

The Golden Sunset



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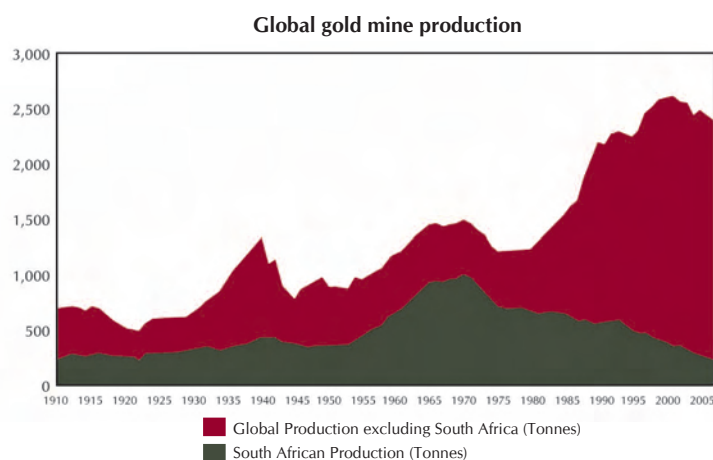
Late last year a controversial article¹ was published in the South African Journal of Science. The author (C.J.H. Hartnady) estimated current South African gold reserves to only be half the size of the figure cited by The United States Geological Survey². His contentious calculation predicted the actual tally to only be 2948 tonnes compared to the 6000 tonnes reported in the survey.

He went on to conclude that the Witwatersrand goldfields are now almost 95% exhausted and that the area's annual production rate will fall permanently below 100 tonnes over the next decade.

While the magnitude and extent of Mr. Hartnady's conclusion is controversial, his gloomy prediction for the South African gold industry is not. This research article explains why this is the case by reviewing the sector's history and putting the current situation in context. It then highlights the key problems and tries to assess the implications for the country and the industry's main stakeholders.

In The Beginning ...

Archaeological evidence at Mapungubwe and K2 suggest that almost a millennia ago early South Africans were bartering gold with traders from East Africa, Persia, Egypt, India and China³. At this time gold was used sparingly and reserved for significant individuals who used the brilliant metal for adornment and as a symbol of status. It wasn't until 1886, when gold was discovered on the Witwatersrand, that South Africa's mass production of the precious commodity truly began. By the time the Union of South Africa was formed in 1910, the country's annual output was already a third of global production.



Source: South African Chamber of Mines, Afena Capital.

¹ Hartnady C.J.H. (2009). South Africa's gold production and reserves. South African Journal of Science 105: 328-329.

² U.S. Geological Survey (2008). Mineral Commodity Summaries. U.S. Government Printing Office, Washington. Online at: <http://minerals.usgs.gov/minerals/pubs/mcs/2008/mcs2008.pdf>

³ <http://www.mapungubwe.com>



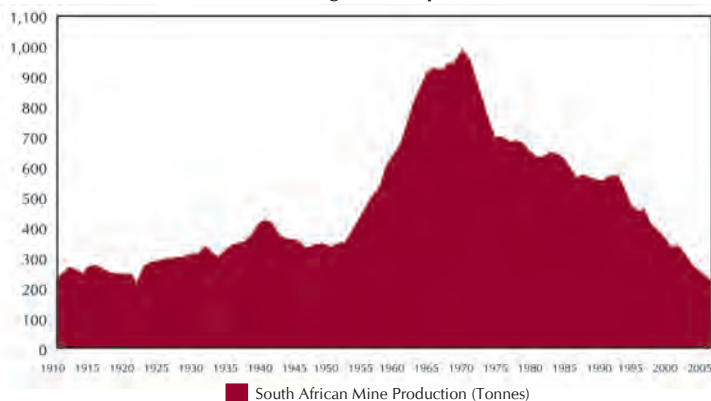
Gold may be a malleable substance but it was this soft metal which ironically shaped South Africa's post colonial history. It was gold that transformed the poor Boer republic of the Transvaal into the world's richest gold mining area and allowed Johannesburg to eventually overtake Cape Town as the country's largest settlement. It was this rapid development which helped create infrastructure (railways and roads), institutions (The Johannesburg Stock Exchange) and many supplementary businesses - all built to help supply the burgeoning gold mines. Unfortunately it should also be noted that the discovery of gold on the Witwatersrand contributed to the ongoing tension between the Boer government and the British, culminating in the Jameson Raid and eventually the Second Boer War. The mines' need for labour also drove oppressive policies (taxation and regulation) aimed at land control, urbanisation and the creation of the migrant labour system. In order to control the large number of Africans coming into the urban areas the Kruger government eventually introduced the pass system, a regime which remained in place in one form or another until 1986^{4,5}.

While one of gold's most endearing properties may be its inert nature, it only takes a cursory glance at South Africa's development and history to realise that gold was a key catalyst in creating the country we know today.

The Slow Demise ...

South Africa's annual goldmine production peaked in 1970 at just less than a thousand tonnes. Since then the country's yearly output has steadily declined and is now only just above 200 tonnes per year (80% off the peak and at a level last seen in the early 1900s).

South African gold mine production



Source: South African Chamber of Mines, Afena Capital

South Africa's contribution to global gold production has therefore reduced from 68% at its peak in 1969 to less than 9% today. This point is important because the South African gold industry, given its greatly reduced contribution, may not necessarily see the benefit in the gold price should its contribution to global supply fall further. This is a key difference between the South African gold and platinum miners. The platinum miners are likely to recoup their lower production and higher costs in the actual platinum price, given the fact that almost 70% of the metal still comes from South Africa.

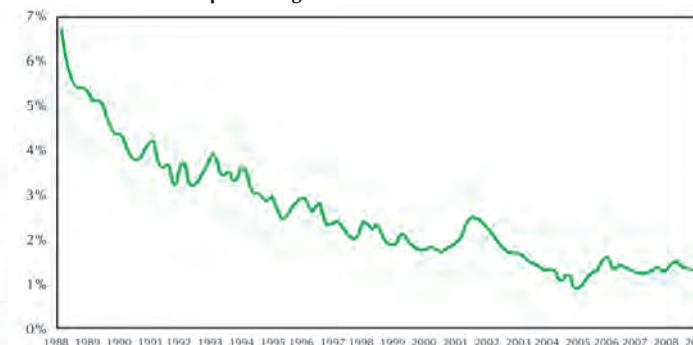
South Africa's contribution to global gold production



Source: South African Chamber of Mines, Afena Capital

Gold mining is also losing its significance in the South African economy. The graphs below show gold's contribution to the South African gross domestic product (GDP) and the country's export earnings. The data only goes back to 1988 and 1998 respectively but it gives a clear indication of the trend. Gold sales used to directly make up almost 7% of South Africa's gross domestic product, now they make up a little more than 1%.

Gold mine sales as a percentage of South Africa's Gross Domestic Product

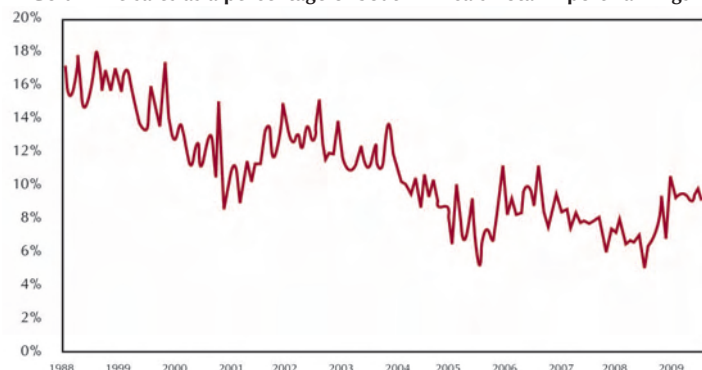


Source: I-Net, Afena Capital

⁴ <http://www.sahistory.org.za/pages/library-resources/online%20books/all-that-glitters/the-glitter-of-gold.htm>
⁵ Gold in South Africa 2007, Genesis Analytics (Pty) Ltd. Online at: <http://www.goldinsouthafrica.co.za>

Gold sales used to directly make up almost 18% of South Africa's export earnings, now they make up a little less than 9%.

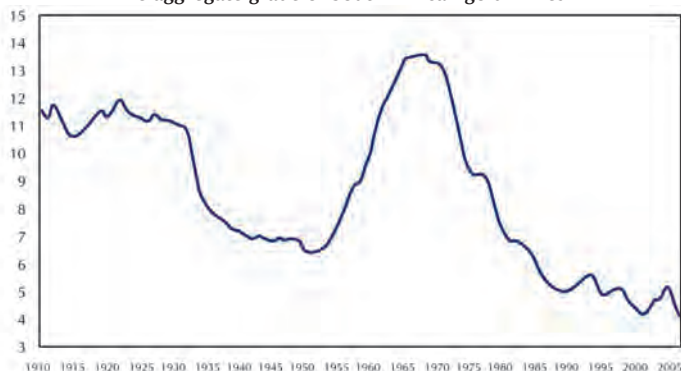
Gold mine sales as a percentage of South Africa's Total Export Earnings



Source: I-Net, Afena Capital

The reason for this dwindling production is fairly obvious. The South African deep level mining industry is more than a hundred years old and has therefore already mined out most of the easy and inexpensive ore. Every new ounce of gold consequently takes more energy, labour and money to extract. The declining quality of the South African mineral resource is well represented in the graph below which shows the South African gold mine's average grade (how many grams of gold one gets for every tonne of ore mined) through time. It shows that to get the same amount of gold as in the 1960s, the miners must now mine at least three times more ore.

The aggregate grade of South African gold mines

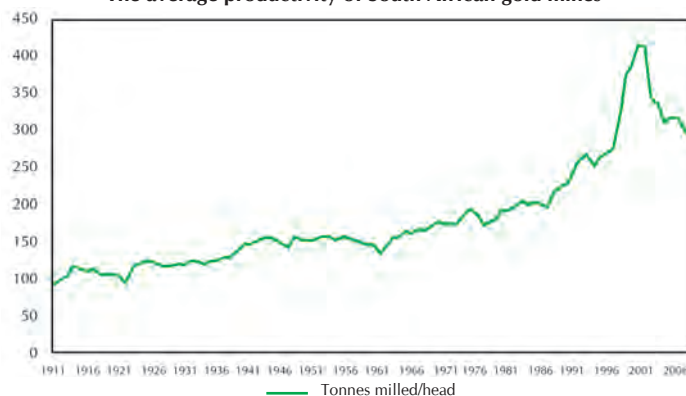


Source: South African Chamber of Mines, Afena Capital

It should be noted that the decline in grade is not just due to a drop in the asset quality but also due to a change in mining method (open pit mining is feasible at much lower grades) and improvements in technology (heap leaching enabled the mines to process low grade dumps). The trend is however once again what is important and shows that even if the exogenous cost factors were immaterial (which I shall show in a moment are not) the ability of the South African gold industry to generate profitable ounces is waning.

The decrease in production is not purely a function of the mine's declining grade. The graph below shows the tonnes of ore mined by the average South African mine employee through time. Up until 2001 the productivity of the average South African gold miner was increasing (most probably due to technological advancement). The last eight years have however seen this trend reverse with the average amount of ore milled per employee decrease from 411 tonnes to only 288 tonnes, a 30% decrease. The reason for this reversal isn't clear but higher absenteeism (maybe due to HIV and its related illnesses), illegal mining and safety stoppages most probably all play a part.

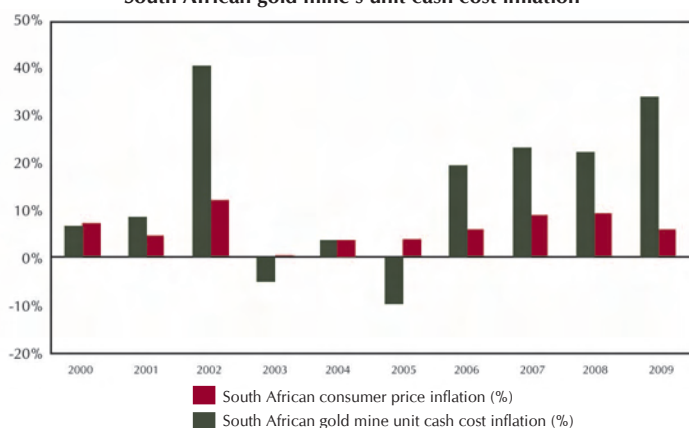
The average productivity of South African gold mines



Source: South African Chamber of Mines, Deutsche Securities

Not surprisingly, these poor production results, when combined with elevated cost pressures, result in very poor unit cash cost performance. The graph overleaf shows the industry's annual unit cash cost inflation over the last ten years.

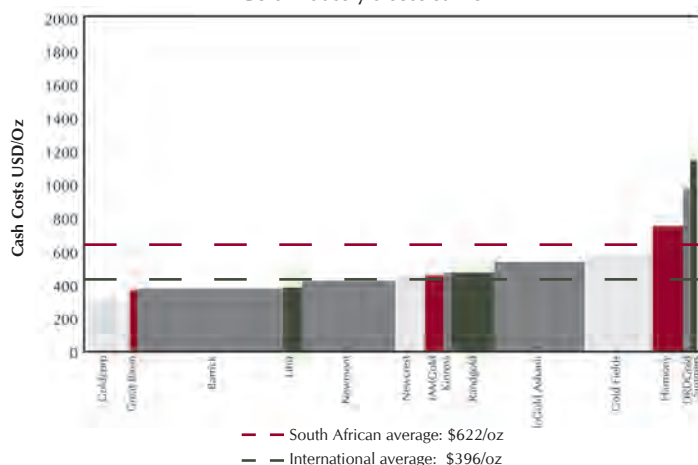
South African gold mine's unit cash cost inflation



Source: Deutsche Securities

These extraordinary increases, combined with a strengthening Rand have caused the South African gold miners to become the most expensive in the world. The graph below represents the global cost curve and clearly shows that, at the current exchange rate, it costs the South African gold miners more to produce an ounce of gold than most other mines in the world.

Gold industry's cost curve



Source: Deutsche Securities

These graphs show a gloomy picture for the South African gold mining industry. They show a drastically declining production profile, driven not only by deteriorating assets but lower productivity.

They show rampant cost escalation propelled by lower production, more expensive consumables, above inflation wage demands and higher electricity tariffs. They show an uncompetitive industry, which has lost its significance in the gold market and therefore has little hope of being compensated by a higher gold price for its declining volume. The situation really does seem dire and could have negative implications for the sector's key stakeholders unless these very same stakeholders change their behaviour. Praying for a higher gold price is not a viable strategy.

The Future ...

South Africa still has a significant gold resource. The problem is that most of this metal is buried in such a manner as to make it uneconomical to extract and process. In fact, many of the tonnes being produced currently by the large South African gold mines are unprofitable (before one even starts taking the cost of capital into account). The future of South African gold mining is therefore clear. Unless the sector is saved by a significantly higher Rand gold price, production will continue to reduce to a level where (a) the cost of the tonnes being mined is globally competitive and (b) the new marginal shareholders are fairly compensated for their capital. What isn't as clear is how the industry gets there. If the current conditions and actions persist, the route will be drawn out and even more resources (both capital and human) will be lost.

The more proactive approach would see shareholders refusing to continually fund unprofitable capital expenditure. It would see management taking the initiative and actively closing the poor quality mines and focusing their energy on redeploying the firm's resources to profitable and sustainable enterprises. It would see labour understanding the dire situation on many of the country's gold fields and being open to any opportunities to re-skill. Employment in the industry is already a fraction of what it was. Taking the initiative to re-skill now and pre-empting the continuation of the existing trend would not only help the mines return to economic profitability but also give the employees extra time to gain the training required to find employment outside this mature sector.

Total South African gold mine employees



Source: South African Chamber of Mines, Deutsche Securities, Afena Capital

By refocusing the South African gold industry, fewer more profitable mines will need to be managed. The existing capital can be more effectively deployed, ensuring better safety and job security for the employees. New capital will once more be fairly compensated for the inherent risk and investor confidence in the sector will be restored. Only then will the South African gold industry be sustainable and be assured of a smaller, but brighter future.