

industrial applications (semiconductors, quantum-computing, lasers, etc). If the CVD industry can expand capacity to supply these sectors, in our view it is likely that capacity growth would be sufficient to meet demand growth for diamond jewellery.

On page 39, we summarise multiple other planned capacity additions and endorsements of synthetic diamonds; a number of them are pushing the 'ethical' angle for synthetics. We expect to hear of more announcements of planned capacity additions and endorsements of synthetic diamonds in the coming months, which should help to support growth in the category from its current low base.

## Modelling synthetic diamonds

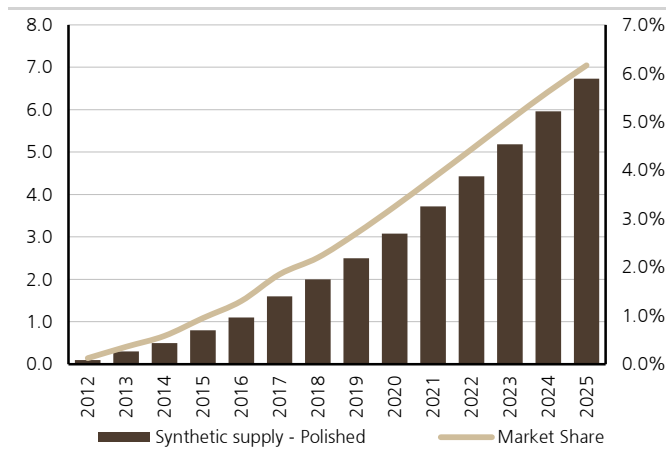
Visibility and availability of data on the broader diamond market (defined as Gem quality diamond produced for fine jewellery) is challenging; the "synthetic diamond market" can be further nuanced as the vast majority of the large (10bnct) synthetic market goes into industrial or fashion jewellery and therefore does not directly compete with gem quality natural diamonds.

For supply & demand analysis synthetic diamonds can either be viewed as a supply item (substitution for mined rough diamonds) or a demand item (substitution for polished diamonds by jewellery manufactures). We take the demand approach; we model total gem quality jewellery demand (natural + synthetic) and deduct projected supply of polished synthetic diamonds to derive demand for natural diamonds. Therefore the faster the growth/penetration in synthetic diamond demand the slower the growth in demand for natural diamonds (see model summary on page 27).

Diamond consultant Paul Zimmisky estimates that synthetic diamond sales (gem-quality diamonds produced for jewellery) were c\$2bn in 2018; equivalent to 2.2% of the global diamond jewellery market. He estimates that the synthetic market grew by 40-50% p.a. between 2014 and 2018.

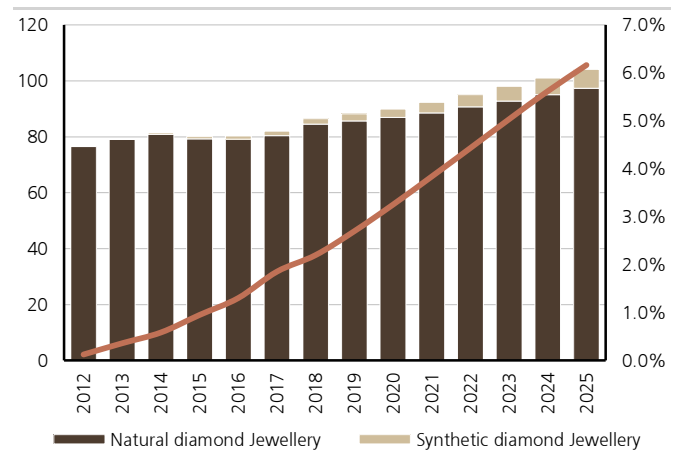
We acknowledge that forecasting growth in a new/immature market from a currently low base is challenging and we focus more on our sensitivity analysis. However, in our base case we assume growth in synthetic diamond demand expands at a CAGR of 20% over the next five years, with the synthetic diamond market reaching c\$5bn in size or ~5% of the global diamond jewellery market by 2023.

**Figure 57: Synthetic diamond supply (US\$bn) and global market share**



Source: Paul Zimmisky, UBS estimates

**Figure 58: Global diamond jewellery market (US\$bn) – natural vs synthetic**

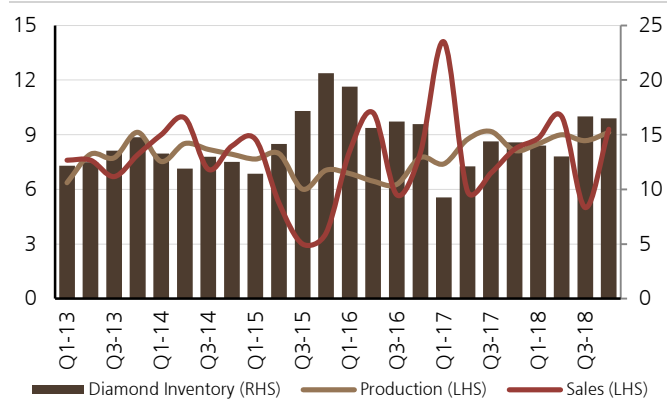


Source: Paul Zimmisky, UBS estimates

**Inventory trends:** Paul Zimnisky estimates that rough diamond inventories held by the majors have averaged ~30mcts over 2013-18, with Alrosa and De Beers both holding ~15mcts. We note that in response to weak demand in 2015, both of the majors cut production and built inventory, and it took some time for this inventory to re-enter the market – this is likely to have suppressed rough diamond price upside in 2017/18.

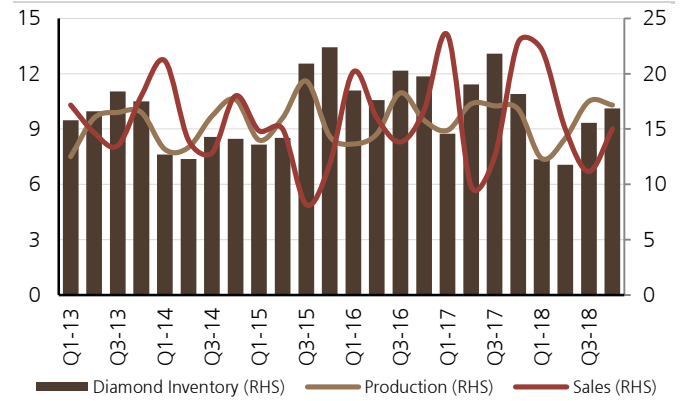
After building inventory in 2H18, we estimate that inventories are now c3mcts above the average seen over the last six years and the majority of this inventory is likely to be small/low value. The inventory build is not nearly as severe as in 2015 (16mcts), but in our view the majors are sitting on slightly higher than 'normal' inventories. We think growth in rough diamond demand and some midstream restocking will be able to absorb much of this inventory in 2019/20, but we caution that it may cap potential price upside, particularly for smaller stones.

**Figure 66: De Beers – Diamond production, Sales and Inventory (Mcts)**



Source: Anglo American, Paul Zimnisky analysis

**Figure 67: Alrosa – Diamond production, Sales and Inventory (Mcts)**

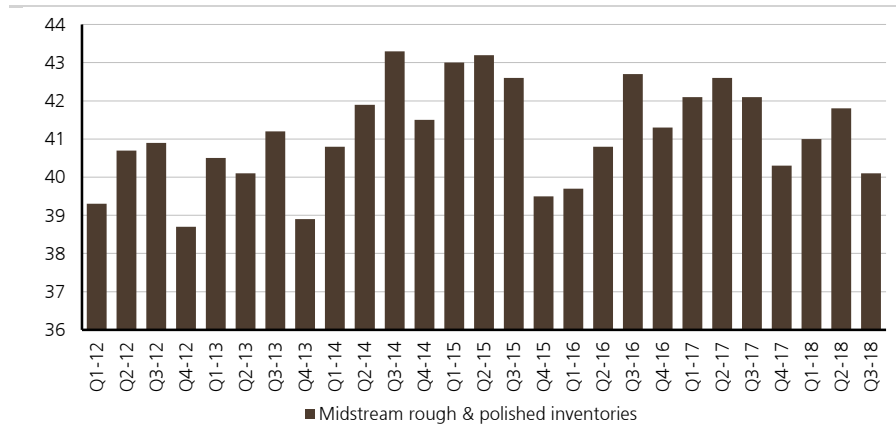


Source: Alrosa, Paul Zimnisky analysis

**Seasonality:** We note that diamond demand is seasonal, with peak demand seen around the traditional gifting season in the US in 4Q (Thanksgiving and Christmas) and in China in 1Q (Chinese New Year). This creates some natural seasonality in inventory build, particularly for Alrosa, which has a seasonal peak in alluvial diamond production in 2Q and 3Q.

**Midstream** inventories tend to move in the opposite direction to producer inventories. Alrosa estimates that midstream inventories fell by ~2mcts in 2H18.

**Figure 68: Midstream rough & polished diamond inventories (mcts)**



Source: Alrosa

## Pricing: Size/quality divergence in 2H18

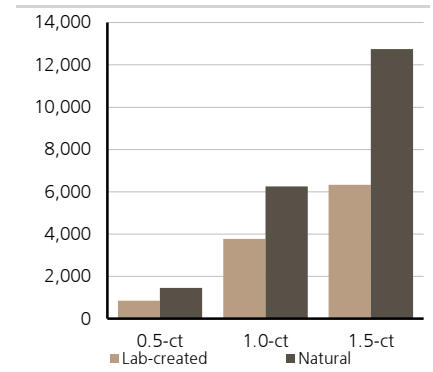
Pricing is one of the most opaque components of the diamond market due to the exponential relationship between diamond pricing and size/quantity and limited disclosure by the major producers (Alrosa and De Beers) on the specific sizes and qualities of diamonds produced/sold in any period. This makes it difficult to distinguish between underlying price trends and the impact of varying size/quality from individual producers and the broader market.

There are a number of pricing benchmarks available that are calculated using different slightly methodologies:

**Rough diamonds** – For diamond miners the key benchmark for forecasting revenue is the rough diamond price. Polished Prices.com (available on Bloomberg) produces the most readily available rough price indicator. As well as publishing their own realised prices, which are impacted by product mix, De Beers and Alrosa publish market price indices at varying intervals; we also follow diamond consultant Paul Zimnisky's price index (Zimnisky Global Rough Diamond Price Index – [Link](#)). Given the easier availability of data for equity market participants, we base our price forecasts on the Polished Prices Rough Diamond index, but note that realised prices for key producers can vary substantially (see below).

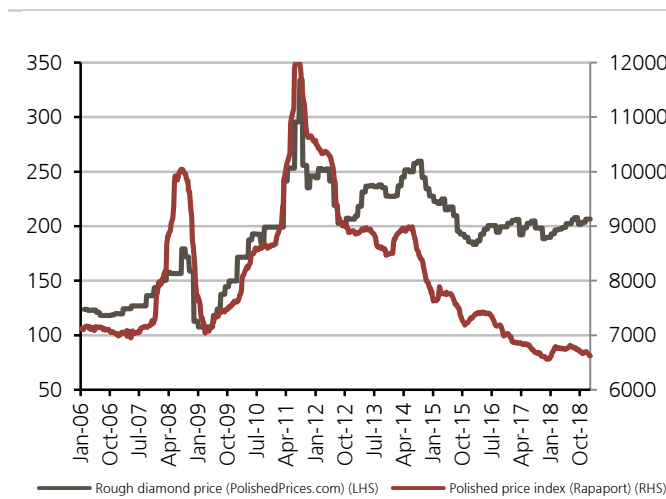
**Polished diamonds:** Tracking polished diamond prices is a useful indicator of the underlying health of the mid-stream diamond polishing industry and supply and demand dynamics in the polished diamond market, but the major diamond producers have limited direct exposure to the polished price. The most readily available reference for polished diamonds is the Rapaport Index (available on Bloomberg), but Rapaport also produces a range of reference prices for different sizes and qualities of diamonds.

**Figure 69: 1Q19 polished diamond pricing by size (US\$/ct)**



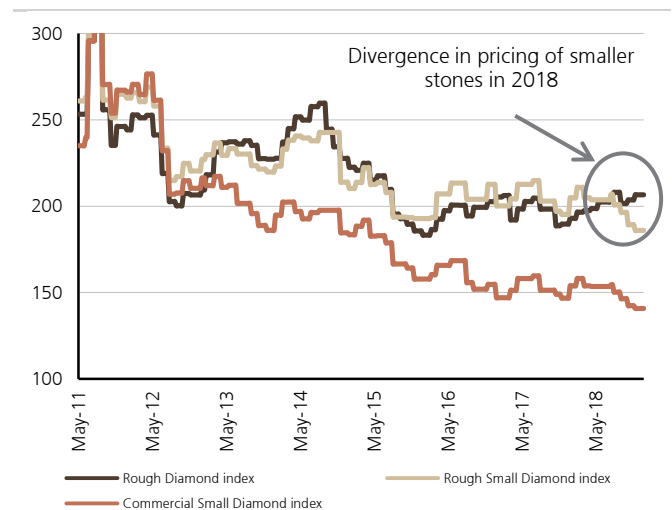
Source: Zimnisky research

**Figure 70: Rough and Polished diamond prices**



Source: Bloomberg

**Figure 71: Rough diamond prices**



Source: Bloomberg