Mining Strategy
Diamond expert call: Key takeaways

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Diamonds: market softer after strong H1 but outlook still encouraging

Since our previous call in Jun-18 (Link), rough prices have come under pressure. But our consultant is upbeat, seeing supply falling, demand growing with GDP & inventories low; he expects a good selling season in the US/mid-stream restocking to lift rough prices in Q1-19. Synthetics are a risk but De Beers (DB) is taking control of the market.

Demand: US & China strong in H1; generic marketing picking up

The US accounts for ~50% of global demand with China ~20% & India 5-8%. In H1-18, retail sales were strong in the US (Signet, Tiffany & LVMH) & Greater China was recovering (Chow Tai Fook new store openings up materially); India was subdued to bankruptcy of Modi retail business/Rupee/gold price. The US is well positioned into the key 4Q selling season supported by increased spend on generic marketing (DPA now spending $85m, still below DB ~$200m in 1980s); weaker yuan/ falling stock market is a concern for China. Mid-stream re-stocking in 1Q19 has the potential to support rough diamond demand. Global consumer diamond demand is to grow ~4% in 2018. While marriage rates decline in DM's, self-purchase by women is lifting; millennials appear less of a risk while China/ India's middle class is key diamond growth driver.

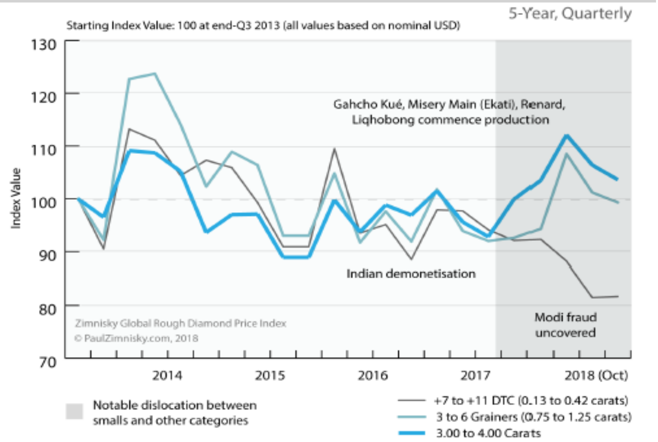
Supply: rough production to fall; synthetics threaten low quality

Supply will fall by ~18mct or 12% over 3yrs to ~131mtct as mines deplete (Rio: Argyle 10mct; DB: Victor, Voorspoed, Namibia alluvial; Alrosa: Jubilee -5mct). Key sources of new supply are Angola (Luaxe - medium quality ~10mct) and Zimbabwe (Marange potential to lift supply from 2022), but visibility on timing and volumes are less clear. Alrosa (Verkhne-Munskoye - 2mct) & DB (Jwaneng Cut 8&9, Venetia u/g) are investing in new mines but these are largely for replacement/life extension. Rough inventories are low. Synthetics are a risk to smaller stones; the mkt is currently small (~2mct) but can grow rapidly with China producing 10bnct of industrial quality diamonds.

Prices now falling after H1 pick-up; smaller stones particularly weak

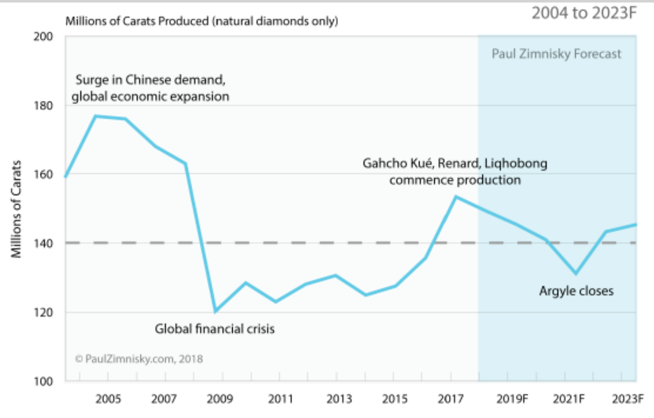
Polished & rough diamond prices increased in Q1-18 for 1st time in 3yrs supported by low inventories & strong demand; in Q3 however prices of smaller stones (<0.5ct) fell ~11% due to oversupply & mid-stream pressures; prices of higher quality stones have also softened but are up YTD with the market becoming increasingly segmented.

Figure 1: Rough diamond price performance by size



Source: Paul Zimnisky diamond analytics

Figure 2: 2005-2023 Global rough diamond production



Source: Paul Zimnisky diamond analytics

Key takeaways from expert call

UBS hosted a call with Paul Zimnisky, a leading independent diamond consultant on 19th November to discuss the outlook for diamonds. Paul covered price trends (polished and rough), the supply & demand outlook and inventory levels as well as the challenges from synthetics, mid-stream financing and changing consumer habits. The replay details are: +44 207 136 9233 (Link for other replay numbers); Passcode: 90969896

Prices: starting to pick up after downtrend

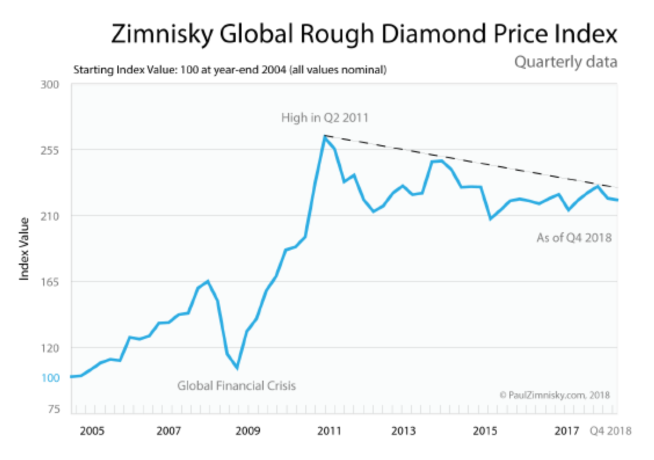
Like for like rough diamond index prices are up >40% in the last decade

Rough diamond prices have risen >40% in the last decade however much of this was in 2008-2011 after the global financial crisis when prices rebounded in just over two years from Q1 2009 to Q2 2011 led by engagement jewellery demand growth in China.

Polished & rough diamond prices increased in Q1-18 for 1st time in 3yrs supported by low inventories & strong demand with prices hitting a 52-week high in May but are still well below previous highs in 2011 and 2014. In Q3 however prices of smaller stones (<0.5ct) fell ~11% due to oversupply & mid-stream pressures; prices of higher quality stones have also softened but are up YTD with market increasingly segmented.

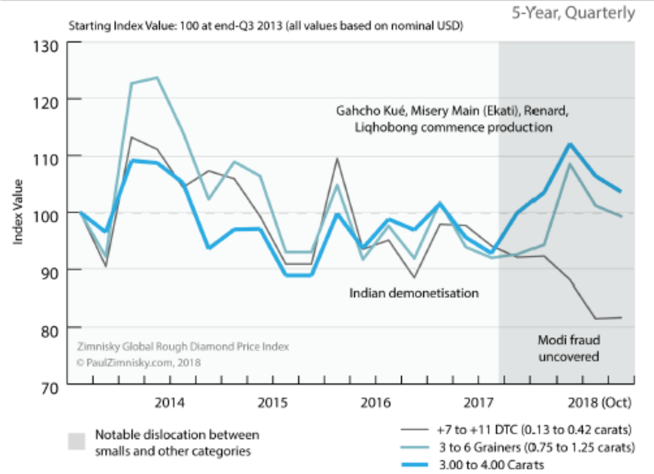
Despite recent price weakness, Zimnisky is upbeat, seeing supply falling, demand growing with GDP & inventories low; he expects a good selling season in the US & mid-stream restocking to lift rough prices in Q1-19.

Figure 3: Zimnisky global rough diamond price index



Source: Paul Zimnisky diamond analytics Note: All global figures are based on **nominal** estimates (www.paulzimnisky.com)

Figure 4: Rough diamond price performance by size



Source: Paul Zimnisky diamond analytics Note: All global figures are based on **nominal** estimates (www.paulzimnisky.com)

Demand robust with global GDP

Over the last 10 years polished diamond end demand has grown around 32% from US$19bn in 2008 to estimated $25bn in 2018. At the same time diamond jewellery demand has grown 27% in real terms from US$59bn to $87bn over the same period. Global consumer diamond demand is forecasted to grow at a nominal ~4% in 2018 as illustrated below; largely driven by robust US growth.

Figure 5: Nominal global polished demand growth

All figures in USD Bil	*Jewelry*		*Diamond Content*	
	Jewelry[2]	Diamond Jewelry	Diamond	**Nominal Growth**
2016A	$231.2	$75.1	$23.3	N/A
2017A	$245.4	$79.2	$24.1	3.7%
2018	$259.7	$83.8	$25.1	4.0%
2019	$273.2	$88.1	$26.0	3.5%
2020	$287.3	$91.9	$27.1	4.3%
2021	$301.7	$96.6	$28.5	5.0%
2022	$316.7	$100.6	$29.7	4.2%

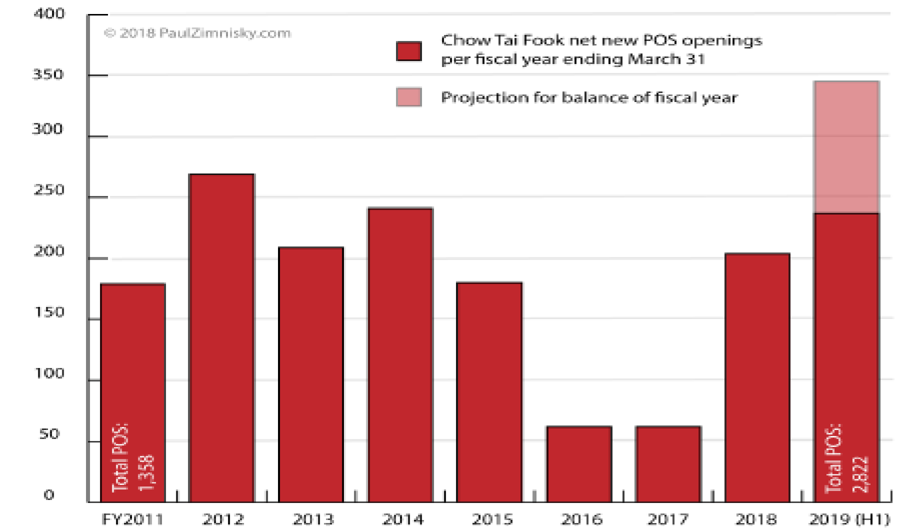
Source: Paul Zimnisky diamond analytics (www.paulzimnisky.com)

The US is the "anchor" for global diamond demand accounting for almost 50% of the market. Fine jewellery (>$1000 value) has been losing market share to fashion jewellery (<$500-700) however retailers have been reducing the value of diamonds in jewellery to maintain consumer spending.

In China (~20% of demand) the growth of the middle class has seen consumer demand migrate towards less expensive, lower quality diamonds similar to the demand profile in the US. The Chinese government has also taken steps to incentivise more consumer consumption domestically including announcing that it would cut import tariffs on gemstones from 35% to 10% as of 1st July 2018. After weakness in new store openings in 2016 & 2017, New Chow Tai Fook new openings point to a more positive outlook on consumer demand in 2018; however we acknowledge that weakness in the yuan & Chinese equity markets and signs of softening in Chinese consumer confidence are risks to demand in 2019.

India, the 3rd largest (~8%) and fastest growing consumer market is being spurred by the growing affluent middle class and by population growth which is approaching that of China (1.3bn). The Nirav Modi and Mehul Choksi alleged fraud is expected to exceed US$2bn and negatively impacted demand in 1H18 with their bankrupt retail business having ~50% market share in India. The event may encourage consolidation among the midstream operators and could set-up for some re-stocking in 2019.

Figure 6: Chow Tai Fook Net New POS Openings



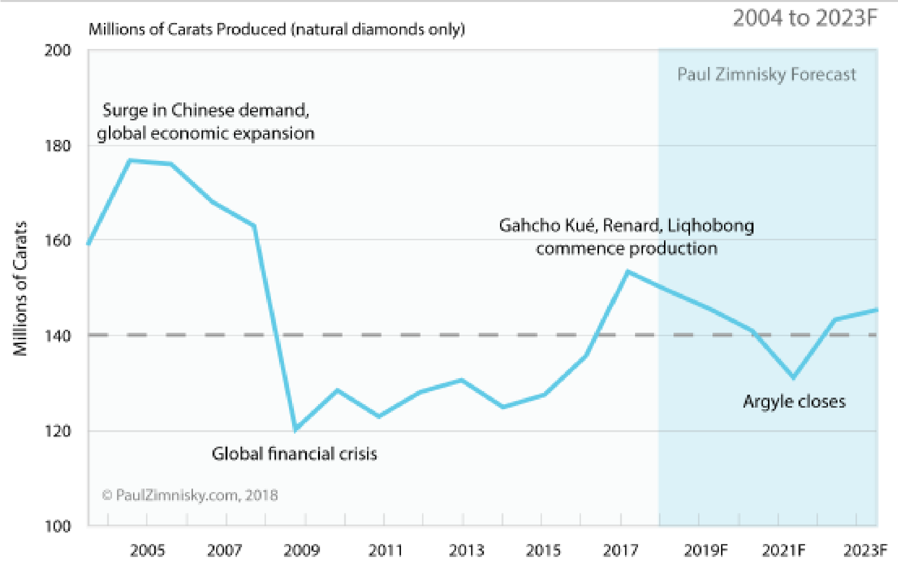
Source: Paul Zimnisky diamond analytics (www.paulzimnisky.com)

Supply set to fall with mines depleting

South Africa, Namibia, Russia and Canada are the main diamond mining centres.

Russia and Botswana are the top countries for diamond mining by volume and value. Mined diamond supply by total carats peaked in 2005 at around ~175Mcts before dropping sharply to a low of 120Mcts during the GFC in 2009. Supply has recovered since with output at ~150Mcts in 2017 however ageing mines and long lead times are forecast to lead to supply falling through 2021 as illustrated below.

Figure 7: 2005-2023 Global rough diamond production



Source: Paul Zimnisky diamond analytics (www.paulzimnisky.com)

In 2018, global natural diamond production is expected to fall 1.9% to 149mCts with De Beers and Alrosa forecasting a decrease in production. Over the last few years, the major producers have curtailed supply when deemed necessary to restore the supply/ demand balance. Excess inventory levels for both producers has fallen significantly since 2015 with De Beers' now estimated at ~5mCts and Alrosa at ~3.5mCts.

Zimnisky expects rough diamond supply to decline by ~20mCts over the next 4 years and the market to be in deficit. The main drivers of falling supply are:

- **Argyle**: the last year of production at Rio Tinto's underground Argyle mine in Australia is expected to be 2019, based on current reserves. This mine produces 10-12mCts pa (down from peak of 40-50mCts) though the quality of the stones is relatively low (albeit there are some fancy pink stones). Rio has the potential to invest more in the underground block cave to extend the life though the economics are questionable (especially after the previous investment).

- **De Beers** three of De Beers' older operations (Victor, Voorspoed, and the alluvial mines in Namibia) are approaching end of life and are all expected to be closed in the next 3-4 years. These operations are however relatively small, only producing ~2mCts in 2017.

- **ALROSA's** largest mine, Jubilee, is set to decrease from an estimated 10mCts in 2017 to 5mCts by 2020 as the mine depletes. Alrosa also expects no production from Mir until at least 2020, after a flooding incident in summer 2017 halted production; the mine had a production capacity of 3mCts annually.

There are currently 2 mines which are in development, the **Luaxe** project in Angola and Alrosa's **Verkhne-Munskoye** project. Luaxe has the potential to be a top 5 diamond mine in the world but is currently expected to have annual production just in excess of 1mCts. ZCDC, Zimbabwe's government-run diamond unit, has plans to ramp up to 10mCts annually by 2022 at the recently nationalised Marange operations; this is to be supported by a $400m investment over the next 5 years.

Figure 8: Estimated rough inventory levels of major producers 2013-2018

De Beers

	Production	Sales	Inventory Change	Est. Inventory
2013	31.2	29.8	1.4	14.8
2014	32.6	34.4	-1.8	13.0
2015	28.7	20.6	8.1	21.1
2016	27.3	32.0	-4.7	16.4
2017	33.5	35.1	-1.6	14.8
2018[1]	26.2	23.8	2.4	17.2

Estimated normal operating inventory: 11.9

Estimated current excess inventory: 5.3

ALROSA

	Production	Sales	Inventory Change	Est. Inventory
2013	36.9	38.0	-1.1	17.5
2014	36.2	39.6	-3.4	14.1
2015	38.3	30.0	8.3	22.4
2016	37.4	40.0	-2.6	19.8
2017	39.6	41.2	-1.6	18.2
2018[1]	26.4	28.9	-2.5	15.7

Estimated normal operating inventory: 12.1

Estimated current excess inventory: 3.6

Source: Paul Zimnisky diamond analytics (www.paulzimnisky.com)

Figure 9: Key risks which industry faces

Micro: 3 Primary Challenges Facing the Industry

- **Supply chain opacity and consumer trust**
  - Implication: Current generation has been significantly exposed to negative industry PR surrounding unethical sourcing and environmental impact of diamond mining
  - Industry response: Increase supply chain transparency via blockchain and other new technology; branded diamonds; personalized customer experience and custom jewelry
- **Changing consumer preferences and declining marriage rates**
  - Implication: Newer generations spending less on luxury, declining marriage rates
  - Industry response: Return of generic marketing via DPA targeting Millennials, non-married couples and self-purchasing women; targeting Chinese and Indian consumer
- **Lab-created diamonds**
  - Implication: Lab-created diamonds taking market share from natural and undermining value
  - Industry response: Strategic bifurcation of product via Lightbox; readily available screening equipment

Source: Paul Zimnisky diamond analytics (www.paulzimnisky.com)

Figure 10: De Beers synthetic strategy views

Lab-created Diamonds

- **Natural diamond production 2018E**
  - Global average cash cost per carat (ex. artisanal): $75-100
    - E.g. Letšeng $1,000, Ekati $30
  - <20% of production is >1-carat (rough)
  - Product mix cannot be controlled
  - Quality enhancement considered unacceptable
- **Lab-created diamond production**
  - Light-box selling 1-carat (polished) for $800
    - Initial sell-out of larger solitaire products
  - Chinese generic 2-carat (rough) selling for $300
  - Product mix can be controlled
  - Enhancement acceptable because already man-made
- **Polished price differential in Q4 2018**
  - Generic lab-created discount to natural: 40-50%
  - Lightbox discount: 70-80%

Image source: Lightbox

WWW.PAULZIMNISKY.COM

Source: Paul Zimnisky diamond analytics (www.paulzimnisky.com)

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Neutral	FSR is between -6% and 6% of the MRA.	37%	21%
Sell	FSR is > 6% below the MRA.	15%	12%
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Source: UBS. Rating allocations are as of 30 September 2018.
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