Deutsche Securities
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Industry Update

PGM outlook

Bullish stance maintained

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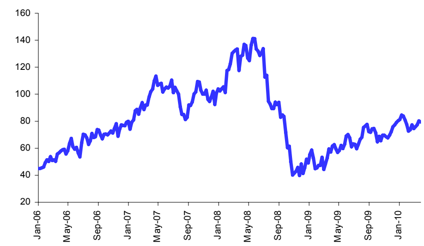
A strong start to the year, with more to come
The PGM complex has performed more or less in line with our expectations over the past quarter, we have thus made only minor adjustments to our 2010 forecasts with palladium up 4%, rhodium down 2% and platinum unchanged. In our opinion, the main driver of platinum and palladium prices was investment demand in the form of a newly listed ETF. While not as visible, autocat demand has also been strong in our view, and is likely to become the dominant driver from 2011 onwards. We retain our bullish stance on platinum and palladium.

Adjusting individual drivers, but the overall outlook remains bullish
While we have adjusted individual components in our PGM (platinum group metal) supply-demand balances, the overall picture remains the same. We still forecast a deficit market in platinum over the next two years, a near balanced market in palladium, but which is highly dependent on Russian stockpile sales to ensure this balance, and a surplus market in rhodium. In platinum and palladium, the uptake in the newly listed US ETFs has been stronger than we had forecast (admittedly at the expense of some of the existing ETFs), and we had increased our investment demand forecast for the two metals in 2010 accordingly. We have increased our automotive catalyst (autocat) demand forecast modestly for 2010, given the strong start to production, especially outside of Europe. Sharply declining European sales in 2H10 remains the key risk, especially to platinum. Chinese trading activity and import data suggests the appetite for platinum and palladium has not been dented by the increase in pricing levels, which we believe is also supportive for demand. Due to the strong price environment, we believe secondary supply will increase strongly during the year, rebounding close to 2008 levels. We believe there is a building awareness of the value of precious metals in consumer products and are forecasting strong growth rates in recycling.

Long-term 3-PGM basket price unchanged at USD1,237/ounce
We have left our long-term real 3-PGM basket price forecast unchanged at US$1,237/ounce (US$1,370/ounce nominal). As a result, our real long-term platinum and palladium prices remains US$1,381 and US$470/ounce, respectively. Our long-term prices are calculated based on an incentive pricing model, simulating the prices required to provide a 15% hurdle rate for developing and "average" Bushveld Igneous Complex mine. We maintain our view that medium-term incentive pricing is likely to be determined by bringing on-line new capacity in SA, while long-term incentive pricing is dependant on low-cost, low-capex Zimbabwe. As a result, our PGM price outlook represents a rising profile in the medium-term, before declining to our long-term average of US$1,237/ounce (real).

Key risks
The key downside risks to our forecasts include a significant appreciation of the dollar, which will tarnish the appeal of PGMs as an investment class, worse-than-expected OECD automotive market sales figures leading to production cutbacks and weak jewellery sales in China and Japan. Upside risks, include the possibility of further short-term supply issues, especially related to power supply disruptions in southern Africa.

FTSE/JSE Africa Platinum and Precious Metals index



Source: I-Net Bridge

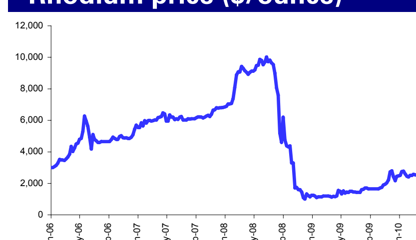
Platinum price ($/ounce)

Source: I-Net Bridge

Palladium price ($/ounce)

Source: I-Net Bridge

Rhodium price ($/ounce)



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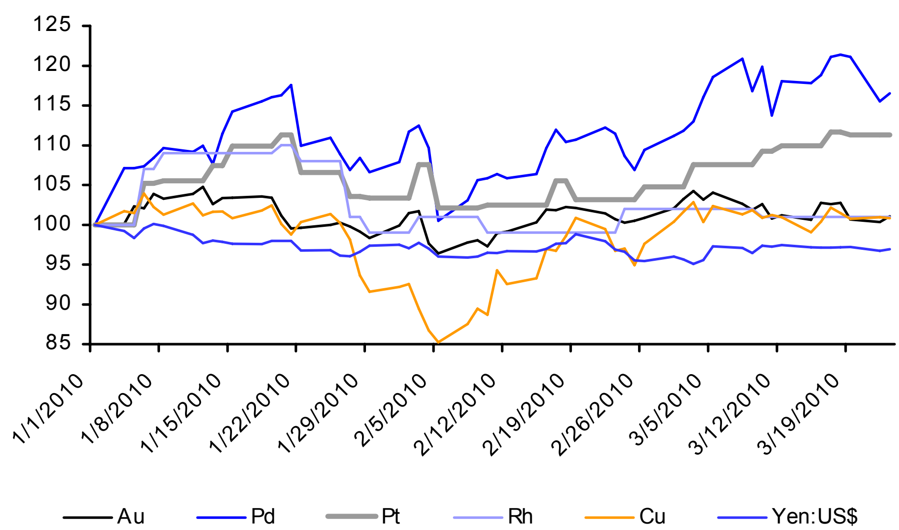
What's driving PGM prices?

Investment demand seems to be dominant at this stage

Platinum and palladium prices have outperformed both gold (the precious reference metal) and copper (the industrial reference metal for the PGM group) over the quarter, up 12% and 16% respectively. We believe this is mainly due to strong investment demand for platinum and palladium, supported by a recovery in global auto sales and surprisingly robust jewellery demand from China. Gold and copper are essentially flat over the quarter, with both metals c.1% higher than the start of the year, although copper's path has been more volatile. However, neither metal is providing a useful clue as to the driver of PGM prices. Rhodium prices are also flat over the quarter and give little insight as to the driver of the other two PGMs. Our rationale is that a strong performance in rhodium would be indicative of a strong industrial/autocat demand, as the metal's end-demand is c.85% from the autocat sector and has historically attracted very little visible speculative interest. The dollar has strengthened against the major currencies over the quarter (c.4% against the ¥), and in this environment we would expect gold to be weaker over the quarter. The entire metal complex has been insensitive to this driver, which to us suggests that the currencies have not been a major influence on the PGM complex.

Palladium and platinum have out-performed both gold and copper

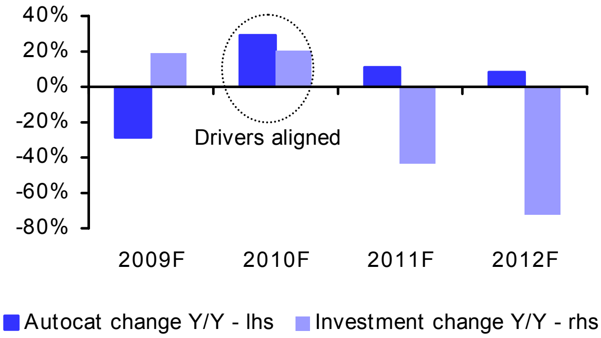
Figure 1: Metal price performance rebased to 100 at 1 January 2010



Source: Deutsche Bank, Thomson Financial Datastream

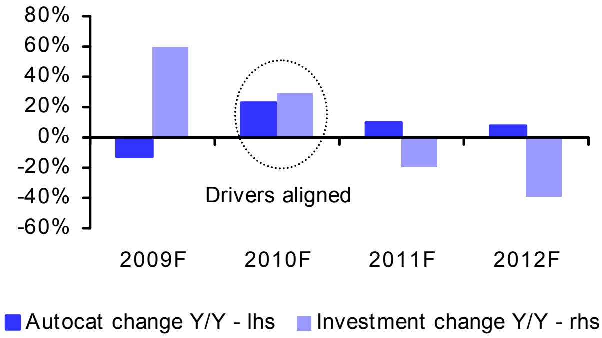
With "reference" metals providing very little insight into the drivers of both platinum and palladium, we have looked to other indicators such as auto sales trends, non-commercial positions on the NYMEX, holdings in physically backed ETFs and Chinese import data for a better understanding. Our conclusion is that investment demand has been the dominant driver in the quarter, and whilst industrial demand has been positive, not quite as visible. Our expectation is that during the course of 2010 and into 2011, "investment" demand will fade and autocat/Industrial demand is likely to come to the fore. It is in 2010F that we are forecasting both autocat and investment demand to drive a positive y-o-y change.

Figure 2: Platinum demand components – y-o-y change



Source: Deutsche Bank

Figure 3: Palladium demand components – y-o-y change

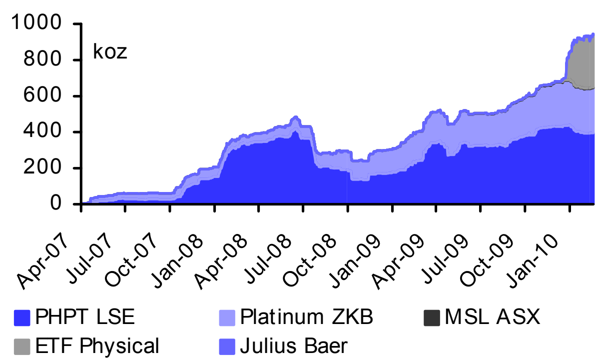


Source: Deutsche Bank

Investment demand and speculative interest grows near term

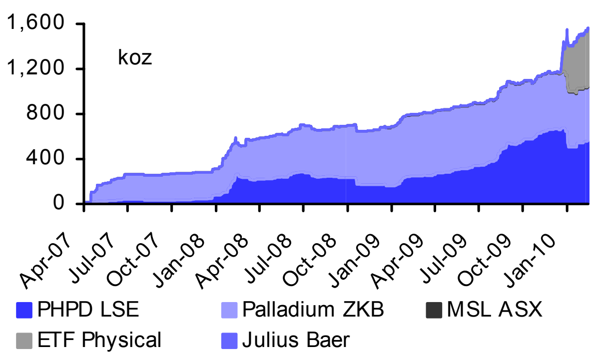
The launch of two new physically backed ETFs one in the US and one in the Switzerland has contributed an additional 255,000 ounces of platinum demand and 420,000 ounces of palladium demand since their launch at the beginning of the year. We do note, however, that there has been some outflow from the London listed ETF to the US listed ETF. The total metal held in ETFs is currently 1.567m ounces of palladium, worth US$730m and 0.944m ounces of platinum, worth US$1.5bn.

Figure 4: ETF holdings in platinum



Source: Deutsche Bank, ZKB,ETF Securities, Metals Securities Australia, Julius Baer

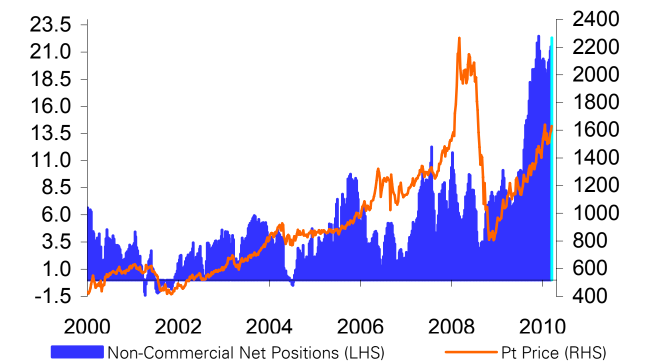
Figure 5: ETF holdings in palladium



Source: Deutsche Bank, ZKB,ETF Securities, Metals Securities Australia, Julius Baer

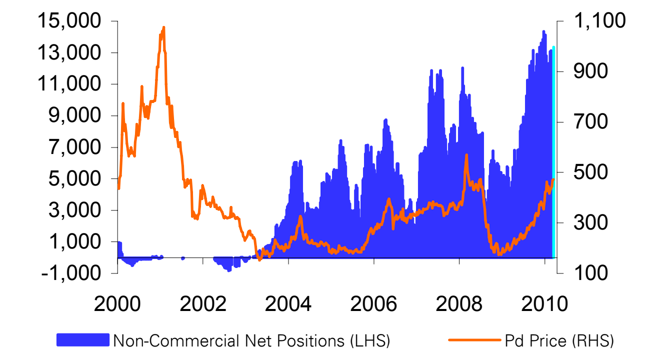
Non-commercial positions on the NYMEX are close to all-time records, both for platinum and palladium, with net longs increasing over the past two weeks. These near all-time high positions do present some risk to the complex in our view, and short-term liquidations may cause volatility in the near-term.

Figure 6: Non-commercial positions in the NYMEX – platinum



Source: Reuters, CFTC, Deutsche Bank

Figure 7: Non-commercial positions in the NYMEX – palladium



Source: Reuters, CFTC, Deutsche Bank

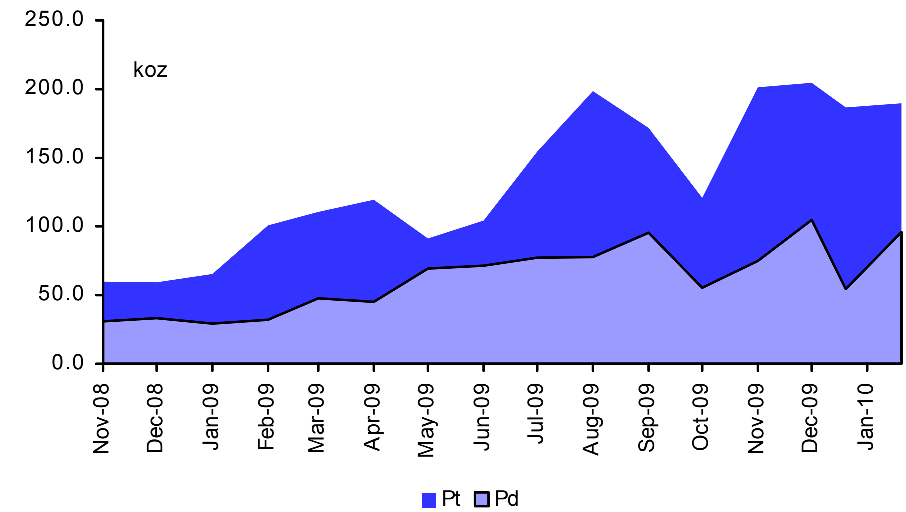
We believe the motivation behind the rise in investment flows is two-fold: Firstly, as a hedge against inflation or more correctly negative returns on cash and weakening fiat currencies ie a gold substitute, and secondly; simply as an investment in the robust fundamentals of the PGM markets. We maintain our view that rising prices are likely to lead to slowing inflows into 2011 and 2012. Whilst we believe gold prices will continue to rise into 2011 and therefore be supportive for the PGM complex, this support is likely to fall away into 2012.

Chinese demand remains robust, despite our view that the jewellery market has re-stocked

We believe a key risk to demand is a significant decline in Chinese purchases, specifically in platinum where we estimate that 2009 is likely to be a record year, with 1700,000 ounces destined for the Chinese jewellery industry. We estimate total Chinese demand at 2.06m ounces in 2009, with imports at 1.64m ounces according to customs statistics, implying consumption out of existing stocks. While we do expect the level of jewellery demand to fall in 2010 (by c.10% to 1.53m ounces), we expect industrial demand to make up the difference with net Chinese demand increasing to 2.1m ounces. Initial import data points to a strong year. In platinum, net imports for the first two months of the year are 2.26m ounces on an annualised basis. In palladium the first two months have been strong with imports up 244% y-o-y to 900,000 ounces on an annualised basis. Measures such as reserve rate requirements and interest rate hikes may well curb some of the more speculative end of the Chinese buying, but a moderately appreciating Remnimbi should offset this to a certain extent.

Chinese imports have started off strongly, but these are likely to cool as monetary policy tightens

Figure 8: Monthly PGM imports into China

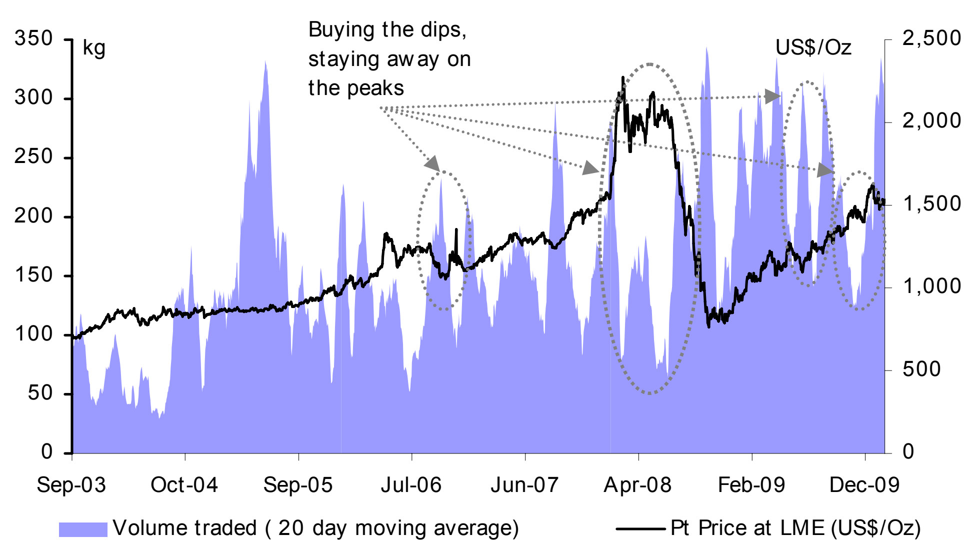


Source: Deutsche Bank, Reuters, Chinese Customs Statistics

The trading activity in platinum on the Shanghai Gold exchange also gives us some insight into Chinese buying patterns. Activity over the past 12 months has been significant, with the average five day moving average daily traded volume at 231kg vs the average of 160kg since records began. The highest five-day moving average daily volume was recorded in the middle of January at 592kg, in the run-up to the Chinese New Year. We note that volumes have been more muted post the Chinese New year at c.145kg/day. Our main observation is that Chinese activity pricks up during price dips, which is supportive for the platinum market in our view.

Bargain-hunting on the Shanghai Gold exchange

Figure 9: Daily traded platinum volumes on the Shanghai Gold exchange (20-day moving average)



Source: Deutsche Bank, SGE

The auto sector has had a strong start to the year – some risks still remain as "incentive schemes" unwind

Sales, registration and production data coming out of the auto-sector has been strong since the start of the year, with the sponge/metals discount stable at US$1/ounce. *(PGM in the sponge form is used in autocats, while ingots or bars are used in investments or jewellery.*

The metal form requires further processing and should command a premium – hence a small premium is an indicator of strong auto or industrial demand). We do recognise, however, that comparisons between 1Q10 vs 1Q09 are skewed due to the low base in 2009. A key risk to our bullish PGM view remains significantly declining sales in 2H in the US and Europe, which in turn has a knock-on effect on production levels. We highlight the key headlines over the past quarter: from the auto sector in the table below:

Figure 10: Q1 production, sales and registration data from the auto sector

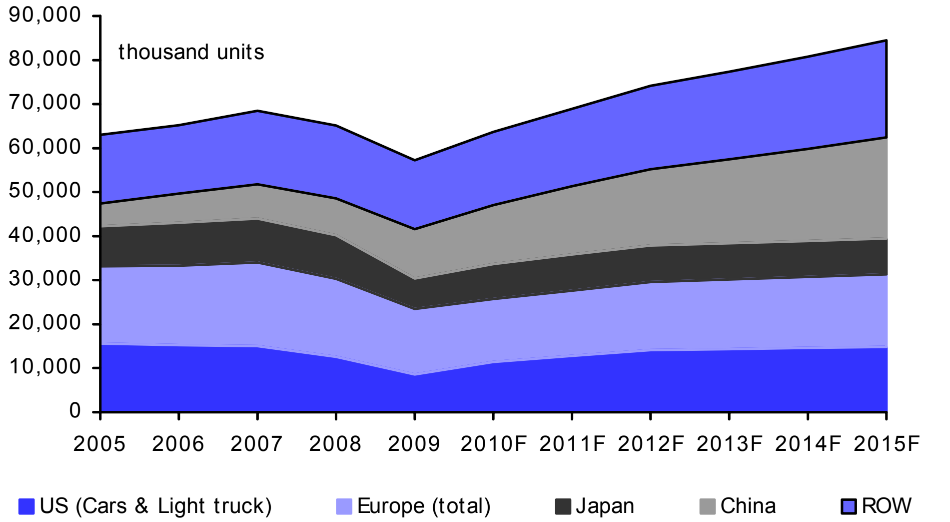
Newsflow item	Impact on PGM markets
Stronger than expected North American production levels through February (+80% y-o-y), better-than-expected sales projections for March, and continued low inventory levels have led us to conclude that 1Q10 production will likely exceed our prior (and consensus) expectations. We are raising our 1Q10 North American production estimate to 2.88m units from 2.60m previously (+5% sequentially and +71% y-o-y). Additionally, CSM recently raised its FY10 North American production forecast by 600,000 units to 11.5, units (100,000 units higher than DB). Many suppliers base their earnings guidance on CSM, so we see potential for upward revisions. *Source: DB Research*	Positive – more so for palladium than platinum
European production (source JD Power) increased by 23% in February and +31% for the first two months. This is mainly due to the non recurrent destocking effect of 1Q09.	Positive
In 2009, the Russian market dropped by a high 50% to 1.45m units. To offset the market fall, the Russian Government announced a cash-for-clunkers programme that started this week. It offers 200,000 vouchers worth 50,000 rubbles (US$1,200) for the scrappage of a 10 year old vehicle (cars of more than 10 years old represent 45% of the Russian park estimated at 30.0m units vs 32% in Western Europe). *(Source: DB Research)*	Positive – more so for palladium than platinum
An example of the exuberance of the Chinese economy comes from the preliminary car sales figures for January. According to the China Association of Automobile Manufacturers (CAAM), car sales reached a record high of 1.7m units, up by 126% y-o-y and 17.7% m-o-m. Production of cars and light vehicles increased by 5.9% m-o-m and 146% y-o-y in January to 1.6m units. Output is still being boosted by incentive schemes that will run until the end of this year. These include a reduction in sales tax on cars of less than 1.6L (from 10% to 7.5%) and subsidies in rural areas to encourage farmers to purchase mini vans and trucks with engines below 1.3L. CAAM is maintaining its vehicle sales growth forecast of 10% this year to 15m units, although this is substantially less than the 45% y-o-y increase sales in 2009. *(Source: Brook Hunt)*	Positive – more so for palladium than platinum
In February, 1.206m automobiles were manufactured in China, up 49.1% y-o-y but down 25.3% m-o-m, while 1.212m automobiles were sold, up 46.3% y-o-y but down 27.2% m-o-m, according to data released by China Association of Automobile Manufacturers on March 9. The reporting period included a week-long vacation for the Chinese New Year holiday, between February 13 and 19. In the first two months of 2010, China manufactured 2.82m automobiles and sold 2.87munits, representing y-o-y growth of 92.4% and 83.78%, respectively. *(Source: CAAM)*	Positive – more so for palladium than platinum
Western European car registrations were up 4% in February (+10% y-t-d, SAAR ~14m units/year) (source: JD Power). The high growth rates in the main markets were dragged down by Germany. February was the last month with positive growth. With the tapering off of the incentives, the non recurrent Italian incentives and still weak economic outlook, we now expect the market to fall 11% to 12.1m units in 2010 (12.2m before), underlying-14% for the rest of the year. *(Source: DB Research)*	Positive
Conversations with our industry players indicate that the European car market is likely to remain in the positive territory in March, +4%; of which -25% in Germany, +10% each in France and in Italy, +20% in the UK (an important month with the change of license plates) and +40% in Spain. Thus, the European registrations would have increased by a good +7% in 1Q with a high variation among countries (country mix will remain key in the performance of each OEM). Furthermore, order intake is slowing down significantly. Overall, since we leave our FY registrations of -11% unchanged, the rest of the year should be weak, especially 2H. *(Source: DB Research)*	A risk to platinum demand in 2H

Source: Deutsche Bank

The overall impact has been positive to our PGM demand forecasts. However, the latest data from the ACEA, shows diesel penetration at 46% in Western Europe which is 1.5% weaker than we have modelled in, and this has dampened our platinum demand forecasts. We outline our diesel penetration expectations in Western Europe and global passenger and LDV production forecast in the charts below:

Figure 11: Vehicle production forecasts in our PGM supply – demand balances

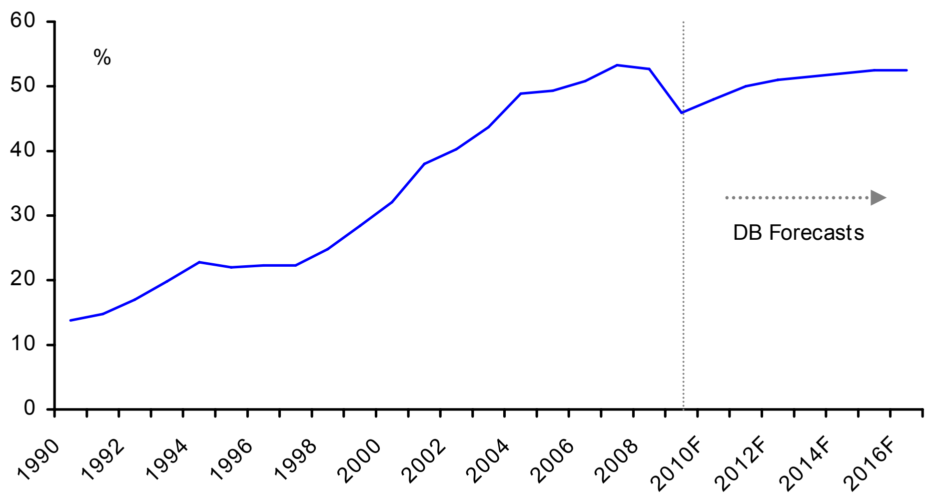
Recovering, but modest growth in the OECD, outstripped by sharp growth in China and the rest of the developing world.



Source: Deutsche Bank, Johnson Matthey, JD Power,

Figure 12: Diesel vehicles as a percentage of new registrations in Western Europe

We are forecasting a recovery in Diesel vehicle sales, but not to reach the peak of 2007. As auto-manufacturers move to smaller power plants to curb CO2 emissions diesel engines become less economical.



Source: ACEA, Deutsche Bank

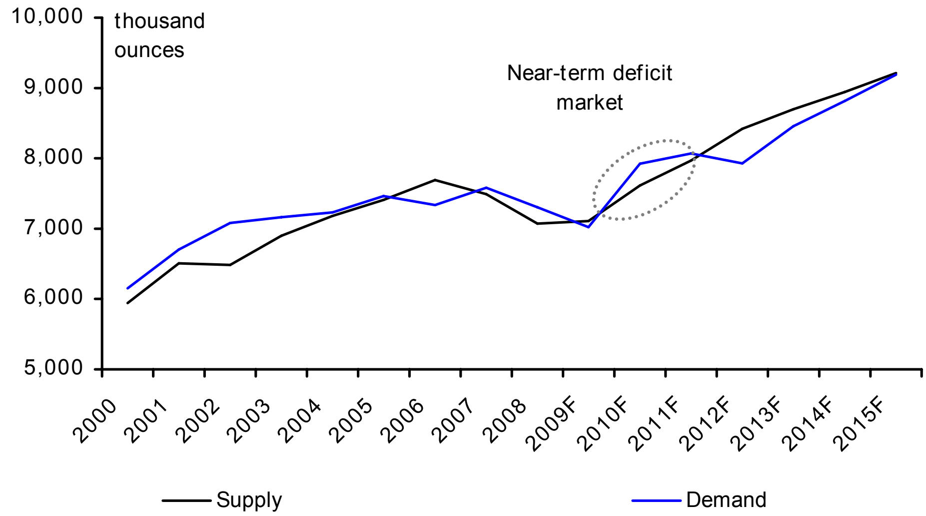
In a downside risk scenario, if we assume flat vehicle production in Europe, combined with a flat diesel sales percentage, we would forecast the platinum demand to contract by c.80,000-100,000 ounces, which still yields a deficit of c.200,000 ounces.

Supply is recovering too

We are forecasting a healthy recovery in PGM supply over the next three years, as the primary producers recover from weather (AngloPlat) and geological disruptions (Aquarius), and Impala and Lonmin catch up on their development programmes. We believe the industry is starting to manage Section 54 (safety related production stoppages) in a more controlled manner, and as safety performances start to improve, the political pressure may abate slightly. Power shortages in SA between now and 2013/14, when new generation capacity is slated to come on-stream is still a risk to primary PGM supply, specifically platinum and rhodium. We also believe that secondary supply ie recycling will increase significantly in 2010 onwards as the pricing environment provides the incentive for improved collection efficiencies. Accordingly we have adjusted our supply forecasts upwards to account for this trend. We outline our supply/demand forecasts in charts below:

A demand side risk is weaker than expected European production, and a lower percentage of diesel vehicle registrations. Primary supply trends are supportive as more UG2 ore is mined which has a lower platinum prill split (grade)

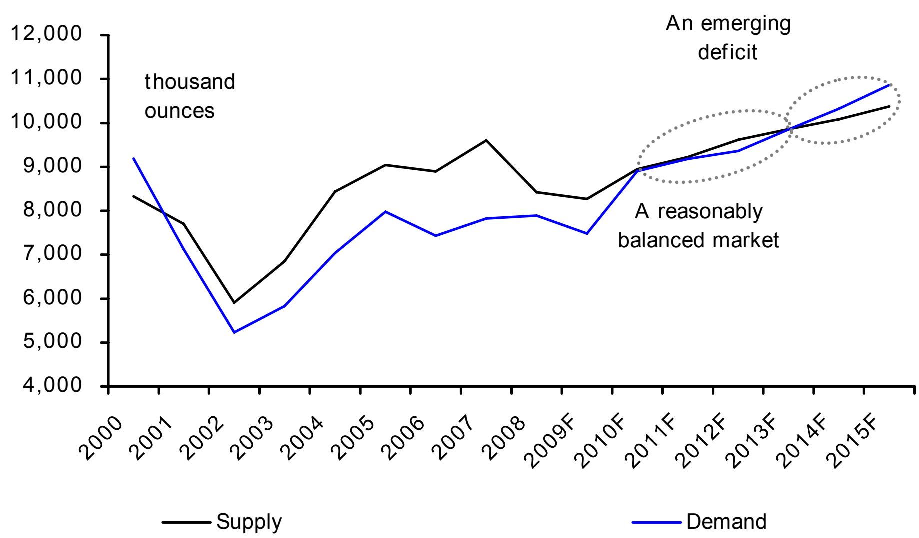
Figure 13: Platinum supply and demand trends



Source: Johnson Matthey, Deutsche Bank

Increasing vehicle sales in the emerging markets (predominantly petrol based) is favourable for palladium demand

Figure 14: Palladium supply and demand trends

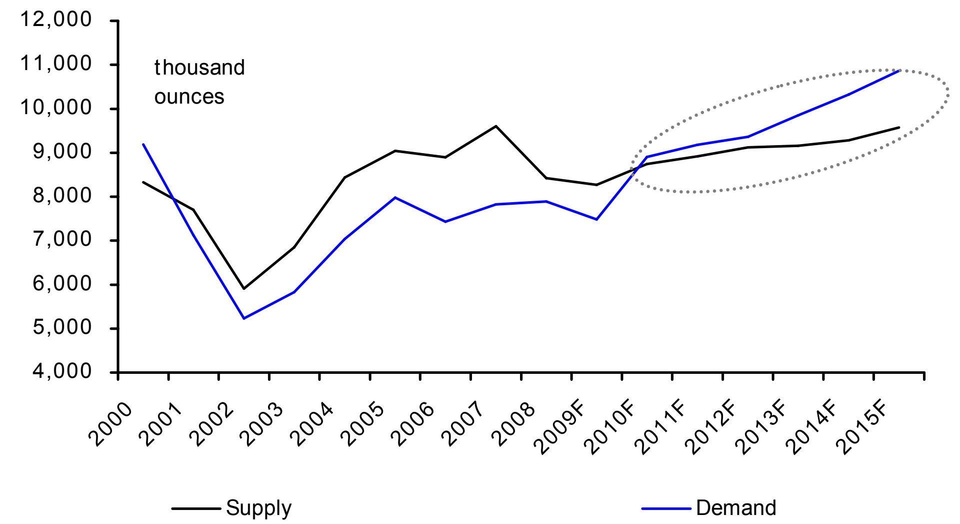


Source: Johnson Matthey, Deutsche Bank

The perception in the palladium market has changed over the past year, in our opinion. Previously, the size of Russian stockpiles was seen as an overhang on the market. More recently, market participants have suggested these stockpiles may be near to exhaustion, and that only c.1m ounces remain. We estimate that since 2002, when the palladium market has been in surplus, a total of 3.3m ounces have been produced in excess of demand. We estimate a stockpile of this magnitude would be consumed by the end of 2013. Our base case assumes that Russian stockpiles continue to supply the market until 2016 at a constant 800,000-900,000 ounces pa. If we assume this level of sales decline over the next few years, a deficit market in palladium may be a reality sooner than we are currently forecasting.

A deficit market may emerge sooner than forecast if Russian stockpiles have been consumed

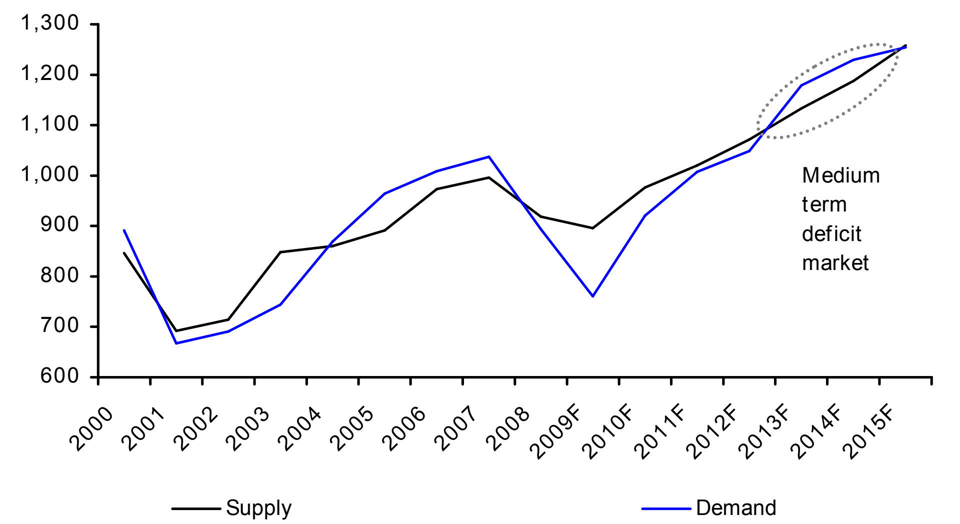
Figure 15: Palladium supply – demand trends in an upside risk scenario



Source: Johnson Matthey, Deutsche Bank

Figure 16: Rhodium supply –demand trends: Still and essential metal in autocats

The preferential growth in gasoline engines in the emerging markets favours palladium catalysts where rhodium is a key co-catalyst



Source: Johnson Matthey, Deutsche Bank

PGM price forecasts – virtually unchanged

We have modestly adjusted our 2010 PGM forecasts to take account of the 1Q10 performance. Our platinum forecast remains virtually unchanged; while we have upgraded our 2010F palladium forecasts by c.6% given the strong start to the year. Rhodium has lagged slightly, hence our 2% downgrade. Our marginally stronger rand forecasts results in a 2-4% downgrade in rand 3-PGM price over the next four years. Our new price forecasts are shown in the table below:

Figure 17: DB PGM forecasts

	Units	2009	2010F	2011F	2012F	2013F	2014F	Long-term
ZAR/USD								
New		8.43	7.57	8.56	8.89	9.15	9.43	10.17
Old		8.43	7.53	8.76	9.12	9.49	9.77	10.17
% change		0	0	-2	-3	-4	-4	0
Platinum								
New	US$/oz	1,205	1,652	1,750	1,550	1,550	1,530	1,530
Old	US$/oz	1,205	1,650	1,750	1,550	1,550	1,530	1,530
% change	%	0	0	0	0	0	0	0
New	R/oz	10,158	12,500	14,979	13,773	14,186	14,423	15,560
Old	R/oz	10,158	12,425	15,330	14,136	14,710	14,955	15,560
% change	%	0	1	-2	-3	-4	-4	0
Palladium								
New	US$/oz	264	470	525	425	500	530	530
Old	US$/oz	264	444	525	425	500	530	530
% change	%	0	6	0	0	0	0	0
New	R/oz	2,225	3,554	4,494	3,776	4,576	4,996	5,390
Old	R/oz	2,226	3,343	4,599	3,876	4,745	5,181	5,390
% change	%	0	6	-2	-3	-4	-4	0
Rhodium	**US$/oz**							
New	US$/oz	1,618	2,676	3,200	3,000	3,300	3,300	3,350
Old	US$/oz	1,618	2,725	3,200	3,000	3,300	3,300	3,350
% change	%	0	-2	0	0	0	0	0
New	R/oz	13,646	20,250	27,390	26,657	30,203	31,109	34,070
Old	R/oz	13,640	20,519	28,032	27,360	31,317	32,257	34,070
% change	%	0	-1	-2	-3	-4	-4	0
3-PGM basket price								
New	US$/oz	951	1,369	1,484	1,314	1,358	1,354	1,357
Old	US$/oz	952	1,363	1,484	1,314	1,358	1,354	1,357
% change	%	0	0	0	0	0	0	0
New	R/oz	8,022	10,359	12,702	11,676	12,424	12,763	13,805
Old	R/oz	8,022	10,267	13,000	11,984	12,883	13,234	13,805
% change	%	0	1	-2	-3	-4	-4	0

**Based on SA average (Platinum 63%, Palladium 30%, Rhodium 7%)*
Source: Deutsche Bank

PGM supply/demand balances

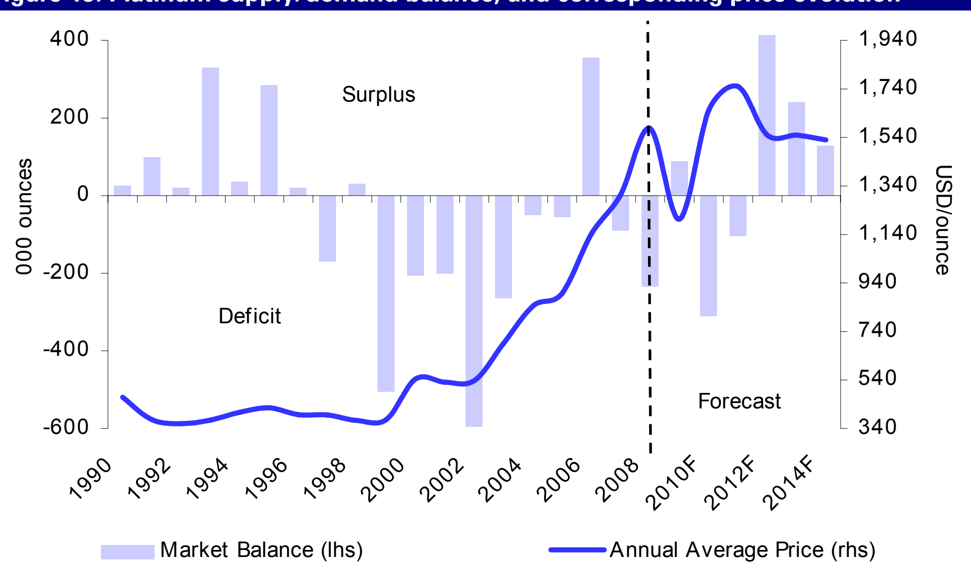
Platinum supply/demand balance

Figure 18: Platinum supply/demand

Platinum		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009F	2010F	2011F	2012F	2013F	2014F
Total supply	**000 oz**	**5,944**	**6,505**	**6,485**	**6,901**	**7,180**	**7,410**	**7,690**	**7,490**	**7,070**	**7,109**	**7,615**	**7,967**	**8,419**	**8,697**	**8,944**
Supply growth	*%*	*8*	*9*	*0*	*6*	*4*	*3*	*4*	*-3*	*-6*	*1*	*7*	*5*	*6*	*3*	*3*
South African supply	000 oz	3,851	4,100	4,428	4,802	5,010	5,115	5,295	5,030	4,520	4,833	5,041	5,225	5,571	5,783	5,957
North American supply	000 oz	293	350	360	295	385	365	345	325	325	265	340	372	386	381	376
Russian production	000 oz	935	963	980	950	845	890	920	910	810	790	810	815	799	783	767
Russian stockdraw	000 oz	165	337	0	100	0	0	0	0	0	0	0	0	0	0	0
Russian sales	000 oz	1,100	1,300	980	1,050	845	890	920	910	810	790	810	815	799	783	767
Other*	000 oz	700	755	717	754	940	1,040	1,130	1,225	1,415	1,220	1,424	1,555	1,663	1,751	1,844
Total demand	**000 oz**	**6,150**	**6,705**	**7,080**	**7,165**	**7,230**	**7,465**	**7,335**	**7,580**	**7,305**	**7,020**	**7,925**	**8,071**	**7,930**	**8,457**	**8,816**
Demand growth	*%*	*2.3*	*9.0*	*5.6*	*1.2*	*0.9*	*3.3*	*-1.7*	*3.3*	*-3.6*	*-3.9*	*12.2*	*1.8*	*-1.7*	*6.6*	*4.2*
Autocatalyst	000 oz	1,890	2,520	2,610	3,190	3,490	3,795	3,905	4,145	3,700	2,644	3,414	3,791	4,106	4,475	4,717
Chemical	000 oz	295	290	325	310	325	325	395	410	400	364	393	408	422	440	459
Electrical	000 oz	455	385	330	340	300	360	360	320	225	216	205	261	273	283	294
Glass	000 oz	255	285	235	175	290	360	405	390	320	80	305	440	455	450	445
Investment	000 oz	-60	80	80	15	45	15	-40	170	555	660	795	450	125	280	300
Jewellery	000 oz	2,830	2,550	2,830	2,440	2,160	1,965	1,640	1,460	1,365	2,442	1,929	1,802	1,608	1,561	1,599
Petroleum	000 oz	110	130	130	150	150	170	180	210	240	210	275	285	305	320	335
Other	000 oz	375	465	540	545	470	475	490	475	500	405	475	511	533	550	567
Market balance	**000 oz**	**-206**	**-200**	**-595**	**-264**	**-50**	**-55**	**355**	**-90**	**-235**	**88**	**-309**	**-104**	**489**	**240**	**128**
Annual average price	USD/oz	545	532	538	691	845	897	1,143	1,305	1,577	1,202	1,653	1,750	1,550	1,550	1,530

*Secondary supply from autocat recycling and mined supply from Zimbabwe
Source: Johnson Matthey, Deutsche Bank

Figure 19: Platinum supply/demand balance, and corresponding price evolution



Source: Johnson Matthey, Deutsche Bank

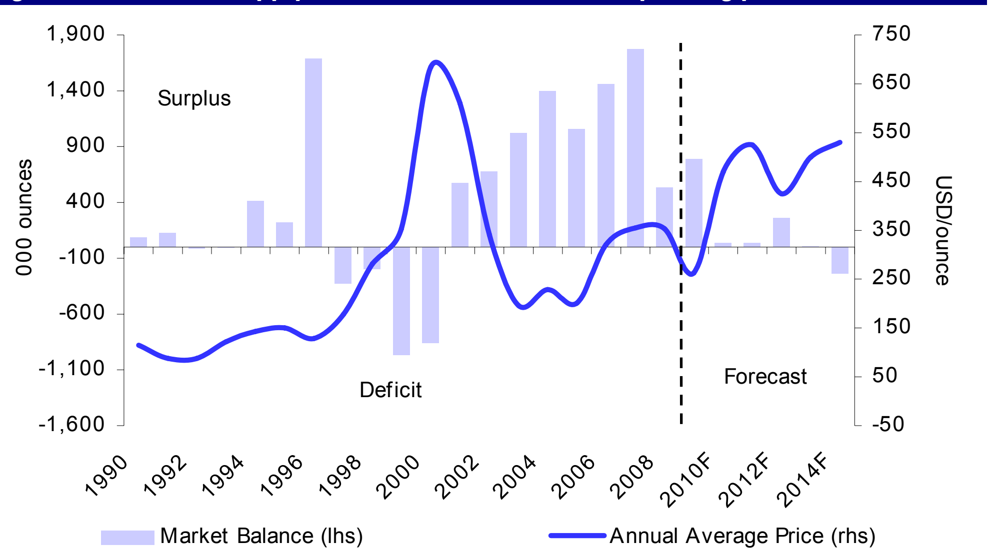
Palladium supply/demand balance

Figure 20: Palladium supply/demand

Palladium		2001	2002	2003	2004	2005	2006	2007	2008	2009F	2010F	2011F	2012F	2013F	2014F
Total supply	**000 oz**	**7,703**	**5,908**	**6,850**	**8,440**	**9,040**	**8,895**	**9,600**	**8,425**	**8,272**	**8,944**	**9,296**	**9,639**	**9,828**	**9,986**
Supply growth	*%*	*-7.5*	*-23.3*	*15.9*	*23.2*	*7.1*	*-1.6*	*7.9*	*-12.2*	*-1.8*	*8.1*	*3.1*	*4.3*	*2.5*	*2.3*
South African supply	000 oz	2,010	2,199	2,416	2,510	2,605	2,905	2,770	2,430	2,649	2,882	3,031	3,279	3,283	3,455
North American supply	000 oz	773	990	940	1,035	910	985	990	910	765	975	1,050	1,066	1,060	1,053
Russian production	000 oz	2,300	2,800	2,850	3,300	3,230	3,160	3,050	2,700	2,685	2,658	2,632	2,605	2,579	2,553
Russian stockdraw	000 oz	2,040	-870	100	800	1,390	740	1,490	960	900	900	800	800	800	800
Russian sales	000 oz	4,340	1,930	2,950	4,100	4,620	3,900	4,540	3,660	3,585	3,558	3,532	3,505	3,479	3,453
Other*	000 oz	580	789	544	795	905	1,105	1,300	1,425	1,273	1,529	1,707	1,870	2,036	2,220
Total demand	**000 oz**	**7,125**	**5,230**	**5,830**	**7,040**	**7,980**	**7,435**	**7,825**	**7,890**	**7,483**	**8,903**	**9,181**	**9,359**	**9,8527**	**10,323**
Demand growth	*%*	*-22.5*	*-26.6*	*11.5*	*20.8*	*13.4*	*-6.8*	*5.2*	*0.8*	*-5.2*	*19.0*	*3.1*	*1.9*	*5.3*	*4.8*
Autocatalyst	000 oz	5,110	3,080	3,450	3,720	3,865	4,015	4,450	4,460	3,888	4,779	5,255	5,664	6,119	6,420
Dental	000 oz	670	770	825	850	815	800	635	625	612	668	670	673	676	679
Electronics	000 oz	790	775	900	955	970	1,065	1,285	1,100	970	1,118	1,121	1,188	1,239	1,292
Chemical	000 oz	250	255	265	305	415	420	370	355	341	396	409	422	438	453
Jewellery	000 oz	240	260	250	920	1,430	995	740	855	912	973	915	864	930	1,003
Investment	000 oz							260	420	670	865	695	423	315	330
Other	000 oz	65	90	140	290	485	140	85	75	91	104	115	126	136	147
Market balance	**000 oz**	**578**	**678**	**1,020**	**1,400**	**1,060**	**1,460**	**1,775**	**535**	**788**	**41**	**40**	**261**	**6**	**-241**
Annual average price	USD/oz	610	341	196	229	201	321	355	353	263	470	525	425	500	530

**Secondary supply from autocat recycling and mined supply from Zimbabwe*
Source: Johnson Matthey, Deutsche Bank

Figure 21: Palladium supply/demand balance, and corresponding price evolution



Source: Johnson Matthey, Deutsche Bank

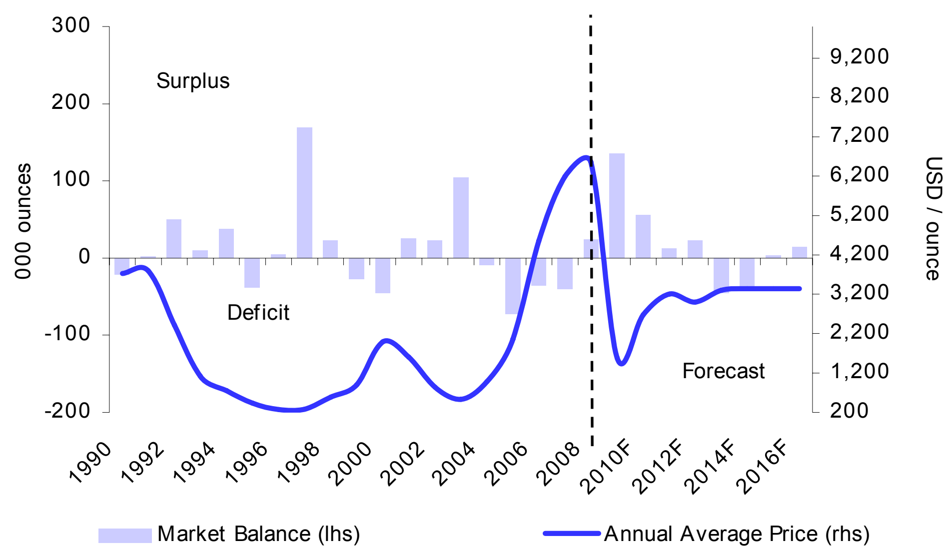
Rhodium supply/demand balance

Figure 22: Rhodium supply/demand

Rhodium		2001	2002	2003	2004	2005	2006	2007	2008	2009F	2010F	2011F	2012F	2013F	2014F
Total supply	**000 oz**	**692**	**714**	**848**	**860**	**891**	**973**	**996**	**919**	**896**	**976**	**1,,020**	**1071**	**1133**	**1187**
Supply growth	*%*	*-18.2*	*3.2*	*18.8*	*1.4*	*3.6*	*9.2*	*2.3*	*-7.8*	*-2.5*	*9.0*	*4.5*	*5.0*	*5.8*	*4.8*
South African supply	000 oz	452	490	544	587	627	666	696	574	606	623	644	675	701	719
North American supply	000 oz	23	25	26	17	20	17	20	18	12	17	19	19	19	19
Russian sales	000 oz	125	90	140	100	90	100	90	85	65	80	81	82	82	83
Other*	000 oz	92	109	138	156	154	190	190	242	211	255	276	296	316	336
Total demand	**000 oz**	**667**	**691**	**744**	**869**	**964**	**1,009**	**1,030**	**894**	**761**	**921**	**1007**	**1,049**	**1,179**	**1,230**
Demand growth	*%*	*-25.1*	*3.6*	*7.7*	*16.8*	*10.9*	*4.7*	*2.1*	*-13.2*	*-14.9*	*21.0*	*9.4*	*4.1*	*12.4*	*4.3*
Autocatalyst	000 oz	566	599	660	758	829	863	879	760	641	782	840	869	989	1042
Chemical	000 oz	44	39	39	43	48	49	63	68	66	71	76	83	88	94
Electrical	000 oz	6	6	6	8	10	9	9	3	5	6	6	6	6	6
Glass	000 oz	39	37	31	46	57	64	59	34	27	41	62	67	71	75
Other	000 oz	10	10	13	14	20	23	24	24	21	22	23	24	25	26
Market balance	**000 oz**	**25**	**23**	**104**	**-9**	**-73**	**-36**	**-34**	**25**	**135**	**56**	**13**	**23**	**-46**	**-42**
Annual average price	USD/oz	1,603	837	530	981	2,054	4,556	6,191	6,556	1,582	2,678	3,200	3,000	3,300	3,340

*Mostly recycled material from autocats and mined supply from Zimbabwe
Source: Johnson Matthey, Deutsche Bank

Figure 23: Rhodium supply/demand balance, and corresponding price evolution



Source: Johnson Matthey, Deutsche Bank

Long-term PGM prices

Method for deriving our long-term PGM prices

We use a theoretical mine model to calculate the long-term incentive price – ie the price required to incentivise PGM producers to invest new capital in order to bring new production online. The logic relates to determining at what metal prices the industry can no longer replace or grow production to keep pace with demand given certain ZAR/USD assumptions. This is a first-principles approach to solving the problem; we do it by simulating the starting of a hybrid green/brownfields mine – what it would cost and what metal prices would be required to achieve a realistic hurdle rate?

The mine model is designed to represent a new mine in southern Africa. The base inputs for the mine are tabulated below, as is the method for the calculation.

Figure 24: Model project valuation parameters

Life of mine reserves	Platinum (m ounces)	5.3
	Palladium (m ounces)	2.5
Project capex (Rm)	Basic	9,100
	Plus smelting and refining	2,200
Life of mine (years)		30
Annual milling rate (m tonnes)		3
Recovered 5E grade (grams/tonne)		3.8
% UG2 ore		50
Lead time (years)		3
Annual production		
Platinum (ounces)		208
Palladium (ounces)		98
Rhodium (ounces)		22
Gold (ounces)		8
Nickel (kilograms)		1,350
Copper (kilograms)		1,350
Hurdle rate (%)		15
Royalty rate (% revenue)		4
Mineral rights acquisition cost (Rm)		550
Long-term ZAR/USD (real)		8.20

Source: Deutsche Securities calculations

The mine is assumed to have a 30-year life and a lead time of three years. We assume basic project capex of R9.1bn, and an incremental R2.2bn to build smelting and refining capacity. The basic project capex requirement represents R25,000/4E ounce of annual production, which is representative of the current capital requirements at Booysendal (assuming R6.0bn capex to add 220,000 ounces pa). Given the shallow nature of the Booysendal deposit relative to an "average" Bushveld Igneous Complex underground mine, we believe these capital estimates are conservative and, in the medium-term, contain a fair degree of upside risk. However, given that a significant portion of longer-term expansion is likely to come from low-cost and low-capex Zimbabwean mines, we view this capex requirement a relevant for calculating long-term incentive pricing.

We model the mine on a UG2/Merensky ore split of 50%, recovered 5-PGE grades of 3.8 grams/tonne, unit costs of R460/tonne milled and revenue royalties of around 4%. We also create the flexibility to be able to toll refine concentrate, refine at existing facilities (ie not have to build incremental infrastructure), build smelting and refining infrastructure and finally, we cater for having to buy mineral rights in some instances.

The method is for the project to generate an IRR that meets an assumed WACC of 15% (rand nominal) and to do this, we change the metal price basket composed of platinum, palladium and rhodium. We make standard price assumptions on the rest of the by-product metals as listed below. We then simulate a range of different scenarios and calculate the 3-PGE (platinum, palladium and rhodium) basket needed to meet the project hurdle rate.

Long-term prices unchanged

The results of the exercise are tabulated below. On a 3-PGM basis, we calculated real incentive pricing at US$1,030-1,341/ounce, averaging US$1,186/ounce. Given this range, we estimate a 3-PGM basket price of US$1,237/ounce for our long-term assumptions (being what we believe will represent the future production-weighted average). This number is unchanged from our previous forecast.

As a result, our long-term real platinum, palladium, and rhodium prices have remained constant at US$1,381/ounce, US$476/ounce and US$3,029/ounce respectively.

Figure 25: Marginal cost of production scenario analysis (real 2010 terms)

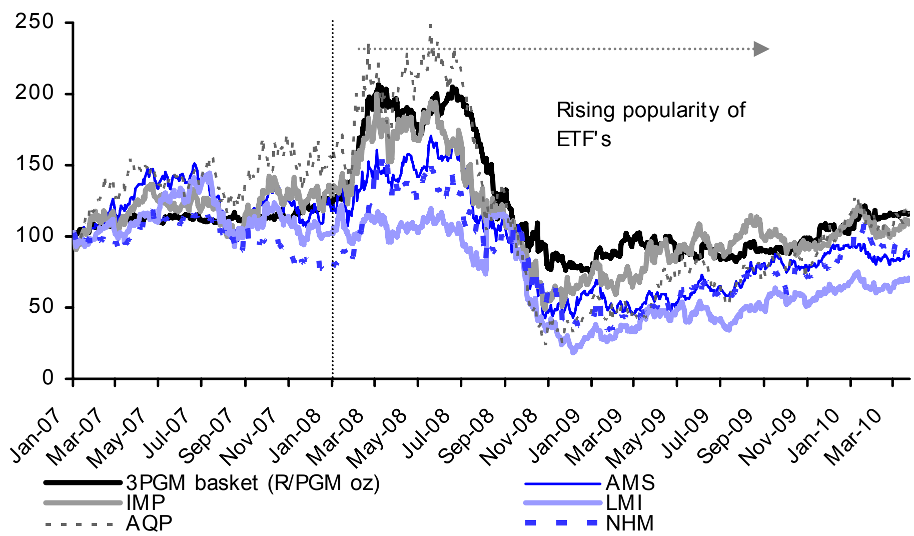
		3-PGM basket price (US$/ounce)	Platinum US$/ounce)	Palladium (US$/ounce)	Rhodium (US$/ounce)
1	Own mineral rights, spare refining capacity	1,030	1,150	396	2,738
2	Own mineral rights, build refining capacity	1,147	1,281	442	3,049
3	Own mineral rights, outsource refining	1,293	1,443	498	3,436
4	Purchase mineral rights, spare refining capacity	1,066	1,190	410	2,834
5	Purchase mineral rights, build refining capacity	1,184	1,321	456	3,146
6	Purchase mineral rights, outsource refining	1,341	1,497	516	3,564

Source: Deutsche Securities calculations

Equity performance is likely to continue lagging the commodity basket

While we remain bullish on the PGM complex in general, individual equities may continue to lag the commodity price performance for two reasons: Firstly, part of the reason the market is constructive towards PGMs is the supply-side constraints – the fleet of mines in the Bushveld is ageing with declining grades and deeper shafts. Power shortages and disruptions in SA could further tighten the PGM market, but this is likely to hamper the SA-based companies and for them it may prove to be a "zero-sum" game. Secondly, we believe ETFs have cannibalised some of the investment allocation that would have been allocated to equities. Simply put, investors can have exposure to the PGM price without taking on the risk of appreciating currencies, local cost inflation and potential production disappointments. In a sense, the advent of ETFs has been a blessing for the PGM producers but may prove to be a negative in the medium-term. Hence, we prefer companies with growth beyond exposure to equities that offer growth or have a better track record compared to its peers in managing the operating environment. In our coverage universe, only Aquarius and Impala have matched the performance of the rand PGM basket price, and we believe these companies are well positioned to at least match the rand basket price.

Figure 26: PGM basket vs equity performance rebased to 100 from 2007



Source: Thomson Financial Datastream, Deutsche Bank

Appendix 1

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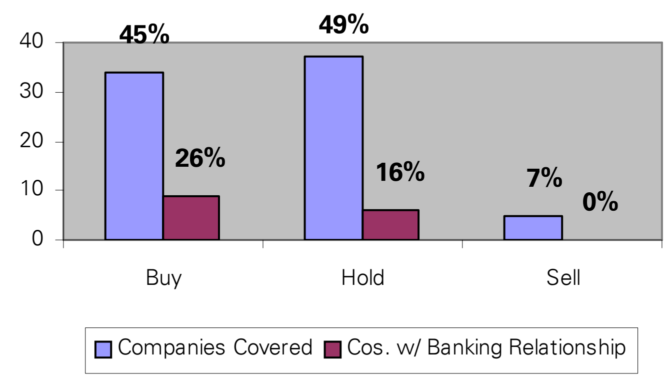
Equity rating dispersion and banking relationships



GEMs South African Universe

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