Hedging gold production: an analysis of historical South African gains and losses

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Transaction Paper

Synopsis

South Africa remains the largest global producer of gold, accounting for 11.3 per cent of total world mine production, which amounted to 2520.2 t in 2005. The benefits and disadvantages associated with hedging practices in general, and among South African gold producers is examined. The wide variety and unique nature of risks faced by the mining industries provide a strong case for hedging. Only the principles of hedging, such as selling ounces of gold in the ground at a pre-agreed price for delivery at a future date as a cost-effective mechanism for price risk management, is discussed. Progressive and cumulative increases in the volume of forward sales in the major producing countries are considered by many to be the cause of the declining gold price over the past decade. In spite of negative publicity, forward selling continued as an industry-wide practice until recently (2002) when the global hedge book contracted by 352 t; contraction amounted to 158.6 t in first quarter of 2006. The objectives and benefits of hedging include continuity and stability of cash flows, stability in price achieved, reduction of frictional costs, and creating an effective management tool.

The importance of a defined hedging strategy in reducing uncertainty about the hedging objectives is essential to a successful hedging policy. Historical patterns in hedging revenues at an industry level indicate five distinct periods during which the fortunes of hedgers have fluctuated. Finally, since 2001 the rising gold price and reduced price volatility through the consolidation in the global price means that the need to stabilize revenue flows is less urgent. This has meant that hedging is becoming progressively less important for the mining industry at large.

Introduction

The mining industry faces financial risks to its profitability, cash flows and value chain, unlike those in any other industry. In a recent study (Rockman *et al.*, 2003), the risks have been shown to arise as a consequence of volatility in the exchange rates, interest rates and commodity prices. Because of the direct, but weak linkages between a mining company's balance sheet and the principal asset of the company, namely the orebody as reflected in the Mineral Resource and Reserve Statement, changes in the price of gold are not rapidly reflected in expansions or contractions of the ore reserves or the life of mine. Furthermore, changes in the value of the orebody, due to changes in the price, cannot be reflected in the company balance sheet until the gold is mined and sold. Hedging is just one of many risk management tools (insurance, capital restructuring, risk transfer to customers, etc.) that could be used to stabilize revenue streams. While opponents of hedging view the gold production advanced through hedging as a constraint on higher prices, there is a certain proportion of production that would never have seen the light of day if hedging had not been in place (Lynman, 2006, pers. comm.). Companies with strategic hedging policies have been able to mine much lower grades, grades that would not have mined had the hedge not been in place.

Challenges facing the gold mining industry in the new South Africa, recently examined by Butler and Cross (2005), cover a broad spectrum of issues. Apart from the ever present financial challenges, gold mines in South Africa face legislative and regulatory obligations that will increase social responsibilities, above-inflation wage settlements, an aging workforce with deteriorating health due to HIV/Aids, declining reserves, average grade constraints, and rising costs. The demands of the new regulatory environment in which mines operate arise from the Minerals and Petroleum Resources Development Act (MPRDA), the Broad-Based Socio-Economic Empowerment Charter (Mining Charter) and the impending requirements of the controversial Royalty Bill are also part of the new operating framework. Opportunities for mining companies to stabilize revenue streams in such

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an operating environment are likely to be exploited by management teams. Hedging of future gold production has offered just such relief over the past two decades. This paper does not explain the range, capability and application of tools that are available for hedging; it does not question producers' motives for hedging, nor is it a commentary on either good or bad hedging practice by individual companies. It aims to take a reflective look at the financial consequences of hedging activities in the South African gold mining industry.

The structure and ownership of assets in the gold industry accounts for the way in which hedging is undertaken among South African producers (Lynman, pers. comm., 2006). For example, the way that Harmony undertakes hedging and the way AnglogoldAshanti (AGA) undertakes hedging is dependent on the value of their operations. AGA divested themselves of their low value marginal operations, while Harmony promote their shares on the basis that they do not hedge and that they allow their shares to be fully exposed to the movements of spot price (exploiting the blue sky opportunity). AGA, by contrast, is heavily involved in hedging because it allows them to manage risk and financial security; they have less leverage, but more security. Over the years changes in market structure and asset ownership have affected company hedging policies, depending on what they believe the market is looking for, greater stability or more volatility. Investor expectations about the mining company strategy and the benefits of hedging for the company are significant considerations.

The effects of escalating costs on the relevance and value of the hedge as a preserver of financial integrity can be seriously compromised. The rate at which costs are escalating begs the question 'When is a hedge not a hedge?' If costs are escalating at a rate that exceeds the Libor rate then there is little or no value left in the hedge position. The rate at which costs in the mining industry are escalating can make a hedged position worthless. The influence of the overall commodities market must be assessed. The influence of the economy, its strengths, and direction of movement, its rate of change, on a hedging programme must be assessed.

The value of the asset being hedged is also important; it is not the hedge as much as the proportion of hedged production, relative to total production over the hedged period that is important. Generally the difference between spot price and price achieved should not be the only measure of success of the hedging strategy. The new meter for measuring the success of a hedging strategy must include the proportion of production relative to total production that has been hedged relative to the price achieved and the spot price.

There is not just one approach to hedging—there is no 'one size fits all' approach. Each hedging opportunity has to be evaluated on its own merits. Each hedging opportunity contains its own costs and benefits; and opportunity losses or gains in the hedge must be evaluated. Furthermore, the difference between high and low prices and their influence on taxation of revenues is important. Hedging attracts its own rate of taxation and the methods by which taxation is levied.

The case for hedging

While gold production declined around 13 per cent from 342 t in 2004 to 296.3 t in 2005, South Africa is still the world's largest producer of gold providing approximately 11.8 per cent of the global supply in 2005, its lowest production ever (Levine and Wright, 2006). Of the 33 operating gold mines in the country only 1 or 2 of them, or 2–4 per cent are loss-makers, and a further seven mines are marginally profitable. Profit margins are being eroded as price and cost curves converge and higher production costs affect the viability of a large proportion of the sector; but through a combination of cost-cutting, innovations to improve flexibility and efficiency, eleventh-hour rationalization measures and improved spot prices, weakening of the rand in mid 2006 and hedging practices, most of the marginal mines have ensured their survival. The major problems encountered by the industry since 1994 are due to an increased number of public holidays, labour disruptions and a lowering of pay limits, which has reduced gold output, the deepening of mine workings, the imposition of cost incurred rather than profit related taxes (VAT), and the fact that management fees were unrelated to mining profits (Handley,1996).

The practice of hedging gold production added a meaningful component to gold trade in the late 1970s and early 1980s when producers identified the opportunity to sell gold ahead of its actually being produced in order to create a price that they find acceptable. Much of the early activity of moving unmined physical gold into the financial market ahead of production was clandestine, and information and data were hard to come by for this segment of the market. Although minor amounts of gold were transacted as forward sales in the years 1982 and 1983 (Jacks,1991), forward sales first appeared in measurable supply to the global supply-demand balance in 1983, when 4 t of additional physical supply were recorded from hedging transactions (GFMS, 1992). Since then the physical measures of gold associated with risk management practices grew rapidly, reaching a maximum in the third quarter of 2001. Since then it has diminished by over one third, but the global hedge book is still a substantive part of the gold market (Cross, 2005a). Two and a half decades later, just as the concrete body of knowledge about the subject is being consolidated, the practice appears to be receding into the past as a financial artefact (Cross 2005b). The trend in de-hedging, particularly among the big producers Barrick, AngloGold Ashanti and Newcrest who contributed 80 per cent of the 5.1 Moz decline, as shown in Figure 1, is principally due to restrained hedging activity during 2005. Only 30 0000 oz were added to hedge books in Q2 of 2006.

This is a consequence of the more or less steady rise in the gold price since the first quarter of 2001 and over the first quarter of 2006 which left the global hedge books 8 per cent lighter with the total amount of gold hedged amounting to 1563 t (GFMS, 2006).

Hedging—what it is and how it works

The term hedging has evolved over time as the value and benefits of the process have become apparent. It ' ...is one of

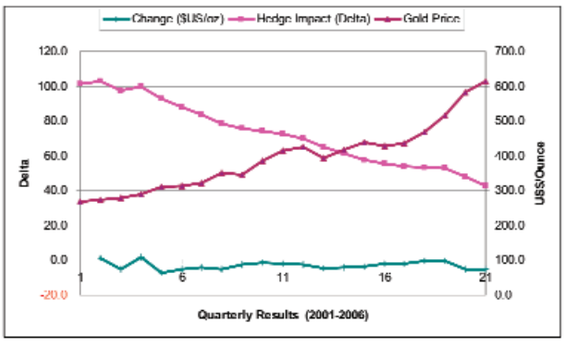

Figure 1—Changes in and declining impact of the hedge Delta with increasing gold price. Data sourced from The Yellow Book November 2005. Edn. 1. *Virtual Metals Research and Consulting*, November 2005. 41 pp.

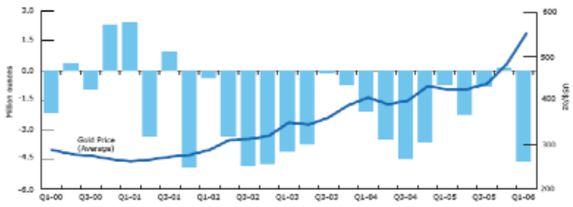

Figure 2—Impact of reduced producer hedging and improved gold price. Source: http://www.gfms.co.uk/Market Commentary Global Hedge Book Analysis Q1 06.pdf

the most important concepts in risk management... ' but it seems there are as many definitions as people you ask (Humphreys, 2005). Although there are explicit rules for hedge accounting (Statement 133) the US Financial Accounting Standards Board (FASB, 2002), never actually defines the term. While it is possible to reduce the risk of exposure by at least 80 per cent, the hedge focuses on only one portion of the total corporate risk profile. Furthermore, any definition must include words that reflect the efficiency of the hedge. The following definition, which is rooted in the idea of a desired risk profile, has been proposed.

'Hedging is any transaction that moves the corporate risk profile towards the shareholders, desired risk profile in the most efficient manner possible' (Rockman *et al.*, 2003, p 3).

Perhaps a simpler and more appropriate definition is that:

'Hedging refers to the selling of as yet unmined gold at a prearranged price for delivery in the future.' (Rockman *et al.*, 2003, p 1).

According to a study undertaken by Pricewaterhouse-Coopers in 1999, failure of management to understand, design, control, communicate and account for their hedging strategies has been the cause of significant number of financial crises in the mining industry. The report identified five key areas that mine management should consider, including the reason for hedging, the tools available, the control and monitoring of a hedging strategy, the importance of communication to stakeholders, and the implications for accounting.

It was uncertainty about just such issues that led the South African Reserve Bank (Bank) to establish a facility known as the Stabilised Gold Contango in 1983 when forward sales of gold production was first recognized as a means of reducing price volatility for South African gold producers. With the Bank's assistance South African producers wanting to enter the hedge markets received a flat rand price known as a stabilized contango for up to two years. In this way the Bank undertook to hedge the exchange rate risk for producers who want to enter into forward sales of gold, but are unsure of how to mitigate rand-dollar exchange rate risk.

It has been suggested that Australian producers be commended for their example of proper and sensible hedging, by looking for a disciplined approach supported by sound economic reasons for the practice (Lynman, 2006, pers. comm.). Even when prices were low, the reason that producers maintained and even increased their hedge positions, is that hedging provides risk certainty on price, especially in markets viewed as bearish for the longer term. Ashanti and Cambior provide examples of producers who were overexposed on their hedge books such that their funding structures were created simply to bring in the cash. Prices were artificially low at the time they opened their hedge books. When prices rose, their overleveraged position cost these companies dearly, calling into question the benefits of hedging. Since 2001, the rise in the gold price has pressed the industry into a dehedging mode, indicating the common sense, well-considered approach taken by producers.

Speculation or risk mitigation?

The reason that mining companies open hedge books is the defining boundary between speculation and mitigation of risk. Issues such as a company's risk profile, financial position, risk aversion and general strategic position must be taken into account in order to take a considered hedged position. As South African producers began participating in hedging practices in the early to mid 1980s, no strong boundary between good or bad reasons for hedging existed. Most producers recognized that the promise of speculative profits was not a good reason for entering the market, but the lure was strong and many were tempted to hedge production even when they had no good reason for it. Nowdays no one would admit that this was the case because the element of the unknown has largely been dispelled through detailed specialist understanding of how the derivative instruments work. The hedging process has now gone full circle and will now only be used under specialized project-specific circumstances (Cross, 2003).

Risks faced by mining companies

The range of technical risks faced by mining companies is daunting compared to that of normal production facilities simply because of the exhaustible nature of the resource being exploited. Exploration, mineral discovery, proving the

deposit, mineral development, logistics, financing, marketing and sales of the product affect the entire value chain (Rockman *et al.*, 2003). Economic mineral deposits are unusual in terms of volume and areal extent of the earth's crust. The technical characteristics of exploitable orebody are a function of the complex geological setting and history of its formation and add to the cost of discovery in terms of time and finances and affects exploitation and evaluation. Technical characteristics such as the size, shape, depth, grade, and tonnes are unique to each orebody. The morphology, mineralogy and chemistry of the orebody can vary laterally and in depth, which means that rates of production and average grade of production may vary as the deeper parts of the orebody are extracted. Orebodies vary in location, size, quality, complexity, depth and consequently in economic potential; orebody characteristics that initially attract investors could change as different portions of the orebody are exploited. The economic implications related to the location of the orebody have to be taken into account. Generally capital and technology inputs are high and mineral developments are characterized by high risks associated with uncertain and unsuccessful exploration. When discoveries of potentially exploitable resources are made, investors are faced with long lead times before production begins and revenue streams manifest. Once production begins the orebody is subject to technical, physical and economic depletion (exhaustible—concept of scarcity is implicit), in addition to which mine operators may be subject to political risks.

The location of mineral developments relative to other investments also means that they are subject to risk in terms of input price volatility, and consequently the costs of production can vary considerably unless they can take advantage of hedging tools to limit the exposure to price risk in the cost base. In this regard the cost of fossil fuels or electrical energy could be substantial, depending on the geographic location of the operation.

Financial risks related to variations in exchange rates, interest rates and of course commodity prices, also have to be taken into account. The cash flow at risk increases with time as the variance associated with estimates of price increases with time, being statistically more variable the further into the future that the forecast is made. Foreign exchange risks are normally accommodated in the forward selling contracts through fixed forward exchange rates, while interest rate swaps are commonly used to hedge risks due to adverse variations in interest rates as part of the company's cash management activities. The very high cots associated with forward currency / forex contracts is one of the reasons that Western Areas Limited entertained a US$ gold hedge/deferred premium structure without instituting a rand hedge.

Objective of hedging

Hedging is a simple means of allowing companies to protect their profitability, revenue flows and balance sheets from the damaging effects of the commodity prices due to downside movements and cyclical reversals. However, it is essential that absolute clarity about the purpose of the hedge contracts is understood by all the stakeholders. Attempts to accumulate incremental cash flows by repositioning in the market can only be viewed as speculation or opportunistic interventions. Hedging has been defined by Rockman *et al.* (2003) as:

'The mitigation of risk in accordance with management's analysis of the profile and dynamics of financial and other risks, and within the boards expressed appetite for risk'.

The underlying concern should in such cases be for the benefit of the company shareholder. While the practical aspects of hedging are relatively simple, the consequences of a hedged position for the company may have benefits and negative consequences that are not all that clear. For this reason risks to the producer should be identified and the objectives of hedging must be clearly articulated in a policy or strategy that is material, transparent and effective. In order to maintain these last three criteria a company would need to examine its long-term strategy, its policies and corporate risk appetite and risk aversion.

A three-stage process for determining the whys and wherefores of hedging has been proposed by Rockman *et al.*, (2003). The first step involves a consideration of 'the value proposition for hedging'. Why should a mining company sell some of its production forward? The second step examines the nature and composition of the risks that the company faces, what the consequences of such events taking place would have on the company, and what the level of risk aversion or appetite the company has. The third step requires an assessment of the hedging tools available and the technical skills required to establish a forward position in the market.

Benefits of hedging

Continuity and cash flows stability

Continuous and stable revenue flows derived through hedging transactions have great advantages for mine planning. The miner can choose what proportion of production to hedge and how far into the future the hedged position is to be established and maintained. There may be periods when a producer in hindsight, realizes that returns through the spot price would have been better than those achieved through the forward sale. However, high cost producers and marginal mines are probably unwilling to sacrifice the reduced risk for additional, risk-mitigated profits. Thus the certainty in production planning at guaranteed minimum prices for gold through forward sales protects both a company's future and that of its employees.

Market price stability

Minimum guaranteed metal prices over a scheduled period also provides security on a project-specific basis for financing capital programmes, against rising operating costs, when implementing rationalization programmes, and in periods when a minimum level of earnings and dividends is required (*Economic Focus*, 1992). While risk management through

hedging practices has previously been the choice of mine management, such approaches may be demanded in the future from project finance institutions and shareholders (Hall and Winter, 1996). Gold mine managements have improved shareholders' profits and strengthened balance sheets over the past decade by useing hedging instruments. Hedging techniques have allowed mines to improve profitability by achieving markedly higher prices than those offered on the current market, particularly when the gold price is flat, bearish or is rising at a rate less than that of the contango, while high-cost and marginal mines have been able to keep operating profitably.

Frictional costs and agency theory

The Modigliani-Miller theory (Modigliani and Miller, 1958, 1963) is the basis for much of the modern thinking on capital structure (Titman, 2001), the way in which companies finance themselves through a combination of equity, bonds or debt that should preferably minimize the cost of capital and maximize the share price. Basically the theory states that in an efficient market, the value of a firm is determined by its earning power and the risk of its underlying assets, and is independent of the way it chooses to finance its investments (either by equity or debt), or distribute dividends (Modigliani and Miller, 1963). Furthermore, the Capital Asset Pricing Model (CAPM) suggests that there is no value added for a company that mitigates risk if it is possible for the investor to mitigate risk through a diversified investment portfolio. So standard practice suggests then that hedging is not going to improve the market value, or share price for that matter.

If this is the case, what then could be sufficient reason for a company to take on a hedged position for its gold production? According to Titman (2001) the two main reasons are reduced 'frictional costs' in the market and the so-called 'agency theory'. Frictional costs arise from financial distress that accompanies the higher perceived risks of mining operations because of the volatile commodity price. These may include less favourable terms of trade, difficulty in obtaining raw material supplies and higher interest rates on debt loans. Hedging therefore provides a means of lowering financial distress. More often than not hedging is the principle means for stabilizing cash flows in order that evenly distributed, project-specific financing can be planned to completion without fear of uneven revenue streams arising from falling commodity prices. Finally, since peaks in the revenue stream will probably be taxed at a higher rate, the overall royalty on revenue tax burden can probably be reduced if revenue streams can be stabilized through hedging. The effect of a seven-year flat forward position in gold for varying percentages of production from zero to 30 per cent is shown in Figure 3. An example of the spreadsheet for a forward sale indicating where forward revenues are incorporated in the cash flow account is given in Table A1 in Appendix 1.

The agency theory provides yet another reason that mine managers will take forward positions in the gold market. The security in terms of overall business performance as well as job security and stable wage packets will cause managers to enter hedged positions because of personal interests, regardless of benefits to shareholders.

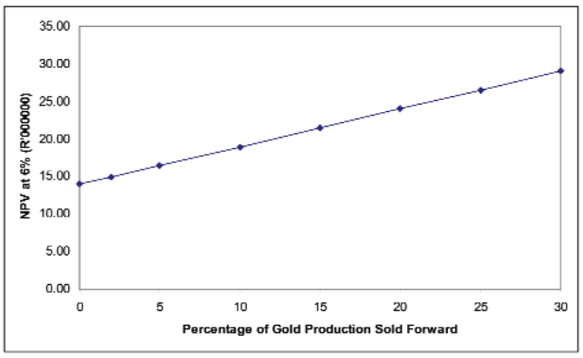

Figure 3—Linear increases in positive NPV streams associated with increasing percentages of forward selling

Risk management strategies

Instead of the somewhat illogical drive to hedge gold production being the possibility that 'we could lose out and not really know about it', a logical sequence for developing a hedging strategy has emerged. The rationale of any mineral producer for entering forward sales positions has to be interrogated by the question, 'How will managing volatility support our corporate plan and contribute to shareholder value?' If the answers are that definable company–specific risks could be managed and mitigated then the next step is to decide how to implement the strategy. The risks may simply be to reduce expected frictional costs related to financial distress, corporate taxes, and external financing. Alternatively, managers may have a personal interest in protecting the business, irrespective of shareholder benefits, or may be solely interested in a stable platform for budgeting and planning. A sustained contango, enhanced sales value and steady cash flows are in themselves a huge incentive for taking a position in the futures markets (Rockman *et al.*, 2003).

Assessing a company's need for a risk management programme should be tempered by the nature and materiality of the risks the company faces (Rockman *et al.*, 2003). In addition, the availability of capital, the costs of hedging and the company's aversion to or appetite for risk must be considered. Hedging provides a means of managing the timing and distribution of cash flows, and stabilizing these may in fact add a premium to shareholders' value.

It is worth noting that in a generally bearish economy any spike in the gold price is likely to bring forth potential gold hedgers. Companies armed with clear hedging philosophies (Rockman *et al.*, 2003) as a means of mitigating identifiable risk will be waiting for the 'right moment'—a sharp rise in the gold price,—to open the hedge book. Historical spikes in a flat gold market should be matched by some evidence of hedging activity by producers. This is seen in Figure 4 where the difference between quarterly spot and prices achieved are compared with the average quarterly gold price.

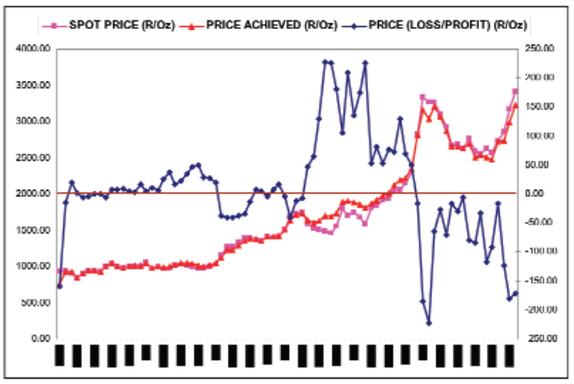

Figure 4—Price difference between spot (R/oz) and price achieved (1986–2006)

The single most important rule in developing a hedging strategy is to undertake a comprehensive study of the impact of financial risk on the company. Key questions to be answered are how will a well conceived hedging philosophy enhance shareholder value? Like any policy that is introduced, it is essential to review the outcome of the policy implementation. Having implemented the hedging strategy it is imperative that the risk management concept being invoked (distribution of cash flows, cash flow volatility, cash-flow-at-risk, earnings-at-risk, etc.), be reconciled or measured against an intended outcome to ensure that the strategy is indeed doing what was intended.

Creating a hedging strategy

Any intervention that can stabilize the volatility in the commodity price is a mitigation of the main risk that metal producers face. Hedging the future revenue stream is done by means of financial instruments, each with their own transaction costs, cash flows and credit risks, which allow producers to secure a minimum price for their gold production (Leigh and Jenkins, 2003). Gold production that is not hedged yields a declining revenue stream for the same output in a long-term falling price market, but unhedged production enjoys a proportionate increase in revenues if the market price of the commodity is rising. So insuring revenue flows against commodity price fluctuations by hedging production, brings with it the danger that benefits that could accrue from an improved commodity price are foregone.

Without a definitive hedging strategy the company that undertakes hedging is involved only in speculation. It is this aspect of the practice that no company wants to be associated with, and provided that a clear strategy can be articulated, no hedger need fear this kind of incrimination. The following steps are required to determine an appropriate hedging strategy (Leigh and Jenkins, 2003):

Identify the risks

These risks would include commodity price, currency, interest rate, operational, credit and legal risks, while the degree of exposure to such risks depends to a large extent on the location of the mining operation and the characteristics of the jurisdiction within which it operates. Mines operating close to the margin of profitability are greatly helped if they can secure stability to future revenue streams, whereas highly profitable mines probably do not need to hedge their production to remain in operation. On the other hand, profitable mines may want to protect revenue streams out of a sense of corporate responsibility underpinned by good stewardship of the company assets, such as for capital expansions.

Articulate risk aversion

It is probably this aspect of hedging strategy that is most difficult to quantify because there is no single institutional or corporate conscience. Depending on their position in the mining organization, each member could have a different view on which risk is most threatening and would motivate that that perceived risk be mitigated. A clear measure of risk appetite or aversion to a range of risks for gold mining companies has yet to be devised. If risk appetite or aversion is truly reflected in a mining company's hedging strategy then a look at historical data should provide an indication of a company's corporate conscience, even if such attitudes towards risk are not specifically expressed.

Continuous strategy review

Operational factors, the dynamic nature of commodity markets and the relatively large number of variables that can strengthen or weaken a producer's position means that the hedge strategy will have to be reviewed on a regular basis to ensure that corporate goals are still served. Infrastructural framework in order to carry on forward sales of gold, the process of identifying, reporting adverse price exposure, and the organizational structures responsible for establishing forward positions in the market, have to be balanced with the company culture, objectives and appetite for risk. In their study, PricewaterhouseCoopers (1999) identified this failure as the principal cause that companies stray out of control. The guidelines for monitoring the risk management process are presented in Table I.

Decisions about windfall gains and losses

The way in which a hedged producer responds to windfall gains or losses as a result of its hedging activity will indeed reflect the underlying strength of the company policy and commitment to the articulated strategy. Closing out the hedge book to take profits is the company's prerogative, but it also provides a signal, both within the corporation and to external parties such as shareholders, about the motive for entering the hedge position in the first place. Words like 'opportunist decisions' and 'speculating on the underlying market price' are used. On the other hand, a company's failure to capture additional revenues or refusal to unwind a hedged position as the commodity price increases will almost certainly be viewed as irresponsible by its shareholders. Financiers also enforce hedging for funding projects. The unwinding may then

Table I

Risk management process and guidelines

Risk management and monitoring	Guideline
1. Recognize the source of risk	Sources of risk to be identified and classified according to origin and degree of certainty
2. Consolidate exposure	Exposure to be reported, aggregated on risk source and type
3. Execute and manage hedge programme	Hedge programme executed according to company objectives and policy mandate
4. Measure and control risk and hedge programmes	Residual risk to be appropriately monitored
5. Link to strategy and risk aversion	Outstanding residual risk compared to limits and benchmarks of risk appetite and achievement of strategy objectives

Source: Stebbings (2003)

Table II

South African gold producers

Data available from	Mining company	Terminated operations
1986	Johannesburg Mining	1988
1986	Rand Mines	1991
1986	GENCOR	1998
1986	Golden Dumps	1999
1986	JCI	2000
1986	Independents	2003
1986	Anglovaal	2005
1986	Anglogold Ashanti	Current producer
1986	Gold Fields of South Africa	Current producer
1989	SouthGO	1995
1992	Rand Gold	1995
1996	Consolidated Mining	1999
1999	Durban Roodepoort Deep	Current producer
1999	Harmony	2005
2000	Western Areas	Current producer
2002	ARMGOLD#	2005
2003	AFLEASE#	2005
# Minor producers		

become fortuitous rather than strategic—Metorex did exactly this when they were forced to hedge to borrow the cash for the acquisition of Eastern Transvaal consolidated (ETC). Over a year later they closed around 40 per cent of their in-the-money hedges and used the proceeds to effect an early debt settlement.

Historical South African patterns in hedging revenues

The current demise of hedging among producers (GFMS, 2006b), relatively poor understanding about what makes for an acceptable hedging philosophy, the extremely bad publicity that the practice has received, and the fact that there are 20 years of good data available, provides an ideal accumulation of events from which to quantify and consider the benefits hedging has yielded to the South African gold mining industry as a whole. There are also a number of significant assumptions that could be challenged by closer analysis of the data, but essentially they do not affect the outcomes of the analysis.

In some ways the analysis is more a commentary on the historical development of the aggregate South African gold mining industry hedging policies since 1986. The analysis examines quarterly gold production for the major producers since 1986 as well as the price they received compared to the spot price of gold. Some of those producers have since ceased mining operations, closed, or have been taken over by other mining companies, but the history of their hedging practices and policies are embedded in the historical quarterly results. The companies for which data available are listed in Table II together with a comment about the date at which the smaller mines terminated operations.

Assumptions about the data

The data for this exercise was kindly provided by the co-author, Mr Nick Goodwin, who over the years has accumulated, recorded and systematized the output from quarterly reports across the South African gold mining industry. A number of assumptions have been made about the data from these quarterly reports. The first is that the

difference between the market spot price of gold (in R/oz) and price achieved by individual companies is an indication that the producer had the ability to predetermine the price for its gold output in a futures market, i.e. that forward sales of gold production has taken place. Negative differences imply that increases in the spot price have eliminated any contango, while positive differences indicate a benefit to the producer as a consequence of a weakening gold price and for selling some or all his production forward. The structural complexity or simplicity of the forward instrument is not relevant here. Rather, it is the presence of a difference between spot and price achieved that is significant.

The important items of information in this study were the price (R/oz) received by the various mining houses for their gold production and the quarterly spot price for gold. The difference between the spot price and the price received reflects some activity in the market that provides the producer with either a premium over spot or a shortfall relative to spot as a consequence of being locked into a hedged or forward sale price that lies below the spot price for gold. It is these rand per ounce differences in price received as well as the amount of gold produced that form the basis of this analysis.

A second assumption is that the magnitude of the difference between price achieved and spot is also a function of the date on which the sale was made relative to movement of the price during any particular quarter. For example, Gold Fields Limited has maintained a policy of not hedging their gold production (although they did relinquish this position for the large capital outlays for the Kloof Extension project). Nevertheless, the history of the difference between price achieved and average quarterly spot price (in the period December 1986 to June 1993) put them R38 bn ahead of the spot market. This indicates that on average they were able to sell their gold production on days when the price was above average for the quarter.

The difference between the spot price and average price received by South African gold mining companies multiplied by the gold produced shows the receipts or losses for any quarter, as shown in Figure 5. Bars above the line indicate gains whereas those below the line are indicative of losses.

Periods of hedging-related losses and gains

On the basis of movements in the gold price, the revenues earned and lost the history in South African hedging can be divided into six distinct time periods. These periods listed in Table III with the profits and losses associated with each period, arise as a consequence of the interplay between the aggregated industry hedging policies and the movements in the gold price over the period 1986 to 2006. The total benefits to the industry as a consequence of hedging practices amount to R2896.1 million.

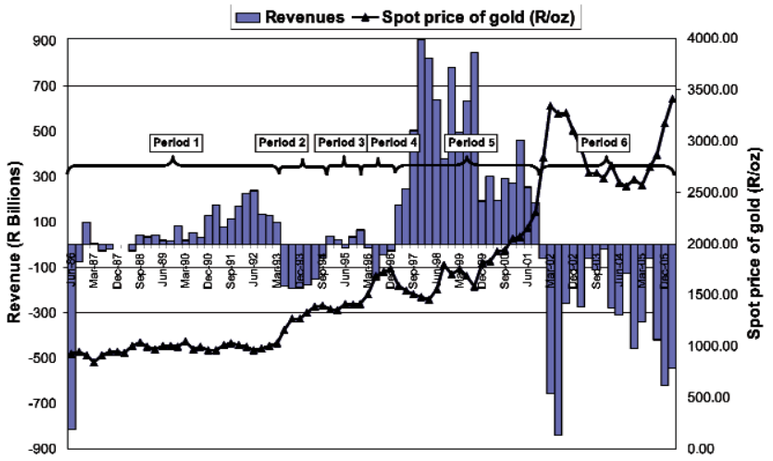

Figure 5—The profits and losses of revenue associated with hedging activity for the whole of the South African gold mining industry (June 1986 to December 2006)

Table III

Revenues earned and lost due to hedging (R millions)

1986–2003	Revenues earned	Revenues lost	Revenue balance
Period 1 (Q2 86 Q1 93)	1911.41	-970.25	941.16
Period 2 (Q2 93 Q3 94)		-954.41	-954.41
Period 3 (Q4 94 Q1 96)	140.40	-15.79	124.61
Period 4 (Q2 96 Q4 96)		-246.29	-246.29
Period 5 (Q1 97 Q3 01)	8574.421		8574.421
Period 6 (Q4 01 Q1 06)		-5559.19	-5559.19
		Total benefit	**2896.09**

The magnitude of the gains and losses is shown graphically in Figure 5.

Period 1: Lasted from June 1986 to March 1993. During this period the industry earned an additional R1758.4 bn over and above the receipts that may have been expected due to gold sales at the spot price of gold. Initially the South African gold mining industry approached the practice of hedging with much scepticism and suspicion. The significant losses in the second quarter of 1986 were largely due to unhedged exchange rates, which the Reserve Bank moved to prevent by introducing the Stabilised Gold Contango and allowing a maximum of 25 per cent of production to be hedged. This was the early stage where good returns on hedging policies despite slow beginnings led most producers that had been shy at first to entrench themselves in hedging programmes.

Period 2: During the six-quarter period from June 1993 to September 1994 hedged producers found themselves having to sell gold at prices significantly lower than the improved spot price. Losses to the industry as a whole in this period amounted to R 954.4 bn.

Period 3: The five-quarter period from December 1994 to March 1996 was marked by a relatively non-volatile gold price and an overall industry benefit of R124.6 bn through the hedge book. In terms of the modest revenues lost and generated in this period the industry was in a state of recovery. Previously very positive pro-hedgers were reconsidering their position and reconsidering their activities in the forward markets.

Period 4: Lasted three quarters from March 1996 to December 1996. This again was a period of a much improved gold price increasing R240/oz (from R1507/oz to R1747/oz). Producers that had been lured back into hedged positions during the September and December quarters of 1995 again found themselves in a loss making position and the industry as a whole lost R246 bn as a consequence of not being able to sell their production in the spot market for gold.

Period 5: This was a quite remarkable period for the South African gold mining industry in terms of hedging benefits that started in March 1997 and continued to the end of 2001. The period can be divided into two sections: the first from Q1 97 to Q3 99 was a period during which the industry received a price 10 per cent higher than the average spot price for the period, and the second from Q4 99 to Q3 01 during which period the price was only 3.7 per cent higher than spot due to improvements in the spot price. Total benefits to the industry during this four and a half year period amounted to R8574.42 bn.

Period 6: By contrast with the experience during period 5, huge losses were experienced during this period because of hedged positions in the gold mining industry as the gold price improved. Total aggregate industry losses during this period have amounted to R5559.19 bn.

At the end of a volatile 20-year experience with hedging (Figure 6) the South African gold mining industry overall finds itself R2896.09 bn ahead of the spot market. The question that remains to be asked is has this benefit been worth the effort? The boundary between mitigating risk and speculation in the commodity market is difficult to define but it is important to distinguish producer hedging activity from the bulk of derivative trading, which could be classified as speculation. Forward selling is distinct from speculation in that the producer locks in a future gold price against his current costs of production. Hedging is usually instituted against the risk of a falling commodity price, but mitigating this risk automatically sets up the alternate risk that the price may rise and that the company may suffer losses. Generally, however, reducing risk is not viewed as speculation. The difference between mitigating risk and speculation probably depends on the intention of the person instituting the hedge, but at the end of the day it is probably shareholder response that defines their perception of risk mitigation and speculation. The major hedgers of gold, according to Williams (1998) do not enter positions as a response to views on the gold market or with the hope of securing an above spot price for their metals or with the view that substantial price rises are not possible in the future. Instead they see forward pricing as the best method available for rationalizing price views in the short term. Hedging is a financial tool that allows producers to achieve company objectives and should never be 'judged retrospectively against spot price comparisons' (Williams, 1998, p. 2).

The demise of hedging

There are two main reasons why the practice of hedging gold production has slowed. The single most influential event occurred in September 1999 when the Washington Central Banks Agreement on Gold was signed by 15 European countries that together account for 45 per cent of the reserves held by bullion banks. The agreement pegged five-year gold sales at no more than 2 000 t and bullion banks began decreasing their credit lines to gold producers (Cross, 2003, p. 1). In South Africa, particularly, but also in Australia, the weakening of currencies placed the currency component of the hedge books in difficulty, and hedged miners could not hedge themselves out of trouble. As a consequence, producers bought back gold and stopped hedging. However, the Washington Central Banks Agreement on Gold (1999), which pegged 45 per cent of Central Bank bullion reserves to no more than 2 000 t over the next five years. This Agreement was renewed and extended to 2 500 t over 5 years in 2004, and extending the orderly behaviour of Central Banks through renewal will depend mainly on their attitude towards lending and bullion sales.

The second factor is the decline in discoveries of new stock due to the general decline in exploration expenditure. Many Australian producers hedged as much as 300 per cent of their annual production by selling their reserves below ground forward. However, companies can no longer obtain credit on the basis of their reserves because they are not being replaced (Cross, 2003, p. 1), either because the mines are aging or because of reduced exploration expenditures.

Hedging will, however still make economic sense, especially when specialized project specific finance is required. The recent consolidation of the gold at higher prices is seen as a combination of increased demand for gold, the drawing in of credit lines from major bullion banks, transparency about volumes of bullion sales by central banks, the lack of in-mine exploration and structural market strengths.

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Hedging gold production: an analysis of historical South African gains and losses

Appendix 1

Table A1

Flat forward hedge for 7 years at a 6% discount rate

Years	1	2	3	4	5	6	7	8	9	10
Tonnes milled (000's)	800 000	1 000 000	1 200 000	1 200 000	1 200 000	1 200 000	1 200 000	1 200 000	1 200 000	1 200 000
Recovered grade (g/t)	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
Ounces	131 172 000	163 965 000	196 758 000	196 758 000	196 758 000	196 758 000	196 758 000	196 758 000	196 758 000	196 758 000
Cost/ton milled	50	50	50	50	50	50	50	50	50	50
Spot price ($/oz)	380	380	380	380	380	380	380	380	380	380
Hedged %	25	25	25	25	25	25	25			
Hedged Oz's	32 793 000	40 991 250	49 189 500	49 189 500	49 189 500	49 189 500	49 189 500			
Hedged Price ($/oz)	442	442	442	442	442	442	442			
Price received ($/oz)	396	396	396	396	396	396	396	380	380	380
All Figures in $000's										
Revenue	51 878 526	64 848 158	77 817 789	77 817 789	77 817 789	77 817 789	77 817 789	74 768 040	74 768 040	74 768 040
Working costs	40 000 000	50 000 000	60 000 000	60 000 000	60 000 000	60 000 000	60 000 000	60 000 000	60 000 000	60 000 000
Interest paid (@7.7%)	3 080 000	3 334 000	2 673 268	1 696 695	635 160	0	0	0	0	0
Working profit	8 798 526	11 514 158	1 5144 521	16 121 094	17 182 629	17 817 789	17 817 789	14 768 040	14 768 040	14 768 040
Capex	3 000 000	3 000 000	3 000 000	3 000 000	3 000 000	3 000 000	3 000 000	3 000 000	3 000 000	3 000 000
Loan repayment	8 000 000	8 000 000	8 000 000	8 000 000	8 000 000					
Pretax profit	-2 201 474	514 158	414 4521	5 121 094	6 182 629	14 817 789	14 817 789	11 768 040	11 7680 40	11 768 040
Mining tax	0	0	0	0	0	7 408 895	7 408 895	5 884 020	5 884 020	5 884 020
After tax profit	-2 201 474	514 158	414 4521	5 121 094	6 182 629	7 408 895	7 408 895	5 884 020	5 884 020	5 884 020
Available profit	0	0	0	0	5 962 401	7 408 895	7 408 895	5 884 020	5 884 020	5 884 020
Loan balance b/f	40 000 000	32 000 000	24 000 000	16 000 000	8 000 000	0	0	0	0	0
Loan balance c/f	32 000 000	24 000 000	16 000 000	8 000 000	0	0	0	0	0	0
Subord. loan	10 000 000	9 485 843	5 341 322	220 228	0	0	0	0	0	0
NPV @ 6%	**26 569 774**									