year. In approximate value terms, platinum Investment amounted to \$442 million in 2013.

As illustrated in the table below, central to the 28% rise in Investment was a strong increase in demand for platinum ETFs last year, in part driven by the new product launch in South Africa. Total platinum ETF holdings rose by almost 892,000 ounces (27.7 t) for the full year, with the holdings held by the South Africa-listed fund growing by over 540,000 ounces (16.8 t) since its launch in April 2013. By contrast, retail investment in bars and coins eased considerably last year, led by losses in Japan, due to a sustained weakness of the Japanese yen throughout the year that saw the yen platinum price rise strongly, compared with a modest decline in the dollar price.

Our analysis has last year's platinum market in net balance deficit, a good part of which was fed by a relatively high degree of investor selling outside platinum

INVESTMENT

(000 ounces)	Platinum				Palladium			
	2010	2011	2012	2013	2010	2011	2012	2013
Retail Investment	95	312	282	161	80	61	37	38
Exchange Traded Funds	574	145	237	892	1,089	(532)	448	0.1
Net Balance	65	593	(288)	(756)	(939)	1,045	(1,202)	(979)
Investment	735	1,050	231	297	230	574	(717)	(941)
Indicative Value US\$ (Mn)*	1,182	1,808	359	442	121	421	(461)	(682)

*Indicative value calculated using annual average volume and prices.

Source: GFMS, Thomson Reuters

ETFs. Starting with the futures markets, net investor positions on NYMEX and TOCOM collectively fell by over 847,000 ounces (26.3 t) during 2013. While it is impossible to be sure what the precise physical impact of this major decline would have been, it would seem that investors in the futures market were net sellers last year. It is worth noting, however, that the decline was largely attributed to hefty selling on NYMEX, while investor interest in the metal on TOCOM saw a robust increase. Our analysis also suggests that there was modest net buying in the OTC market in 2013, particularly in the second quarter when the price decline sparked some opportunistic buying.

Turning to intra-year developments, investor activity fluctuated considerably during the year. The year started with robust investment in ETFs, which by the end of January reached a new high of 1.66 Moz (51.6 t), and fresh speculative buying interest in the futures market. This was bolstered by renewed concerns over mine production in South Africa after Anglo American Platinum, the world's largest producer, announced plans to reduce output as part of its restructuring programme.

Thereafter, investor sentiment started to turn negative on increased concerns about the outlook for US monetary policy and growing speculation that the Fed was becoming more hawkish. This translated into heavy selling in net investor positions in platinum futures on the major exchanges during the February-June period. In contrast, after a period of profit-taking in February, platinum ETFs enjoyed robust investor interest in the next few months, which took total holdings to a fresh high by end-June. This was related to the listing in April of the new NewPlat ETF in South Africa that became the world's largest platinum ETF. Investors continued to build their ETF holdings in the second half of the year, driven by an improving sentiment towards world

economic growth and fresh supply-side fears in light of a lack of progress in the sector's wage negotiations. It is of note, however, that despite some recovery in investor activity in the futures market over the same period, net investor positions on the principal exchanges by year-end remained well below the levels seen in early 2013.

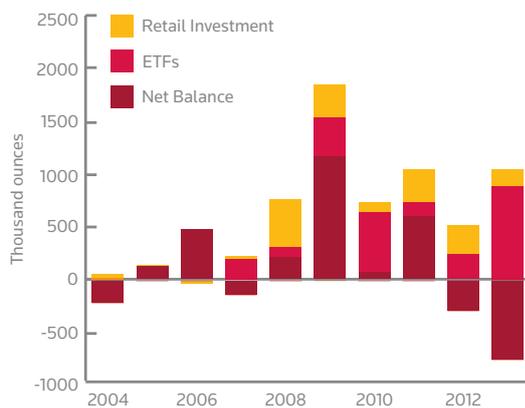
In early 2014, platinum benefitted from a positive shift in investor sentiment towards gold, driven by renewed concerns over global economic slowdown and the escalation of geopolitical tensions in Ukraine. Moreover, a deteriorating situation in South Africa in light of prolonged mining strikes saw a rapid increase in long speculative platinum positions and ETF holdings in the first quarter of the year.

PALLADIUM

For the second year in a row, the investor community as a whole remained net sellers of palladium in 2013. Disinvestment came to approximately 940,000 ounces (29.3 t) last year, compared to just below 717,000 ounces (22.3 t) in 2012. In approximate value terms, last year's outflows were equivalent to \$682 million on a net basis.

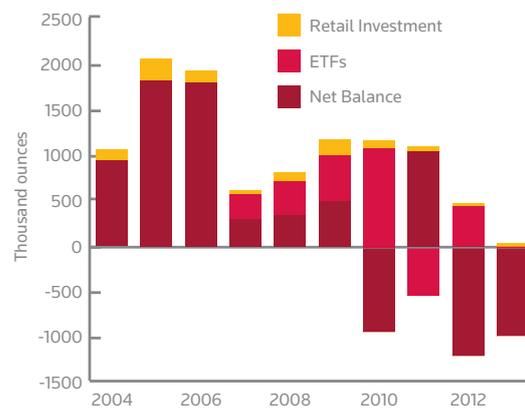
A close analysis of individual investment components suggests that last year's outcome was almost entirely driven by a sizeable market deficit, which was also fed by net investor sales outside palladium ETFs. Combined net investor positions on NYMEX and TOCOM dropped by nearly 467,800 ounces (14.6 t) over the year. The implication therefore is that there was some selling in the OTC market, as investors took advantage to lock in profits at higher prices. It is worth noting, however, that fundamental deficit was smaller than that of 2012. This implies that it is not just the level of selling in the futures and OTC markets that was a feature of the market last year, but also a lack of fresh investor interest in palladium

WORLD PLATINUM INVESTMENT



Source: GFMS, Thomson Reuters

WORLD PALLADIUM INVESTMENT



Source: GFMS, Thomson Reuters

PLATINUM AND PALLADIUM EXCHANGE TRADED FUNDS

Combined platinum ETFs grew by 55% or nearly 892,000 ounces (27.7 t) in 2013, to reach 2.53 Moz (78.6 t) by year-end. Meanwhile, palladium ETF holdings remained flat, closing the year at 2.17 Moz (67.6 t). Starting with platinum ETFs, last year's growth was largely thanks to inflows into the NewPlat fund launched in South Africa in April 2013, which soon became the largest platinum ETF, with its holdings standing at nearly 0.91 Moz (28.3 t) by year-end. The fact that the NewPlat ETF is classified as a domestic investment, which means that investment in this product will not affect the foreign exposure limits applicable to retail and institutional investors, has attracted strong interest from South African investors. Excluding this fund from the total reveals that other platinum ETFs fell by 1% or roughly 17,400 ounces (0.5 t) last year.

Platinum ETFs enjoyed decent buying at the start of the year, taking total holdings to a fresh high of 1.66 Moz (51.6 t) by end-January. After the February selling (driven by profit-taking when the platinum price broke through the \$1,700/oz level) the pace of buying accelerated in the second quarter, particularly in April, when the launch of the South African ETF attracted high levels of investor interest. This, along with some interest from bargain hunters in light of lower prices, pushed ETF holdings to a record of 2.14 Moz (66.5 t) by end-June. Momentum slowed thereafter, before inflows rebounded in the final months of the year on renewed concerns about South Africa, with additional support stemming from the improving economic outlook, especially as it pointed to better prospects for autocatalyst demand.

Palladium, meanwhile, enjoyed positive inflows in the first two months of 2013, taking holdings to a new high of 2.37 Moz (73.7 t) before end-February. In early March the breach of the \$780/oz price level triggered profit-taking, with ETF investors reducing their holdings by nearly 12,690 ounces (0.4 t) by end-month. Holdings then stabilised in April and started to recover in May, hitting a new high of 2.42 Moz (75.3 t) by

NET INFLOWS INTO PLATINUM & PALLADIUM ETFS

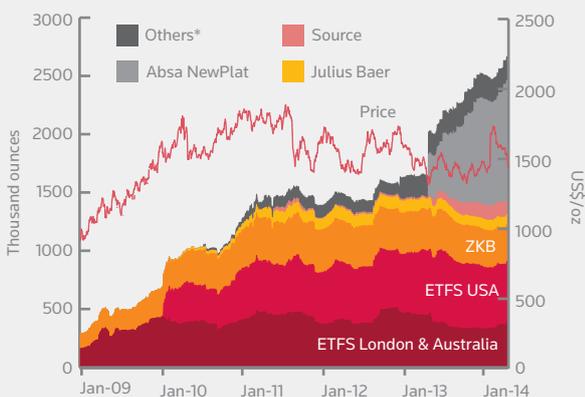
(000 ounces)		
Platinum	2013	Jan-Apr 2014*
Absa NewPlat	909.4	114.5
ETFS USA	36.1	-20.6
ETFS London and Australia	-136.0	60.2
Zürcher Kantonalbank	-32.2	-3.9
Others**	114.8	-3.4
Total	892.0	146.8
Palladium		
ETFS USA	5.5	-84.3
ETFS London and Australia	-88.1	50.2
Zürcher Kantonalbank	-78.1	-7.0
Standard Bank AfricaPalladium	-	221.0
Absa NewPalladium	-	192.8
Others**	160.7	-9.9
Total	0.1	362.8

*until 23rd April; **ETF Securities Glitter, WITE, Mitsubishi, Deutsche Bank, iShares ETC, Source, Sprott, Julius Bär; Source: Respective issuers

mid-month. Selling resumed in June and continued for five consecutive months, taking combined holdings to 2.16 Moz (67.1 t) by the end of October, down by over 260,000 ounces (8.2 t) or nearly 11% from the May high. This was partly related to investors' increasingly cautious attitude towards the metal, as the market had been overbought, particularly given the net gain in NYMEX gross longs. In addition, the uncertainty about the outlook for US monetary policy weighed heavily on market sentiment, although investment demand for platinum, as opposed to palladium, was supported by renewed supply-side risks. A brief recovery in November was followed by profit-taking in December, which took combined holdings to 2.17 Moz (67.6 t) by year-end. While flat year-on-year, this was down by 246,000 ounces (7.7 t) from the May high.

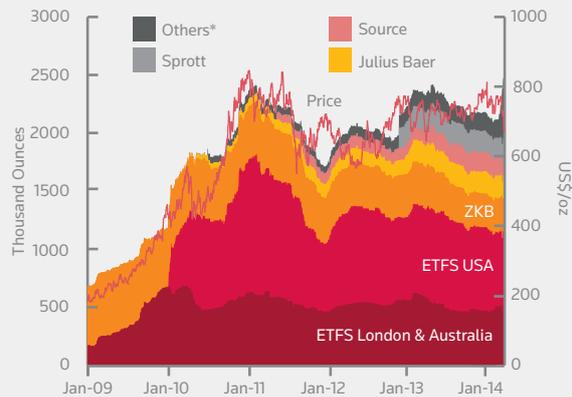
Selling continued in early 2014, before March saw a jump in investment demand, due to the listing of the new Absa and Standard Bank palladium ETFs in South Africa. At the time of writing, combined holdings in these two funds stood at over 400,000 ounces (12.4 t).

PLATINUM ETF HOLDINGS



Source: GFMS, Thomson Reuters; collated from respective ETF issuers' data
*ETF Securities GLTR, WITE, Mitsubishi, DB Physical Platinum, iShares Physical Platinum ETC, Sprott Physical Platinum Trust

PALLADIUM ETF HOLDINGS



Source: GFMS, Thomson Reuters; collated from respective ETF issuers' data
*ETF Securities GLTR, WITE, Mitsubishi, DB Physical Palladium, iShares Physical Palladium ETC, Absa NewPalladium, Standard Bank AfricaPalladium

ETFs for the year as a whole. Combined ETF holdings at end-2013 remained flat year-on-year. This by no means implies the complete absence of fresh buy-side interest in palladium ETFs during the year. On the contrary, combined holdings reached a series of new highs during the first half of 2013. Nonetheless, marked outflows that started in June and continued for the rest of the year took ETF holdings by end-December back to levels seen in early 2013.

Meanwhile, palladium retail investment was marginally higher last year, as robust demand for physical bars in North America offset losses elsewhere. Having said that, the absolute level of retail investment remained insignificant in 2013.

The reasons for last year's palladium sales have much in common with those mentioned earlier in the platinum section. More specifically, a negative market sentiment towards gold (driven by a shift in US monetary policy and a return of risk appetite in the markets) that prevailed through much of 2013 put downward pressure on investment demand for palladium. In addition, it is important to stress several other factors, which helped to explain selling in the futures and OTC markets last year.

First, higher palladium prices triggered profit taking from some investors, especially from those that had bought the metal at considerably lower price levels in previous years. Moreover, market concerns about a slowdown in economic activity in China that re-emerged in the second half of the year had a negative impact on investment demand for palladium given its dual nature as both an investment asset and an industrial metal.

Having said that, while 2013 as a whole saw net disinvestment, there were periods over the course of the year that witnessed fresh investment inflows. As mentioned above, this was especially evident in a steady

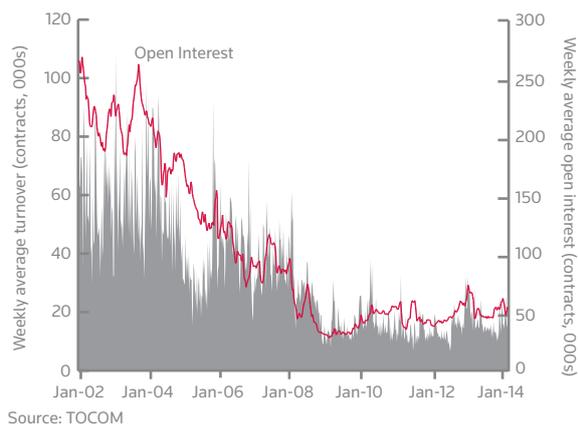
rise in investment in palladium ETFs at the beginning of the year. In addition, investor interest in palladium on NYMEX rose substantially in the first quarter of 2013, to reach a fresh high in early April.

Palladium's appeal was boosted by the metal's positive long term fundamentals, in particular a promising outlook for industrial fabrication demand. Unlike platinum, which heavily relies on European vehicle production, palladium's autocatalyst demand is expected to benefit from ongoing recovery in car production in North America and emerging markets, where autocatalyst loadings are heavily weighted in favour of palladium. This, along with ongoing substitution gains in diesel applications at the expense of platinum, attracted certain long-term investors, who expect palladium prices to move higher in the coming years.

Moreover, the news that South Africa's Absa Capital was planning to launch the first palladium ETF before year-end helped to maintain positive investor sentiment towards the white metal. Additional support came from renewed concerns about South Africa, although the impact on palladium was somewhat smaller than for its sister metal. In contrast, the news that Russian stock sales would only be marginal in 2013 provided a significant boost to investor sentiment.

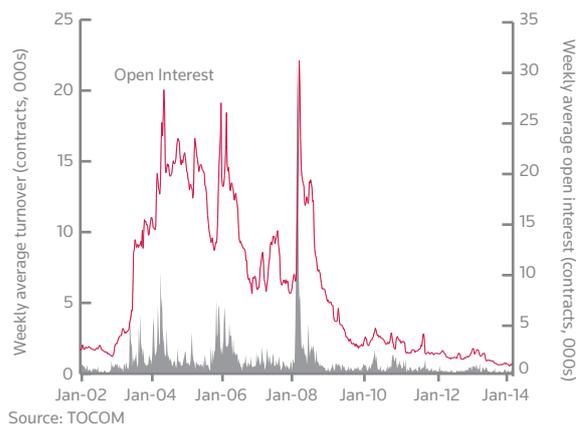
Turning to developments in 2014, the first few months saw a rise in investor activity on NYMEX, mainly on the back of the improved investor attitude towards gold. By contrast, ETF selling continued into the first two months of the year on rising fears about global economic weakness, which took holdings by end-February to their lowest level since December 2012. That said, investor buying resumed in March, thanks to inflows into the newly launched Absa and Standard Bank ETFs in South Africa, which saw their combined holdings rise to over 400,000 ounces (12.4 t) in April.

TOCOM PLATINUM FUTURES



Source: TOCOM

TOCOM PALLADIUM FUTURES



Source: TOCOM

NET 'INVESTOR' POSITIONS ON THE TOCOM AND NYMEX

(end-period; positive represents net longs)	Platinum				Palladium			
	H1.12	H2.12	H1.13	H2.13	H1.12	H2.12	H1.13	H2.13
TOCOM Futures Contracts	13,285	28,751	17,374	28,993	611	756	648	669
- equivalent in ounces (000s)	214	462	279	466	10	12	10	11
NYMEX Futures Contracts	21,062	41,268	21,532	24,236	4,724	22,564	20,083	17,900
- equivalent in ounces (000s)	1,053	2,063	1,077	1,212	472	2,256	2,008	1,790

Source: TOCOM, CFTC

COMMODITY EXCHANGES

- **Turnover in platinum futures traded on TOCOM continued to recover, posting a 23% increase last year. After two consecutive years of decline, palladium volumes rebounded strongly in 2013.**
- **Both metals saw a sizeable increase in trading volumes in NYMEX futures last year.**
- **Platinum trading volumes on the Shanghai Gold Exchange reached record levels last year.**

NYMEX

Trading volumes in NYMEX **platinum** futures enjoyed yet another good year in 2013. Turnover jumped to over 3.2 million contracts, equivalent to a nominal 163.14 Moz (5,074.2 t), up by 24% year-on-year. At end-2013, open interest stood at 62,037 contracts, 4% higher than the previous year's figure.

An analysis of the data published by the CFTC in its weekly reports on non-commercial and non-reportable net positions in NYMEX futures provides a proxy for investor activity on the exchange. As illustrated in the graph on the next page, investor interest in the futures market continued to build up at the start of 2013. The net investor long jumped by 38% from the end-2012 figure, to a fresh high of 2.85 Moz (88.7 t) by mid-February. Central to this were growing supply-side concerns, especially after Amplats, the world's largest producer of platinum, revealed plans to cut production following a strategic review of its operations in South Africa.

Nevertheless, platinum, along with the rest of the precious metals complex, came under selling pressure in the coming months, as investors became increasingly concerned about the outlook for US monetary policy. Fears that the Fed could start tapering earlier than expected weighed considerably on investor sentiment, sending the net long position to 1.05 Moz (32.8 t) in the last week of June. This was the lowest level since July 2012 and down by 63% from its record high in February. The move was primarily driven by a sharp

increase in short positions, to a record of 1.29 Moz (40.2 t) by end-June, an increase of 790,250 ounces (24.6 t) from the start of the year.

In the second half of the year, however, investor interest resumed on fresh concerns revolving around the South African mining sector's wage negotiations. Increased fears of a new cycle of unrest and production stoppages in the region saw the net investor long nearly double between end-June and early September, to hit 2.03 Moz (63.2 t) in the last week of August, when the price jumped to a multi-month high of \$1,546. Despite a brief recovery in the final weeks of October through to early November, liquidations prevailed for much of the rest of the year, taking the net long down to 1.21 Moz (37.7 t) by year-end.

Palladium turnover rose by a third to 1.5 million contracts last year, which was equivalent to 148.60 Moz (4,622.1 t). At end-December 2013, open interest on the exchange stood at 38,885 contracts, up by 36% year-on-year.

As with platinum, palladium enjoyed a steady increase in speculative buy-side interest in the first quarter of 2013, helped by renewed concerns over supply issues in response to Amplats' announcement of its annual results. Moreover, upbeat economic data in China along with the announcement that Russia's palladium reserves had almost run out, and that sales from state stockpiles were expected to be only marginal in 2013, pushed the net investor long to a record high of 2.97 Moz (92.3 t) in early April.

Despite a high degree of volatility, interest in palladium held up relatively well for much of the remainder of the year, helped by the metal's strong underlying fundamentals and the continued uncertainty on the platinum supply side. A more positive macroeconomic outlook in the second half of the year and, as such, improving prospects for autocatalyst demand, provided additional support to the white metal. The net investor long remained elevated for much of the year, before profit taking ahead of year-end took the net long to a record low of 1.79 Moz (55.7 t) by end-December.

ANNUAL PGM FUTURES TURNOVER, 2013

(nominal)	Platinum		Palladium	
	TOCOM	NYMEX	TOCOM	NYMEX
Million ounces	68.8	163.1	1.3	148.6
Tonnes	2,139	5,074	40	4,622
Value* (US\$ billion)	102.3	242.5	0.9	107.7

*using 2013 average for London p.m. fix

Source: Thomson Reuters; TOCOM

TOCOM

Last year, turnover in **platinum** futures jumped by 23% to nearly 4.3 million contracts. This was equivalent to a daily average of 17,463 contracts (almost 280,727 ounces or 8.7 t in nominal terms). Having said that, last year's volume only recovered to 2010 levels and remained well below highs seen in the past. At end-2013, open interest amounted to 56,351 contracts, equivalent to a nominal 905,862 ounces (28.2 t), down by 8% year-on-year.

The period between mid-January and mid-February 2013 saw a rapid increase in investment demand, driven by a marked weakening of the Japanese yen in response to the Bank of Japan's aggressive policy moves to spur economic growth. The net investor long jumped to nearly 39,500 contracts (635,000 ounces or 19.8 t in nominal terms) by mid-February, the highest level since March 2011. However, sharp bouts of profit taking in the second half of February and mid-April, when the price neared ¥5,000/g, pushed the net long to 16,739 contracts (just above 269,000 ounces or 8.4 t) in early May, its lowest level since October 2012.

As the Japanese currency continued its descent, breaching the 100 yen to the US dollar mark in mid-May for the first time in four years, net investor positions saw a brief recovery, rising to 24,256 contracts (close to 390,000 ounces or 12.1 t) on 12th June. This was followed

by a period of profit-taking, which took the net investor long below 15,000 contracts in late August.

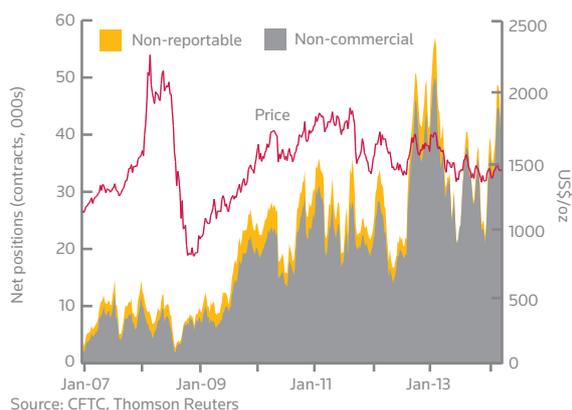
The last few months saw investment demand pick up on an improving economic outlook, the Japanese government's pro-growth policies and ongoing uncertainty in South Africa, which took the net long to nearly 29,000 contracts (just above 466,000 ounces or 14.5 t) by year-end, albeit still well below the levels seen earlier in the year.

Turning to **palladium**, turnover rose to just over 79,350 contracts, up by near a third year-on-year. This was equivalent to an average daily volume of 5,207 ounces (0.2 t), less than 2% of platinum volume on the TOCOM. End-2013 open interest, at 1,538 contracts, was down by 29% on the 2012 figure.

Similar to platinum, early 2013 saw fresh buy-side interest in palladium futures, taking the net investor long to 1,414 contracts (4,546 ounces or 0.1 t) at the start of February, its highest level since October 2011. While this was followed by a period of profit-taking, investor interest recovered in early March on positive data from the vehicle market in the United States and China, along with growing concerns on the platinum supply side. Moreover, the news that Russia and South Africa were considering to set-up an OPEC-style trading partnership for the PGMs market provided a further boost, taking the net long to the year's high of 1,545 contracts (4,967 ounces or 0.2 t in nominal terms) in early April.

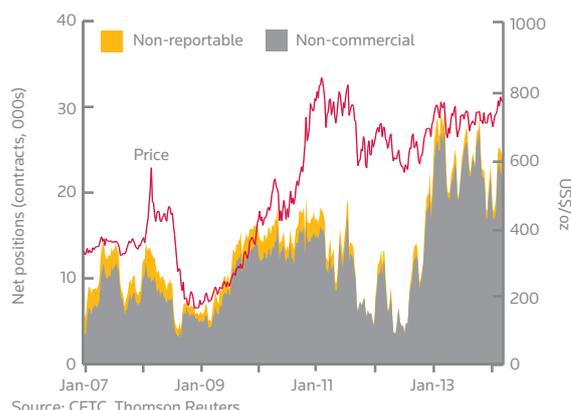
Profit-taking in the latter half of April and June took the net long towards 648 contracts by end-June, down by nearly 60% from the high level seen in early April. Despite a temporary recovery thereafter, investor interest remained weak for the rest of the year, closing the year at 669 contracts, down by 18% from the start of 2013.

NYMEX: PLATINUM TOTAL NET POSITIONS



Source: CFTC, Thomson Reuters

NYMEX: PALLADIUM TOTAL NET POSITIONS



Source: CFTC, Thomson Reuters

SHANGHAI GOLD EXCHANGE

The Shanghai Gold Exchange (SGE) remained the only official source of VAT-free platinum in China in 2013. Information received from members of the SGE that are involved in platinum trading, along with our own field research, confirms that the overwhelming majority of the trading on the SGE is related to the sourcing of metal for industrial and jewellery fabrication. In contrast, investor activity remained subdued last year, due to the lack of effective two-way trading on the exchange.

Total volume on the SGE rose by 41% to 2.90 Moz (90.2 t) last year. The increase was almost exclusively driven by a hefty rise in jewellery demand, with gains concentrated in April and June when platinum prices fell sharply. Meanwhile, demand from industrial sources fell last year, as China's economic growth continued to ease.

The closed nature of the Chinese platinum bullion market generally leads to a differential between the SGE and the international price. The graph below illustrates the monthly premium or discount between the closing SGE price and the London a.m. fix. Using this benchmark, the SGE premium rose to an annual average of \$78/oz last year, compared to \$74/oz in 2012. The average SGE premium, measured in percentage terms (basis the a.m. fix), rose above 5% in 2013, up by 9% year-on-year.

RETAIL INVESTMENT

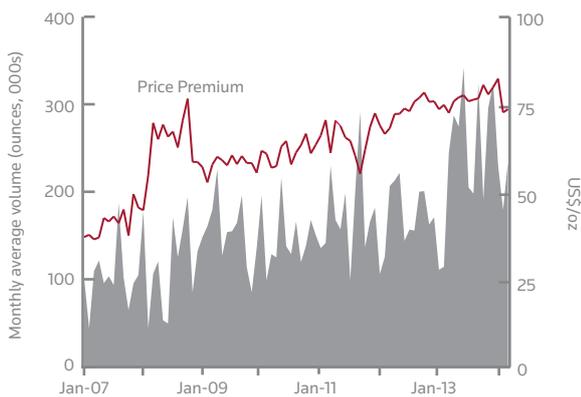
The vast majority of investment in physical platinum and palladium bullion products has historically been concentrated in two countries, namely Japan and the United States. Demand in the former is aided by a long history of investing in the PGMs and it has been the most important retail investment market for platinum. There have also been sporadic bursts of interest in palladium bullion from US investors.

Looking at Japan first, physical investment for platinum is estimated to have totalled 62,000 ounces (1.9 t) in 2013, down by 58% on the previous year's figure. Despite last year's drop, Japan remained the world's largest retail market for platinum investment, accounting for nearly 40% of the total. The steep decline was due to the marked weakness of the Japanese yen, which dropped in late 2013 to its lowest level since 2008 against the US dollar. As a result, while the dollar platinum price registered a drop of 4% over the course of 2013, the yen price rose by 17%, which clearly undermined investor interest in the metal. That said, the first quarter of 2014 saw a jump in platinum bar sales ahead of a VAT rise.

Moving to North America, demand for platinum bullion posted a marked decline, dropping by 37% last year. This was partly due to high investment demand in 2012, which was the third highest level since our records began in 1999. Furthermore, last year saw reduced safe haven purchases as the improving outlook for the US economy prompted investors to flee from safe-haven assets towards more conventional, higher-yielding equities. Meanwhile, palladium retail investment was up by 11% last year, albeit still well below the levels seen in the past. The rise was largely a reflection of a robust demand for bars, fuelled by the metal's attractive supply/demand fundamentals and higher price expectations.

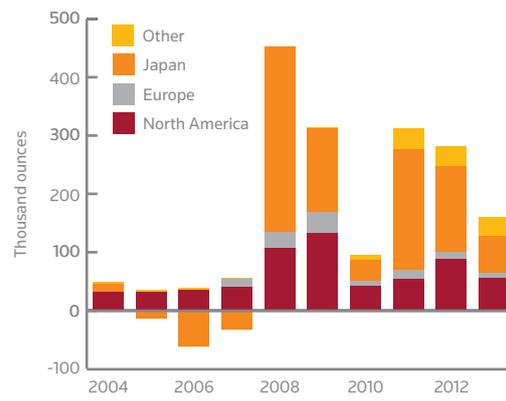
Physical investment in Europe remained subdued in 2013. This is largely because purchases of platinum and palladium bullion continue to be impeded by Value Added Tax (VAT) being levied on sales of bars and coins; investment in the region is therefore mainly in the form of VAT-exempt metal accounts. In China, purchases of physical platinum and palladium bullion products remained limited last year. This is mainly due to still very low awareness of PGMs as alternative investment vehicles among the general public, coupled with these bullion products' high premia at the retail level.

SGE PLATINUM MONTHLY VOLUME & PRICE PREMIUM



Source: GFMS, Thomson Reuters; SGE

PLATINUM RETAIL INVESTMENT



Source: GFMS, Thomson Reuters

4. SUPPLY

- **Global refined platinum mine production edged up by 2%, to 5.94 Moz (184.8 t), up from 2012's ten-year low, driven by gains of roughly equal measure in South Africa and Zimbabwe.**
- **Global palladium mine supply fell by 1% to 6.44 Moz (200.4 t) last year, with losses in each of the three largest producing countries; Russia, South Africa and Canada.**
- **Producers' costs on a platinum equivalent (co-product) basis in dollar terms fell, with Total Cash Costs (TCC), TCC + Sustaining Capex, and All-in Costs lower by 10%, 13% and 12% respectively.**
- **A sharply weaker South African rand and higher palladium prices contributed to cost reductions in dollar terms.**

MINE PRODUCTION

SOUTH AFRICA

Following on from the dismal production performance in 2012 due to widespread strike action, in 2013 platinum production in South Africa recovered by just 2% to 4.27 Moz (132.9 t). Palladium output, on the other hand, contracted further, falling by 2% to 2.35 Moz (73.2 t). The weaker relative outcome for palladium was mostly attributable to lower refined output by all three of the largest producers, partly owing to refining pipeline effects. At the margin a change in ore sources also had a bearing on contained metal values entering the process pipeline.

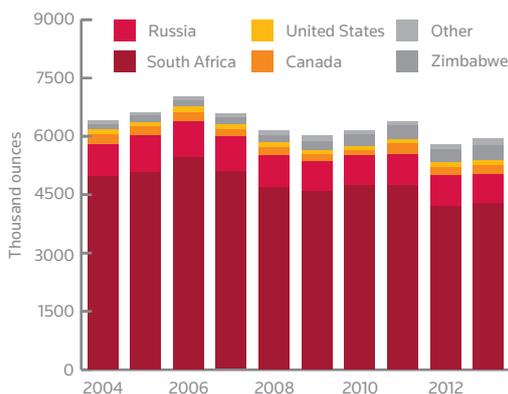
At this time last year, a meaningful increase in production seemed a remote possibility for 2013, with strike action

then expected to weigh heavily again. This was based on expectations that the newly-recognised Association of Mineworkers and Construction Union (AMCU) would gain traction, and that there was little likelihood of meaningful change from the perspective of management-initiated or government-imposed Section 54 safety stoppages. Reflecting on events, this viewpoint proved slightly pessimistic. Although the labour situation remained volatile, major industrial unrest was deferred into 2014 (detailed in the focus box in this chapter). Mine safety rates improved last year, and on balance 2013 was a year with fewer Section 54 interventions than in 2012. These factors were among the positive drivers towards a slight year-on-year increase in South African milled tonnage and, consequently, a rise in the volume of precious metals in concentrate produced by the platinum industry.

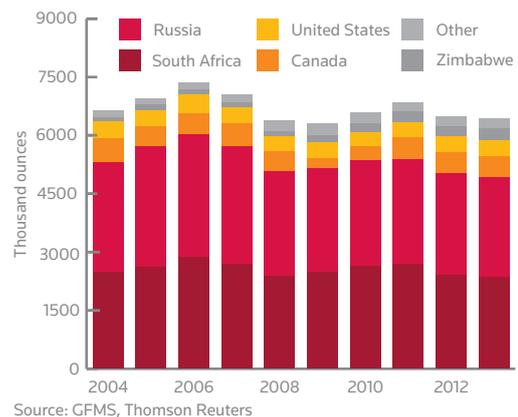
The labour unrest has at times been wholly expected and in most cases was entirely foreseeable to the market. This helps explain why the dollar price response has been remarkably benign, given the scale of production losses and the lasting damage to the industry. In addition to the clear emerging markets sell-off in the early months of 2014, the industrial action in the first half of 2014 and the speculation surrounding it clearly impacted the local economy in a number of ways. The rand's low, of sub-11 to the dollar, was reached one week into the AMCU platinum strike and it is estimated that on the basis of the direct loss of sales revenue alone, the past three months have seen South Africa forego more than R14 billion, equivalent to almost one quarter of the country's annualised GDP growth.

Anglo American Platinum (Amplats) faced another year of challenges and in its own words, a "critical year for the company and the industry." Total refined platinum

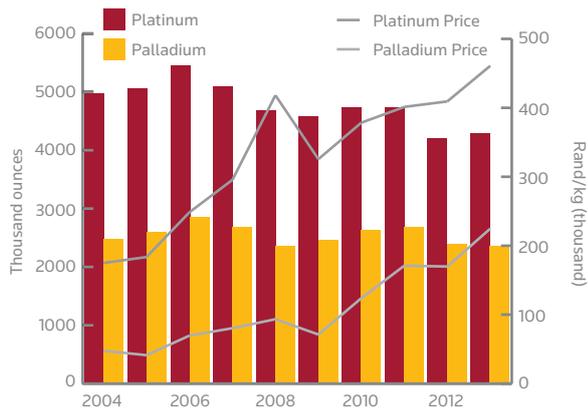
WORLD PLATINUM MINE PRODUCTION



WORLD PALLADIUM MINE PRODUCTION



SOUTH AFRICAN MINE PRODUCTION



Source: GFMS, Thomson Reuters

output (including feeds from third parties and joint ventures) was essentially flat at 2.38 Moz (74.0 t), while by the same metric palladium outturn was fractionally lower year-on-year, by 1%, at 1.38 Moz (42.9 t). A broadly similar trend was witnessed for the company's equity-attributable refined production. Contrary to its peers, Amplats witnessed an uptick in the number of Section 54 stoppages imposed at its operations.

Plans to undertake a well-telegraphed restructure of its Rustenburg shafts proved drawn-out. An initially-tabled proposal was moderated and one shaft earmarked for care & maintenance, Khuseleka 1#, has since been preserved and incorporated into the Thembelani unit, under a broad re-drawing of Rustenburg Section's reporting units from five to three. Central to the restructure was a push to control operating costs through headcount reductions and thrifting capital expenditure, in part by diverting spending away from a number of loss-making areas. As a consequence, operations ceased at old decline workings at Union Section, as well as at Khuseleka 2# and at both Khomanani 1# and 2#, which ceased mining in August.

Associated with the extended time taken to finalise this restructure and proceed with the "Section 189" consultation process, other assets saw a knock-on impact. Amandelbult, for example, had a weak start to

2013. Natural staff attrition, coupled with a decision to redeploy staff which were at risk of retrenchment from Rustenburg shafts. This led to the Tumela and Dishaba mines becoming under-resourced, which was one factor behind lower run-of-mine ore tonnage in the first half of the year.

Notably, though, in spite of this reorganisation, recoverable platinum in concentrate from Rustenburg actually rose modestly last year, to just above 0.50 Moz (15.6 t). Likewise, despite the closure activities at Union's declines, and recruitment disruption at Amandelbult, production of metal in concentrate was steady year-on-year, although this must be considered against the backdrop of the strike-impacted 2012 figures.

Amplats' stand-out performer was, for another year, its Mogalakwena open pit complex on the Northern Limb. Earmarked as a core asset not only for Anglo Platinum, but also by parent Anglo American, during a strategy day in London the latter identified a revised mine plan that substantially lowered the strip ratio over the medium term to increase much later in the mine plan. In early 2013 a new production strategy was implemented with a plan to increase mining rates and expand the primary stockpile from which mill feed is drawn. Further, in addressing downstream bottlenecks, the company entered into a short term agreement with a third party concentrator.

At Impala Platinum's Lease Area, refined production of platinum in 2013 rebounded, up by 16% to 0.73 Moz (22.7 t) although palladium output was essentially flat year-on-year. This reflected a recovery from a challenging environment for Implats in 2012; in particular, a lack of panel availability after strike in the first quarter, and rising proportions of UG2 ore feeds ahead of the onset of its current series of three Merensky reef shaft developments. Ore mined and milled was up, and at a slightly improved Merensky reef ratio, which in turn positively influenced PGM head grades. Recoveries were also better on the back of optimisation of the

WORLD PLATINUM MINE PRODUCTION

(000 ounces)	2012	2013	Change
South Africa	4,187	4,272	2%
Russia	804	765	-5%
Zimbabwe	335	409	22%
Canada	220	217	-1%
United States	120	122	2%
Other	138	156	13%
World Total	5,805	5,941	2%

Source: GFMS, Thomson Reuters

WORLD PALLADIUM MINE PRODUCTION

(000 ounces)	2012	2013	Change
Russia	2,627	2,580	-2%
South Africa	2,392	2,353	-2%
Canada	557	530	-5%
United States	396	404	2%
Zimbabwe	256	314	23%
Other	271	260	-4%
World Total	6,500	6,442	-1%

Source: GFMS, Thomson Reuters

SOUTH AFRICAN PLATINUM SAFETY RECORD

	2012	2013	Change
Fatalities Pt	28	27	-4%
Fatalities Au	53	37	-30%
Fatality rate Pt ¹	0.07	0.07	0%
Fatality rate Au ¹	0.18	0.14	-22%
Reportable injuries Pt	1,345	1,344	0%
Reportable injuries Au	1,477	1,252	-15%
Reportable injury rate Pt ¹	3.43	3.53	3%
Reportable injury rate Au ¹	5.13	4.66	-9%

¹ Number of incidents per million hours worked
 Source: Department of Mineral Resources

concentrators to achieve a finer grind and increased liberation of precious metals particles. Palladium outturn was not higher last year largely due to the release of metal locked up in the palladium refining circuit in previous years; 2013 represented a return to more 'normal' output levels.

At the company's majority-owned Marula joint venture on the Eastern Limb, which had been under lengthy operational review, labour productivity saw substantial gains under the 'Proudfoot' initiative. Production of platinum and palladium in concentrate both grew by approximately one-tenth year-on-year.

Lonmin's Marikana recorded a divergent trend, with platinum sales (incorporating Pandora material) having edged 1% higher, and palladium dropping sharply year-on-year. Plant recoveries posted yet another year of improvement, along with mining operations enjoying both higher volume and grade. Although the other majors have continued to produce from non-Western Limb mines, Lonmin has been unable to escape in this regard, with the entirety of its production offline from the 23rd January to at least late April (time of writing) due to strike action.

Among the mid-tier producers, Northam Platinum's Zondereinde suffered two episodes of extended industrial action, at the start and end of 2013, which led to platinum output falling by around one-fifth to 0.14 Moz (4.4 t). Palladium fell by a similar proportion. The company's metal production (excluding purchases) edged higher, however, as the Booyendal project was successfully brought online in the second half of the year. Royal Bafokeng Platinum continued to deliver steady results

at its BRPM Boschkopie mine, as it continues to advance its adjacent Styldrift vertical shaft project. Atlatza Resources, meanwhile, started to deliver on its turnaround strategy at Bokoni, in part thanks to additional mill throughput from an open pit operation.

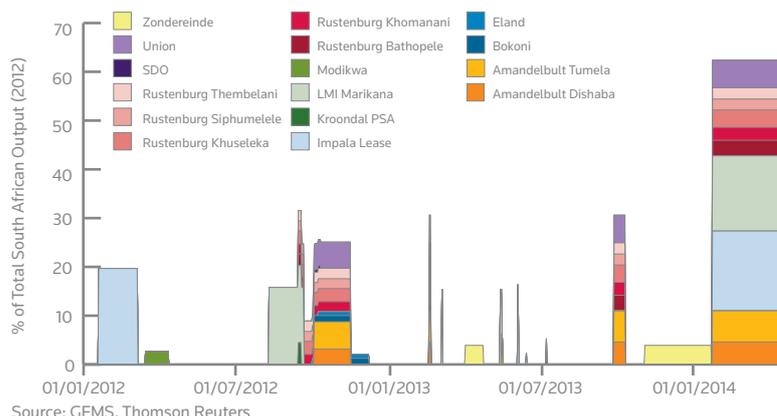
Aquarius Platinum, which is in the process of refinancing near-term debt, had a good year operationally at its flagship Kroondal Pool & Share joint venture, recording platinum production in concentrate of 0.25 Moz (7.8 t). However, the year-on-year production loss due to several of its operations being placed on care & maintenance, namely the Marikana Pool & Share, Everest South and CTRP assets, dominated the company's headline production trend. Similarly, in two phases of care & maintenance decisions, Eastplats' Crocodile River mine ceased operations during 2013.

Tailings retreatment and by-product operations provided a meaningful boost to production last year, notably the ramp up of a new PGM plant at chrome producer Tharisa Minerals, based near Marikana. A lesser, but nevertheless solid, rise in output was noted by Amplats at its Western Limb Tailings Retreatment, and Sylvania Platinum's collective dumps operations, SDO, also recorded additional PGMs. Meanwhile African Rainbow Minerals and Norilsk's Nkomati nickel mine also increased PGM output substantially.

RUSSIA

In 2013, **Russian** platinum output fell by 5% to 0.76 Moz (23.8 t) and palladium mine production contracted by 2% to 2.58 Moz (80.2 t). The Russian PGM industry is dominated by Norilsk Nickel, which produces platinum, and more importantly palladium, as a co-product of its nickel mining operations based on the Taimyr and Kola Peninsulas. The company's domestic output

SOUTH AFRICAN STRIKE ACTIVITY 2012-2014



INDUSTRIAL ACTION IN SOUTH AFRICA

Compared to 2012, last year saw relatively muted strike action across the South African platinum industry, with the only protracted disruptions occurring at Northam's Zondereinde and Amplats' Rustenburg, Union and Amandelbult sections. While platinum producers sought to cut costs in a year of narrow profit margins, the Association of Mineworkers and Construction Union (AMCU) continued to gain formal recognition as the dominant representative union at all three of the major producers' Western Limb operations, and indeed it became the dominant union across the country's platinum in its entirety. In early July, the AMCU formally put forward the set of drastic wage demands to Anglo Platinum that it had used to wrest worker representation from the National Union of Mineworkers (NUM) in 2012. These included a demand for what represented a 150% increase in entry level wages for underground workers and improvements to a number of other allowances. Surprisingly, despite these early wage demands, widespread strike action was largely postponed for the remainder of the year as AMCU only secured the certificates of non-resolution for the major producers in the fourth quarter of 2013. On 23rd January 2014 (one day after NUM reached an agreement at Northam's Zondereinde), AMCU launched the country's largest ever coordinated strike. Over 60% of South African production capacity was affected and remains curtailed at the time of writing.

The chart opposite highlights the episodes of strike disruption across the platinum industry from January 2012 to the time of writing, expressed as a percentage of the previous year's production capacity (2011 and 2012) taken offline through strike action.

Disruptions during 2013 were comparatively minor with a number of wildcat strikes between February and August being related either to working environment grievances, union rivalries (between the NUM and AMCU), or dismissals of a number of AMCU representatives. Of the longer strikes last year, the AMCU led a prolonged strike at Amplats' Rustenburg, Union and Amandelbult operations in September in protest over the retrenchment of 3,300 mineworkers. Elsewhere, Northam's Zondereinde operation was impacted by two periods of protracted disruption last year. For a large portion of April, underground rock drill operators (RDO's) downed tools as they sought an improvement to Zondereinde's productivity bonus scheme. In early November, the NUM launched what would end up being a 79 day second strike and demanded an effective 61% wage hike. After a number of earlier offers from Northam were rejected by the NUM, an agreement facilitated by the Commission for Conciliation, Mediation and Arbitration was secured on 22nd January 2014. The two year agreement included an annual 7.5-9.5% basic wage rise and a 7-9% increase in the living out allowance.

Turning to this year, with AMCU having secured strike certificates against South Africa's three largest producers, the union launched the largest coordinated mining strike in South African history on 23rd January, the day after Northam's wage agreement with the NUM. Talking to the details, AMCU demanded a basic wage hike in the region of 150%, or R12,500 per month for an entry-level worker. In addition, a number of allowances for housing, skills, safety, shift, operator and meals were demanded, which cumulatively equated to a minimum cost to the company of more than R23,530 (2,240 USD at the approximate exchange rate at time of writing) per month for an entry-level worker. With these demands arriving at a time when profit margins for the majors were already severely pressured, the focus of negotiations were eased somewhat to allow an applicable implementation period for reaching some of the minimum AMCU criteria outlined above. Impala Platinum, for example, released a settlement offer on 17th April 2014 that would ensure that the lowest-paid underground employees' cash remuneration was increased to R12,500 per month by July 2017, and which would entail a minimum cost to company per entry-level underground employee rising to over R17,500 per month by July 2017.

A number of the secured agreements have seen single-figure percentage wage increases. These include the mid-2013 one-year (6% wage increase) agreement between Aquarius Platinum and the NUM at Kroondal Pool & Share joint venture (with Amplats), the two year above-mentioned 22nd January 2014 agreement between Northam and the NUM and the recent 20th March 2014 two-year agreement between Anglo Platinum and the National Union of Metalworkers of South Africa, which included a 7.5-8.5% wage increase in year one and an 8% increase in year two.

With the continuing strikes curtailing over 60% of the country's production capacity, we estimate that some 0.6 Moz (19 t) of platinum production has been lost to-date. The three biggest producers suggest that lost revenue due to the industry-wide strike stands at over R14.4 billion, with striking employees having already lost over R6.4 billion in wages. With the length of the strikes approaching three months, and workers represented by the striking unions having received no wages during this period, the NUM has started rapidly to regain representation at the expense of AMCU memberships. This has fostered belief that the AMCU position with its representatives is weakening and that a resolution to the strikes could be near. Even if a near term resolution is found, we estimate that a further 0.35 Moz (11 t) of platinum production will be lost as the re-hiring, re-training of employees and gradual ramp up to capacity at the affected mines takes place. The direct and indirect effect of the three month strikes will likely result in over R18 billion, or around 0.5% of South Africa's annual Gross Domestic Product evaporating.

TOP 10 PLATINUM PRODUCING COMPANIES

Rank	Rank		Company	Output (000 ounces)	
	2012	2013		2012	2013
1	1		Anglo American Platinum Ltd. ¹	1,741	1,747
2	2		Impala Platinum Holdings Ltd. ²	950	1,122
3	3		Lonmin plc. ³	717	722
4	4		OJSC MMC Norilsk Nickel	683	651
7	5		Northam Platinum Ltd. ⁴	172	198
5	6		Aquarius Platinum Ltd.	198	187
6	7		Royal Bafokeng Platinum Ltd. ⁵	174	181
8	8		ARM Platinum	163	177
9	9		Glencore Xstrata plc. ⁶	140	150
10	10		Vale S.A. ⁷	134	145

¹ Refined production from mining operations

² Attributable mine production including Zimplats

³ Calendar year refined sales ⁴ Estimated saleable metal in concentrate

⁵ Estimated metal in concentrate ⁶ Estimate ⁷ Including custom feeds

reflected the change at the national level with platinum and palladium down 5% and 2% respectively, at 2.58 Moz (80.2 t) and 0.63 Moz (19.5 t). Although full-year results came in according to company guidance, Norilsk experienced a weaker than usual first quarter of operations, owing to unscheduled repair works that inhibited production volumes at the Oktyabrysky shaft, one of the Norilsk complex' largest mining operations, and at Nadezhda smelter. This led to reduced shipments of matte early in the year.

Norilsk Nickel hosted a strategy session in October in which it detailed its medium term commitments to the pipeline of Russian projects. This outlined a plan to deploy the bulk of mining capital expenditure, out to 2015, towards four assets in the Norilsk area. This involves three brown field developments at Oktyabrysky, Taimyrsky and Komsomolsky, along with the deep level green field development Skalisty, at which commissioning production is scheduled for 2014. It is planned that these projects will have the potential to turn around a previously projected slide in output, by

RUSSIAN MINE PRODUCTION



Source: GFMS, Thomson Reuters

TOP 10 PALLADIUM PRODUCING COMPANIES

Rank	Rank		Company	Output (000 ounces)	
	2012	2013		2012	2013
1	1		OJSC MMC Norilsk Nickel	2,732	2,661
2	2		Anglo American Platinum Ltd. ¹	1,066	1,045
3	3		Impala Platinum Holdings Ltd. ²	608	656
4	4		Stillwater Mining Co.	396	404
6	5		Vale S.A. ⁷	251	352
5	6		Lonmin plc. ³	340	317
9	7		ARM Platinum	144	161
8	8		Glencore Xstrata plc. ⁶	160	160
7	9		North American Palladium Ltd.	164	135
10	10		Aquarius Platinum Ltd.	115	111

Source: GFMS, Thomson Reuters

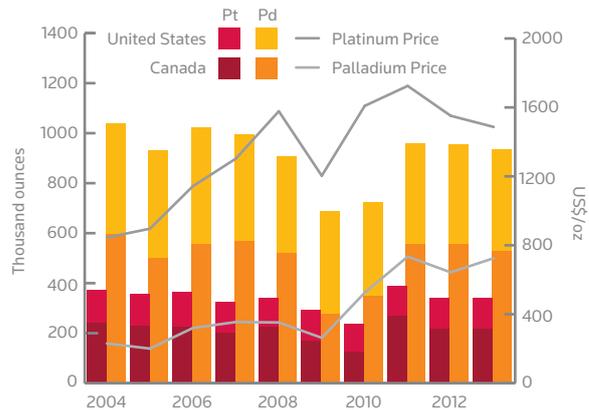
bringing additional high grade production online in order to compensate in part for the declining processed grade profile as 'disseminated' ore sources become an increasingly substantial component of mill feed.

Elsewhere in Russia, alluvial production contracted by 6% to 0.14 Moz (4.2 t) last year. Russian Platinum, which controls the world's largest alluvial platinum mining complex (Kondyor in Russia's far east), comprises the majority of this sector and recorded platinum production of 0.11 Moz (3.5 t). The company has been investing in new mining equipment and production is thus expected to increase slightly this year.

CANADA

Canadian platinum output contracted by 1% last year while palladium saw a more severe 5% fall in production, to 0.22 Moz (6.8 t) and 0.53 Moz (16.5 t) respectively. The main reason for the fall, and for the higher impact on palladium output, related to lower output from Lac des Iles. Palladium output, which represents the

NORTH AMERICAN MINE PRODUCTION



Source: GFMS, Thomson Reuters

overwhelming majority of precious metals production by volume, contracted by 18% as the developed ore sources were depleted. In March and May 2013 the supply of run-of-mine ore from Lac des Iles' Roby Zone underground and open pit mines ceased. These higher grade run-of-mine feeds were replaced by stockpiled low-grade ore and commissioning production from the Offset Zone vertical shaft. Although now past the peak of the Offset Zone project's capital budget, the company faced liquidity concerns towards the end of 2013 but has since raised additional funding for the completion of the project.

Platinum and palladium output as a by-product of nickel mining from the large diversified producers, Vale and Glencore Xstrata, was broadly flat last year, excluding toll treatment and purchases of third party material. Creighton and Coleman, two of the shafts that typically mine higher PGM grade ores within Vale's Sudbury complex, saw higher production rates, although we estimate that much of the gains here were compensated by the closure of the Frood shaft in late 2012. Towards the end of 2013, another comparatively PGM-rich shaft, Totten, was commissioned. We understand that Glencore Xstrata's Canadian production, which is principally derived from the Sudbury assets but also from Raglan in Quebec, contracted modestly. KGHM International's precious metals production from Sudbury also fell last year, largely owing to the cessation of mining at Podolsky in early 2013.

UNITED STATES

Both platinum and palladium mine output in the **United States** edged up by 2% last year. The overwhelming majority of mined output originates from Stillwater Mining's assets in Montana. East Boulder saw an impressive gain in PGM output of almost one-fifth, reaching its highest output for six years, primarily on the back of higher grades processed. However, the flagship Stillwater mine saw output contract last year, as grade control issues were further impeded by the failure of an ore pass, which necessitated the utilisation of other underground infrastructure to handle both waste and ore, compounding mining dilution.

Stillwater Mining's assets benefitted marginally from the release of inventory in the form of approximately 8,000 ounces of PGMs liberated from the reprocessing of the smelter's refractory lining. This was metal that had been absorbed from the smelting of mine concentrate and locked up over the course of the bricks' four years of use. This material was recognised as production in 2013.

In addition to the existing Stillwater and East Boulder mines, the company is currently developing shafts into new reserve areas on its existing leases; these may have the scope to add to its Montana production profile in the medium term, as existing operations mature. Last year two projects at Stillwater progressed, with the Lower Far West development, expected to deliver production within the next three years, and the larger Blitz project, which is a longer-term proposition. At East Boulder the company is developing the Graham Creek project, which could begin production within the next year.

ZIMBABWE

Platinum and palladium production in **Zimbabwe** rose by 22% and 23% last year, to 0.41 Moz (12.7 t) and 0.31 Moz (9.8 t) respectively. It must be noted, however, that the high production volume and growth rate last year were inflated by the smelting of concentrate that had been produced in 2012 but held back due to a processing bottleneck arising due to unscheduled maintenance at the Selous Metallurgical Complex. Despite continued political headwinds and issues regarding the implementation of Zimbabwe's indigenisation act, producers have continued to perform well with cumulative platinum and palladium mine supply showing an impressive five year compound annual growth rate of 18%.

Zimbabwe's largest platinum operation, Ngezi continued to ramp up its fourth shaft (Mupfuti) in the middle of the year. Concentrates that had been produced and stockpiled during the latter half of 2012 (due largely to furnace outages) were smelted and trucked for refining in 2013, resulting in inflated production figures. Platinum and palladium in matte from Ngezi were up by 43% and 41%, to 0.24 Moz (7.5 t) and 0.19 Moz (5.9 t) respectively. Ngezi's Phase 2 expansion progressed in line with last year's revised schedule, with the underground crusher at

ZIMBABWEAN MINE PRODUCTION



the portal due for completion towards the latter half of this year and design capacity to be reached in early-2015. Elsewhere, at Mimosa, throughput, processed head grades, and plant recoveries remained steady versus 2012, with similar platinum and palladium output, at 0.11 Moz (3.4 t) and 0.08 Moz (2.5 t) respectively. Amplats' most recent commercial operation, Unki, posted record platinum output of 0.07 Moz (2.1 t).

An aspiration that has provided rhetoric opportunities in Zimbabwe for several years, of building a vertically integrated platinum industry, was brought to the fore in 2013 and escalated in early 2014. This was done by way of a request for proposal on the development of domestic base metal and precious metal refineries, which could potentially close the door on exports of semi-processed platinum. Coinciding with this, ministers have been recently quoted as reiterating the suggested ban on unrefined platinum, which had been proposed to come into effect at the end of 2014. Presently the three producers truck nickel-copper-PGM matte (in the case of Ngezi) and mine concentrate (Mimosa and Unki) to South Africa for further upgrading by Impala and Amplats.

OTHER COUNTRIES

Limited volumes of PGMs are recovered on a widespread basis from large-scale copper and nickel processing, but the number of countries that produce measurably significant volumes outside the main five of South Africa, Russia, Canada, the United States and Zimbabwe remain small in number. Platinum output from 'other countries', however, saw a meaningful increase of 13% last year. Much of this was attributable to growth in **Finland** as the Kevitsa open pit ramped up, having been commissioned in mid-2012. Although a primary nickel-copper mine, Kevitsa produces appreciable volumes of PGMs, with a slight bias towards platinum. Aguablanca in **Spain** suffered a pit wall failure in 2010 and, following rehabilitation, production was restarted in 2012 to resume steady state operations last year. **Colombian** output, which originates mostly as alluvial production from the Chocó department, was marginally higher last year.

Palladium output on the other hand contracted modestly among this group. Output at the Tati Nickel operation in **Botswana** fell by around one-third, primarily owing to lower mill head grades. Elsewhere, the nickel mineralisation at Jinchuan's mines in Gansu Province in **China** hosts moderate concentrations of associated PGMs. Last year the company's nickel output rose strongly, although this was largely due to imported

ores and we estimate domestic PGM production to have remained flat.

PRODUCER HEDGING

Hedging of platinum and palladium by producers over extended tenures remained limited. Although quotational period hedging is relatively normal, for instance as a tool to manage provisional pricing exposure, such activity has little impact on the market year to year.

Platinum stocks in recent years are much larger than those in, for example, 2007, when we have argued that a lack of market liquidity would render large-scale producer hedging unfeasible. In the current climate the more pertinent factor remains the opposition towards the practice of metal production hedging by mining company management and shareholders. Volumes of hedging in the PGM mining industry outside of quotational period contracts are therefore negligible. One publicly disclosed hedge transaction was by North American Palladium, which at end-2013 had sold forward 31,000 oz (1.0 t) of palladium at an average strike price of \$735; at the time of publication these positions had all matured.

PRODUCTION COSTS

- *Global average Total Cash Costs expressed in dollars decreased by 10% year-on-year, to \$1,191/platinum equivalent ounce (PtEqoz).*
- *The main driver of the fall in the average total cash cost was exchange rate movement, particularly the sharp depreciation of the rand against the US dollar.*
- *Labour costs continued to increase in local currency terms, as above-inflation pay rises were awarded to (or in many cases provisioned for) South African miners in particular. However, the industry was less severely affected by labour unrest than in 2012.*
- *Global All-in Costs, which include all cash and non-cash costs, sustaining capital expenditure, indirect costs and overheads, decreased to an average of \$1,595/PtEqoz, a fall of 13% year-on-year.*

Global Total Cash Costs expressed in dollars decreased by 10% year-on-year to \$1,191/PtEqoz. This fall in the average total cash cost owes much to the depreciation of the rand against the US dollar, which during 2013 was on average 17% weaker than in 2012 and this, given that approximately 85% of the platinum equivalent production analysed here originates from South Africa, was of significant benefit to the industry. Furthermore, operators in South Africa were not impacted by strike

action to the same extent that they were in 2012. Finally, in 2013 platinum producers' actions showed several core behaviours that have been common across the resources space; notably a focus on operating cost-containment and a more disciplined approach to capital expenditure, in large part driven by the tough stance adopted by shareholders across the industry.

Average Total Cash Costs decreased in each of the major platinum-producing countries or regions. In South Africa, costs fell by 9% to \$1,224/PtEqoz, although this remains the highest-cost jurisdiction for platinum production. In 2013, South Africa benefitted greatly from the depreciation of the rand against the US dollar, and at the margin, operations also returned to more 'normal' conditions following the severe disruption caused by widespread labour unrest and safety-related Section 54 stoppages during 2012. At South Africa's largest mine complexes, Marikana and Impala Lease Area, higher production volumes helped to contain unit costs, with both operations reporting fewer stoppages than during the previous year.

In North America, Total Cash Costs decreased by 8% year-on-year, to \$1,062/PtEqoz. This is arguably more noteworthy than the reduction in South Africa, given that currency effects can be largely disregarded. This outcome came about from entirely separate factors at the region's two major mining areas for primary PGMs; Thunder Bay in Ontario, Canada and the J-M reef in Montana in the United States. North American Palladium processed fewer tonnes of ore, and of a lower grade, than in 2012, pushing costs up. Production costs were also adversely affected by increased power usage,

TOTAL CASH COSTS PER EQUIVALENT OUNCE (US\$)

	2012	2013	Change
North America	1,156	1,062	-8%
South Africa	1,344	1,224	-9%
Zimbabwe	1,115	959	-14%
World*	1,317	1,191	-10%

*Excluding Norilsk Nickel

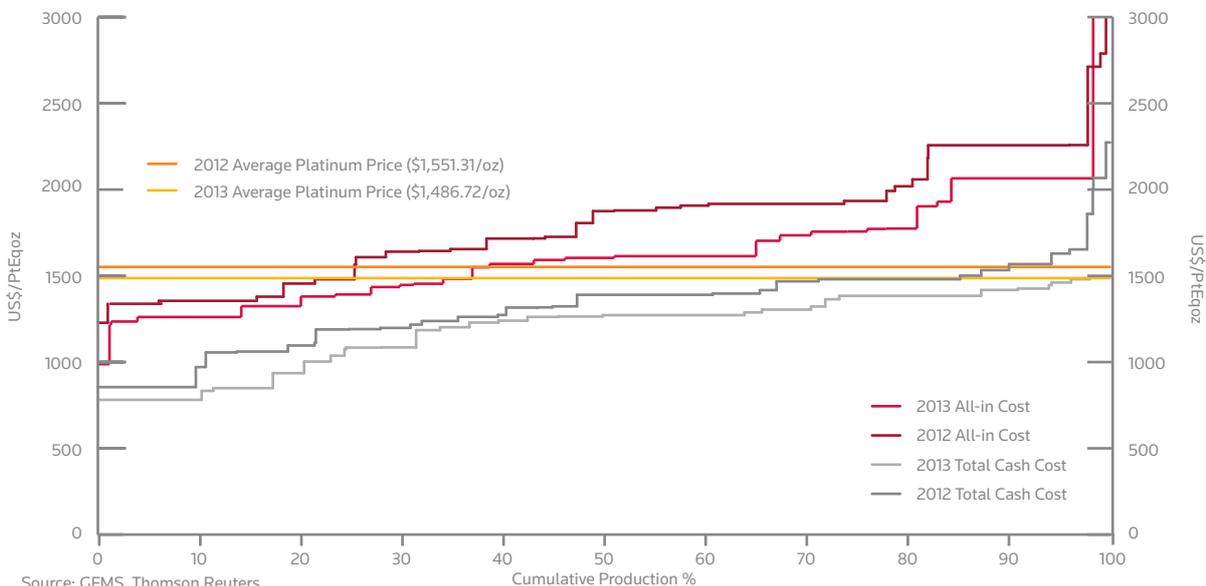
Source: GFMS, Thomson Reuters

higher milling costs and lower by-product revenues. Stillwater, on the other hand, benefitted from a positive inventory change, as production was sourced from waste furnace brick following relining of the main smelter. A factor common to both the Stillwater's mines and Lac des Iles, all of which are arguably 'primary palladium' mines, was the strongly beneficial impact to costs expressed in PtEqoz against a backdrop of the outperformance of palladium versus platinum. By way of example, when expressed in palladium equivalent terms, North American Total Cash Costs in fact increased, by 8%, to \$517/PdEqoz.

In Zimbabwe, the 14% year-on-year decrease in Total Cash Costs, to \$959/PtEqoz, was largely due to the 2012 delay in matte shipments to South Africa, owing to furnace outages at Ngezi. The stockpiled concentrate was processed in 2013, leading to the realisation of additional production for the year, and consequently lowering production costs per ounce for 2013 (contrasting with the artificially high dollar per ounce costs in 2012).

Norilsk Nickel produces substantial quantities of platinum and palladium as co-products of its nickel-copper mining activities in Russia. This producer is

WORLD PLATINUM EQUIVALENT TOTAL CASH COST AND ALL IN COST CURVES



Source: GFMS, Thomson Reuters



excluded from the global production cost analysis presented here in order to avoid distortion to the cost statistics. Were Norilsk's Russian assets to be included in the analysis they would have the effect of dragging the global average lower by approximately 20%.

YEAR-ON-YEAR COST CHANGES

Based on detailed mine-by-mine analysis in Thomson Reuters' PGM Mine Economics service, estimates of the main cost drivers of mine production can be isolated and quantified, in the form of a year-on-year variance analysis. These are presented here on a \$/PtEqoz basis, and reflect platinum equivalent production of recoverable metal in concentrate for our global population of primary PGM mines.

The first step in this process is to quantify and strip out the effects of **exchange rate** changes, by calculating the extent to which mine site costs would have changed from one year to the next in dollar terms, were exchange rates the only driving factor. The net effect of these changes on Total Cash Costs in 2013 was a negative \$187/PtEqoz on a production-weighted basis. As was the case in 2012, exchange rates were the most significant factor driving production costs. This reflects the combination of the platinum industry's geographical concentration in South Africa, together with the 18% depreciation of the rand against the US dollar.

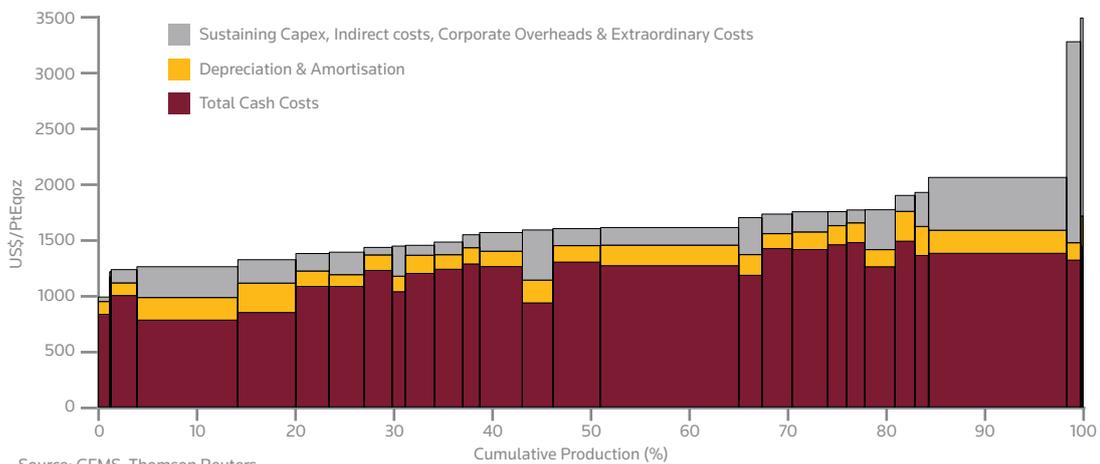
The prices of the basket of key co-product metals had mixed performances in 2013, with price of palladium increasing by 13%, whereas platinum, rhodium and nickel prices decreased by 4%, 17% and 14% respectively. Most significant was the relationship of platinum price to palladium price: the platinum:palladium ratio fell to 2.05, from 2.41 in 2012. Similarly, trends in metal

production volumes were variable, with palladium production slightly up year-on-year, whereas rhodium and nickel output decreased; consequently the relative impact of palladium prices and volumes on producer costs was higher in 2013 than in 2012. The strong performance of the palladium price, together with the increase in production, led to an overall \$5/PtEqoz of downward pressure on producer costs from **metal production volumes and prices**.

Smelting and refining costs also decreased during 2013, lowering the platinum equivalent production cost by approximately \$13/PtEqoz. In 2012 and early 2013 we saw the removal of several higher-cost mines from the cost curve, including Everest South, Marikana Pool & Share and Crocodile River, all of which operated as concentrate producers that sold mine concentrate to Amplats or Impala for smelting and refining under offtake agreements that ensure processing margin for the purchaser through 'payability' adjustments on contained metal. Expressed as the smelting and refining 'cost', these payment deductions were substantially above the average downstream cost for vertically integrated producers. Elsewhere at continuing operations, producers are attempting to limit increases in smelting and refining costs by identifying opportunities to improve efficiency. For example, Amplats reduced the cost of smelting, treatment and refining in 2013 through initiatives such as reducing reagent consumption.

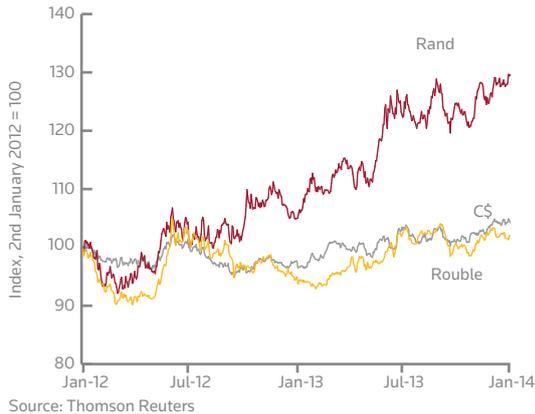
The principal upward pressure on costs came from **labour** during 2013, which added \$55/PtEqoz, a similarly strong increase to that of 2012. Labour accounted for 45% of mine site costs in 2013, representing the largest proportion of costs. This came despite some producers reducing employee numbers as part of wide-ranging restructuring programs in an attempt to improve

2013 PLATINUM EQUIVALENT ALL IN COST CURVE



Source: GFMS, Thomson Reuters

US\$ AGAINST PGM PRODUCERS' CURRENCIES



efficiency. Most notably, Amplats undertook a major asset restructure across its Western Limb operations during 2013, with Rustenburg reconfigured from five operating units to three and high cost declines at Union Section closed (and the mine being prepared for sale). Nonetheless, above-inflation pay increases continued to put producers under pressure, and, albeit to a much lesser extent than in 2012, there were episodes of strike activity, most notably last year at Northam's Zondereinde. Amplats operations were impacted by an 11-day strike in September, in protest over the company's proposed retrenchments, and labour unrest also impacted operations at Kroondal during the early part of the year. In this fashion labour costs in South Africa typically have a much wider impact on the weighted average cost of production beyond simple wage levels, with strikes affecting productivity during the ramp-up phase and consequently production and unit costs.

Power and fuel unit costs each added \$4/PtEqoz to average Total Cash Costs in 2013, reflecting a slower rate of increase than that seen in recent years. However, energy costs remain an important factor pressuring producer margins, particularly in South Africa where

AVERAGE MARGINS (PRIMARY PGM MINES)

	2012	2013	Change
South Africa (annual averages in 000 rand/kg)			
TCC + Sustaining Capex	424	438	3%
Revenue Realised	374	430	15%
Margin	-51	-8	85%
US\$:Rand	8.20	9.62	17%

	2012	2013	Change
North America (annual averages in US\$/PtEqoz)			
TCC + Sustaining Capex	1,392	1,315	-6%
Revenue Realised	1,469	1,405	-4%
Margin	77	89	17%

	2012	2013	Change
Zimbabwe (annual averages in US\$/PtEqoz)			
TCC + Sustaining Capex	1,290	1,070	-17%
Revenue Realised	1,443	1,393	-3%
Margin	153	323	111%

Source: GFMS, Thomson Reuters

a nominal Eskom power tariff increase of 8% annually over the five years from April 2013 came into effect under the auspices of "Multi Year Price Determination 3", as approved by the energy regulator. Producers continue actively to manage energy consumption in efforts both to contain cost escalation and minimise draw on the grid.

Royalty rates increased in 2013, adding \$8/PtEqoz to the total cash cost per platinum equivalent ounce. As royalties are paid based on an EBIT (earnings before interest and tax) related formula, rather than revenue, in South Africa, lower production costs in dollar terms in 2013 flowed through with gearing to higher royalty payments.

A remaining \$11/PtEqoz of upward pressure on Total Cash Costs is allocated to the miscellaneous category. This includes factors that cannot satisfactorily be disaggregated, such as maintenance costs.

PLATINUM EQUIVALENT TOTAL CASH COST VARIANCE ANALYSIS



SUPPLY

SCRAP SUPPLY

- **Platinum output from autocatalyst and old jewellery scrap increased to 1.39 Moz (43.2 t) in 2013, 5% higher than 2012. Scrapped autocatalyst feedstock volumes rose, which boosted platinum supply from this scrap source, while jewellery scrap sales fell.**
- **Palladium supply from autocatalyst and jewellery scrap recycling increased 12% last year to 1.89 Moz (58.8 t), mostly due to the rise in palladium per-unit content of autocatalysts scrapped last year.**

Platinum and palladium annual scrap supply includes sources of recycled material that are brought back to market for use in newly fabricated products or sold to investors in refined form, often referred to as “open-loop” scrap. These sources include old jewellery sold back by consumers or liquidated by retailers and wholesalers and old autocatalysts from scrapped vehicles. Closed-loop recycled material refers to metal recycled from manufacturing scrap, which are returned directly to manufacturers for ongoing manufacturing purposes.

Last year, the volume of autocatalyst scrap material rose, a function of stronger vehicle sales, which translated to an increase in scrapped vehicles, and higher sales of these autocatalysts from collectors to recyclers, due to an improved price environment. The composition of PGM loadings in spent autocatalysts being sold to recyclers has been shifting toward higher palladium and lower platinum concentrations over the past several years. As such, the increase in palladium refined from spent autocatalyst has been more robust than the increase in platinum autocatalyst scrap supply. Platinum autocatalyst scrap has been benefitting solely from increases in feedstock volumes, since the per-unit content has been trending lower over the past several years. Collectors released more autocatalyst scrap in 2013 relative to 2012. Autocatalyst collectors can be highly price-sensitive and although platinum prices averaged 4% lower last year, collectors sold more inventory than in 2012 when they held back on sales due to a relatively more benign price environment.

Platinum jewellery scrap fell 5% in 2013, mostly due to the decline in platinum prices, which discouraged old jewellery sales among consumers. These consumers, also responding to lower gold prices, held off on selling jewellery potentially available for scrap refining. Palladium jewellery scrap on the other hand rose 12% in 2013, backed by higher prices and an increase in retailer liquidations in China. Interest in palladium jewellery in China has been waning and consequently, retailers are

less interested in maintaining inventory and providing shelf space for palladium jewellery.

AUTOCATALYST RECYCLING

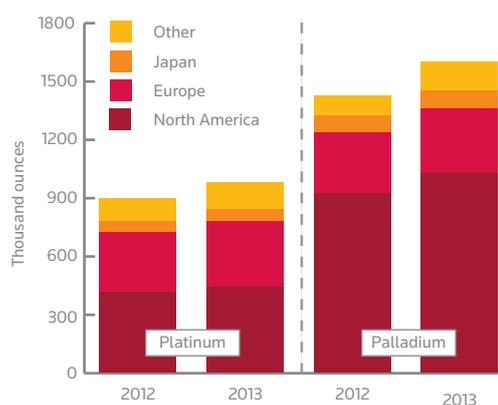
- **Global platinum autocatalyst recycling significantly increased, by 9%, to 0.98 Moz (30.5 t) in 2013, the highest level since 2008 and following an 8% decrease the prior year.**
- **Palladium scrap also steamed ahead witnessing an increase of 12%, lifting total recovery from spent autocatalysts to a new all time record of 1.60 Moz (49.8 t).**

Last year, following a pause in the post-recession upward trend in 2012, supply of **platinum** and **palladium** from spent autocatalyst recycling continued on its growth path by increasing 9% and 12% to 0.98 Moz (30.5 t) and 1.60 Moz (49.8 t) respectively. The rise followed declines in 2012, which were driven by the expiry of various government-incentivised scrappage schemes as well as lower PGM prices that year.

Autocatalysts (or autocats) make up the largest share of PGM consumption and with an average life of around 11 to 14 years on a global basis, recycling of spent autocats last year was mainly from cars produced around the start of the millennium. In the early 2000s, emissions legislation in many countries, particularly in the developing world, was still in its infancy. Emission standards in countries such as India, China and Russia were equivalent to Euro 1 standards, for instance.

Emissions standards were the most stringent at the time in the United States and Europe. In the United States, the phase in of Tier 1 standards starting in 1994 saw considerable usage of PGMs in autocatalysts due to technological experimentation. As such, the PGMs

GLOBAL AUTOCATALYST RECYCLING



Source: GFMS, Thomson Reuters

loaded on autocatalysts at the turn of the century were higher on a per-unit basis compared to loadings today. Technological innovation has helped thrift these expensive metals on autocatalyst over the past decade as improvements in washcoat technologies and engine configurations have helped lower automaker PGM requirements on average per vehicle. That said the autocatalysts being scrapped contain much higher loadings than autocatalysts being fitted to cars today.

The recycling process is composed of several stages. First de-registered vehicles are, mostly, shipped to scrapyards. A percentage of de-registered vehicles are rendered lost due to these vehicles being exported to developing regions for continued use, however. Also, some cars never make it to a scrapyard, as they may sit in backyards for extended periods of time, saved by the consumer for parts or simply due to neglect. Next, autocatalysts are collected, dismantled and de-canned. Some of this material gets lost due to damage and inefficient collection systems.

Recycling rates of this “open-loop” system are usually much lower compared to “closed-loop” systems due to losses throughout the supply chain (and tend to vary widely by region based on the level of sophistication of the collection and recycling systems). In closed-loop systems, material management is only handled by the PGM user and the recycler, which is a much smaller supply chain and effectively more efficient.

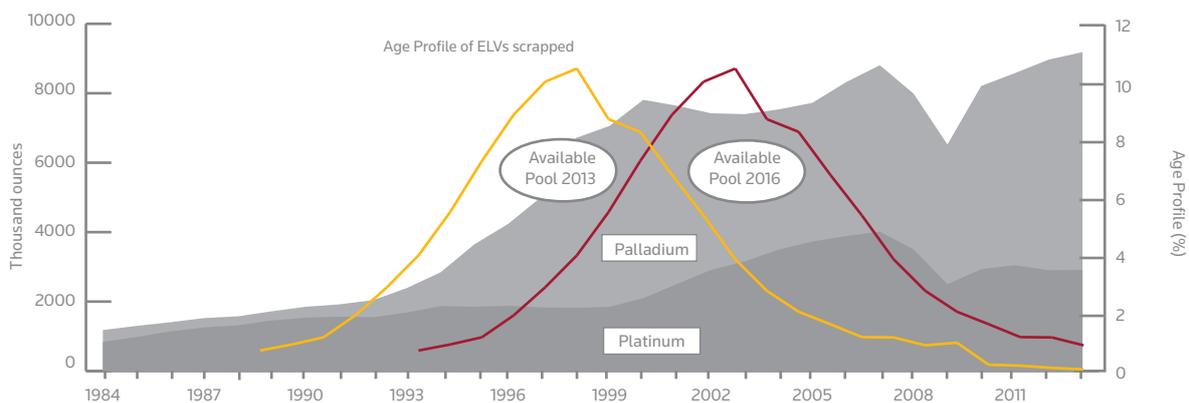
Autocatalyst material refining is generally large scale, at the international level, whereas recycling and collection is often local and more labour-intensive. For the small scale collector the monetary returns of purchasing large modern “sense and sort” technologies are not always justifiable and much otherwise recoverable material gets therefore lost.

As a result, the size and technical capabilities of the various players engaged in the autocat recycling process rapidly declines further upstream. There are only a handful of refiners of spent automotive catalysts worldwide, while there are over 100,000 collectors. As is the case in the gold market, collectors tend to pop in and out of existence depending on the price of the underlying metals; when gold fell in 2013, so did the number of small scale collectors that operated on thin margins.

Platinum supply from spent autocatalysts in **Europe** witnessed a 10% increase to 0.34 Moz (10.6 t) last year. This was somewhat surprising given platinum’s price decline. However, contrary to gold, last year European autocatalyst recyclers largely refrained themselves from speculating on future price developments and on average did not withhold substantial amounts of material from the market. More importantly, however, the strong increase of platinum recovery was also a function of the higher platinum-containing diesel particulate filters - particularly originated from France - widely fitted to vehicles in various European some years earlier. Palladium supply continued to increase too, albeit by a somewhat more modest 6% to 0.33 Moz (10.4 t). The rise in supply of spent autocatalysts is not only a function of previous domestically sold vehicles but also a result of material flows from foreign sources such as India and South Africa. Indeed, European-based recyclers have witnessed a rise in the South African collection rate often consisting of relatively new autocats, driven by increased dismantling incentives in the country due to the absence of any emissions legislation.

Last year, **North America** continued to be the largest region of platinum and palladium autocatalyst recycling on a global basis, accounting for 45% of platinum and 64% of palladium scrap output. Indeed, volumes increased a healthy 7% and 11% for platinum and

AUTOCATALYST DEMAND AND AGE PROFILE



palladium, pushing recovery of both metals to 0.44 Moz (13.7 t) and 1.03 Moz (31.9 t) respectively. The North American autocatalyst recycling industry is the most sophisticated in the world, has the lowest rate of recovery losses and therefore is considered to be the most efficient with regards to its collection system.

Unique to the scrap flows from the United States is the emergence of autocatalyst scrap material from the period between 1994 and 1997 when Tier 1 emission standards were being phased in. During this period, automakers were using the largest per-unit volume of PGMs in history in order to comply with standards. This was also the period in which these automakers began switching from predominant use of platinum to use of palladium in gasoline cars in order to take advantage of palladium's lower price. Subsequently, mostly between 2000 and 2005, automakers reduced the per-unit PGM loading on gasoline vehicles significantly due to technological improvements and a better knowledge of the effectiveness and reliability of PGM performance on autocatalysts. Over the past several years, while smelters' autocatalyst feedstock volumes have been rising, this has not always translated to higher refined output due to the thrifing factor.

Turning to **Japan**, platinum and palladium recovery came in at 4% and 10% higher last year respectively, pushing total recycled volumes to 0.06 Moz (1.8 t) and 0.93 Moz (2.9 t). The rise was mainly a function of higher recycling rates but was slower relative to 2012, when scrap expanded, driven by a government-backed environmentally friendly incentive scheme.

Recycling volumes captured in our "**Other Region**" category recorded some very healthy increases last year of 18% for platinum and a staggering 44% for palladium, albeit from a relatively low base. Indeed, its share of global recycling added up to only 14% and 9% respectively in 2013, and considering it is home to some of the largest vehicle sales markets in the world, not least China, it leaves much room for future recycling growth.

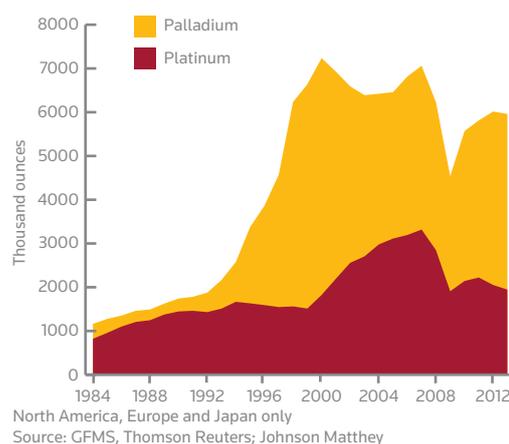
With that in mind, China's recent passage of its Clean Air Action Plan, which will limit the number of vehicles registered annually to 6 million units by 2017 and apply more stringent emissions standards on newly registered as well as currently registered vehicles, is expected to have a direct impact on scrap growth going forward. This legislation will demand all currently registered cars to have a minimum requirement of Euro 1 in place. Failure to comply will lead to the mandatory scrapping of the car. Many of the old vehicles that could be scrapped,

however, will not have any autocatalyst fitted and so we do not expect an immediate increase in precious metals recycled from spent autocats.

Nevertheless, this process will most likely strongly contribute to the development of a more sophisticated recycling supply chain and will lead to higher PGM recovery in emerging nations in the long term. Despite China making some solid increases last year, recycling rates are still well below those of advanced countries, with recycling technology still lagging behind international standards. In addition, the PGMs loaded on scrapped vehicles in China is relatively low, making domestic catalyst recycling less attractive. As a consequence, these attributes strongly contributed towards making domestic recycling less attractive and so the bulk of this material was exported for recycling to the United States, Europe and Japan.

The material that does enter the recycling circuit in China quite often contains higher impurities in the autocat itself with elevated traces of sulphur and even lead or magnesium present. Higher levels of sulphur are a direct result of the domestic oil refining process, which at present is still struggling to deliver the ultra-low fuel quality that is required for Euro 5 equivalent emission standards. Other impurities, however, are in some cases a function of fuel-dilution at petrol stations driven by owners' incentives to boost profits. These impurities reduce the functionality of the autocatalyst and in some instances even render them useless. This creates elevated replacement demand for new autocatalysts fitted to existing vehicles and is one of the factors we believe has contributed to China's increased scrap supply last year.

HISTORICAL AUTOCATALYST PGM DEMAND



JEWELLERY SCRAP SUPPLY

- **Last year's 5% decline in global platinum jewellery scrap was driven by continued weakness in Japan, the largest source of platinum scrap supply.**
- **Palladium jewellery scrap increased 12% last year to reach a new historical high of 0.29 Moz (9.0 t). This gain can largely be attributed to growth in Chinese scrap, where a higher palladium price supported the supply chain.**

Global platinum jewellery scrap declined 5% last year to reach 0.41 Moz (12.6 t) while supply of palladium jewellery scrap rose by 12% to 0.29 Moz (9.0 t). In our view the main reasons behind the reduced flow of platinum scrap was due to a decline in close to market stocks, expectation of a return to higher prices and the 4% drop in the average platinum price in 2013. Interestingly, over the year supply from North America and Europe remained relatively unchanged, while China, the world's second largest producer of platinum jewellery scrap, saw a mild increase in supply. The decline therefore was solely driven by the losses in Japan, which accounted for 58% of scrap supply last year.

The 12% increase in palladium scrap flow over 2013 saw the metal reach a new historical high of 0.29 Moz (9.0 t), marking the fourth consecutive year of supply growth. Similarly to platinum, the growth in palladium scrap sales was seen to be directly linked to the price movement of the metal, with the annual average palladium price increasing by 13% over the year. Strong growth from China, in addition to reduced declines from Japan, helped to more than double the growth from levels in 2012.

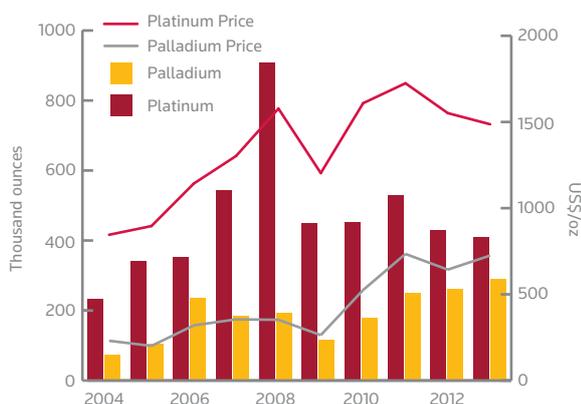
Platinum jewellery scrap from Japan decreased 9% last year, to an estimated 0.24 Moz (7.5 t). The fall was

largely driven by gold's 29% price decline, which tends to influence platinum. As a consequence consumer liquidations of loosely held assets were reduced as they waited for a rebound in prices, particularly as the domestic platinum price continued to fall after reaching its highest level of over 5,000 yen per gramme for the year in the first quarter. Japan's reduced scrap flow should also be viewed in the context of 2011's record high flows which were mainly propelled by impending changes in tax regulations on scrapped precious metals as well a more developed scrap collection network. Last year's continued decline therefore saw smaller scrap collectors face consolidation with a notable reduction in the size of network collections.

Following on from 2012's 7% decline in Chinese platinum jewellery scrap flows, last year saw supply levels recover, growing by 1% to 0.15 Moz (4.6 t), although still 45% below the peak of 0.27 Moz (8.5 t) seen in 2008. We expect that the sharp drop in platinum prices experienced in 2012 of 19% in comparison to this year's 5% decline gave mild encouragement to the sector. However, recovery will continue to be limited while high fabrication charges and buy back discounts make swapping of old items for new, or outright resale, relatively unattractive to consumers in a weak price environment.

Palladium jewellery scrap supply is dominated by scrap sales in China. Last year scrap supply from China made up over 80% of total global jewellery scrap sales and grew 15% year-on-year to 0.24 Moz (7.5 t). We expect that the 13% increase in metal price encouraged a wave of selling of redundant jewellery stocks in addition to old unwanted consumer jewellery. Meanwhile, jewellery scrap sales in Japan fell 3% in 2013, compared to the 25% decline we witnessed the year before.

PLATINUM & PALLADIUM JEWELLERY SCRAP



Source: GFMS, Thomson Reuters

ABOVE-GROUND BULLION STOCKS

- A return to a significant physical surplus in 2013 caused above-ground bullion stocks of platinum to rise to 4.40 Moz (136.7 t) by year-end. This is equivalent to over seven months' fabrication demand or more than one year of mine output in South Africa.
- Above-ground bullion stocks of palladium continued to slide last year, slipping by 10% to 8.80 Moz (273.8 t). This equates to a little over 11 months of fabrication demand cover.

BACKGROUND

Our supply/demand balances for platinum and palladium are designed to separate any distorting effect of flows from pre-existing above-ground stocks. Where we are able to identify such flows with reasonable confidence, these are shown separately as "below the line" items. Consequently, the arithmetical difference between our estimates of new supply (from mining and recycling) and fabrication demand, i.e. the physical surplus or deficit, represents our view of the underlying fundamentals of these metals. Where a physical surplus is reported, this indicates an excess of new supply over fabrication demand, implying a consequent increase in above-ground stocks. Conversely, a physical deficit indicates a shortfall of new supply relative to fabrication demand. This implies an equivalent decline in above-ground stocks as this metal is called upon to redress that shortfall and satisfy fabrication needs.

In conjunction with our supply/demand balances, we also attempt to quantify the broad scale of above-ground platinum and palladium bullion stocks. This includes stocks in the terminal markets (implied in part from historical trade data), allocations to physically-backed ETFs and declared stock holdings on futures exchanges. In addition, we also include an estimate for the remaining

Russian government stocks of palladium, at least those that can reasonably be regarded as surplus to requirements and therefore available for sale. Although this remains a grey area, we believe there is sufficient anecdotal evidence to enable us to make estimates. However, we are not able to adequately define stocks of refined metal that may be held by industrial consumers and producers (industry stocks), although from time to time we are able to imply flows relating to such holdings, insofar these can be detected or deduced in our analysis.

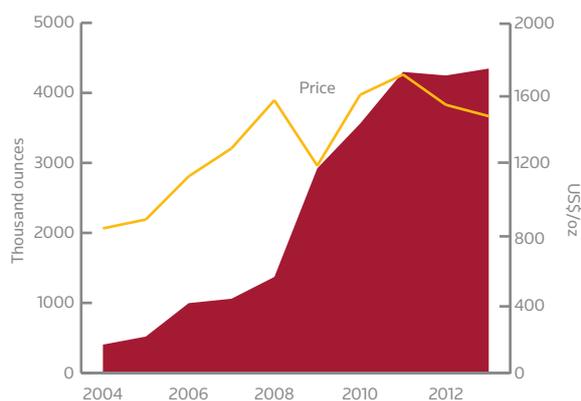
PLATINUM

Last year saw a return to physical surplus for the platinum market, after 2012 had been the first year since 2004 when the market had been in deficit. The surplus in 2013 is estimated at 486,000 ounces (15.1 t) thus causing a slight increase in above-ground platinum bullion stocks last year. This return to a substantial physical surplus developed despite only a modest upturn in South African production, while a drop in demand both from industrial customers and retail investors played a larger role.

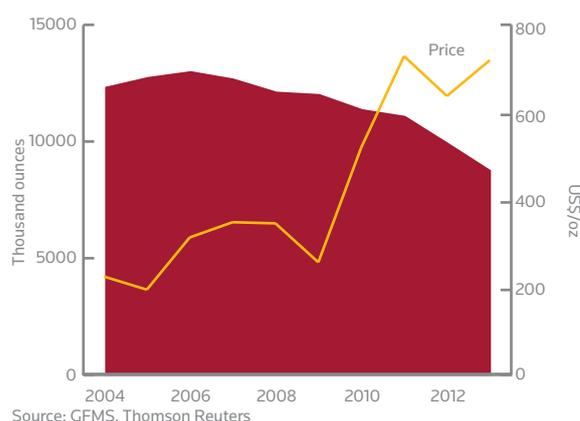
As a result, above-ground stocks of platinum have now risen to the highest level in our 15-year data series. In fact, even after accounting for the change in demand over the period the level of stocks is at its highest in terms of months' demand since 1999 and unsurprisingly therefore acted as a major drag on the platinum price.

Our end-2013 estimate of above-ground stocks, at just below 4.40 Moz (136.7 t), represents a tenfold increase from the historic 2004 low and is now equivalent to more than seven months' fabrication demand. Put even more starkly, it is more than one year of South Africa's entire mine production. Indeed, the increase would have been more marked were it not for an increase of industry stockpiles of approximately 350,000 ounces. We believe that this largely occurred in the second half of 2013 as

ESTIMATED ABOVE-GROUND PLATINUM STOCKS



ESTIMATED ABOVE-GROUND PALLADIUM STOCKS



ESTIMATED MOVEMENTS IN STOCKS

(000 ounces)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
PLATINUM										
Physical Surplus/(Deficit)	(377)	103	477	263	612	886	640	738	(51)	486
Identifiable Stock Movements										
Russia	165	0	0	0	0	0	0	0	0	0
US National Defense Stockpile	0	13	0	0	0	0	0	0	0	0
Industry Stocks	0	0	0	(200)	(300)	665	0	0	0	(350)
Exchange Traded Funds	0	0	0	(194)	(102)	(384)	(574)	(145)	(237)	(892)
Sub total - stock movements	165	13	0	(394)	(402)	281	(574)	(145)	(237)	(1,242)
Net Balance	(212)	115	477	(132)	210	1,167	65	593	(288)	(756)
PALLADIUM										
Physical Surplus/(Deficit)	(123)	(34)	188	(319)	(561)	(101)	(650)	(287)	(1,154)	(1,029)
Identifiable stock movements										
Russia	500	1,400	1,550	900	1,280	1,100	800	800	400	200
Stillwater	375	439	63	0	0	0	0	0	0	0
US National Defense Stockpile	38	19	0	0	0	0	0	0	0	0
Industry Stocks	150	0	0	0	0	0	0	0	0	(150)
Exchange Traded Funds	0	0	0	(280)	(381)	(507)	(1,089)	532	(448)	0
Sub total - stock movements	1,064	1,858	1,613	620	899	593	(289)	1,332	(48)	50
Net Balance	941	1,824	1,802	301	338	492	(939)	1,045	(1,202)	(979)

Source: GFMS, Thomson Reuters

it became increasingly likely that South African miners would go on a widespread strike early in 2014. The high stock levels also indicate why this had little discernible impact at the time on physical liquidity or lease rates.

PALLADIUM

For the seventh year in a row, the palladium market recorded a physical deficit in 2013, with this volume rising to 1.03 Moz (32.0 t). This in turn implies a continued fall in above-ground palladium stocks, which are estimated to have dropped to 8.80 Moz (273.8 t) by end-2013, equal to roughly 11 months' fabrication demand. In a similar vein to platinum, however, this was coloured by an increase in industry stocks, due to concerns about a possible South African strike in early 2014, of around 150,000 ounces (4.7 t).

Above-ground palladium stocks are still undeniably substantial but they are trending downward, albeit slowly. This is the result of a string of physical deficits that have underlain the palladium market almost continuously over the last fifteen years or so, although this was obscured by unrelated releases from stocks long held off-market – the most prominent being those from Russian government stocks. Below the surface, however, it is evident that, while off-market holdings of palladium (notably Russia's but historically others such as those of the US auto industry) have been declining for a very long time, implied stocks of palladium in the terminal market

have been rising as a result. However, if we combine these (off-market and terminal market), the overall total for above-ground palladium stocks is trending downward in line with the underlying physical deficit conditions, which have been near constant since the late 1990s.

TERMINAL MARKET

Since 2010, the assessment of above-ground bullion stocks in the terminal market has been complicated by transfers of metals from Zurich to London, when clearing and settlement of platinum and palladium trades (previously carried out almost entirely in Switzerland) started to gather momentum in London as London took over as the primary central clearer for the market. This has been compounded by the effects of uncleared, bonded holdings adjacent to both locations, which are not necessarily reflected in national trade data. However, we believe the starting point in our analysis (immediately prior to the commencement of these transfers) is sufficiently robust, underpinned by an extensive set of trade flow data dating back to the 1970s.

Starting with platinum, holdings in the terminal market (Zurich and London together) are estimated to have totalled 1.6 Moz (48.7 t) at end-2013, accounting for 36% of global above-ground bullion stocks (Note: the terminal market excludes ETF holdings, which are dealt with separately). Perhaps surprisingly given the substantial physical surplus, the level is sharply lower than a year

earlier, by roughly 0.80 Moz (24.8 t). The decline in the terminal market last year partly reflected the aforementioned increase in industry stocks, but a greater factor was a bigger rise in platinum ETF holdings.

Turning to palladium, our estimate shows that stocks in the terminal market dropped by approaching 1.0 Moz (30.4 t) to a six-year low of 6.1 Moz (189.8 t) by end-2013. This was equivalent to just under 70% of global above-ground bullion stocks. It is of note that the fall in the terminal market was similar to that seen in above-ground stocks (the amount of the physical deficit), as the increase in industrial stocks was broadly met by the relatively low level of disposals from the Russian government.

RUSSIA

As we understand it, Russian mine production of both platinum and palladium was again sold in its entirety in 2013. Furthermore, sales from mine production are understood to have been transacted independently and therefore had no bearing on the level of stocks controlled by the Russian government. As is well known, stocks owned by the Russian government remain classified as an official state secret. Therefore, all estimates relating to these holdings are derived from anecdotal information, together with the analysis of available trade data.

In addition to Russian mine production (which we include in our supply/demand balances as new supply), we have included 0.20 Moz (6.2 t) of palladium as a “below the line” item, reflecting our estimate of sales from Russia’s state-owned inventories during 2013. This is a mere quarter of the sales in 2011 and just half of the next lowest in the past decade. It should also be noted that this is appreciably less than trade data, which indicate that there was a movement of in excess of 0.50 Moz (15.6 t). This difference is due to the fact that while the metal was stamped from Russia, it is our belief that it had been elsewhere for some considerable time and was hence not directly from Russian state stocks.

In essence, the sharp reduction in sales occurred due to the much-reduced level of government-owned stocks after heavy sales in previous years. Although it is hard to be certain as to how much may remain, this is unlikely to exceed 0.3 Moz (10 t) and could be negligible. This contrasts with a level in excess of 12 Moz (370 t) at the beginning of the last decade, and most likely double that in the early 1990s before Russia embarked on its extended programme of sales. Based on anecdotal information, we believe that the era of sales from surplus Russian government palladium stocks may have ended.

While we believe 2013 was the end of Russian state sales, this does not necessarily mean that the government’s palladium stocks are entirely eradicated. It is probable that the government will continue to hold any stocks of palladium that it considers either part of its reserve assets or otherwise strategic. Any such retained holdings would therefore not be viewed as “surplus to requirements” and managed accordingly.

EXCHANGE TRADED FUNDS (ETFs)

Our chapter on investment covers the subject of physically-backed ETFs in some detail. Their relevance to the issue of above-ground stocks is that investment in these instruments is backed by physical metal that is segregated from the generally-available pool of “unallocated” physical metal and which is specifically “allocated” as identifiable ingot/plate to the order of the fund in question. Metal allocated in this fashion is held separately by the fund’s custodian for the sole benefit of the shareholders in that fund, and may not be used for any other purpose.

Since their inception in 2007, physically-backed platinum and palladium ETFs have seen considerable investment inflows, particularly in early 2010 when the first platinum and palladium ETFs were launched in the United States. And in the case of platinum sharp inflows were seen again in 2013 with the introduction of the first South-African based platinum ETF. Platinum ETF allocations soared by 55% in 2013 to 2.5 Moz (78.6 t) by year-end, accounting for 58% of global above-ground bullion stocks. Meanwhile after some significant inflows in 2012, interest in palladium ETFs waned in 2013 and they ended the year unchanged from the level a year earlier. Consequently, combined ETF holdings amounted to 2.2 Moz (67.6 t) at end-2013, equal to 25% of above-ground stocks.

It should also be noted that the introduction of new South-African based palladium ETFs in 2014 have already encouraged gains in ETF holdings. Given that this is occurring at a time when mine production is lower, this is set to lead to a substantial increase in the proportion of above-ground stocks that are held in ETFs in 2014.

While held separately from the generally available pool of “unallocated” physical metal, we regard all allocated holdings in physically-backed ETFs as an integral component of global above-ground platinum and palladium stocks. We treat year-on-year increases or decreases in these allocations as “below the line”

items, separate from fabrication demand, or indeed new supply. Our rationale for this is that all metal allocated to these ETFs is in the form of plate or ingot, which not only complies with the terminal market's "good delivery" standards, but is also stored in secure facilities in close proximity to the vaults of the terminal market. Therefore, by virtue of its physical form and location, there is no impediment to immediate two-way flows between ETFs and the terminal market as investment in these funds rises or falls. Additionally, ETF holdings are by definition non-fabricated metal, with year-on-year movements in allocations generally reflecting a change of ownership between the fund(s) and positions in the terminal market.

Although ETFs are treated in this manner, we continue to include "retail investment" within our fabrication demand estimates and are sometimes asked why we treat this differently. "Retail investment" differs from investment in ETFs in a number of ways. First, the metal that is transacted at the retail level is typically "fabricated" in the form of small bars or coins, rather than non-fabricated good delivery plate in which ETFs ultimately transact. Second, small bars and coins are not available "on demand" from the terminal market and, similarly, are not accepted as good delivery. Third, investors in these retail products are typically private individuals who are not only far removed geographically from the terminal market, but also in the main take personal custody across the dealer's counter.

Therefore, while there is an active two-way business at the retail level, the investor base is fragmented and there are a number of hurdles (including melting and reforming) separating these investors from the terminal market. In contrast, the interchange between ETFs and the terminal market is unrestricted (in terms of form, location and scale) and can be instantaneous in both directions.

COMMODITY EXCHANGES

The final component of above-ground stocks is exchange-deliverable metal in NYMEX and TOCOM depositories. After substantial increases in both 2011 and 2012, platinum stocks also continued to grow in 2013, with the total at 0.30 Moz (9.4 t) by year-end, the vast majority of this residing in NYMEX depositories. Futures exchange stocks of palladium also rose, although at a more subdued rate than for platinum, to 0.55 Moz (17.1 t) by end-2013. Despite the smaller increase, the level of palladium stocks on exchanges remains higher than those of platinum. While not insignificant, the stocks held on futures exchanges are the smallest component of global above-ground stocks, with the levels at the end of 2013 representing just 7% and 6% of the totals for platinum and palladium respectively.

FUTURES EXCHANGES - YEAR END STOCKS

(000 ounces)	2012	2013	Change +/-
PLATINUM			
NYMEX	208	251	43
TOCOM	53	50	-3
PALLADIUM			
NYMEX	523	546	23
TOCOM	5	3	-1

Source: NYMEX and TOCOM



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5. DEMAND

FABRICATION BY REGION, 2004 - 2013

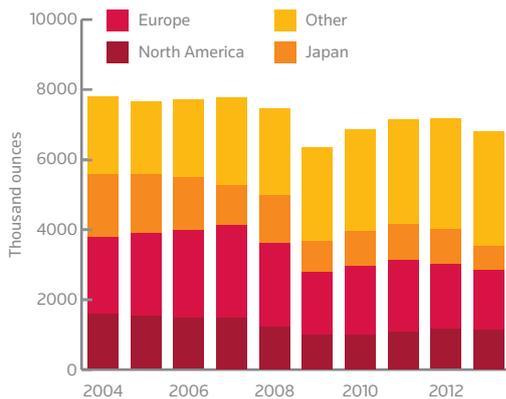
(000 ounces)

PLATINUM	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
North America	1,569	1,507	1,453	1,461	1,217	986	976	1,070	1,132	1,134
Europe	2,202	2,382	2,529	2,656	2,417	1,805	1,992	2,062	1,870	1,708
Japan	1,798	1,689	1,512	1,154	1,365	870	978	1,025	1,002	707
Other regions	2,221	2,087	2,230	2,493	2,451	2,698	2,917	3,002	3,179	3,295
Total	7,790	7,665	7,724	7,765	7,449	6,359	6,863	7,159	7,183	6,843

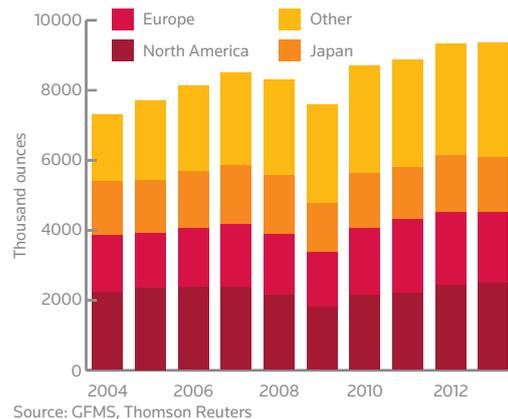
PALLADIUM	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
North America	2,222	2,337	2,353	2,356	2,127	1,788	2,118	2,183	2,410	2,467
Europe	1,638	1,594	1,704	1,815	1,754	1,583	1,938	2,121	2,092	2,054
Japan	1,548	1,482	1,633	1,692	1,706	1,411	1,587	1,492	1,641	1,566
Other regions	1,906	2,303	2,455	2,641	2,735	2,804	3,073	3,080	3,198	3,274
Total	7,314	7,716	8,145	8,504	8,323	7,585	8,715	8,875	9,340	9,361

- **Global platinum demand fell 5% in 2013, as a decline in some key industrial uses offset a modest gain in jewellery offtake.**
- **Autocatalyst demand for platinum fell by just 1% last year. A surge in Chinese demand and healthy car sales growth in North America were offset by losses in Japan and Europe.**
- **Platinum jewellery offtake increased by less than 1% in 2013 to an estimated 2.29 Moz (71.1 t) as weaker European demand dragged down modest gains elsewhere.**
- **The chemical sector recovered strongly last year, but this was tempered by sizeable falls in the petroleum and glass sectors.**
- **Platinum retail investment retreated by 43%, with sharp reductions seen in the key Japanese and North American markets.**
- **Palladium demand was almost unchanged at 9.36 Moz (291.2 t). Modest gains in the autocatalyst and chemical sectors offset falls from jewellery and electronics.**
- **Palladium autocatalyst demand rose 3% in 2013, due to gains in North American and Chinese production. Growth was curbed by reduced demand in Europe and Japan as well as substitution away from platinum in diesel.**
- **The chemical sector was the other industrial segment to register a rise last year, with palladium consumed in other areas, most notably electronics, all weaker year-on-year.**
- **Palladium jewellery demand slumped 11% last year to a ten-year low, led by a sizeable fall in China and a weaker North American market.**
- **Retail investment recorded a modest 3% rise in 2013, with a healthy double-digit gain from North America offsetting an annual decline of 20% from Europe.**

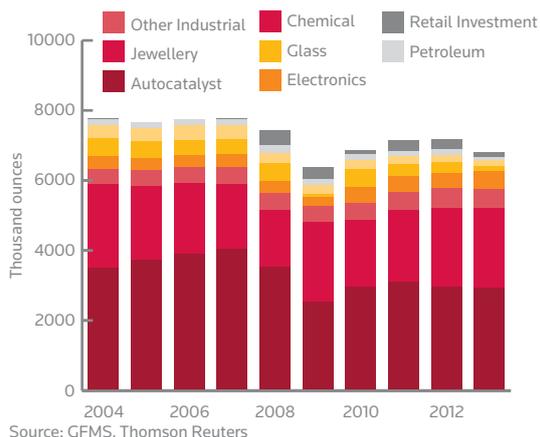
PLATINUM DEMAND BY REGION



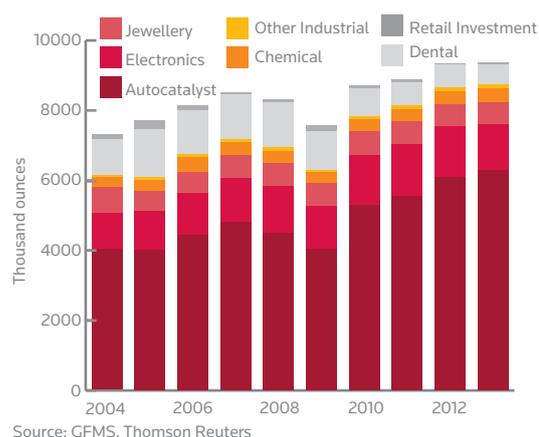
PALLADIUM DEMAND BY REGION



PLATINUM DEMAND BY SECTOR



PALLADIUM DEMAND BY SECTOR



AUTOCATALYST DEMAND

- **Platinum autocatalyst demand fell by 1.2% last year to 2.91 Moz (90.6 t), driven by lower offtake in Europe.**
- **Palladium demand was boosted by continued substitution for platinum in diesel vehicles and strong sales growth in gasoline markets. Demand rose 3.3% to 6.27 Moz (195.1 t) last year.**

OVERVIEW OF 2013

Global vehicle production increased by 4% to almost 89.0M units in 2013, with European demand falling as a result of a continued struggling automotive market. Largely responsible for the strong increase was China, where vehicle production rose 14% to 22.5M units. China represented 25% of total vehicle production last year, a staggering achievement considering it accounted for less than 4% of the global total at the start of the millennium. Excluding China, vehicle production rose a modest 1%, driven by North America, which increased output by 5% to roughly 14.2M units. Beyond these two countries, vehicle production witnessed a far more challenging environment with growth stagnating in Europe and slowing significantly in our 'Other Region' category. Meanwhile, a strong decline in the light duty sector (LDS) caused vehicle production in Japan to fall 4% to 9.2M units.

Despite ongoing concerns in some regions, the stabilisation of several key automotive markets in 2013 motivated the global automotive industry to forge ahead with technological innovation, driving strategic partnership and increased JV and mergers and acquisitions activity. For example, GM and Honda partnered to develop the next generation of fuel cell technology.

Demand for **platinum** in autocatalyst applications fell to 2.91 Moz (90.6 t) in 2013. The main region responsible for the increase was China, while demand fell in Europe, the largest user of the metal in autocatalysts. Chinese platinum use in autocatalyst applications surged 33%, driven particularly by the light duty diesel (LDD) sector and to a somewhat lesser extent by the light duty gasoline (LDG) and heavy duty diesel (HDD) sectors. Platinum demand for autocatalyst applications in North America and 'Other Regions' also rose, albeit by a far more modest 2% and 4% respectively, whereas offtake from Europe and Japan fell 4% and 11% respectively.

Demand for **palladium** in autocatalyst applications followed the trend in platinum, although with less variation in the rate of growth. China once again posted the highest growth rate, increasing its demand by 14% to 1.39 Moz (43.2 t) with North America and 'Other Regions' following with growth rates of 5% and 1%, representing 1.64 Moz (50.9 t)

AUTOCATALYST DEMAND

PLATINUM

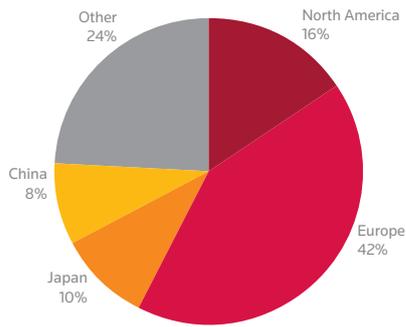
(000 ounces)	2012	2013
North America	447	458
Europe	1,311	1,220
Japan	322	286
China	184	248
Other regions	682	701
Total	2,947	2,913

PALLADIUM

(000 ounces)	2011	2012
North America	1,563	1,636
Europe	1,545	1,524
Japan	883	856
China	1,224	1,390
Other regions	856	865
Total	6,070	6,271

Source: GFMS, Thomson Reuters

PLATINUM DEMAND IN AUTOCATALYSTS, 2013



Source: GFMS, Thomson Reuters

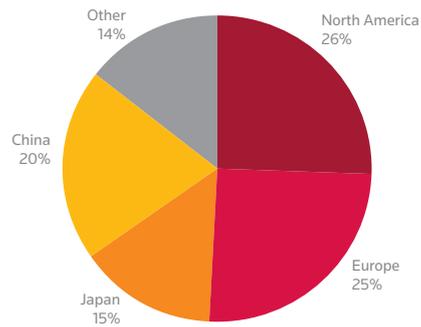
and 0.87 Moz (26.9 t) respectively. Declines in consumption were once again witnessed in both Europe and Japan.

NORTH AMERICA

Following an exceptionally strong increase in 2012, vehicle production in North America last year continued on a positive trend, albeit at a more modest 5% to approximately 14.2M units. Vehicle sales followed a similar trend and increased by 8% last year, mainly driven by cars produced in North America, which represented 92% of total light duty car sales. Despite this increase stretching over a wide range of international brands, the traditional US car manufacturers witnessed above trend vehicle sales growth of around 9%, in turn lifting their share of total domestic sales to 56% in 2013.

However, despite another strong performance, last year's production levels overall remained well below those recorded at the beginning of the millennium when vehicle production (including heavy duty on-road and off-road vehicles) exceeded 16M units.

PALLADIUM DEMAND IN AUTOCATALYSTS, 2013

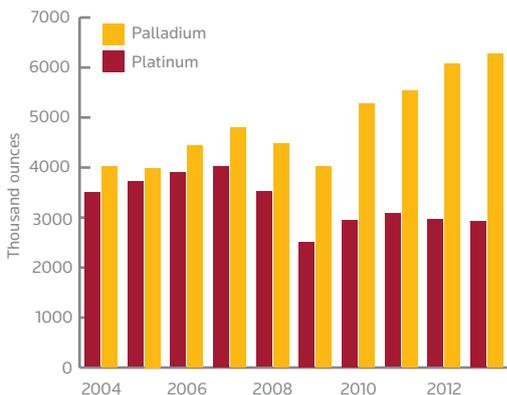


Source: GFMS, Thomson Reuters

Last year, **platinum** autocatalyst demand witnessed a small increase of 2%, led again entirely by diesel applications, whose share of platinum autocatalyst demand rose for the fourth consecutive year, to 69%. The majority of this gain was in turn on the back of the HDD sector, where road-going trucks in particular saw considerable increases compared to the prior year, pushing platinum demand to 0.5 Moz (14.2 t).

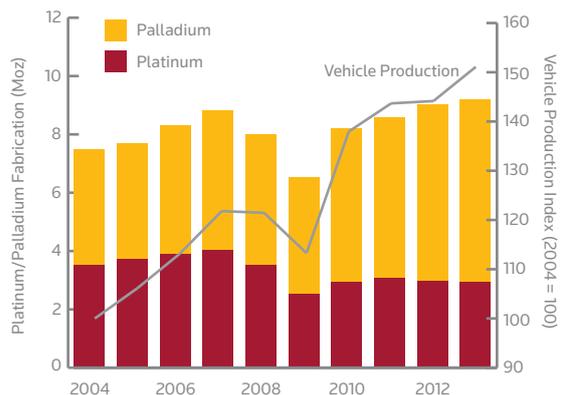
Although the diesel market in the US is expanding, its share remains small compared to gasoline powered vehicles. Consumer preference for gasoline over diesel vehicles remains prevalent in the country, perhaps due to arguably outdated consumer perceptions of diesel vehicles as loud and smelly. Although diesel technology has improved significantly, reducing emissions, noise and odours, while also providing better fuel economy compared to gasoline cars, almost 90% of US car production in North America last year was of gasoline fuelled vehicles with palladium-based catalysts as the preferred technical after-treatment solution.

PLATINUM & PALLADIUM AUTOCATALYST DEMAND



Source: GFMS, Thomson Reuters

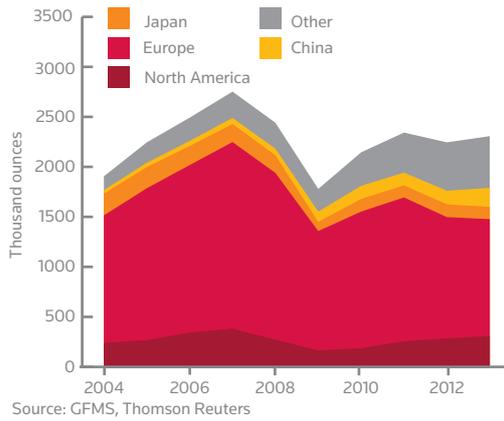
AUTOCATALYST DEMAND VS VEHICLE OUTPUT



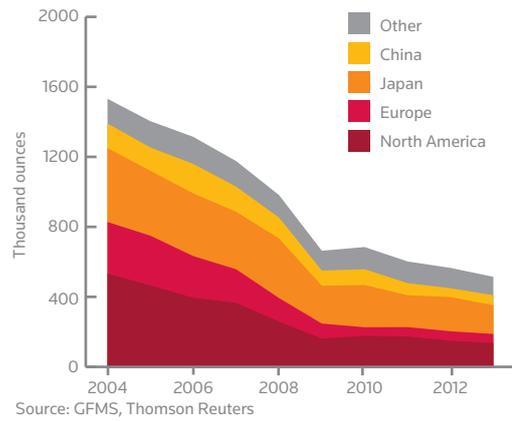
Source: GFMS, Thomson Reuters



DIESEL PLATINUM DEMAND



GASOLINE PLATINUM DEMAND



Palladium-based autocatalyst demand thus increased by 5% to 1.64 Moz (50.9 t), mainly supported by the light duty sector, although the heavy duty diesel (HDD) sector also grew. Indeed, palladium is not only substituting for platinum in light duty vehicles but is also increasingly being used in HDD applications.

Average PGM loadings remained under pressure in the light duty gasoline sector due to ongoing thrifting and continued efforts towards engine downsizing. In 2013 the average engine displacement in gasoline engines sold in North America was 2.9 litres (or 3.5 litres for traditional US car brands), a considerable decline compared to 3.7 litres in 2007. US car manufacturers have also increased hybrid and electrical engines as well as fuel economy for internal combustion engines in recent years, driven by the increasingly tough Corporate Average Fuel Economy (CAFE) standards set by the central administration.

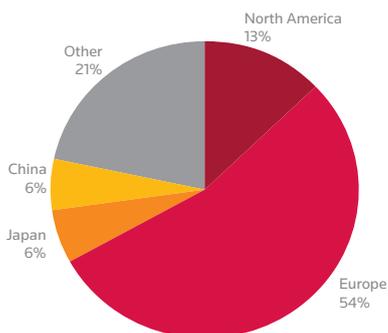
In the US, federal regulations do not require the entire HDD sector to be certified as conforming to emission standards, but instead call for the engine to meet the emission limits. The HDD sector has the most stringent

emissions requirements regarding HC, NOx and PM emissions in place as of the phase in of EPA10 emission standards between 2007 and 2010. At present, much of the HDD regulation in road-going trucks is focused on reducing greenhouse gas (GHG) emissions, which does not necessarily have a positive bearing on PGM loadings. Therefore, with road-going truck sales flat last year, and continued thrifting efforts, we estimate that demand for platinum from this segment has decreased around 8% whereas that for palladium has remained stable.

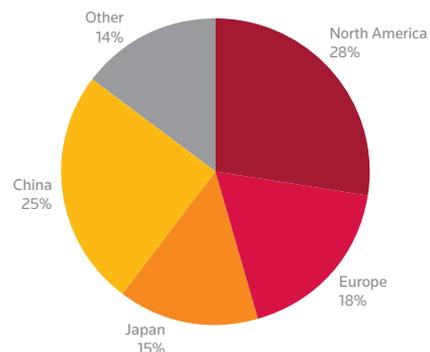
On the non-road side of the market, however, sales of trucks in North America rose last year by 6% aided by a strong manufacturing sector, particularly where these vehicles are heavily utilized, for example in forestry, construction and road transport.

In addition, more stringent emissions legislation in the form of Tier 4a and 4b have already contributed to increased usage of PGMs in autocatalyst applications, despite Selective Catalyst Reduction (SCR) also being a widely used technology. As a result we estimate demand for platinum to have gained around 10% in the total

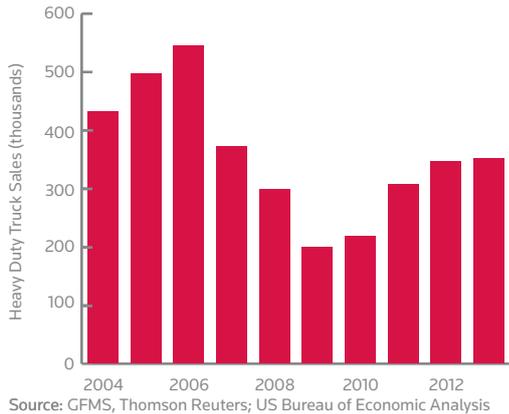
PLATINUM IN DIESEL, 2013; REGIONAL DEMAND



PALLADIUM IN GASOLINE, 2013; REGIONAL DEMAND



HEAVY DUTY TRUCK SALES: UNITED STATES

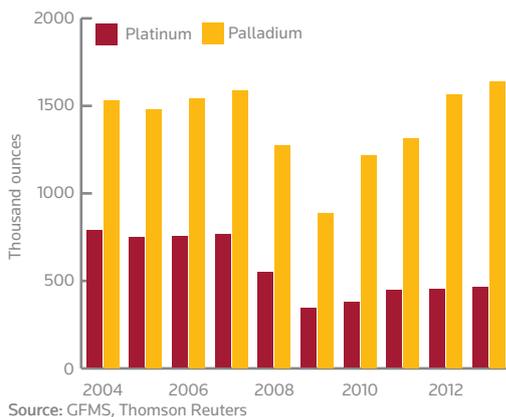


HDD segment, representing around 46% of platinum consumption in North America. Palladium demand is also estimated to have increased substantially, by 12%, in the HDD segment.

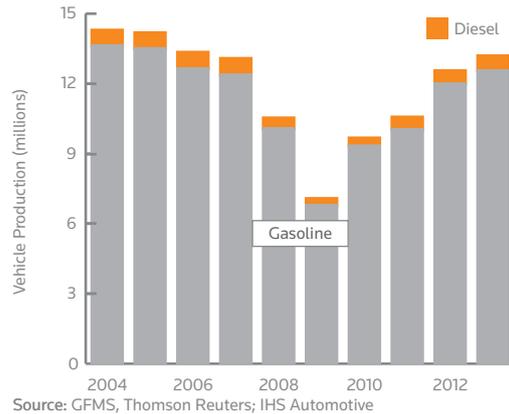
EUROPE

European vehicle production increased a slight 0.2%, boosting the total to just shy of 20M units. The main driver was the 0.8% increase in the light duty gasoline sector, which represents the bulk (54%) of total vehicle production in the region. In addition, despite their minor contribution, more solid gains were also recorded in the off-road and on-road HDD segments, where, particularly due to the introduction of new Euro VI emissions legislation in 2014, some vehicle purchases were pulled forward. Light vehicle sales (including light trucks), however, did not follow that mildly optimistic scenario and registered a 3% decline in 2013. Unsurprisingly, most of that development was driven by disappointing sales on the continent itself, as shipments to destinations outside Europe increased by 6%, mainly on the back of healthy sales of German premium car brands.

AUTOCATALYST DEMAND: NORTH AMERICA



NORTH AMERICA LIGHT DUTY VEHICLE PRODUCTION



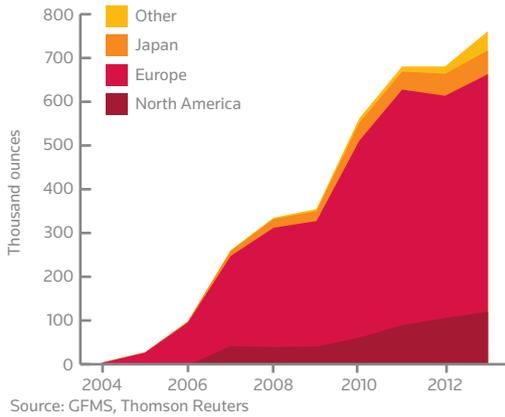
Other European markets, however, continued to struggle last year, most notably those of France and Italy. Exposure to the European market has been the Achilles heel for the French and Italian car producers, who have seen production volumes and sales orders tumble, in turn negatively affecting their share price. With many of these cars being diesel-powered, roughly 59% and 50% of vehicles produced in France and Italy respectively, the dire state of both markets weighed on platinum demand. Consequently, **platinum** demand in autocatalyst applications fell 7% in 2013 to 1.22 Moz (38.0 t) in Europe, driven by the LDD sector which makes up 86% of total platinum autocatalyst consumption in the region.

However, despite diesel cars still comprising the bulk of the European car fleet, substitution towards gasoline vehicles (and hybrid-electrical vehicles) has increased in recent years. Developments such as a decline in mileage driven, diesel being cheaper than petrol, and the introduction of increased emissions standards and technological advances that have improved the yields on petrol engines, have all contributed towards this gain in gasoline market share. In addition, due to the complexity of catalyst systems for diesel cars, a diesel vehicle currently represents approximately five times the PGM cost of an equivalent petrol vehicle. This is estimated to rise by another 20% due to the Euro 6 legislation which will push the cost burden for manufacturers higher compared to petrol equivalents. New, more efficient direct injection petrol engines are also likely to see some increase in catalytic requirements due to Euro 6c emission standards, but not to the same extent as diesels and not before September 2017.

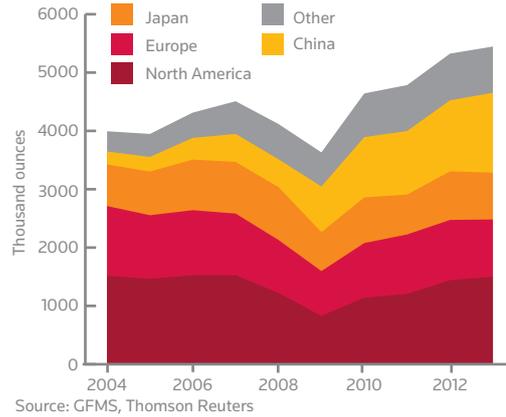
Palladium-based autocatalyst demand also declined, albeit by a smaller percentage, falling 1% to 1.52 Moz (47.4 t). Unsurprisingly, the main segment driving demand lower was light duty



DIESEL PALLADIUM DEMAND



GASOLINE PALLADIUM DEMAND



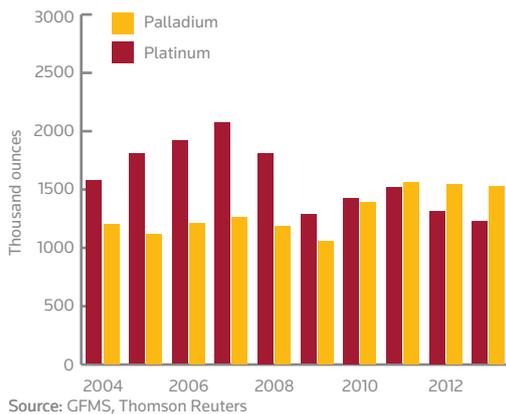
gasoline production, reducing volumes 5% compared to the previous year. Palladium usage in light duty gasoline applications makes up about two-thirds of total palladium demand. Palladium-based autocatalysts in diesel applications recorded a minor increase last year due to the continued substitution efforts in the automotive industry.

for PGM consumption, as there likely will be a migration to smaller engines, which require lower PGM loadings. However, on the other hand the implementation of a real life testing cycle will force manufacturers to comply with lower emissions which could have a positive impact on average autocatalyst PGM loadings.

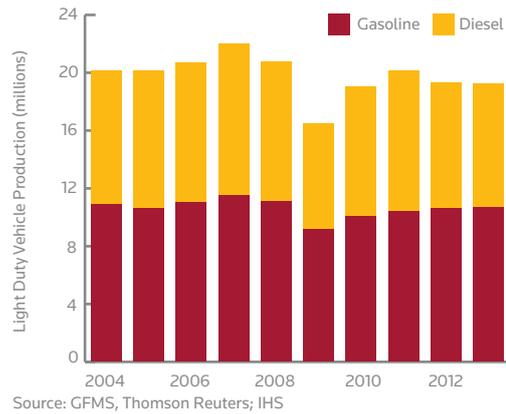
In mid-March 2014, the European Parliament passed the updated CO₂ target, having a one-year phase in period in 2020 – with an estimated saving of around 15 million tonnes of CO₂ per year. As such, in 2020 95% of the fleet of all manufacturers has to meet the 95g/km target, and then 100% of the fleet will need to comply one year later. In addition, the new testing cycle based on shorter stop times and longer test cycles, among other measures, will reflect real world driving conditions more closely and might be adopted as early as 2017. This development is expected to deliver increased cost pressures on the industry, particularly for the German premium brands, and it is generally perceived that this cost will amount to an extra €1,000-1,500 per vehicle. The more stringent CO₂ emission targets are a negative

The introduction of Euro 6 for passenger cars and light duty trucks in September this year for all new models and next year for all car registrations is likely to require more stringent after treatment systems that can comply with the standards. However, although we expect a small increase in PGM loadings during the first stages of the introduction, it is certainly not a given this will boost PGM consumption considerably in the coming years. The European light diesel engines can be distributed between <1.4 L, 1.4-2.0 L, and above 2.0 L. It is our understanding that the smaller engines make up around 20% of the market and are increasingly going for the LNT (Lean NOx Trap) with a DPF (Diesel Particulate Filter), but are already compliant due to Euro 5 and will be light enough to adhere to Euro 6. We understand that the larger engines above 2.0 L (10% of the market) will use SCR

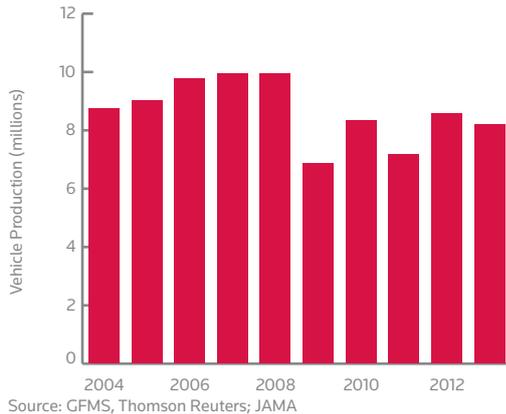
AUTOCATALYST DEMAND: EUROPE



EUROPEAN LIGHT DUTY VEHICLE PRODUCTION



JAPANESE PASSENGER CAR PRODUCTION



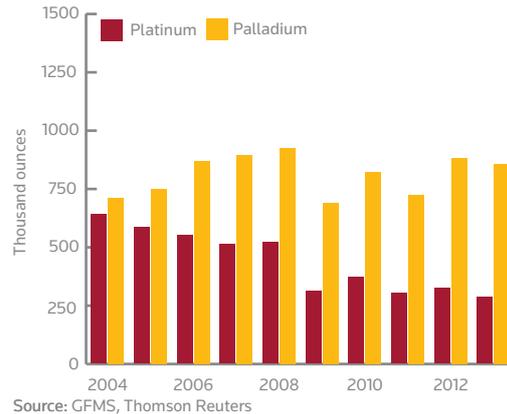
technology, which doesn't require PGMs. However the main fleet with an engine size between 1.4-2.0 L (70%) could also go for the SCR non-PGM based solution in turn not significantly bolstering the demand for these metals either. The case for not going down the SCR route, even for mid-sized vehicles, is a strong one because it would require increased investment in infrastructure, such as refilling stations. The tighter CO₂ emissions legislation, which will force manufacturers to reduce weight and improve vehicle streamlining, would also involve reducing the size of the urea tank.

In the HDD sector, truck orders increased in 2013 driven by the more stringent emissions legislation of Euro VI, which is set to be implemented for all vehicles in 2014. As a consequence, HDD sales rose 6% last year to roughly 450,000 units, countering the negative production trend the prior year. We expect this new legislation to have some positive impact on demand for platinum and palladium and, indeed, believe consumption of both metals to have risen considerably. However, despite the increase, we estimate that platinum consumption in the HDD market only makes up 9% of total consumption in autocatalyst applications. HDD only accounts for 2% of palladium autocatalyst demand in Europe. In addition, the increase is expected to be shortlived as thrifting efforts will continue and continued adoption of the non-PGM containing SCR catalyst is expected.

JAPAN

Japanese vehicle production was 4% lower in 2013 due to a heavy drop in the road-going heavy duty diesel and light duty gasoline sectors. Sales of light duty vehicles (including light trucks) fell 6% last year, driven by an 8% reduction in vehicles sold domestically (including South Korea) and some notable weakness in their main

AUTOCATALYST DEMAND: JAPAN



export regions like Europe (-2%) and North America (stable).

Demand for **platinum** in autocatalyst applications fell 12% to 0.29 Moz (8.9 t). The light duty diesel segment recorded a minor increase of 2%, whereas the light duty gasoline and heavy duty sectors both posted notable declines compares to the previous year. **Palladium** demand in autocatalyst applications followed a similar trend, albeit more modestly, falling 3% to 0.86 Moz (26.6 t) last year. The main driver once again was the light duty gasoline segment (responsible for 94% of total palladium demand) which reflected lower demand for petrol driven cars in Japan.

The central government in Japan has introduced various stimulus schemes to promote the sale of electric and hybrid vehicles in order to reduce harmful emissions. Since 2009, when some of these measures were introduced, sales of these low emission vehicles (LEV) have been surging. In 2005 Japan introduced stringent emissions legislation for petrol as well as diesel cars; this was tightened further in 2009. Particularly for gasoline driven cars, manufacturers introduced the technology of electronically-controlled fuel injection (for more efficient combustion) in combination with autocatalysts.

To achieve emission reductions in diesel vehicles, a combination of technological improvements, such as retarded fuel injection timing, optimised combustion chamber configuration, improved intake/exhaust systems and high pressure fuel injections contributed towards ensuring compliance with the 2005 standards. In addition EGR systems plus DPFs or SCRs ensured that NO_x and PM levels were compliant with the even more stringent 2009 legislation. In 2016, diesel NO_x emissions will be regulated even more tightly, particularly for heavy duty vehicles and a world-harmonised transient test cycle

(WHTC) for measuring diesel HDV exhaust emissions will be employed. We do not expect this to have an immediate positive impact on PGM demand as the reduction of NOx emissions will probably be tackled with the non-PGM containing SCR technology.

The battle towards reducing emissions from gasoline and diesel driven cars in recent years has focused more towards CO₂ reduction. Measures such as reducing vehicle weight, streamlining aerodynamics, and improving engine efficiency should all optimise fuel efficiency and fuel economy and contribute towards reducing CO₂ emissions. Our understanding is that engine downsizing will also play a part in this process, on top of conventional thrifting efforts, which we expect to reduce required PGM loadings. Toyota, for example, is launching a new engine technology that will reduce fuel consumption up to 30% with a 1.0 litre engine. The Atkinson cycle engines allow it to improve fuel economy, among other features, on a cooled exhaust gas recirculation (EGR) which reduces NOx emissions.

On the HDD market, Japan's emissions legislation was introduced in 2009 and is likely to remain unchanged until the more stringent version in 2016. HDV sales fell sharply last year for both on-road and off-road trucks, in line with the malaise witnessed in the passenger vehicle market. Between 2011 and 2013, Japan implemented new off-highway emission standards for off-road diesel vehicles, which are similar to the EU's Stage IIIB standards for non-road diesel engines. Proposals to tighten NOx emission limits to 0.4 g/kWh for engines between 56 and 560 kW, identical to the EU's Stage IV regulations are under consideration, with a tentative implementation date set at October 2015 for engines between 56 and 130 kW, and October 2014 for engines between 130 and 560 kW.

Until those new rules are implemented, we expect continued thrifting of PGM loadings, in particular for the on-road sector. This trend in combination with declining sales pushed platinum and palladium consumption lower from the HDD segment by a significant 19% and 3% respectively last year.

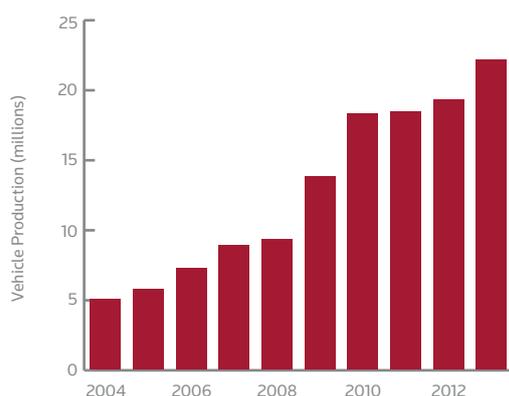
CHINA

Vehicle production in China recorded a very robust 14% increase in 2013, largely fuelled by the light duty gasoline segment, which makes up the bulk (83%) of vehicle production in the country. Light duty vehicle sales (including commercial trucks) increased as well, albeit at a more modest 8% last year. The robust growth was due to the return of some of the Japanese brands after the territorial dispute in the second half of 2012 as well as a continued increase in the size of the working class, which has translated into more first time buyers.

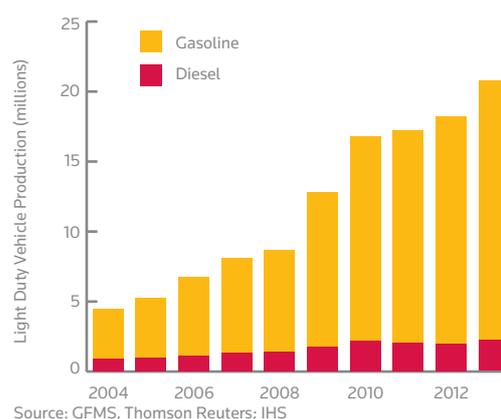
Almost all cars produced in China (99%) reach the domestic market, although the variety of different car brands is enormous with the share of foreign brands produced and sold on the mainland almost equally as large as the domestic manufacturers. However, when looking at the passenger car market only, the share of foreign brands compared to domestic is much larger and it is no secret that Chinese brands have struggled in making decent vehicle sales. This has unleashed the debate among policymakers and Chinese car companies about relaxing the 50% foreign ownership rule in order to counter this trend.

Due to robust car production and sales in 2013, PGM consumption continued its steady increase too. Indeed, **platinum** usage in autocatalysts is estimated to have risen by 33% last year to 0.25 Moz (7.7 t), driven by the light duty sector. **Palladium** usage in autocatalysts is

CHINESE VEHICLE PRODUCTION



CHINESE LIGHT DUTY VEHICLE PRODUCTION



estimated to also have risen, albeit by a more modest 14% to 1.39 Moz (43.2 t), due to a strong light duty gasoline sector.

Although electric vehicles are still marginal in China, with just below 16,000 units produced in 2013 (up 30%), the State's intention to reduce pollution, particularly in cities, means that the electric vehicle market in China is expected to grow substantially in the coming years, substituting usage from its fossil fuel burning counterparts. This will be accompanied by the much needed development of electric vehicle charging infrastructure in combination with a push towards JVs and other areas of collaboration with western-based brands in this segment.

However, parallel to that development and more relevant at present, China introduced its more stringent emissions legislation, China IV, for diesel vehicles last year, two years after its original implementation date and also two years after the introduction for gasoline vehicles. Much of this delay had to do with fuel quality, or fuel impurities such as too-high levels of sulphur, which reduce the effectiveness of PGM-based autocatalysts. We believe that this measure had a positive impact on PGM loadings in the country last year and that this will increase in the near future. However, average PGM loadings in Chinese vehicles are significantly lower compared to the more developed markets in the US, Europe and Japan.

In contrast to light duty trucks, heavy duty vehicle sales are not a function of personal income growth or an increase in consumer spending, but considered a corporate investment and therefore correlate more strongly with economic growth and manufacturing activity particularly in certain areas of the economy.

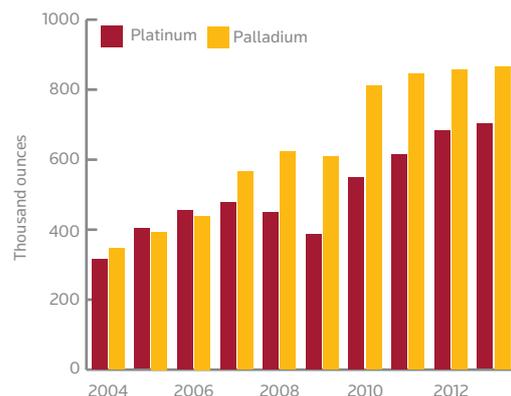
Last year, entrepreneurs' confidence in construction, industry and general manufacturing was offset by continued weakness in manufacturing data. Despite foreign investment hitting record highs last year, most of it was accumulated in the services sector as industrial investment in the primary sector declined. This was reflected in HDD road-going truck sales in the country last year, which fell an average 10%. In China, driven by delays due to fuel quality issues, China IV and V emission legislation is in place, with the iteration depending on location. Therefore, despite a decline in HDD road-going vehicle sales, we still estimate platinum consumption to have increased in this segment (palladium too but its share of usage in this segment remains very small) representing around 21% of total platinum used in diesel applications, a significant increase from previous years.

OTHER REGIONS

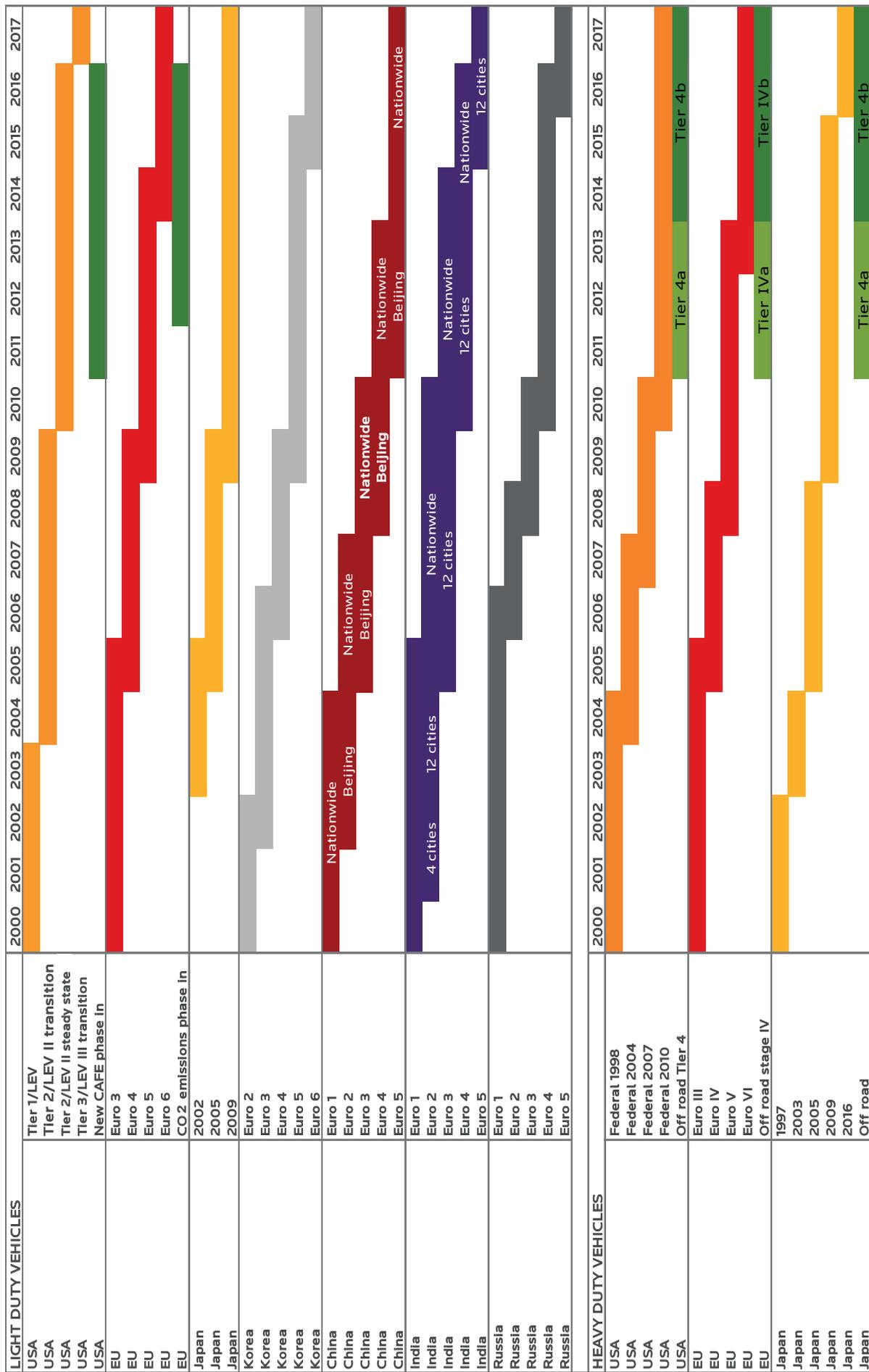
Vehicle production in our 'Other Region' category stagnated last year with growth amounting to 1%. When looking into more country-specific detail the performance year-on-year is very much a mixed bag. Leading automotive manufacturers (based on units of production) such as India recorded declines last year whereas Brazil and Mexico witnessed some notable increases.

Almost all countries have some form of emissions legislation in place, most often modelled after European standards. Several Southeast Asian countries, such as Thailand, Malaysia and Indonesia, and Brazil have recently adopted Euro 4 emissions legislation and as such we estimate this development to have some positive impact on demand for autocatalyst applications. As a consequence, both platinum and palladium demand have posted gains, although the increase is likely going to be relatively small given that the impact of the newly introduced legislation is going to be spread over a few years. At the same time, another cautionary note is that implementation of new regulations is often easier than enforcing compliance, which, to our understanding, still seems to be quite the challenge in the majority of these countries. **Platinum** consumption in autocatalyst applications came in slightly higher than in 2012, as the HDD road-going segment rose, to an estimated 0.70 Moz (21.8 t) whereas we estimate that **palladium** demand reached 0.87 Moz (26.9 t), a gain of a little over 1%.

AUROCATALYST DEMAND: REST OF WORLD



HIGHLIGHTS OF EMISSION STANDARD TIMETABLES



JEWELLERY

- *Global platinum jewellery fabrication rose by less than 1% to an estimated 2.29 Moz (71.1 t) in 2013 due chiefly to a significant slowdown in demand from East Asia.*
- *Palladium jewellery demand fell by 11% to 0.58 Moz (18.0 t), largely the result of a significant pullback in China.*

In 2013, global **platinum** jewellery fabrication edged up by less than 1% to reach an estimated 2.29 Moz (71.1 t). This resulted in jewellery's share of total platinum demand remaining steady at around 33% from last year, down from 44% at the start of the millennium. Demand growth last year was mainly driven by North American countries, as weaker prices and an improving economy encouraged restocking and consumption activities in this region. After recording a 3% increase in 2012, a faster paced North American economic recovery further propelled demand for platinum jewellery, lifting offtake by 5% year-on-year in 2013. In contrast, Europe, which recorded a modest fall of just 1% in 2012, saw the decrease in demand accelerate in 2013, to an estimated 0.18 Moz (5.5 t), representing a fall of over 10% year-on-year. Meanwhile, China still represented close to two-thirds of global fabrication. However, demand for platinum jewellery by the Asian giant rose by barely 1% last year, as gold essentially stole the spotlight after a steep drop-off in price. This price impact, coupled with a drop in retail promotions compared to an aggressive promotional campaign for platinum jewellery that took place in 2012, also played a role in this unimpressive outcome. The anti-corruption/gifting policy

implemented by the Chinese government last year may also have played a role in the slow growth in demand. On the other hand, demand in India (a market still in its infancy) was stronger last year, rising by 9% over 2012. The notable growth could be attributed to growing popularity in the diamond jewellery segment and also preference by urban youth to exchange engagement/wedding rings in platinum.

In contrast, the use of **palladium** in jewellery fabrication fell for the fifth consecutive year, by 11% year-on-year, to 0.58 Moz (18.0 t), the lowest since 2004. The decline can be attributed mostly to China, where jewellery offtake last year dropped by over a fifth, with China's share of the global total shrinking to 44%, compared to the peak of 76% in 2005. Lower fabrication demand in China was due to a combination of factors discussed in detail below, with the declining trend not looking like it will be tempered anytime soon. Europe is one of the few regions to have registered growth for palladium jewellery demand last year, thanks to continued strength in carat palladium, although gains remained largely confined to the bridal sector.

CHINA

Thomson Reuters' estimate for platinum jewellery demand in China is based on our interpretation of net bullion inflows to mainland China and neighbouring Hong Kong, as well as the total volume of metal traded on the Shanghai Gold Exchange (SGE). More importantly, though, our assessment is based on information collated during our many research trips to Shenzhen, China's centre for gold, platinum and palladium jewellery fabrication.

Following a 9% rise in 2012, **platinum** jewellery fabrication managed only a modest 1% rise to an estimated 1.44 Moz (44.7 t) in 2013. In value terms, demand fell by 3% to approximately US\$2 billion, as the average price of platinum fell by 4%.

Traditionally, offtake is at its strongest in the second and fourth quarters, helped by the Chinese Labour day holiday in May and National Day holiday in October, and during the run up to the celebrations at the end of the calendar year. Looking at the trend in 2013, however, only the final quarter did well, as the acute gold price drop in the second quarter stole the main focus away from all other segments of the jewellery market.

As outlined in previous editions of the *GFMS Platinum & Palladium Survey*, it can be challenging to analyse

JEWELLERY DEMAND

PLATINUM		
(000 ounces)	2012	2013
North America	224	235
Europe	196	176
Japan	320	327
China	1,423	1,437
Other regions	105	110
Total	2,268	2,286

PALLADIUM		
(000 ounces)	2012	2013
North America	78	75
Europe	153	155
Japan	50	50
China	322	257
Other regions	48	42
Total	651	579

Source: GFMS, Thomson Reuters

China's and Hong Kong's platinum inflows and outflows in isolation, as they often present more uncertainty than clarity, consequently leaving room for potential miscalculations and overestimation. A review of available statistics reveals that the Hong Kong platinum bullion imports maintained a healthy growth last year, jumping from 1.24 Moz (38.5 t) in 2012 to 1.42 Moz (44.3 t) last year, but fell well short of the near 1.61 Moz (50.0 t) recorded at the peak in 2009. Imports in the first quarter of 2013 were relatively weak, with average monthly shipments close to 88,000 ounces (2.7 t). To put this into perspective, imports in the second and third quarters were relatively stable at around 119,000 ounces (3.7 t) per month, and as outlined, imports continued to grow in the fourth quarter as demand picked up, reaching an average monthly shipment of around 148,000 oz (4.6 t).

Chinese mainland statistics, on the other hand, reported a 23.5% year-on-year growth in platinum imports to 3.16 Moz (98.3 t). This sizable increase in imports can be attributed to several factors: such as restocking and building inventory in response to the price drop; and a rise in private investment and potentially overstated figures by producers to get financing from banks. It is also important to note, however, that a portion of these imports, albeit smaller than witnessed in 2012, was inflated by a flow of metal which could be interpreted as round-tripping by the local trading companies. This was chiefly motivated by the interplay between the Chinese yuan and the US dollar interest rates, as well as by the availability of financial products such as forward currency contracts (NDFs).

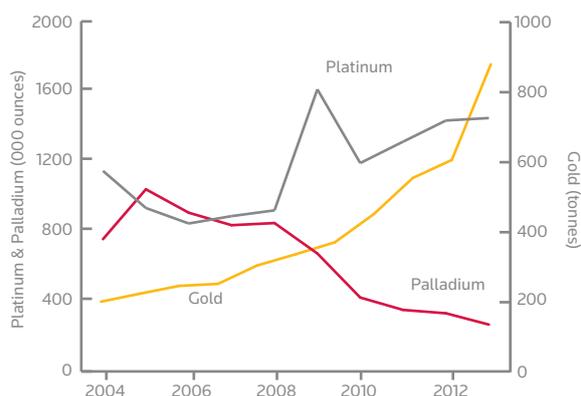
Excluding round tripping activity, the majority of China's official platinum imports (less than 0.65 Moz (20.0 t) in 2013), was destined for the Shanghai Gold Exchange (SGE), the country's only platform for purchasing the metal at a zero VAT rate. The remaining metal was brought in by industrial end users

(autocatalyst and glass panel fabricators, for example). The turnover on the SGE rose by 41% to 2.90 Moz (90.2 t) last year, with elevated volumes recorded in the second and fourth quarters, which, not surprisingly, coincided with platinum's weaker price periods. The highest monthly turnover of 341,000 oz (10.6 t) was registered in June, and the lowest of 110,000 oz (3.4 t) in January.

China's annual GDP growth rate was 7.7% in 2013, the lowest since 1999. Despite surpassing market expectations, growth in many sectors in China slowed noticeably, which could be attributed to stalled growth in manufacturing and export demand, government intervention in the real estate market, and the implementation of the anti-corruption/gifting policy, which discouraged consumption in the luxury market. Furthermore, per capita income growth in both rural households and the urban population also slowed to 9% and 7% respectively. That said, we do not believe that the relative slowdown of the Chinese economy was the major driver for the deceleration in platinum fabrication growth last year.

Demand for platinum jewellery was more robust in 2012, when it was mostly trading at a discount to gold. Also, the continuation of urbanisation of third and fourth tier cities as well as double-digit growth in both the rural households and the urban population, in conjunction with aggressive sales promotions and campaigns, spurred demand for platinum jewellery to 1.42 Moz (44.2 t). This combination of positive factors was not in play in 2013. Although the story of urbanisation and the rise of household income continued, it was the extraordinary demand for the yellow metal that stole the spotlight after the acute drop in the second quarter saw many Chinese (mostly women) actively buying gold jewellery and building their physical gold portfolios. As outlined in the 2014 Thomson Reuters *GFMS Gold Survey*, China's gold jewellery fabrication demand rose by 46% year-on-year to a staggering 872 tonnes.

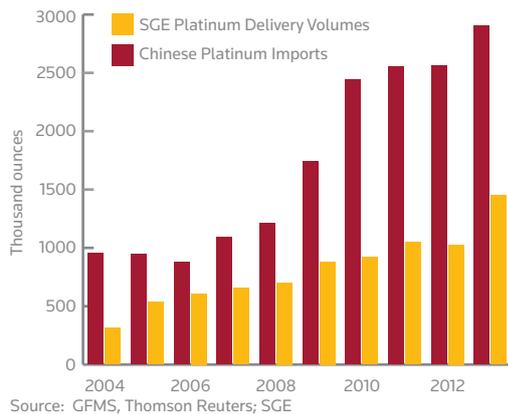
CHINESE JEWELLERY FABRICATION



Source: GFMS, Thomson Reuters

The main driver behind the robust demand for gold jewellery pieces has been gold's impressive price performance over the past decade, which has bolstered the metal's appeal as a reliable investment option. As in the case of India, the Chinese have a long cultural affinity to gold since it is a symbol of wealth. To the traditional Chinese, housing and gold are the two major 'necessities'. The sharp fall in the gold price last April provided a buying opportunity, and many people rushed into the market; an indicator that many consumers were extremely price sensitive.

CHINESE PLATINUM IMPORTS



In response to high gold demand, many fabricators have placed more emphasis on gold jewellery output rather than on platinum (or palladium), allocating more capacity to produce and sell 24-carat gold as this was the main thrust of consumer demand. Although fabricating platinum gives a higher margin per unit than gold, the gold frenzy last year was so extraordinary that many retail stores ran out of stocks, and fabricators could only produce pure gold jewellery with a simple design to satisfy demand due to time constraints. The volume of gold fabrication was so large that over 100 small independent fabricators were also set up in Shenzhen to accommodate the surge in demand. In contrast to gold, which is often viewed as a safe-haven investment and a store of value during periods of inflation, platinum is viewed as a luxury item in most cases. To this end, in a slow-growing economic and unstable environment, people tend to choose gold over other luxury items.

Another reason for the marginal growth in platinum fabrication demand might be found in the Chinese culture. The year 2013 was the Year of the Snake based on China's lunar calendar, and according to tradition it was not an auspicious year to get married. As platinum is primarily used to fabricate wedding rings, this Chinese custom may have also contributed to a slowdown in offtake within the bridal segment.

Platinum jewellery also suffers from a huge pricing variance in the Chinese retail industry. As a luxury item and unlike gold, platinum jewellery is usually sold at a significant premium over the metals' intrinsic value. This can often lead to confusion among consumers, as there can be a large degree of variance in pricing of two identical platinum pieces sold in different retail outlets.

As mentioned above, platinum demand started to pick up pace in the fourth quarter last year. Some manufacturers

CHINESE PLATINUM JEWELLERY FABRICATION



even saw double-digit growth in the second half of the year. In addition, according to our various sources, the industry leaders in the sector actually gained market share last year. We believe their robust figures were not actually a reflection of a stronger market for platinum jewellery, but rather a shrinking market instead, or one where growth has stalled. Indeed, the larger fabricators increased their output while smaller operators moved their focus to gold. We also noticed that the demand for platinum jewellery last year was mainly supported by retail expansion (increasing number of outlets), while same store growth for platinum was far less impressive and in many cases saw shelf space reduced to cater for gold jewellery.

Turning to 2014, we believe that platinum jewellery demand will grow at a slightly faster pace relative to 2013. Barring any huge corrections in the gold price, another gold frenzy is less likely, and people may reallocate some of their attention to platinum. In addition, this year is the Year of the Horse according to the Chinese lunar calendar; a reasonably auspicious year to get married, which should help demand for platinum wedding and engagement rings. Many market participants were apprehensive about the potential for a price shock as a result of the recent strike action in South Africa and the impact such a shock may have on domestic demand. However, up to the writing of this survey demand has been stable and not too price sensitive, though the rise in the RMB platinum price to date has been modest. That said, should any significant turbulence in the domestic or global economy occur it may well have a negative impact on consumer sentiment, dampening appetite for platinum jewellery.

Palladium jewellery fabrication in China dropped 20% last year, to an estimated 0.26 Moz (8.0 t). This was the fifth consecutive annual decline and the

largest annual drop since 2010. Palladium jewellery demand was affected by many of the same factors outlined in the platinum jewellery analysis. On the positive side, rapidly rising incomes in the interior, and the creation of new retail space in smaller cities, boosted demand for the metal. There were, however, also negative forces such as strong competition from gold, higher fabrication charges, and a host of other factors.

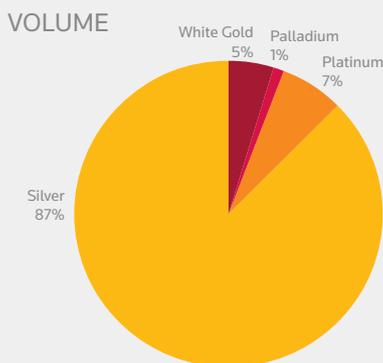
For instance, unlike platinum, palladium jewellery suffers from impediments such as an absence of a transparent pricing mechanism (palladium is not traded on the Shanghai Gold Exchange) and relatively low recognition of the metal among the general public. These two factors explain the bulk of the sector's poor performance over the past six years.

Palladium imports into mainland China are estimated to have risen 8% to 0.63 Moz (20.2 t) in 2013. It must be pointed out, though, that the vast bulk of metal imported officially to the mainland was destined for autocatalyst fabricators and other industrial sectors. Therefore changes in these import figures give us little clarity on the dynamics of the local palladium jewellery market. For this reason, we need to turn most of our attention to data gathered from our extensive field research, our estimates for palladium scrap supply, and to a lesser extent, the flow of metal from Hong Kong.

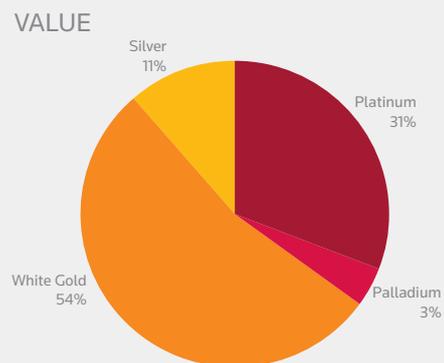
One reason behind the importance of Hong Kong in the bullion trade is that palladium is still not available on China's Shanghai Gold Exchange (SGE), the country's official physical precious metals exchange, thus exposing importers to the full 17% VAT on imported metal. With no official price-making mechanism guidance and no official trading platform from which to source physical metal (unlike gold, platinum and silver), the bulk of the metal flow remains in the hands of dealers who are able to bridge the gap between international pricing and market practices and the still restricted foreign currency system in China. In addition, the proximity of Hong Kong to neighbouring Shenzhen, the hub for gold, platinum and palladium jewellery fabrication in China, makes Hong Kong the obvious location for the unofficial cross-border physical business.

After an almost 50% increase in palladium imports into Hong Kong in 2012, volume continued to grow by 25% in 2013, to 0.45 Moz (14.1 t). However it was still a far cry from the record 1.45 Moz (45.0 t) imported during 2008. While attempting to analyse the Hong Kong/ Chinese mainland bilateral metal flow, one has to keep in mind physical investment, which can involve private investors sourcing metal in Hong Kong yet holding stocks in mainland China. We believe the huge surge in palladium imports into Hong Kong in the last two years was mainly due to physical investment and industrial

CHINESE WHITE JEWELLERY CONSUMPTION, 2013



Source: GFMS, Thomson Reuters



Source: GFMS, Thomson Reuters

Thomson Reuters' estimates for the shares of gold, silver, platinum and palladium in Chinese white precious metals jewellery consumption in 2013 are shown in the above two graphs, in terms of volume and value respectively. The volume split is basis consumption (as opposed to fabrication) in fine metal terms at the trade level. The value estimates are calculated basis the average annual prices for each of the precious metals. They therefore do not take into account mark-ups by manufacturers, wholesalers and retailers over the fine metal values or the contribution of stones to final, retail jewellery prices.

usage (autocatalyst), rather than for jewellery fabrication. One of the clearest examples of this was the import of a combined 2.5 Moz (77.8 t) in 2008 and 2009. The bulk of these shipments coincided with the weakness in palladium prices. However, following the price reversal in late 2009 and 2010, we saw an astounding increase of over 250% in exports of palladium in 2010 from Hong Kong. The large swing in the Hong Kong trade figures suggested strong investment interest in the region.

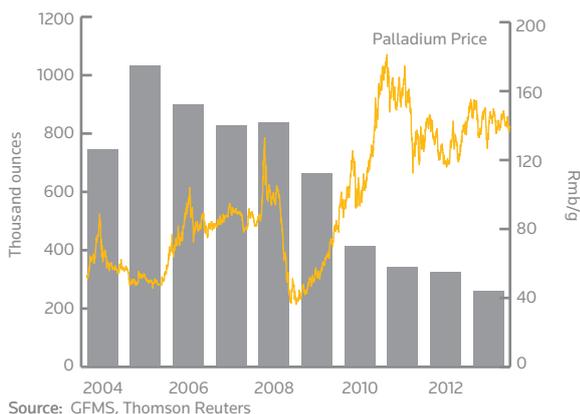
Another major reason behind the lack of significant demand for palladium jewellery in China can be traced back to 2008 and 2009, when PGM (and other precious) metals fell sharply amid the global financial crisis. There was a huge interest in bargain hunting in China, especially for platinum, when it was at a discount to gold. Unfortunately, some took advantage of the situation and sold palladium while marketing it as platinum, to gain the price differential. This fraud made the consumer market even more cautious and created a wary attitude towards palladium, as it may be difficult for the general public to distinguish the difference between platinum and palladium, even with the metal on hand.

Palladium jewellery scrap in China increased 15% to 0.24 Moz (7.5 t) in 2013, the fourth consecutive annual increase. We believe that the rise in palladium scrap can be attributed to a lack of consumer interest in palladium jewellery in China as some of this recycled material has been originating from the supply chain where slow moving stock is returned. In addition, palladium was also being sold to generate cash for other purchases, especially for gold during the height of demand. Interestingly, the amount of palladium jewellery scrap in China serviced over 90% of the local demand last year, up from 65% in 2012.

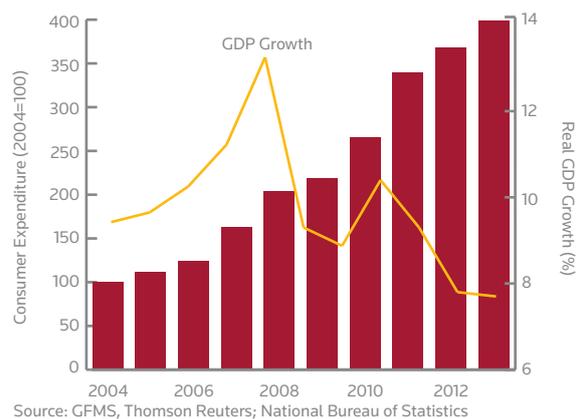
In a similar outcome to that of platinum (but on a larger scale), palladium jewellery demand has been weighed down by the solid popularity of gold jewellery. This has in turn enticed manufacturers to shift part, if not all, of their fabrication capacity to the latter. Adding to the above-mentioned poor consumer awareness, a negative prejudice against palladium and the absence of a regulated and transparent market also prevented an expansion of fabrication beyond its well established base in Shenzhen.

Turning to our forecast for this year, we expect palladium jewellery demand from China to continue declining. A lack of attention to the metal from Chinese consumers will continue, unless there are aggressive marketing campaigns focused on promoting palladium jewellery; but even then, it may take some time for many consumers to accept it as a viable precious metals alternative. Significant volatility and price upswings in palladium should also help gain traction in the metal, but it will most likely stir up interest from the investment side (physical bars, ETFs) first before generating any significant growth in jewellery demand. As mentioned, if palladium can be traded through the Shanghai Gold Exchange, this should also help the metal's exposure, but according to our sources, this does not appear to be on the horizon any time soon. We believe palladium will continue to do well in the industrial and investment spheres, but demand from the jewellery sector may continue to struggle.

CHINESE PALLADIUM JEWELLERY FABRICATION



CHINESE ECONOMIC INDICATORS



JAPANESE PLATINUM JEWELLERY FABRICATION



JAPAN

Japanese **platinum** jewellery fabrication increased by an estimated 2% last year, reaching 0.33 Moz (10.2 t) on a gross basis. This modest rise, the third increase in as many years, lifted platinum demand to a six-year high; however it should be noted that last year's offtake remained less than half of 2006 levels and is only a third of demand recorded at the start of the millennium.

The fact that Japanese platinum jewellery fabrication recorded a rise in 2013 was somewhat surprising given the 17% increase in the domestic bullion price last year. The size of this annual increase can be attributed to the weaker yen forcing the price higher. However, it would appear that an improving economy, and a strong recovery in the stock market, instilled a sense of improving sentiment among Japanese consumers, helping to boost consumer spending, and in turn, lifting retail sales (by 1% on 2012 levels according to the Ministry of Economic Trade and Industry) largely on one-off, luxury purchases.

The higher domestic platinum price was an obvious anchor on demand last year, with yen platinum prices in the first quarter to above JPY 5,000 per gramme for the first time since May 2010. This was to be the zenith in price for the year as prices thereafter followed gold's lead, slumping in mid April and then again retreating in late June; the latter correction saw platinum trade as low as yen 4,167 per gramme before recovering in the third quarter. Moreover, it was this second quarter price action that reinvigorated the market, as consumers rushed to purchase jewellery at the lower price levels, while the supply chain activity replenished inventory during the price dips. While higher prices in the first three months of 2013 dampened demand it should be noted that there was also some market share loss to gold in the lower price environment during this period. Platinum jewellery is still regarded as the most luxurious and high-end

among the precious metals and commands over 50% of all jewellery sold in Japan; some consumers, however, took the opportunity to replenish gold stocks that may have been previously liquidated.

In the second half of the year, fabrication, and indeed domestic consumption, was again impacted by price movements, with platinum demand shaped by the several price retracements that occurred during this time. In addition to price pressures, demand was also boosted by a rise in consumer spending towards the end of the year ahead of the planned rise in the rate of consumption tax from 5% to 8% which took place in April this year, the start of fiscal 2014. A notable increase in retail sales was witnessed across most industry segments with platinum jewellery (and indeed all jewellery segments) a beneficiary of this front-loading before the sales tax increase was introduced.

Demand growth was stronger among department stores last year, with this sector enjoying double-digit expansion, this growth offsetting a weaker growth profile from independent and traditional chains that had been more severely impacted by the economic doldrums of recent years. Jewellery demand growth was largely witnessed at the high-end of the market (consisting mainly of international brands) with offtake of yellow and indeed white gold winning market share at the lower price points (below JPY 100,000).

The bridal sector, although traditionally the most price inelastic and accounting for almost a fifth of the entire Japanese jewellery market, provides the foundation for Japanese consumption. Its demand increased only marginally last year as headwinds from declining marriages and reduced promotional spending affected consumption. Indeed with a declining population base and further falls in weddings per annum (reported to have fallen below 700,000 last year) traders have seen this vital segment of the market eroded and competition from other consumer segments, such as electronics, household appliances, or indeed other precious metals. Within the bridal market, which accounts for over 40% of all platinum jewellery sold in Japan, there was a mixed outcome in 2013. On one hand, wedding bands, which are dominated by Pt 850+ platinum (which has typically been used in over 70% of weddings) lost market share to white gold - a function of the lower price profile and its discount to platinum. Demand for platinum purchased by couples for engagement rings actually increased dominance in this segment though it should be noted that the overall pull on platinum for this segment is significantly less than for wedding bands.

In term of the purity segments, most of the growth last year was seen within the Pt 950 space, which now attracts over a third of the Japanese platinum market, boosted by demand from the wedding sector and cast jewellery designs. In contrast, demand for Pt 850 designs, chiefly used in the fabrication of machine made thick curb or Kihei chain (used for quasi-investment purposes) and thin pendant chain both lost some market share to higher purity items.

Looking briefly at fashion or design trends, there has been only minimal change from previous years, perhaps with the exception of wider usage of precious stones and gems. As in other consuming markets this measure has been introduced in a bid to reduce the metal's weight in order to maintain affordability and to sustain retail price points by limiting the use of the precious metals within the design. Retail sales are dominated by the bridal segment though among non-bridal items the pendant/necklace category is the next strongest category and would appear to be one area that expanded in 2013. In contrast, fashion rings and earrings were reportedly softer overall.

While the domestic retail market was supportive to both platinum and gold jewellery – the latter improving by 9% on 2012 levels – a moribund economy in parts of the western hemisphere and a slowdown in Chinese offtake saw demand for Japanese made jewellery retreat, with gross weight exports slipping by almost 30% in 2013, led principally by a decline in shipments to Hong Kong.

Turning to this year, demand in the first quarter benefitted from the consumption tax increase that took place on the 1st April. Field research at the time found that demand picked up sharply in the final weeks prior to the taxation change, boosting offtake for all jewellery categories, with many couples “front loading” or bringing forward their wedding purchases to capitalise

on the 3% saving. This was especially prevalent in the high-end segment (chiefly diamond set) though demand picked up across the board. To this end, there has been a notable drop off in consumption post the tax implementation and we would expect that offtake may be weaker in the second quarter as a result. What happens thereafter will largely depend on price trajectory, with higher prices likely to dampen demand, especially if gold declines, widening the disparity, between the two metals.

Turning to Japanese **palladium** jewellery fabrication demand, offtake remained broadly steady in 2013 reaching an estimated 50,000 ounces (1.6 t). Its primary use in Japanese jewellery fabrication remains as an alloying component, in both white gold and platinum. Demand for both these precious metals segments recorded modest growth last year, which in turn helped to support the use of palladium across this segment.

As a white metal used for jewellery in its own right, however, palladium is not widely recognised or accepted extensively in Japan as a standalone product, aside from a holding a niche clientele within the bridal market. Indeed, several large high-end department stores and specialised wedding outlets have moved in recent years to offer palladium as a more affordable alternative to that of white gold or platinum by introducing gemset Pd 900 and Pd 950 purity designs. In doing so they have been attempting to capture the budget conscious consumer or those looking for something different to symbolise their wedding, although in reality this remains a fraction of the wider bridal or self gifting market and is likely to remain so in the immediate future.

INDIA

Fabrication of **platinum** jewellery in India rose by 9% in 2013 to 0.07 Moz (2.1 t), accounting for about 3% of the global total, as against 2% in 2012. The pace of growth tapered after recording average annual growth of 44% during 2011 and 2012. The downward shift in the growth trajectory is attributed to the need to control inventory levels. This was actually witnessed across the entire jewellery retail industry, where the cost of financing increased as a result of the new regulations on the procurement of gold that were introduced mid-2013, as gold constitutes 70% to 80% of the raw material cost for the majority of retailers. It was therefore necessary for retailers to strike a balance between their inventory and sales, and so retailers reduced their inventories across the merchandise range. Very few replenished stock levels to previous holdings whether in gold or in platinum pieces. The national and regional chains that continued

JAPANESE JEWELLERY FABRICATION



to expand their stores used the existing stocks across other stores, thus reducing the inventory per outlet.

Consumption increased by 13% to 0.08 Moz (2.5 t), a far cry from the five year average growth rate of 28%. Customs duty of 10% played its part in mellowing demand, affecting sales in the second half. That said, consumption continued to be driven in the diamond jewellery categories as the luxury segment was less affected than gold last year. Furthermore, discussions with retailers revealed that potential conversions from gold to platinum pieces at the point of sale had dropped due to a decline in foot traffic to stores in the third and fourth quarters.

Tight consumer budgets, lower exchange value and higher making charges are factors that have also played a role in slowing down the domestic consumption of platinum jewellery. That said, a notable development is the increase in sales at tier two cities, attributed to the promotions by the Platinum Guild International. This, along with the explosion in growth of organised retail players, has the potential to further enhance the aspirations of consumers towards platinum jewellery, eventually leading to more first time purchases. On the other hand, repeat purchases, which are a key driver to sustain the volumes, have still not taken off to any great extent, suggesting that future growth potential, in the short term at least, is relatively constrained.

NORTH AMERICA

Platinum jewellery fabrication increased to 0.24 Moz (7.3 t) in 2013, up 5% from the previous year. This was the strongest annual increase in demand since 2010. The 4% decline in the annual average price of platinum was the primary driver behind this increase in demand. Improved economic conditions in the region and a decline

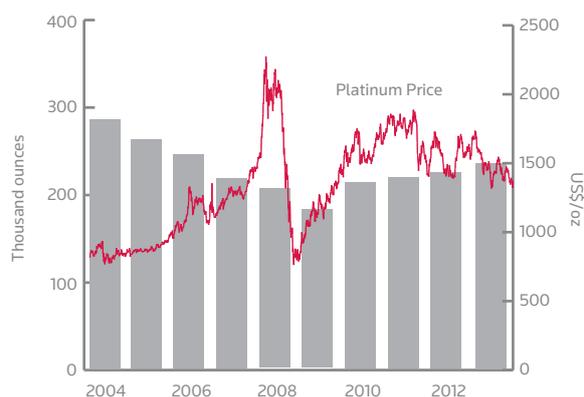
in the unemployment rate in the United States boosted consumer sentiment and expectations. Better consumer sentiment typically means consumers are more willing to spend on discretionary items like precious metals jewellery. The reduction in platinum price volatility boosted demand as well.

US imports of platinum jewellery for consumption rose 2% to total \$253 M in 2013. This 2% increase in the dollar value of imports combined with the 4% decline in platinum prices translated to an estimated 8% increase in fine platinum jewellery imports (in quantity terms) from foreign sources. Platinum jewellery imports are divided into four main categories: rings, necklaces, earrings, and other.

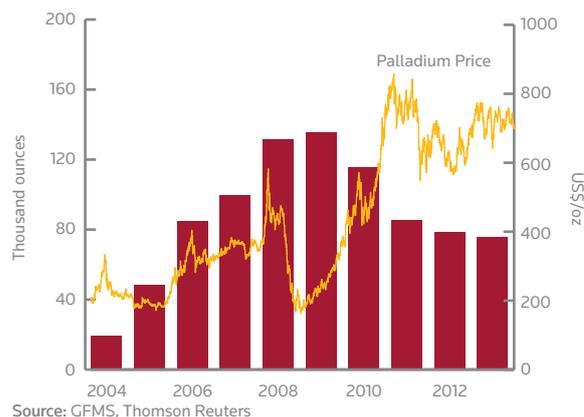
Rings, which accounted for 64% of imports in 2013, are sourced mostly from France, which is known for its high-value luxury jewellery brands. India is also a significant source for platinum rings, although the country's shipments only amounted to 14% of the value of French shipments last year. It should be noted that India is a less expensive alternative to French platinum rings. Platinum ring imports rose to \$161 M last year, up 18% from the previous year. While platinum jewellery imports are not a component of domestic fabrication demand, in the case of North America import trends serve as a partial indicator of local high end retail demand trends.

Stronger retail demand for jewellery helped boost domestic platinum jewellery fabrication last year. Jewellery store sales rose 8% in 2013 compared to 6% growth in 2012, according to US Census Bureau data. This boost in growth was mostly driven by improved consumer sentiment toward the domestic economy. This improvement translated to a greater propensity to spend on discretionary items and big ticket items. Field research confirms that local manufacturing of high-end

NORTH AMERICAN PLATINUM JEWELLERY FABRICATION



NORTH AMERICAN PALLADIUM JEWELLERY FABRICATION



platinum jewellery increased last year as well, with most businesses reporting higher production volumes relative to 2012.

In recent years, the 'millennials' generation has exhibited increased interest in platinum jewellery. This type of consumer tends to seek greater value in big purchases and is more adept at self-educating due to their active use of the internet. This generational trait has benefitted platinum jewellery demand, as it is a lesser known metal relative to gold and silver, which are more 'traditional' purchases. Platinum jewellery demand has historically been driven by large marketing campaigns, which can be costly. Using the internet has been a relatively inexpensive means of promoting platinum jewellery and millennials have responded positively.

Palladium jewellery fabrication fell to 0.08 Moz (2.3 t), down 4% from the previous year. This drop marked the fourth consecutive annual decline in jewellery fabrication for the region and demand in 2013 amounted to 56% of peak demand in 2009. The decrease in 2013 was mostly due to the 13% increase in annual average palladium prices. Palladium is mostly used as a cheaper alternative to platinum in wedding rings and is more common among men. It is also often used in emerald jewellery as platinum would break the gemstone.

EUROPE

European **platinum** jewellery fabrication dropped 10% in 2013, the sharpest annual decline since 2009. Overall, this was the sixth consecutive annual decline in demand from the region as it fell to 0.18 Moz (5.5 t) last year. While the decline in demand is part of a longer term downward trend being driven by weak economic conditions and little marketing for platinum jewellery in the region, there are other factors unique to last years' significant drop in platinum jewellery fabrication. A key contributor to lower demand was the fact that the price of gold fell below that of platinum. One other factor in some markets was superstition around getting married in a year ending in 13. This appears to have led to a drop off in demand for wedding rings in some countries.

Unlike much of the rest of the continent, platinum jewellery fabrication in **Switzerland** jumped higher in 2013, driven by strong performance of the watch industry. This is clearly in evidence in the hallmarking data for Swiss watch cases, which were up 139% for 2013 compared to the previous year. As a result, hallmarking surpassed the 2008 peak, with growth up by more than 60% in every month of 2013. As before, the Swiss brands

UK JEWELLERY HALLMARKING*



Source: GFMS, Thomson Reuters; London Assay Office, British Hallmarking Council
*Hallmarking of palladium compulsory from 1st January 2010

import watchcases from other countries and we allocate the fabrication of those imports to their origins.

Rather than this being due to a rise in the size of the watch industry this surge was more reflective of a regain of market share of platinum from gold that had been lost a few years ago when demand for rose gold and white gold picked up. Arguably, part of the reason for the shift from gold to platinum was an anti-corruption drive by the new Chinese leader, Xi Jinping, from late 2012 onwards, which has dampened demand for "ostentatious gift buying". The first quarter of 2014, meanwhile, has shown signs of demand dropping back significantly, although still remaining appreciably stronger than in 2012.

Last year, **Germany** witnessed a large decline in platinum jewellery fabrication, driven by a combination of reduced consumer interest and stronger competition from Swiss-based manufacturers. Platinum 600, an alloy, predominantly consisting of platinum (60%), palladium and iridium (a combined 35%) and other metals (5%), still witnessed reasonable demand levels last year, particularly within the youth segment. Platinum 600 has a comparable price range to that of 18-carat gold jewellery. Palladium fabrication saw a small increase last year mainly in the form of white gold jewellery.

Fabrication of platinum jewellery in the **United Kingdom** rose strongly in 2013, as shown by the 10% upturn in hallmarking, the strongest growth since 2004. This annual average however masks two distinct trends that took place in the first and second half of the year. The first half of 2013 saw demand continue to decline, not helped by the continued pressure on disposable income domestically. Later in the year, three factors came together to spark sharply higher demand, namely weaker dollar denominated platinum prices, a strengthening of the pound and an improving economy. Furthermore, field research indicates that there was a decline in

the number of weddings in 2013 due to an apparent reluctance by some to get married in a year ending with the number 13. This was a drag on platinum jewellery and an even more important factor impinging on demand for palladium, which continued to slide lower in 2013.

The gold jewellery industry in **France** continued to experience a decline in consumer interest with the large hyper markets in particular suffering the most. Consequently, driven by the decline in the gold price last year, platinum and palladium jewellery witnessed a decrease in usage as well due to reduced interest for price-led switching. This was coupled with a reduced number of weddings, leaving overall platinum jewellery fabrication 5% lower in 2013 than the prior year.

In **Italy**, the mass market in general does not tend to prefer platinum jewellery as it is considered too expensive, particularly now that it is trading at a premium to gold. In addition, Italy still suffers from a challenging economic climate which was reflected in a decline in marriages last year and in turn resulted in falling demand for wedding bands. As such, we estimate platinum jewellery fabrication to have declined by 5% last year.

In general, the preference for jewellery leans towards yellow gold, but on the back of fashion related developments, palladium usage sometimes increases as well. In case white gold is used, palladium has become the metal of choice driven by the abandonment of nickel usage in domestically sold jewellery due to increased skin irritations from this metal.

European **palladium** jewellery offtake rose 1% to 0.16 Moz (4.8 t) in 2013, marking the fourth consecutive increase. Europe was the only major regional demand category to post gains in palladium jewellery demand last year. The region's share to global fabrication has

now risen from under 10% in the mid-2000s to 27% last year.

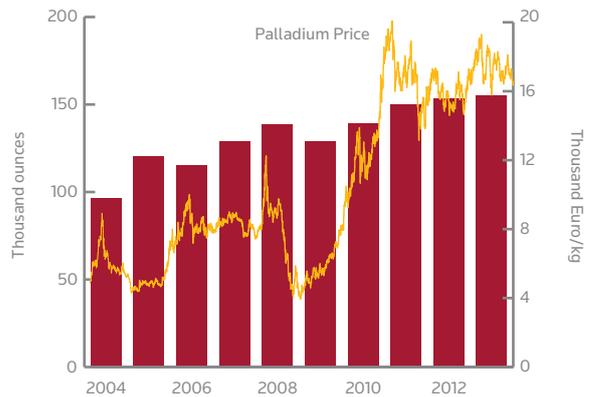
Palladium's role in jewellery has increased in importance over the years particularly as a non-visible but much cheaper alternative to platinum in gold-containing pieces. That trend continued last year but at a slower pace of growth due to the 15% decline of platinum's premium over palladium in combination with a somewhat slower growth in white gold on the back of the sharp correction in the gold price.

Germany, the UK, and Switzerland all recorded healthy increases in palladium jewellery fabrication last year, whereas fabrication in the Mediterranean countries such as Italy, France and Spain continued to contract, driven by either structural factors or a challenging economic environment. The reason for this clear split is a lack of material promotion and advertising of palladium-containing jewellery in Southern Europe. Consequently, the majority of customers in this area continue to prefer yellow gold jewellery pieces. Countering this trend, however, has been the increased preference of palladium jewellery in the bridal sector particularly in the same sex category, in turn supported by the continued expansion of European countries that recognize same-sex marriages. The latest example is the UK, which passed a law on that subject in March 2014 and France, which did so one year earlier, in 2013.

EUROPEAN PLATINUM JEWELLERY FABRICATION



EUROPEAN PALLADIUM JEWELLERY FABRICATION



DENTAL

— *Demand for palladium used in dental applications retreated 3% year-on-year to a seven-year low of 0.63 Moz (19.6 t).*

Dental demand for palladium in **Japan** is estimated to have fallen by close to 5% last year, to reach 0.26 Moz (8.2 t). This is largely determined by the level of demand for Kinpala 12 ('kin' is the Japanese for 'gold' and 'pala' is 'palladium' abbreviated), the primary alloy that is used in dental applications and contains 20% palladium. The amount of Kinpala is determined by the relationship between the 'set' price – the amount paid out by domestic health insurance, set periodically by the Ministry of Health, Labour and Welfare – and the actual material price (the cost of the alloy). When the cost of Kinpala is lower than the set price, demand by dentists tends to rise, and conversely, when the alloy price is higher than the set price, domestic consumption tends to decline.

For all of 2013, the Kinpala alloy cost was higher than the available subsidy, which further dampened demand for this alloy. In addition to the cost pressures, demand has also been swayed by the shift to more cosmetically pleasing ceramics (especially among the younger generations) and improving dental hygiene, which has limited the need for remedial work. Further declines are expected in coming years as changes to the subsidy program are introduced. A review of the subsidy program that will limit claims to the five front teeth was introduced from January this year with trade participants expecting further deregulation.

North American palladium dental offtake rose 3% in 2013, totalling 0.28 Moz (8.8 t). This was the highest level since 1999. North American palladium dental demand has been rising since 2006. Palladium is mostly used in porcelain crowns for its flexibility. A thin cup of palladium is fitted onto a back tooth, which is then surrounded by porcelain; porcelain imitates the appearance of surrounding teeth and the porcelain crown is increasingly preferred over gold in the North American market for its aesthetic appeal as well as the lower cost. Dental demand has been benefitting from an ageing population in the region, which often requires increased restorative dental care and this segment of the North American population actively seeks restorative dental treatment. The increase in palladium prices last year curbed demand growth, however.

Palladium dental fabrication in **Europe** continued to dwindle in 2013, falling by a significant 13% to roughly 72,000 ounces (2.2 t). The main driver behind this structural decline has been a combination of technological developments of alternative materials and a wider adoption of these lower valued materials, namely ceramics, chromium-copper alloys or in some cases even plastics. The softness in the gold price last year did not help either, in that, other than a drive out of precious metals in general, the incentive to switch to palladium based alloys somewhat eased.

DENTAL DEMAND

PALLADIUM		
(000) ounces	2012	2013
North America	274	282
Europe	83	72
Japan	278	263
Other regions	15	13
Total	650	630

Source: GFMS, Thomson Reuters

JAPANESE PALLADIUM DENTAL PRICING



Source: GFMS, Thomson Reuters; Ishifuku Metal Industry Co., Ltd and Ministry of Health, Labour and Welfare

DEMAND

CHEMICAL

- *Platinum demand from the chemical sector rebounded in 2013, growing 14% year-on-year, after an 8% contraction in 2012. Much of this was driven by robust growth in production capacity of paraxylene (PX).*
- *Palladium use in the chemical sector accelerated in 2013, growing 9% year-on-year.*

Demand for platinum and palladium from the chemical sector primarily arises from their use as catalysts. In the case of **platinum**, this is largely for the production of paraxylene (PX) and nitric acid, while it is also used in the curing of silicones. We estimate that platinum use in the chemical sector grew by 14% year-on-year in 2013, after a 9% contraction in 2012. This brings platinum use in the sector to a total of 0.50 Moz (15.4 t), the highest level of usage since our records began in 1999. Growth was especially strong in Japan (up 23% year-on-year) and in the Other regions category (up 20% year-on-year), with the latter driven by robust demand in China.

In terms of areas of usage, the biggest element of demand for platinum comes from the curing of silicones, a process that converts silicone from gel to solid form. The end product of this process is Pressure Sensitive Adhesives (PSA) used in tape applications and release liners, typically used in medical and hygiene applications. While platinum curing is the industry standard approach, the high cost of platinum poses a challenge to its growth compared to cheaper alternatives such as peroxide systems. We believe that platinum use in this area has been flat since 2010.

As a catalyst in the production of nitric acid (a key ingredient in the production of fertilisers, adipic acid and raw material in the manufacturing of plastics), we estimate platinum use to have increased by 11%. This was driven by strong growth in nitric acid demand globally (particularly in the production of non fertiliser products) which necessitated higher incremental catalyst gauze inventory. Meanwhile, platinum demand as a catalyst in PX grew almost threefold in 2013, reflecting the vast increment in catalyst installed as part of a pickup in growth of PX capacity globally. We estimate that PX capacity grew by 6% in 2013, after a brief hiatus in 2012, with substantial new capacity added in Other regions. Platinum demand use in PX is a direct function of the rate of growth in PX capacity. Uptake from Active Pharmaceutical Ingredients (APIs) further supported demand for platinum last year.

CHEMICAL DEMAND

PLATINUM

(000 ounces)	2012	2013
North America	87	98
Europe	112	113
Japan	36	44
Other regions	200	240
Total	435	495

PALLADIUM

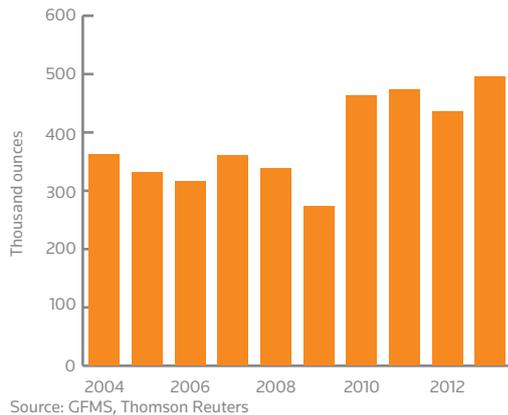
(000 ounces)	2012	2013
North America	56	59
Europe	160	164
Japan	22	23
Other regions	129	152
Total	366	398

Source: GFMS, Thomson Reuters

Palladium's usage in the chemical sector primarily derives from demand for catalysts in the production of vinyl acetate monomer (VAM), purified terephthalic acid (PTA), hydrogen peroxide and catchment gauzes in nitric acid synthesis. Palladium salts are also used for electroplating purposes. We estimate that palladium use in the chemical sector grew by 9% in 2013, an acceleration of the growth rate from the previous year. This brings palladium use in the chemical sector to a total of 0.40 Moz (12.4 t). PTA is an intermediate in the manufacturing of polyester whereas VAM is a key component in the production of polymers, textiles and plastics. An acceleration of PTA capacity growth, especially in China which has seen PTA capacity double in less than four years, has supported healthy demand growth for palladium as catalyst. This was the largest trigger for the healthy growth rate for palladium in chemical applications in 2013. In contrast, the capacity growth rate for VAM was a more modest 4% in 2013 compared to the rate of growth in PTA capacity. As palladium's use is largely a function of the rate of growth in manufacturing capacity, the amount of palladium catalyst in VAM remained largely unchanged from the previous year.

Palladium is also used as catchment gauze in the production of nitric acid to reduce losses of platinum and rhodium, which serve as catalysts. As mentioned above, nitric acid production grew strongly in 2013, which boosted demand for platinum as catalyst; this has further supported demand for palladium in its use as catchment gauze.

WORLD PLATINUM CHEMICAL DEMAND



ELECTRONICS

- **Growth in SSD technologies as well as a drop in PC desktop sales was behind the 14% drop in platinum demand last year to 0.17 Moz (5.3 t).**
- **Sharp declines in PC sales, weaker consumer spending, continued thrifting and increased electronic scrap saw demand for fresh palladium decline by 8% to 1.34 Moz (41.7 t) in 2013.**

The largest source of demand for **platinum** in the electronics sector comes from the hard disk drive (HDD) industry, where the metal is used as part of magnetic storage media to enhance data storage capabilities. Interestingly, platinum's sister PGM metal, ruthenium, is also used for this purpose, with its consumption significantly exceeding that of platinum.

Continuous thrifting and, more importantly, the expansion of new storage technologies, had a negative impact on overall platinum demand in 2013, causing a 14% drop to 0.17 Moz (5.3 t), the lowest level in our 15-year data series.

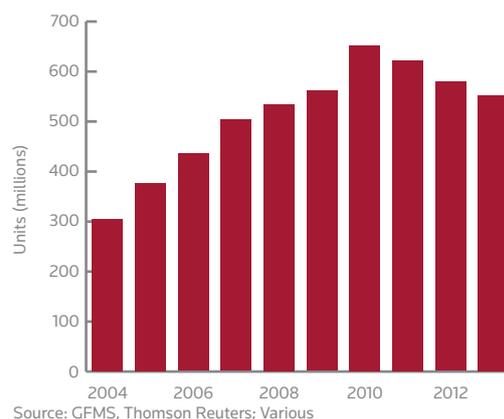
The key driver behind the decline in platinum offtake in the storage sector can be attributed to substitution by new technologies such as solid-state drives (SSDs). SSDs, which are based on semiconductor storage media instead of magnetic media, contain no platinum and are mainly used in tablets and smartphones. They offer faster data access, reduced power usage and higher reliability compared to HDDs. With the rapid growth in portable device and super thin notebook (ultrabook) offerings, SSDs have been infringing substantially on traditional notebook territory. In addition, consumers' preferences for light and thin mobile devices are likely to add further support to SSD demand. Last year hard drive shipments declined for the third consecutive year, falling by 5% to 512 million units.

Interestingly however, increased miniaturisation, boosted by SSD technology, has in turn created a new source of demand for platinum in the form of large scale (often third party) storage space. With the average quantity of data held per device increasing, along with the average number of devices owned per person, demand for a safe and long term solution to storage has been on the increase. Therefore HDDs, both in the current shape and fortified with the introduction of new technologies, such as Shingled Magnetic Recording (SMR), Heat-Assisted Magnetic Recording (HARM), and helium filled drives (all of which are expected to be launched in the next decade) will dominate over SSD for the foreseeable future. Their use in the business sector, the enterprise space, cloud storage and big data analytics will continue to be unrivalled as the most cost effective storage solution.

Additionally, thrifting continued to affect platinum's electronics demand last year, with some uses substituting ruthenium at the expense of platinum. A long-standing industry drive for cost reduction has resulted in a cut in precious metals content by HDD producers. Over the last decade alone, average platinum loadings per disk have declined by 60%, a period in which HDD shipments have virtually doubled.

Demand for **palladium** in the electronics sector declined by an estimated 8% last year to reach a total of 1.34 Moz (5.3 t), its lowest level in four years. The main source of demand in the electronics sector comes from multi-layered ceramic capacitors (MLCCs), where palladium or palladium-silver form a conductive electrode material sandwiched between ceramic wafers; and hybrid integrated circuits (whose vast arrays of electronic components are linked by thick film silver-palladium tracks).

GLOBAL HARD DISK DRIVE SHIPMENTS



The aforementioned applications are used in a wide range of end-use products, such as computers, digital televisions, automotive vehicles and, increasingly, tablets and smartphones. Much of last year's palladium weakness was attributed to this shift towards portable devices and away from traditional PCs, with PC shipments declining by a sharp 10% to 328 million units by end-2013. Additionally, demand for digital televisions also declined last year, particularly in the second half of the year when China, the largest market for these products, ended its year-long Energy Efficient Subsidy programme, reducing the country's overall consumption of electrical appliances.

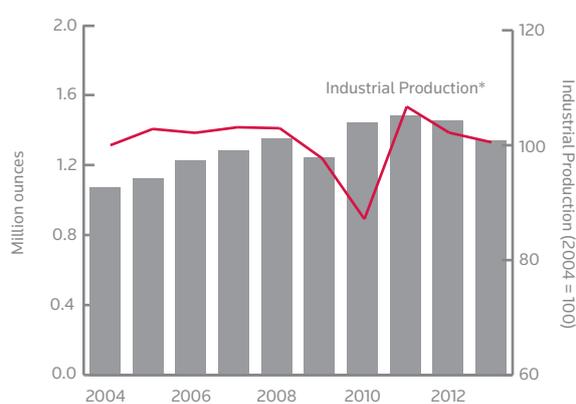
One of the largest areas of weakness for palladium last year can be explained by the growing flow of metal reclaimed in the process of electrical and electronic waste recycling. Tighter environmental regulations on electronic waste disposal, improving collection and recycling networks plus a gradually more environmentally-friendly legal framework in the developing world, have seen rising secondary flows of palladium coming back to the market. With hundreds of millions of electronic products produced and scrapped each year, e-waste has become an "urban mine" for a wide variety of metals. Old mobile phones have in particular proven to be a rich source of metals, with a palladium content estimated at 8 mg per set, while old computers and notebooks have about 80 mg per unit. The higher prices for precious and base metals provide further stimulus to recycling.

Substitution continued to pose a threat to palladium demand last year, especially in areas where cheap alternatives such as nickel had already claimed a decent share of the components market. That said, at this stage, palladium cannot be fully substituted in some applications, as the performance and reliability of low

cost materials, although having improved significantly, still falls short. This is of particular importance in the case of electronic components used in the automotive industry, which requires unquestionable quality and reliability for safety reasons. However, in light of last year's muted growth in this sector of 0.6% (in comparison to 2012's annual growth of 6.3%), palladium demand went unsupported.

Nevertheless, in 2013 palladium continued to benefit from its growing use as a substitute for expensive gold in electroplating compounds. Its use in palladium-copper bonding wire technology was responsible (on our estimation) for almost 30% of the entire bonding wire market by end-2013. Meanwhile, despite aggressive growth in shipment sales of smartphones and tablets growing by 5.1% and 68% respectively, the smaller loadings per unit were unable to offset the losses created by the fall in traditional PC shipment sales.

GLOBAL PALLADIUM ELECTRONICS DEMAND



Source: GFMS, Thomson Reuters; IMF
*IMF Advanced economies

ELECTRONICS DEMAND

PLATINUM

(000 ounces)	2012	2013
North America	27	25
Europe	17	14
Japan	25	22
Other regions	127	109
Total	196	169

PALLADIUM

(000 ounces)	2011	2012
North America	335	307
Europe	123	113
Japan	400	366
Other regions	600	550
Total	1,458	1,337

Source: GFMS, Thomson Reuters

GLASS

- **Platinum offtake from the glass industry totalled 0.17 Moz (5.1 t) in 2013, down 49% from the previous year. Japan and Singapore were net suppliers of platinum while demand from Korea and Taiwan increased last year.**

Platinum is used primarily in manufacturing equipment for the production of display glass, glass fibre, and speciality glass because of its ability to withstand high temperatures and to not react with the molten material. In display glass, which refers to LCD glass and aluminosilicate cover glass, platinum-rhodium alloy coats the melting tank and feeder path equipment. Glass fibre is produced by pouring molten glass through a platinum-rhodium 'bushing,' or vessel populated with tiny holes, to produce strands. Platinum demand from the glass industry is mostly driven by net additions to production capacity.

Platinum used in display glass refers primarily to the production of thin-film-transistor liquid-crystal display (TFT-LCD) glass. This type of glass is used in televisions, computers, and mobile devices. In recent years, however, mobile device manufacturers have been increasingly moving toward the use of aluminosilicate cover glass and away from LCD glass due to the former's greater durability. Many LCD glassmakers have been converting their LCD glass manufacturing equipment into cover glass equipment. Cover glass is thinner than LCD glass, therefore this conversion allows relatively more glass to be produced by a given level of installed capacity. Consequently, production capacity expansion has slowed, which has been negative for platinum demand.

LCD and aluminosilicate production capacity growth slowed in 2013, which translated to a 62% year-on-year decline in platinum offtake to 0.09 Moz (2.8 t) from this source of glass demand. Korea was the largest user of platinum in this segment last year, accounting for over 100% of net LCD demand, a material difference from 2012 when Korea only accounted for 21% of net demand. Moreover, Korean demand exceeded world demand because it gained market share from Japan, which was a net supplier of 0.09 Moz (2.7 t) of platinum to the glass industry in 2013. Japanese glassmakers dismantled large glass tanks in Japan due to inefficiencies and high production and power costs within the country and used this platinum in newly assembled, smaller tanks in Korea and, to a lesser extent, Taiwan. Singapore was also a net supplier of platinum to the market in 2013, due to the closure of glass plants that were operating at protracted

GLASS DEMAND

PLATINUM

(000 ounces)	2012	2013
North America	13	5
Europe	33	8
Japan	84	-78
Other regions	193	230
Total	323	165

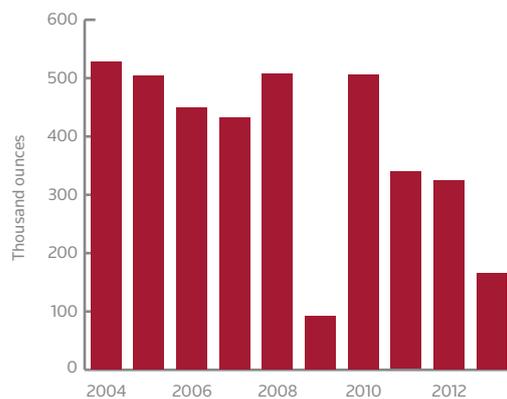
Source: GFMS, Thomson Reuters

losses. Going forward, glassmakers are expected to continue to advance efforts in producing thinner glass and converting LCD production into aluminosilicate cover glass production, both of which are trends that would be negative for annual platinum offtake in the medium term. Strong growth in Chinese capacity, however, may offset these factors.

There was very little increase in glass fibre installed capacity in 2013, with the largest capacity addition taking place in the Middle East. This translated to a 29% decline in offtake to 0.09 Moz (2.7 t) of platinum demand for glass fibre manufacturing equipment. Glass fibre is mostly used as a reinforcement material and is favoured for its light weight and low cost relative to competing products such as carbon fibre. Glass fibre is used in thousands of end-use applications across most industries, such as construction, transportation, and electronics. Growth in glass fibre has exceeded world economic growth for over a decade due to high replacement demand of traditional materials.

Platinum is also used in the production of speciality glass such as optical glass and solar glass. The photovoltaics industry is a growing source of demand for the glass industry, which has benefitted platinum demand in recent years. Demand from this segment was however stable last year.

GLOBAL PLATINUM GLASS DEMAND



Source: GFMS, Thomson Reuters

PETROLEUM

— *Global demand slumped by 46% year-on-year to 0.99 Moz (3.1 t). This was on the back of refinery closures in Japan and Europe and a relative dearth of new capacity in emerging markets.*

Developments in oil refining capacity and specifically new catalytic reforming and isomerisation capacity remained the largest elements of platinum demand within the petroleum industry.

The single most important factor behind the slump in platinum demand, which we show on a net basis, is the lack of new refineries in our '**Other regions**' category. As a result, demand from this sector dropped to the lowest level in the decade over which we have been covering this sector. A key cause of this is that there are two factors dragging on the growth in net **Chinese** refining capacity.

First is the weakness in domestic oil demand, which has led to overcapacity and lower utilisation rates in China. Second, the closure of a number of small, so called teapot refineries has weighed on capacity growth. It should be noted though that this was partially offset by the fact that legislation requiring refineries below 40,000 barrels per day to be closed by the end of 2013 sparked some to expand rather than to close. Future prospects also seem set for limited growth there, as in 2013 China's Ministry of Environment put a temporary ban on the approval of new refineries and expansion of current refineries in reaction to companies missing emissions targets in 2011 and 2012.

Meanwhile in **Japan**, we believe that there was an outright contraction in platinum demand as the closures of refineries led to a contraction in both reforming and isomerisation capacity in the country. Consequently, more of the metal was returned to the market than was used by Japan's refineries. This is partly due to refiners' attempts to meet regulations, which require a minimum Crude Distillation Unit (CDU)-cracking ratio of 13%, and which was passed in 2010 but did not come into force until the end of March 2014. This did not stipulate the closure of capacity, but refiners have generally opted not to make expensive capital investment to meet the rules and consequently have chosen to close capacity ahead of the deadline, especially as domestic oil demand struggles.

In a similar vein, refining capacity in **Europe** has also dropped as capacity in the region has shrunk due to weak end-use demand and squeezed margins. However,

PETROLEUM DEMAND

PLATINUM

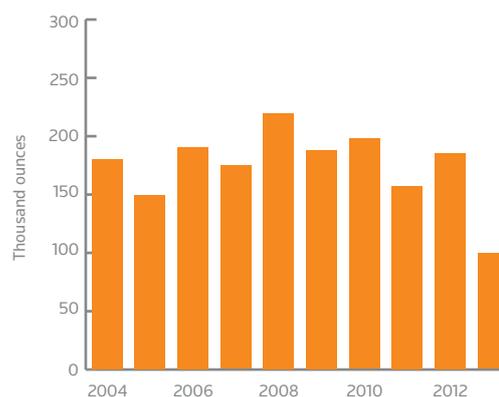
(000 ounces)	2012	2013
North America	46	52
Europe	25	6
Japan	9	-12
Other regions	104	52
Total	185	99

Source: GFMS, Thomson Reuters

unlike Japan demand in the region is at least positive as replacement demand outweighed closures.

North America was the one region where demand was stronger in 2013 as it rose to a four-year high. This was supported by strong demand in the United States, which was helped by high utilisation rates, due to strong refining margins in the region rather than new capacity.

GLOBAL PLATINUM PETROLEUM DEMAND



Source: GFMS, Thomson Reuters

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APPENDIX 1 - PLATINUM SUPPLY AND DEMAND 2004-2013

(000 ounces)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mine production										
South Africa	4,961	5,054	5,447	5,075	4,676	4,570	4,729	4,729	4,187	4,272
Russia	840	960	948	917	830	793	785	818	804	765
Canada	243	233	228	204	227	170	127	270	220	217
United States	131	125	138	120	115	123	111	119	120	122
Zimbabwe	148	160	167	169	180	229	286	341	335	409
Others	91	91	95	98	129	130	125	117	138	156
Total mine production	6,413	6,624	7,024	6,584	6,156	6,016	6,164	6,394	5,805	5,941
Autocatalyst scrap										
North America	495	502	510	527	556	400	449	474	412	440
Europe	150	174	199	247	295	258	298	346	311	342
Japan	60	55	56	63	68	55	61	54	57	59
Other regions	65	72	64	66	80	69	80	102	120	142
Total autocatalyst scrap	770	804	829	903	999	782	889	977	901	982
Old jewellery scrap										
North America	6	7	9	22	41	33	12	10	9	10
Europe	4	5	7	9	11	12	10	8	8	7
Japan	161	193	257	418	579	273	281	344	257	235
China	58	135	74	90	273	129	145	161	150	151
Other regions	1	1	1	1	2	1	2	3	3	3
Total old jewellery scrap	230	340	349	541	906	447	450	526	427	406
SUPPLY	7,413	7,768	8,201	8,028	8,061	7,245	7,502	7,897	7,132	7,329
Autocatalyst demand										
North America	785	745	752	760	544	339	376	443	447	458
Europe	1,570	1,803	1,912	2,065	1,805	1,279	1,422	1,512	1,311	1,220
Japan	641	582	549	511	517	309	368	303	322	286
China	175	177	220	204	187	189	221	197	184	248
Other regions	314	401	454	477	448	386	548	613	682	701
Total autocatalyst demand	3,485	3,708	3,886	4,017	3,502	2,502	2,936	3,068	2,947	2,913
Jewellery demand										
North America	286	262	244	217	205	181	212	218	224	235
Europe	267	255	240	251	239	212	204	199	196	176
Japan	666	658	669	482	249	270	262	283	320	327
China	1,135	923	835	877	910	1,601	1,180	1,302	1,423	1,437
Other regions	45	37	38	41	45	52	69	85	105	110
Total jewellery demand	2,400	2,134	2,026	1,868	1,647	2,316	1,927	2,087	2,268	2,286
Chemical demand										
North America	105	98	88	94	75	56	95	91	87	98
Europe	87	75	60	74	97	72	118	127	112	113
Japan	30	27	27	29	45	28	58	39	36	44
Other regions	138	131	140	163	121	116	191	216	200	240
Total chemical demand	361	331	315	361	338	272	463	473	435	495

APPENDIX 1 - PLATINUM SUPPLY AND DEMAND 2004-2013

(000 ounces)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Electronics demand										
North America	100	98	95	88	58	46	40	31	27	25
Europe	50	44	43	39	29	25	25	18	17	14
Japan	85	88	90	60	44	38	39	31	25	22
Other regions	110	137	177	210	161	133	144	139	127	109
Total electronics demand	345	366	404	397	292	243	248	219	196	169
Glass demand										
North America	(13)	22	(33)	(5)	3	7	(7)	12	13	5
Europe	14	12	49	(11)	(6)	(16)	15	9	33	8
Japan	327	294	168	40	114	31	142	108	84	(78)
Other regions	200	175	265	407	396	70	355	209	193	230
Total glass demand	528	503	449	431	507	91	505	338	323	165
Petroleum demand										
North America	63	43	66	60	31	60	34	34	46	52
Europe	59	37	55	45	41	43	39	21	25	6
Japan	(9)	7	19	13	26	9	22	9	9	(12)
Other regions	66	62	50	57	120	75	103	92	104	52
Total petroleum demand	180	149	190	174	219	187	197	157	185	99
Retail investment										
North America	30	30	34	39	105	131	40	53	87	55
Europe	1	2	2	15	30	38	10	17	13	10
Japan	15	(13)	(60)	(32)	317	142	37	206	148	62
Other regions	3	3	3	1	0	3	8	36	34	34
Total retail investment	49	22	(22)	23	452	313	95	312	282	161
Other industrial demand										
North America	212	210	208	208	196	166	186	187	200	206
Europe	154	154	169	178	180	152	158	160	162	161
Japan	43	47	50	52	53	42	51	46	57	55
Other regions	35	41	48	57	62	73	98	112	127	134
Total other industrial demand	443	452	476	494	491	434	493	505	547	555
DEMAND	7,790	7,665	7,724	7,765	7,449	6,359	6,863	7,159	7,183	6,843
Physical Surplus/(Deficit)	(377)	103	477	263	612	886	640	738	(51)	486
Identifiable stock movements										
Russia	165	0	0	0	0	0	0	0	0	0
Stillwater	0	0	0	0	0	0	0	0	0	0
US National Defense Stockpile	0	13	0	0	0	0	0	0	0	0
Industry stocks	0	0	0	(200)	(300)	665	0	0	0	(350)
Exchange Traded Funds	0	0	0	(194)	(102)	(384)	(574)	(145)	(237)	(892)
Sub total - stock movements	165	13	0	(394)	(402)	281	(574)	(145)	(237)	(1,242)
Net Balance	(212)	115	477	(132)	210	1,167	65	593	(288)	(756)

APPENDIX 2 - PALLADIUM SUPPLY AND DEMAND 2004-2013

(000 ounces)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mine production										
South Africa	2,468	2,591	2,857	2,677	2,365	2,465	2,636	2,682	2,392	2,353
Russia	2,841	3,133	3,164	3,049	2,701	2,677	2,722	2,704	2,627	2,580
Canada	600	502	558	570	524	281	352	560	557	530
United States	439	427	466	425	384	407	374	399	396	404
Zimbabwe	119	135	135	132	139	177	222	261	256	314
Others	164	165	176	197	268	299	296	252	271	260
Total mine production	6,630	6,953	7,355	7,050	6,381	6,305	6,602	6,857	6,500	6,442
Autocatalyst scrap										
North America	325	432	521	652	794	705	831	961	922	1,025
Europe	94	116	139	200	274	241	306	358	317	334
Japan	44	49	49	59	71	70	84	79	84	93
Other regions	24	30	35	39	50	46	64	84	104	149
Total autocatalyst scrap	487	627	744	950	1,190	1,062	1,285	1,482	1,426	1,601
Old jewellery scrap										
North America	0	0	1	2	4	3	1	2	3	4
Europe	4	5	6	7	9	9	10	12	12	11
Japan	37	38	47	64	84	25	32	39	29	28
China	29	56	177	108	87	71	129	190	209	240
Other regions	3	3	4	5	8	9	7	7	7	7
Total old jewellery scrap	74	103	234	185	192	116	179	248	260	290
SUPPLY	7,192	7,683	8,333	8,185	7,762	7,484	8,066	8,588	8,186	8,333
Autocatalyst demand										
North America	1,531	1,477	1,540	1,584	1,276	884	1,217	1,312	1,563	1,636
Europe	1,200	1,119	1,211	1,262	1,182	1,056	1,387	1,558	1,545	1,524
Japan	712	750	869	896	925	690	823	726	883	856
China	223	250	373	481	479	785	1,040	1,094	1,224	1,390
Other regions	348	394	439	567	623	609	810	846	856	865
Total autocatalyst demand	4,014	3,990	4,433	4,790	4,484	4,024	5,277	5,535	6,070	6,271
Jewellery demand										
North America	19	48	85	99	131	135	115	85	78	75
Europe	96	120	115	129	138	128	139	150	153	155
Japan	110	113	121	98	64	48	48	45	50	50
China	745	1,030	896	825	837	663	412	341	322	257
Other regions	52	52	64	130	125	135	85	55	48	42
Total jewellery demand	1,022	1,363	1,281	1,281	1,295	1,110	798	676	651	579
Dental demand										
North America	203	201	205	226	237	249	262	271	274	282
Europe	81	81	80	82	87	91	97	91	83	72
Japan	425	303	294	322	322	305	289	283	278	263
Other regions	12	12	12	15	15	16	16	15	15	13
Total dental demand	721	598	591	645	661	661	664	660	650	630

APPENDIX 2 - PALLADIUM SUPPLY AND DEMAND 2004-2013

(000 ounces)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Chemical demand										
North America	42	46	50	59	54	43	55	55	56	59
Europe	140	147	164	196	184	157	162	164	160	164
Japan	17	18	21	23	22	18	22	22	22	23
Other regions	88	101	166	98	93	82	111	114	129	152
Total chemical demand	286	311	401	376	353	300	349	356	366	398
Electronics demand										
North America	251	261	284	290	304	285	333	341	335	307
Europe	105	110	115	120	120	105	123	126	123	113
Japan	275	290	320	345	365	340	397	407	400	366
Other regions	435	460	500	520	558	510	595	611	600	550
Total electronics demand	1,066	1,121	1,219	1,275	1,347	1,240	1,447	1,485	1,458	1,336
Retail investment										
North America	125	253	132	35	68	140	68	47	27	30
Europe	2	2	3	10	26	30	12	14	10	8
Japan	0	0	0	0	0	0	0	0	0	0
Other regions	0	0	0	0	0	0	0	0	0	0
Total retail investment	127	255	135	45	94	170	80	61	37	38
Other industrial demand										
North America	52	51	57	62	58	52	68	71	77	78
Europe	14	14	16	16	17	16	19	19	18	18
Japan	9	8	8	8	8	8	8	8	8	8
Other regions	4	4	5	5	4	4	4	4	5	5
Total other industrial demand	78	78	86	91	88	80	100	103	109	109
DEMAND	7,314	7,716	8,145	8,504	8,323	7,585	8,715	8,875	9,340	9,361
Physical Surplus/(Deficit)	(123)	(34)	188	(319)	(561)	(101)	(650)	(287)	(1,154)	(1,029)
Identifiable stock movements										
Russia	500	1,400	1,550	900	1,280	1,100	800	800	400	200
Stillwater	375	439	63	0	0	0	0	0	0	0
US National Defense Stockpile	38	19	0	0	0	0	0	0	0	0
Industry stocks	150	0	0	0	0	0	0	0	0	(150)
Exchange Traded Funds	0	0	0	(280)	(381)	(507)	(1,089)	532	(448)	(0)
Sub total - stock movements	1,064	1,858	1,613	620	899	593	(289)	1,332	(48)	50
Net Balance	941	1,824	1,802	301	338	492	(939)	1,045	(1,202)	(979)

APPENDIX 3 - PLATINUM SUPPLY AND DEMAND 2004-2013

(tonnes)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mine production										
South Africa	154.3	157.2	169.4	157.9	145.4	142.1	147.1	147.1	130.2	132.9
Russia	26.1	29.9	29.5	28.5	25.8	24.7	24.4	25.4	25.0	23.8
Canada	7.6	7.2	7.1	6.4	7.1	5.3	4.0	8.4	6.9	6.8
United States	4.1	3.9	4.3	3.7	3.6	3.8	3.5	3.7	3.7	3.8
Zimbabwe	4.6	5.0	5.2	5.3	5.6	7.1	8.9	10.6	10.4	12.7
Others	2.8	2.8	3.0	3.0	4.0	4.1	3.9	3.6	4.3	4.9
Total mine production	199.5	206.0	218.5	204.8	191.5	187.1	191.7	198.9	180.5	184.8
Autocatalyst scrap										
North America	15.4	15.6	15.9	16.4	17.3	12.4	14.0	14.8	12.8	13.7
Europe	4.7	5.4	6.2	7.7	9.2	8.0	9.3	10.8	9.7	10.6
Japan	1.9	1.7	1.7	2.0	2.1	1.7	1.9	1.7	1.8	1.8
Other regions	2.0	2.2	2.0	2.1	2.5	2.1	2.5	3.2	3.7	4.4
Total autocatalyst scrap	24.0	25.0	25.8	28.1	31.1	24.3	27.6	30.4	28.0	30.5
Old jewellery scrap										
North America	0.2	0.2	0.3	0.7	1.3	1.0	0.4	0.3	0.3	0.3
Europe	0.1	0.1	0.2	0.3	0.4	0.4	0.3	0.2	0.2	0.2
Japan	5.0	6.0	8.0	13.0	18.0	8.5	8.7	10.7	8.0	7.3
China	1.8	4.2	2.3	2.8	8.5	4.0	4.5	5.0	4.7	4.7
Other regions	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Total old jewellery scrap	7.1	10.6	10.8	16.8	28.2	13.9	14.0	16.4	13.3	12.6
SUPPLY	230.6	241.6	255.1	249.7	250.7	225.3	233.3	245.6	221.8	228.0
Autocatalyst demand										
North America	24.4	23.2	23.4	23.6	16.9	10.5	11.7	13.8	13.9	14.2
Europe	48.8	56.1	59.5	64.2	56.2	39.8	44.2	47.0	40.8	38.0
Japan	19.9	18.1	17.1	15.9	16.1	9.6	11.5	9.4	10.0	8.9
China	5.4	5.5	6.8	6.4	5.8	5.9	6.9	6.1	5.7	7.7
Other regions	9.8	12.5	14.1	14.8	13.9	12.0	17.1	19.1	21.2	21.8
Total autocatalyst demand	108.4	115.3	120.9	124.9	108.9	77.8	91.3	95.4	91.7	90.6
Jewellery demand										
North America	8.9	8.1	7.6	6.8	6.4	5.6	6.6	6.8	7.0	7.3
Europe	8.3	7.9	7.5	7.8	7.4	6.6	6.3	6.2	6.1	5.5
Japan	20.7	20.5	20.8	15.0	7.7	8.4	8.1	8.8	10.0	10.2
China	35.3	28.7	26.0	27.3	28.3	49.8	36.7	40.5	44.3	44.7
Other regions	1.4	1.2	1.2	1.3	1.4	1.6	2.1	2.6	3.3	3.4
Total jewellery demand	74.6	66.4	63.0	58.1	51.2	72.0	59.9	64.9	70.5	71.1
Chemical demand										
North America	3.3	3.1	2.7	2.9	2.3	1.7	3.0	2.8	2.7	3.1
Europe	2.7	2.3	1.9	2.3	3.0	2.2	3.7	4.0	3.5	3.5
Japan	0.9	0.8	0.8	0.9	1.4	0.9	1.8	1.2	1.1	1.4
Other regions	4.3	4.1	4.4	5.1	3.8	3.6	5.9	6.7	6.2	7.5
Total chemical demand	11.2	10.3	9.8	11.2	10.5	8.5	14.4	14.7	13.5	15.4

APPENDIX 3 - PLATINUM SUPPLY AND DEMAND 2004-2013

(tonnes)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Electronics demand										
North America	3.1	3.0	2.9	2.7	1.8	1.4	1.3	1.0	0.8	0.8
Europe	1.6	1.4	1.3	1.2	0.9	0.8	0.8	0.6	0.5	0.4
Japan	2.6	2.7	2.8	1.9	1.4	1.2	1.2	1.0	0.8	0.7
Other regions	3.4	4.3	5.5	6.5	5.0	4.1	4.5	4.3	3.9	3.4
Total electronics demand	10.7	11.4	12.6	12.3	9.1	7.5	7.7	6.8	6.1	5.3
Glass demand										
North America	(0.4)	0.7	(1.0)	(0.1)	0.1	0.2	(0.2)	0.4	0.4	0.2
Europe	0.4	0.4	1.5	(0.3)	(0.2)	(0.5)	0.5	0.3	1.0	0.2
Japan	10.2	9.1	5.2	1.2	3.5	1.0	4.4	3.4	2.6	(2.4)
Other regions	6.2	5.5	8.2	12.7	12.3	2.2	11.0	6.5	6.0	7.2
Total glass demand	16.4	15.7	14.0	13.4	15.8	2.8	15.7	10.5	10.1	5.1
Petroleum demand										
North America	2.0	1.3	2.0	1.9	1.0	1.9	1.0	1.1	1.4	1.6
Europe	1.8	1.2	1.7	1.4	1.3	1.3	1.2	0.7	0.8	0.2
Japan	(0.3)	0.2	0.6	0.4	0.8	0.3	0.7	0.3	0.3	(0.4)
Other regions	2.1	1.9	1.6	1.8	3.7	2.3	3.2	2.9	3.2	1.6
Total petroleum demand	5.6	4.6	5.9	5.4	6.8	5.8	6.1	4.9	5.7	3.1
Retail investment										
North America	0.9	0.9	1.0	1.2	3.3	4.1	1.3	1.6	2.7	1.7
Europe	0.0	0.1	0.1	0.5	0.9	1.2	0.3	0.5	0.4	0.3
Japan	0.5	(0.4)	(1.9)	(1.0)	9.9	4.4	1.1	6.4	4.6	1.9
Other regions	0.1	0.1	0.1	0.0	0.0	0.1	0.2	1.1	1.1	1.1
Total retail investment	1.5	0.7	(0.7)	0.7	14.1	9.8	3.0	9.7	8.8	5.0
Other industrial demand										
North America	6.6	6.5	6.5	6.5	6.1	5.2	5.8	5.8	6.2	6.4
Europe	4.8	4.8	5.3	5.5	5.6	4.7	4.9	5.0	5.0	5.0
Japan	1.3	1.5	1.6	1.6	1.6	1.3	1.6	1.4	1.8	1.7
Other regions	1.1	1.3	1.5	1.8	1.9	2.3	3.1	3.5	3.9	4.2
Total other industrial demand	13.8	14.0	14.8	15.4	15.3	13.5	15.3	15.7	17.0	17.3
DEMAND	242.3	238.4	240.2	241.5	231.7	197.8	213.5	222.7	223.4	212.8
Physical Surplus/(Deficit)	(11.7)	3.2	14.9	8.2	19.0	27.5	19.9	22.9	(1.6)	15.1
Identifiable stock movements										
Russia	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stillwater	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
US National Defense Stockpile	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Industry stocks	0.0	0.0	0.0	(6.2)	(9.3)	20.7	0.0	0.0	0.0	(10.9)
Exchange Traded Funds	0.0	0.0	0.0	(6.0)	(3.2)	(11.9)	(17.9)	(4.5)	(7.4)	(27.7)
Sub total - stock movements	5.1	0.4	0.0	(12.3)	(12.5)	8.7	(17.9)	(4.5)	(7.4)	(38.6)
Net Balance	(6.6)	3.6	14.9	(4.1)	6.5	36.3	2.0	18.5	(9.0)	(23.5)

APPENDIX 4 - PALLADIUM SUPPLY AND DEMAND 2004-2013

(tonnes)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mine production										
South Africa	76.8	80.6	88.9	83.3	73.6	76.7	82.0	83.4	74.4	73.2
Russia	88.4	97.4	98.4	94.8	84.0	83.3	84.7	84.1	81.7	80.2
Canada	18.7	15.6	17.3	17.7	16.3	8.7	11.0	17.4	17.3	16.5
United States	13.7	13.3	14.5	13.2	11.9	12.7	11.6	12.4	12.3	12.6
Zimbabwe	3.7	4.2	4.2	4.1	4.3	5.5	6.9	8.1	8.0	9.8
Others	5.1	5.1	5.5	6.1	8.3	9.3	9.2	7.8	8.4	8.1
Total mine production	206.2	216.3	228.8	219.3	198.5	196.1	205.4	213.3	202.2	200.4
Autocatalyst scrap										
North America	10.1	13.4	16.2	20.3	24.7	21.9	25.9	29.9	28.7	31.9
Europe	2.9	3.6	4.3	6.2	8.5	7.5	9.5	11.1	9.8	10.4
Japan	1.4	1.5	1.5	1.8	2.2	2.2	2.6	2.5	2.6	2.9
Other regions	0.7	0.9	1.1	1.2	1.6	1.4	2.0	2.6	3.2	4.6
Total autocatalyst scrap	15.2	19.5	23.1	29.6	37.0	33.0	40.0	46.1	44.4	49.8
Old jewellery scrap										
North America	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1
Europe	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.3
Japan	1.2	1.2	1.5	2.0	2.6	0.8	1.0	1.2	0.9	0.9
China	0.9	1.8	5.5	3.4	2.7	2.2	4.0	5.9	6.5	7.5
Other regions	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.2	0.2	0.2
Total old jewellery scrap	2.3	3.2	7.3	5.7	6.0	3.6	5.6	7.7	8.1	9.0
SUPPLY	223.7	239.0	259.2	254.6	241.4	232.8	250.9	267.1	254.6	259.2
Autocatalyst demand										
North America	47.6	45.9	47.9	49.3	39.7	27.5	37.9	40.8	48.6	50.9
Europe	37.3	34.8	37.7	39.3	36.8	32.8	43.1	48.4	48.0	47.4
Japan	22.2	23.3	27.0	27.9	28.8	21.5	25.6	22.6	27.5	26.6
China	6.9	7.8	11.6	15.0	14.9	24.4	32.3	34.0	38.1	43.2
Other regions	10.8	12.3	13.7	17.6	19.4	18.9	25.2	26.3	26.6	26.9
Total autocatalyst demand	124.8	124.1	137.9	149.0	139.5	125.2	164.1	172.1	188.8	195.1
Jewellery demand										
North America	0.6	1.5	2.6	3.1	4.1	4.2	3.6	2.6	2.4	2.3
Europe	3.0	3.7	3.6	4.0	4.3	4.0	4.3	4.7	4.8	4.8
Japan	3.4	3.5	3.8	3.1	2.0	1.5	1.5	1.4	1.6	1.6
China	23.2	32.0	27.9	25.7	26.0	20.6	12.8	10.6	10.0	8.0
Other regions	1.6	1.6	2.0	4.0	3.9	4.2	2.6	1.7	1.5	1.3
Total jewellery demand	31.8	42.4	39.8	39.8	40.3	34.5	24.8	21.0	20.2	18.0
Dental demand										
North America	6.3	6.3	6.4	7.0	7.4	7.7	8.1	8.4	8.5	8.8
Europe	2.5	2.5	2.5	2.6	2.7	2.8	3.0	2.8	2.6	2.2
Japan	13.2	9.4	9.1	10.0	10.0	9.5	9.0	8.8	8.6	8.2
Other regions	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Total dental demand	22.4	18.6	18.4	20.1	20.6	20.6	20.7	20.5	20.2	19.6

APPENDIX 4 - PALLADIUM SUPPLY AND DEMAND 2004-2013

(tonnes)	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Chemical demand										
North America	1.3	1.4	1.5	1.8	1.7	1.3	1.7	1.7	1.7	1.8
Europe	4.3	4.6	5.1	6.1	5.7	4.9	5.0	5.1	5.0	5.1
Japan	0.5	0.6	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7
Other regions	2.7	3.1	5.2	3.1	2.9	2.6	3.4	3.6	4.0	4.7
Total chemical demand	8.9	9.7	12.5	11.7	11.0	9.3	10.9	11.1	11.4	12.4
Electronics demand										
North America	7.8	8.1	8.8	9.0	9.5	8.9	10.3	10.6	10.4	9.6
Europe	3.3	3.4	3.6	3.7	3.7	3.3	3.8	3.9	3.8	3.5
Japan	8.6	9.0	10.0	10.7	11.4	10.6	12.3	12.7	12.4	11.4
Other regions	13.5	14.3	15.6	16.2	17.4	15.9	18.5	19.0	18.6	17.1
Total electronics demand	33.2	34.9	37.9	39.7	41.9	38.6	45.0	46.2	45.3	41.6
Retail investment										
North America	3.9	7.9	4.1	1.1	2.1	4.4	2.1	1.5	0.8	0.9
Europe	0.1	0.1	0.1	0.3	0.8	0.9	0.4	0.4	0.3	0.2
Japan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other regions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total retail investment	4.0	7.9	4.2	1.4	2.9	5.3	2.5	1.9	1.2	1.2
Other industrial demand										
North America	1.6	1.6	1.8	1.9	1.8	1.6	2.1	2.2	2.4	2.4
Europe	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
Japan	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2
Other regions	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
Total other industrial demand	2.4	2.4	2.7	2.8	2.7	2.5	3.1	3.2	3.4	3.4
								0.6		
DEMAND	227.5	240.0	253.3	264.5	258.9	235.9	271.1	276.0	290.5	291.2
Physical Surplus/(Deficit)	(3.8)	(1.0)	5.9	(9.9)	(17.4)	(3.2)	(20.2)	(8.9)	(35.9)	(32.0)
Identifiable stock movements										
Russia	15.6	43.5	48.2	28.0	39.8	34.2	24.9	24.9	12.4	6.2
Stillwater	11.7	13.6	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
US National Defense Stockpile	1.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Industry stocks	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(4.7)
Exchange Traded Funds	0.0	0.0	0.0	(8.7)	(11.9)	(15.8)	(33.9)	16.6	(13.9)	(0.0)
Sub total - stock movements	33.1	57.8	50.2	19.3	28.0	18.5	(9.0)	41.4	(1.5)	1.6
Net Balance	29.3	56.7	56.0	9.4	10.5	15.3	(29.2)	32.5	(37.4)	(30.4)

APPENDIX 5 - NOMINAL PLATINUM & PALLADIUM PRICES, 1994-2013

Average US\$ prices are based on the London p.m. fix. Other prices are calculated using the p.m. fix and London exchange rates.

	PLATINUM					PALLADIUM				
	US\$/oz	euro/kg	yen/g	rand/kg	yuan/kg	US\$/oz	euro/kg	yen/g	rand/kg	yuan/g
1994	405.21	10,809	1,489	46,255	112,284	142.75	3,808	525	16,295	39.56
1995	424.24	9,994	1,567	49,466	113,909	151.29	3,564	559	17,641	40.62
1996	397.43	9,831	1,458	54,905	106,234	128.12	3,169	470	17,700	34.25
1997	395.86	11,284	1,475	58,629	105,507	177.97	5,073	663	26,358	47.43
1998	371.77	10,751	1,484	66,113	98,957	284.12	8,216	1,134	50,526	75.63
1999	376.73	11,377	1,506	74,066	100,268	357.74	10,803	1,430	70,333	95.21
2000	544.14	18,949	1,824	121,484	144,828	680.33	23,692	2,280	151,890	181.08
2001	529.00	18,988	1,997	146,160	140,774	603.68	21,669	2,279	166,795	160.65
2002	539.26	18,341	2,100	182,435	143,501	337.56	11,481	1,314	114,197	89.83
2003	691.19	19,645	2,492	167,945	183,936	200.52	5,701	723	48,736	53.38
2004	845.52	21,864	2,845	175,289	224,997	230.22	5,953	775	47,728	61.26
2005	896.57	23,163	3,071	183,609	236,205	201.08	5,195	689	41,179	52.97
2006	1,142.55	29,258	4,133	248,935	292,896	320.00	8,194	1,158	69,720	82.03
2007	1,302.81	30,557	4,772	295,346	318,651	354.78	8,321	1,299	80,428	86.77
2008	1,577.53	33,948	5,297	405,555	352,282	352.25	7,580	1,183	90,510	78.66
2009	1,203.50	27,684	3,615	322,082	265,670	263.22	6,026	788	69,763	58.26
2010	1,608.98	39,051	4,537	378,424	350,423	525.24	12,747	1,475	122,977	114.35
2011	1,721.87	39,753	4,415	400,322	357,751	733.63	16,936	1,881	170,194	152.18
2012	1,551.48	38,789	3,979	409,162	314,553	643.19	16,079	1,649	169,551	130.37
2013	1,486.72	36,010	4,654	458,212	294,020	725.06	17,556	2,274	224,106	143.33

Note: prior to 1999 Deutsche Mark prices have been converted into Euros at the official rate;

Source: GFMS, Thomson Reuters

APPENDIX 6 - REAL PLATINUM & PALLADIUM PRICES, 1994-2013 (CONSTANT 2013 TERMS)

Average US\$ prices are based on the London p.m. fix. Other prices are calculated using the p.m. fix and London exchange rates.

	PLATINUM					PALLADIUM				
	US\$/oz	euro/kg	yen/g	rand/kg	yuan/kg	US\$/oz	euro/kg	yen/g	rand/kg	yuan/g
1994	636.86	15,663	1,472	143,989	197,279	224.36	5518	518	50725	69.50
1995	648.56	14,135	1,550	141,687	170,958	231.29	5041	553	50528	60.97
1996	590.24	13,609	1,441	146,493	147,175	190.28	4387	465	47226	47.45
1997	574.49	15,384	1,432	144,042	142,175	258.28	6916	644	64758	63.92
1998	531.31	14,497	1,432	151,974	134,389	406.05	11079	1094	116144	102.71
1999	526.84	15,174	1,458	161,867	138,103	500.29	14409	1384	153709	131.14
2000	736.17	24,754	1,777	252,041	198,781	920.42	30950	2222	315124	248.53
2001	696.08	24,238	1,961	286,879	191,827	794.35	27660	2238	327380	218.91
2002	698.43	22,896	2,081	328,018	197,054	437.19	14332	1303	205326	123.35
2003	875.11	24,025	2,476	285,252	249,665	253.95	6972	719	82778	72.45
2004	1,042.69	26,178	2,827	293,657	293,913	283.91	7128	770	79958	80.03
2005	1,069.64	27,142	3,060	297,482	303,024	239.89	6087	686	66718	67.96
2006	1,320.56	33,554	4,108	385,434	370,320	369.85	9398	1150	107950	103.72
2007	1,463.76	34,310	4,740	426,985	384,552	398.61	9343	1291	116275	104.72
2008	1,707.30	36,911	5,190	531,448	401,453	381.22	8242	1159	118606	89.64
2009	1,306.68	30,013	3,590	393,945	304,835	285.78	6533	783	85328	66.85
2010	1,719.21	41,662	4,539	443,957	389,143	561.34	13599	1476	144273	126.99
2011	1,783.32	41,292	4,430	447,281	376,867	759.04	17582	1887	190159	160.31
2012	1,574.19	39,310	3,993	432,695	322,807	652.61	16295	1655	179303	133.79
2013	1,486.72	36,010	4,654	458,212	294,020	725.06	17556	2274	224106	143.33

Note: prior to 1999 Deutsche Mark prices have been converted into Euros at the official rate;

Source: GFMS, Thomson Reuters

APPENDIX 7 - PLATINUM AND PALLADIUM PRICES IN 2013

PLATINUM

	US\$/oz	euro/kg	yen/g	rand/kg	yuan/g	CHF/kg
Annual average	1,486.72	36,010	4,654	458,212	294.02	51,585
Maximum	1,736.00	41,665	5,225	515,817	347.85	60,933
Minimum	1,317.00	31,088	4,167	416,233	257.85	44,286
Range:average	28.2%	29.4%	22.7%	21.7%	30.6%	32.3%

Monthly average

Jan	1,643.98	39,721	4,716	464,146	328.83	57,198
Feb	1,674.55	40,360	5,013	476,863	335.57	58,452
Mar	1,583.30	39,274	4,830	465,921	316.41	53,808
Apr	1,489.12	36,742	4,688	434,350	296.15	51,157
May	1,474.90	36,550	4,792	443,047	291.18	49,576
Jun	1,430.23	34,833	4,472	458,634	282.06	49,308
Jul	1,401.48	34,409	4,488	445,026	276.39	47,748
Aug	1,494.10	36,075	4,696	482,797	294.05	51,907
Sep	1,456.86	35,070	4,646	465,363	286.65	50,742
Oct	1,413.48	33,320	4,445	448,367	277.36	50,340
Nov	1,420.10	33,833	4,569	464,763	278.19	50,036
Dec	1,358.72	31,880	4,526	451,494	265.40	48,910

PALLADIUM

	US\$/oz	euro/kg	yen/g	rand/kg	yuan/g	CHF/kg
Annual average	725.06	17,556	2,274	224,106	143.33	25,165
Maximum	774.00	19,389	2,487	251,149	154.89	27,110
Minimum	643.00	15,860	1,883	184,570	126.88	21,874
Range:average	18.1%	20.1%	26.6%	29.7%	19.5%	20.8%

Monthly average

Jan	712.59	17,217	2,044	201,181	142.53	24,795
Feb	751.93	18,126	2,251	214,124	150.68	26,243
Mar	756.65	18,770	2,309	222,685	151.21	25,713
Apr	703.05	17,348	2,213	205,081	139.82	24,151
May	720.19	17,851	2,341	216,653	142.18	24,196
Jun	713.53	17,377	2,231	228,793	140.72	24,600
Jul	718.02	17,628	2,300	227,990	141.60	24,463
Aug	740.57	17,881	2,328	239,247	145.75	25,728
Sep	709.14	17,065	2,261	226,468	139.53	24,710
Oct	724.61	17,081	2,279	229,849	142.18	25,807
Nov	733.36	17,472	2,360	240,019	143.66	25,840
Dec	719.83	16,890	2,391	239,191	140.61	25,912

Source: GFMS, Thomson Reuters; LPPM

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