The Changing Landscape of Long-term Share-based Compensation in South Africa

An investigation into recent developments in employee incentive schemes used by companies listed on the Johannesburg Stock Exchange

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by

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Declaration

I, Nikolay Mavrodinov, declare that this thesis is my own original work and that all sources used have been accurately reported and acknowledged by means of references.

13th of February 2012

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Abstract

For several decades equity-based compensation has been used as a tool to align the incentives of company executives and employees with those of the company shareholders. For instance globally, during the 1990's, there was an explosion in the issuance of employee stock options. This served several purposes, namely – to motivate managers in the pursuit to increase company value and achieve long-term goals, as a retention tool for talented staff and also as a way for cash strapped young companies to reward employees without the need to divert cash from operating activities.

The global financial crisis, accompanied by a multitude of very costly high profile bailouts, has led to significant shareholder and tax payer dissatisfaction and has succeeded to highlight the inherent deficiencies of traditional share-based incentive schemes such as stock options. Increased scrutiny and calls for better corporate governance, together with evolving accounting and tax treatment, have ultimately led to a shift in share-based incentive schemes practices. Globally, several important developments have emerged. For instance, there has been a marked move away from simple stock option-type schemes towards less dilutive Share Appreciation Rights and also full quantum share schemes. In addition, performance conditions (relative as well as absolute) have become increasingly prevalent in terms of grant vesting (PWC, 2011).

The objective of this study is to examine the current long-term share-based incentive schemes used by JSE listed companies based on data from 50 large and mid cap companies. It aims to identify trends in terms of prevalent scheme types, average scheme size relative to issued share capital, settlement methods, valuation models used, construction of model inputs and the use of performance conditions. These trends are framed in the context of South African tax legislation and IFRS2 accounting standards. The analysis indicates that in recent years South African listed companies have followed the global approach towards share-based incentives, namely:

- Share Appreciation Rights are being used more frequently
- Full quantum schemes are also becoming more popular
- There is increased use of performance conditions embedded in grants
- Companies are moving away from the "one size fits all" approach and are starting to use combinations of schemes to simultaneously address issues such as staff retention, preventing excessive risk taking by managers and attaining short, medium and long term strategic targets

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Chapter 1 – Introduction

1.1 General Background

Share incentive schemes and specifically stock options have been one of the most popular forms of pay for more than two decades. While initially scheme penetration did not go past the top management of companies, with time stock options became more and more recognised as a mechanism to provide employees with equity-based compensation. Conceptually options issuance intends to address several purposes:

- to solve the inherent agency problem between company shareholders and mangers and align their long-term incentives
- in the pursuit of shareholder value creation, as a motivation tool for managers/employees by creating a direct link between their remuneration and the company share price
- together with time-based vesting conditions, it serves as a retention tool for employees, enhancing commitment and reducing staff turnover
- to avoid diverting cash from operating activities and viable projects

There was an explosion of stock option issuance by companies globally during the 1990's. This was not coincidental. The decade was characterised by economic growth, low volatility and a powerful bull market. At the same time the high-tech boom translated into frequent initial public offerings followed by rapid share price appreciation, generally inflated company valuations and a resulting quest by start-up companies to attract talented managers in the presence of little or no cash flows. According to research done by Narayanan and Seyhun (2005), in 1992 in the US there were 940 option grants by 126 firms with a total of 17.3 million shares granted. 1999 saw the peak of option issuance in the US with 72,617 grants by 4,595 companies with a total of 2.94 billion shares granted. Furthermore, in 1980 the average stock option grant represented less than 20% of direct executive pay in the US. In contrast, by 1998, the chief executive officers (CEO's) of the largest US companies received annual stock option awards larger than their salaries and bonuses combined (Hall, 1998).

There is, however, another more subtle but very important reason for the proliferation of employee stock options during the 1990's – more relaxed accounting standards. Until the advent of the revised Statement of Financial Accounting Standards No. 123 (SFAS 123R) in the US and the International Financial Reporting Standard 2 (IFRS2) globally in 2005, employee stock options granted at or out of the money did not have to be recognised as an expense by companies. Given this disclosure-only based approach, they were simply included as a footnote in the financials. Since they had no impact on the company financial statements, options issued to employees did not put a drag on earnings. In short, options were seen (incorrectly) by company boards and managers as almost "free to grant" and effectively as a low-cost way to remunerate employees, thus in the process ignoring the real value of

the options and their dilutive effect to the company (Jensen *at al*., 2004). Perhaps one of the more striking examples of this practice came from Apple Computers Inc. In 2000 the company stated Steve Jobs' salary as being $ 1. At the same time he received share options worth $ 400 million. This amount was not charged to the income statement, consistent with prevailing accounting standards (Botosan *at al*., 2001).

The turn of the century led to a number of significant developments. The spectacular failures of companies like Enron and World.com, widespread revelations of failed corporate governance systems, corporate misdeeds, manipulated financial reporting, fraud and bankruptcy occurred simultaneously with the burst of the high-tech bubble and the loss of trillions of dollars of equity value. This firmly put the spotlight on executive remuneration practices and for the first time the efficacy of share-based remuneration was questioned in the context of agency problems and excessive risk taking by managers. In addition, it motivated regulations such as the Sarbanes-Oxley (SOX) Act and the revision and harmonisation of global accounting standards (Jensen *at al*., 2004). In terms of IFRS2 and SFAS 123R, share-based incentive schemes were properly accounted for and expensed over the vesting period in company financial statements from 2005 onwards.

Another significant accounting scandal related to stock options came to light in 2005. Studies showed that a number of option grants in the US had been timed retroactively by back-dating the strike price, thus artificially inflating the option pay-off and, in the process, robbing company shareholders of value (Lie, 2005). It was found that this practice had been taking place for an extended period of time and the discovery attracted substantial attention from both the media and regulators. Similar studies followed in other markets, including South Africa where some back-dating of grants has also potentially taken place (Holman *at al*., 2010). The SOX Act in the US and IFRS2 internationally have effectively largely put a stop to this practice by requiring greater disclosure and specifically by ensuring that companies are forced to reveal the strike price of each grant almost immediately after the grant date.

In 2007 the roaring bull market started to falter, the Sub-Prime crisis began unfolding, ultimately leading to a global financial crisis. A string of high-profile and extremely costly company bail-outs ensued in both the US and Europe. This succeeded to further highlight the inherent deficiencies of traditional share-based incentive schemes, originally aimed at aligning shareholder and managerial incentives, preventing excessive risk taking and fostering a longer-term more strategic behaviour by managers. The resulting increased scrutiny and calls for better corporate governance, together with evolving accounting and tax treatment, have ultimately led to a shift in share-based incentive schemes practices (PWC, 2011).

Globally, several important developments have emerged over the past five or so years. For instance overall issuance of stock options has declined and the average size of share-based incentive schemes relative to issued share capital has also declined. There has also been a marked move away from simple stock option-type schemes towards less dilutive Share Appreciation Rights and also full quantum share schemes. Another important development are performance conditions which have become increasingly prevalent in terms of grant vesting. Shareholders, regulators and other stakeholders have successfully pushed companies to provide greater amounts performance-based equity at the expense of time-based vesting (PWC, 2011). Such performance conditions can be either absolute (e.g. based on internal targets such as return on equity – ROE or return on invested capital – ROIC) or relative (e.g. based on shareholder return against a peer group of companies or an industry benchmark). Often combinations of absolute and relative performance conditions are present in the same scheme to ensure both the attaining of internal targets as well as to ensure strong relative performance by the company and avoid simply rewarding managers for luck. Furthermore, companies are forced to provide significantly more disclosure about share-based incentives in their financial statements, are decidedly more cognisant of issues such as dilution and tax optimisation and are prepared to look more carefully at the design of incentive schemes (PWC, 2011).

1.2 Terms and Abbreviations Used

The following terms are used interchangeably in the text:

"Exercise price" and "Strike price"

"Firm" and "Company"

"Option expiry date" and "Option maturity date"

"Share" and "Stock" and "Equity"

"Share options" and "Stock options" and "Equity options"

The following abbreviations are used in the text:

APB	Accounting Principles Board
ATM	At-The-Money
BS	Black-Scholes (or Black-Scholes-Merton)
BEE	Black Economic Empowerment
CEO	Chief Executive Officer
CGT	Capital Gains Tax
COE	Cost Of Equity
CRR	Cox-Ross-Rubinstein

DSP	Deferred Share Plan
EPS	Earnings Per Share
ESO	Employee Share/Stock Option
FASB	Financial Accounting Standards Board
HW	Hull-White
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
ITM	In-The-Money
JSE	Johannesburg Stock Exchange (JSE Limited)
LEPO	Low Exercise Price Option
LTIP	Long-term Incentive Plan
MC	Monte Carlo
NIACC	Net Income After Cost of Capital
OTC	Over The Counter
OTM	Out-The-Money
ROCE	Return On Capital Employed
ROE	Return On Capital
ROIC	Return On Invested Capital
SA	Republic of South Africa
SAR	Share Appreciation Right
SARS	South African Revenue Servise
SEC	Securities and Exchange Commission
SFAS	Statement of Financial Accounting Standard
SOX	Sarbanes-Oxley Act
SR	Share Right
TSR	Total Shareholder Return
UK	United Kingdom
US	United States of America
VWAP	Volume Weighted Average Price
WACC	Weighted Average Cost of Capital

1.3 Research Objectives

This study aims to:

- To examine the valuation models commonly used for valuing share-based incentives in the context of some of the more specific features of such incentives
- To examine the accounting and tax treatment of share-based incentives globally and in South Africa
- To examine the current long-term share-based incentive schemes used by JSE listed companies
- To gain an understanding of:
    - prevalent scheme types
    - average scheme size relative to issued share capital
    - settlement methods used – e.g. cash vs. stock
    - method for setting the strike price on schemes with stock options
    - valuation models used
    - methods for constructing model inputs such as volatility and interest rates
    - the types of performance conditions used
- As a reasonability check, to attempt to re-perform the valuation of a random option-based grant and determine:
    - the integrity of the inputs used by the respective company
    - the validity and accuracy of the valuation models used

1.4 Methodology

This study is based on a detailed analysis of the latest annual financial statements of 50 JSE listed companies (see Appendix A for list of companies). The companies chosen are the 40 constituents of the FTSE/JSE TOP40 Index (Bloomberg code: TOP40 <Index>) as of the 30th of November 2011[1]. To get a better understanding of schemes used by smaller companies and avoid complete large cap dominance in the chosen sample, another 10 companies were selected with market capitalisation slightly below that of the TOP40 Index constituents. The 50 companies chosen for the study have a combined market cap which comprises 76% of the market cap of the FTSE/JSE All Share Index (Bloomberg code: JALSH <Index>). In this context, it was felt that they constitute a sufficiently strong representative sample to facilitate understanding of the share-based incentive practices prevalent among JSE listed companies.

[1] With respect to Investec and Mondi, only the inward listed entities were included.

A review of literature related to share-based incentive schemes, their history, evolution, general mechanics, accounting and tax treatment was also performed. This literature review forms part of several chapters, namely Chapters 2, 3, 4 and 5.

1.5 Assumptions and Limitations

The study does not distinguish between share-based incentive schemes for company executive directors and other senior managers and employees. Although the schemes offered to executive directors are manifestly more visible in the company financial statements, given the prevailing mandatory disclosure rules, the basic terms and mechanics of the schemes and the tax and accounting implications are the same for all company employees. What usually tends to vary between executive directors and other senior managers and employees is the Rand value as a proportion of total remuneration package.

Recent developments in corporate governance have led companies to examine more closely how remuneration serves to align employee incentives with those of shareholders. As such, companies are moving away from the "one size fits all" and are designing companywide remuneration frameworks with different terms, tenors and generally increasing complexity. In this context, often some overlap exists between what is usually referred to as short term variable pay and long-term share-based incentives. Normally, short term variable pay consists of an annual performance based cash bonus with some choice to convert this bonus into shares, which may have vesting conditions. Given the broad and varied nature of remuneration schemes as a whole, this study focuses purely on the long-term share-based schemes used by companies.

The study does not incorporate share based incentive schemes related to Black Economic Empowerment (BEE). BEE and specifically black company ownership is a distinctly South African development which has led to formidable tax and financial engineering over the past decade. In the context of the varied and complex nature of BEE focused equity ownership schemes, these were purposefully excluded from the study.

1.6 Structure of the Study

Chapter 1 – Introduction

This chapter provides a general background with a brief history of share-based incentive schemes, together with an outline of the study objectives.

Chapter 2 – A Primer on Options Theory and Employee Stock Option (ESO) Valuation

This chapter explains the basic concepts related to options and their valuation. It also provides an outline of the issues surrounding employee stock option valuation.

Chapter 3 – Types of Share-based Incentive Schemes

This chapter provides an overview of the workings of commonly used long-term share-based incentive schemes.

Chapter 4 – Accounting Treatment of Share-Based Incentives

This chapter looks at the accounting treatment of share-based incentive schemes in South Africa in the context of IFRS2.

Chapter 5 – Tax Treatment of Share-Based Incentives

This chapter looks at the tax treatment of share-based incentive schemes in South Africa in the context of the amendments to Section 8 of the Tax Act No 58 of 1962.

Chapter 6 – Results and Findings

The results of the study are presented in this chapter.

Conclusion

Research results are summarised and some suggestions are provided for future research.

Chapter 2 – A Primer on Options Theory and Employee Stock Option (ESO) Valuation

2.1 General Options Theory

A derivative is a security which derives its value from the value of another asset (called the underlying asset). Options together with other derivative contracts have been used in commerce for centuries. In fact the earliest option trade recorded in Western literature was a bet on a future olive crop by Thales of Miletus, recounted by Aristotle in his Politics. Thales did not trade actual olives, but instead chose to buy the equivalent of a call option on olive presses for fall delivery (Taleb, 1996).

Options are a form of a non-linear derivative in the sense that they confer a right and not an obligation on the holder of the option. A *call* option gives the holder the right but not the obligation to purchase the underlying asset at a pre-agreed price on or before a pre-agreed date in the future. Conversely, a *put* option gives the holder the right but not the obligation to sell the underlying asset at a pre-agreed price on or before a pre-agreed date in the future (Hull, 2005). The pre-agreed price is called the *strike* or *exercise price*, the future date is called the *expiry* date and the time until the expiry date is called the *option term*. An *American* option can be exercised any time before expiry, while a *European* option can only be exercised on the expiry date. *Bermudan* options are options which can be exercised only on pre-specified days or during pre-specified periods prior to expiry. The value of the option is the *option premium*, an amount the buyer pays to the seller (Hull, 2005). Options with a strike price equal to the price of the underlying asset at inception of the trade are said to be struck *at-the-money*. Options with a strike price above the price of the underlying asset (for calls), or below the price of the underlying asset (for puts) are said to be struck *out-the-money*. Options with a strike price below the price of the underlying asset (for calls), or above the price of the underlying asset (for puts) are said to be struck *in-the-money* (Hull, 2005).

The following is a simple illustration of the mechanics of a call option on a share:

Underlying asset:	Share ABC
Option pay-off:	Call
Option type:	European
Option term:	1 year
ABC price:	ZAR 100
Option strike price:	ZAR 100 (i.e. at-the-money)
Option premium:	ZAR 10

In this simple example, the buyer of the option will pay a premium of ZAR 10 to acquire the option from the seller. In a year's time, on the expiry date, two possible scenarios can take place depending on the prevailing ABC share price:

Scenario 1 (e.g. ABC share price = ZAR 90)

In this instance the ABC share price is below the option strike price. The option will expire out-the-money (OTM) and the holder will not exercise it. The profit and loss (P&L) will be as follows:

Premium paid:	- ZAR 10
Option pay-off:	ZAR 0
Net P&L:	- ZAR 10

As a result, the option holder will have lost the premium only.

Scenario 2 (e.g. ABC share price = ZAR 140)

In this instance the ABC share price is above the option strike price. The option will expire in-the-money (ITM) and the holder will exercise it. The holder will buy one ABS share from the option seller for ZAR 100 (the option strike price) and will then sell it immediately on the open market for ZAR 140, in the process making ZAR 40. Alternatively, in instances where the option is cash-settled, the option seller will simply pay ZAR 40 to the holder. The profit and loss (P&L) will be as follows:

Premium paid:	- ZAR 10
Option pay-off:	ZAR 40
Net P&L:	ZAR 30

As can be seen from the above example, options have a convex pay-off to the extent that they effectively work in one direction. The option buyer is subject to a limited loss (the premium) and potentially unlimited upside, while the seller is subject to the opposite – limited gain (the premium) and potentially unlimited loss. As such options have a distinct gearing effect. For example, in the second scenario above, the holder enjoyed a 300% return on their capital. Another important fact to note is that, unlike linear pay-off derivatives such as forwards and futures, the convexity of options' pay-off means that they always have an upfront value.

Options have been traded on different markets for centuries. However, until the advent of the eponymous Black-Scholes-Merton equation (Black *at al*., 1973), options pricing was mostly done using tricks and heuristically derived methodologies. Although the formula itself was not necessarily unique and earlier versions did exist, the Black-Scholes-Merton (commonly referred to as Black-Scholes) argument presented an elegant neo-classical finance solution and, as such, paved the way for a more formal and widely accepted way to value options (Taleb, 2008). Since then a number of

techniques have emerged (e.g. Binomial trees and Monte Carlo) most of which at least to some extent utilise the basic Black-Scholes arguments.

The value of a call option stems from the ability conferred on the holder to buy the underlying asset at a discount to the prevailing price, as illustrated by the above example (scenario 2). Therefore, the value of a call at any point in time can be decomposed into the immediate discount it offers (the difference between the prevailing spot price and the strike), called *intrinsic value*, and the probability that the call may go even deeper ITM and offer an even bigger discount prior to expiry, called *time value*. Correspondingly, a call option may be OTM prior to expiry and still have some time value due to some probability that it may go back to being ITM before it expires. Needless to say, on the day of expiry, options have no time value. The same concepts are applicable to a put option. In this context, the value of options on equities is subject to several important inputs, namely – the expected share price *volatility* over the option term, the *interest rate* applicable for that maturity and the *dividend yield* the share will pay over the option term (Hull, 2005). As such, the value of call options is sensitive to changes in these inputs as well as changes in the share price. These sensitivities are referred to as the *Greeks* of an option. There are a number of Greeks, with the ones mostly relevant to this study being:

Delta:	sensitivity to changes in the underlying share price
Vega:	sensitivity to changes in expected share price volatility

2.2 ESO Valuation

As mentioned already, employee stock options have been widely used as part of compensation packages for a number of years. ESO's are effectively call options on the shares of the respective company which issues them to the employee. They give the right to the employee to purchase the company shares for the strike price on or before a particular date in the future. There are, however, some key differences between ESO's and standard calls traded on exchanges and in the over the counter (OTC) market, namely:

- ESO's have significantly longer terms compared to normal exchange and OTC traded calls. This term can be anything up to ten years (Bulow *at al*., 2005).
- ESO's effectively display both Bermudan and American option features. They do not vest automatically to the employee on the date they are granted. Given that they often serve as an employee retention tool, normally they have a *vesting date* at a point several years after grant date (e.g. 3 years after grant date) and can only be exercised after that date. After vesting, they can then be exercised any time before expiry (West, 2005). Vesting often takes place gradually over time – e.g. 1/3 of the options grant vests in year 3, another 1/3 in year 4 and the last 1/3 in year 5, with a combined expiry date for all 3 tranches in 10 years. If the

employee leaves the firm prior to the vesting date, the options (or particular unvested tranches) are forfeited.

- Unlike standard exchange and OTC traded calls, ESO's are not transferable – i.e. the employee cannot sell the options they have received as part of their remuneration at any point, even if the options have vested. Once the options have vested, they have to be exercised prior to expiring. Needless to say, the employee will only exercise options which are ITM. This is important, because it means that the employee can only ever receive the intrinsic value of the option by exercising it and never the time value it may have prior to expiry.
- There is also a more subtle but important difference. In most circumstances it is never optimal to exercise an option prior to expiry. It makes more sense to sell it, given its time value. In the case of ESO's, however, the non-transferability feature means that, to generate cash proceeds or to diversify their portfolios, employees tend to exercise their options often well before the options reach expiry (Hull, *at al*., 2002).
- Another less obvious difference is the fact that employee attrition and the share price of the company are inversely correlated. A company with a declining share price is more likely to lay off employees and, conversely, employees with valuable unvested options (e.g. options which are deep ITM) are less likely to leave the company voluntarily (Bulow *at al*., 2005).

From what has been said so far it is clearly evident that ESO's always have a value on the date they are granted by the company to the employee, yet ironically until IFRS2 and SFAS 123R were implemented in 2005, it was not mandatory for companies to expense ESO's in their financial statements. The accounting treatment of ESO's is discussed in more detail in Chapter 4, however it is important to mention that the methodology for expensing share-based incentives as prescribed by the accounting standards is closely linked to the ability to establish a fair value for such incentives. As a result, the valuation of share-based incentives and specifically ESO's, given their unique features, has been subject to a lot of debate.

The first thing which tends to pose problems when it comes to fair-valuing ESO's is their extended term. Normally, in the presence of a liquid market for short dated share options it is very easy to imply the inputs used by the market to arrive at a fair value for an option with a particular strike and expiry. For example, backing out the expected (*implied*) volatility from short dated exchange traded options is exceedingly simple in most global markets. However, options with a term of 5 or more years almost never trade (with the exception of convertible debt securities which have embedded equity options) which makes constructing an important input such as implied share price volatility with a good degree of accuracy almost impossible. As a result, companies tend to resort to a shortcut and use the historical volatility of their share price instead. Technically this is incorrect, but in the absence of a robust method to arrive at an implied volatility for a specific option term, it often may be the only way (Oldfield, 2008). A somewhat similar problem exists in terms of the dividend yield the share is likely to

pay during the option term. It is impossible for any company, regardless of size, to accurately predict macro and micro economic factors for the next 10 years and therefore commit to a specific dividend pay-out ratio based on future earnings. Again, in this instance companies tend to look at historical pay-out ratios and use those as guidelines to arrive at a dividend yield. Interest rates, as an input into option valuation models, tend to pose fewer problems, since liquid interest rate curves exist well past the expiry of most ESO's.

The non-transferability of ESO's in the hands of the employee presents another problem. From theoretical standpoint, this feature lowers the value of the option compared to that of a normal call option. However, it is important to note that this value differs depending on whether one looks at it from the point of view of the employee or that of the issuing company. Admittedly the option may have a reduced value to the employee. At the same time, however, it still represents a liability to the company and it should be represented in the company financials based on its cost to the company and not its value to the employee. Oldfield (2008) illustrates this with a simple example where a company gives a Christmas turkey to an employee as part of remuneration. For the employee who does not eat turkey and cannot re-sell the bird, the gift has no value. Despite this compensation failure, the company bought the turkey and incurred the expense. The gift is not an efficient compensation device for the particular employee, but the expense is recorded at the turkey's purchase price, not the employee's personal valuation of the turkey (Oldfield, 2008).

Choosing the correct valuation model to value even simple ESO's has also been subject to significant amount of debate given the new mandatory expensing rules for share-based payments. The accounting standards do not specify the use of a certain model, only requiring the model to be suitable for the scheme in question, given its parameters. There are three somewhat obvious choices, namely: Black-Scholes, Cox-Ross-Rubinstein binomial trees and Monte Carlo numerical valuation.

The Black-Scholes model is decidedly the most rigid model in terms of the assumptions it incorporates. Yet it is perhaps the simplest and, given this simplicity, the most widely accepted. ESO's almost always have vesting conditions attached and as such differ from normal exchange and OTC traded calls –i.e. initially they have a Bermudan feature and then they effectively become American options after they vest. The BS model was specifically developed to value European options which cannot be exercised prior to expiry (Finch, *at al*., 2007). In addition, as mentioned above, the non-transferability feature of ESO's tends to encourage counterintuitive early exercise of options by employees. This aspect of an ESO effectively serves to shorten its life. In order to use the BS model an *expected life*, which falls at some point between vesting and expiry, needs to be calculated by the company, based on estimates of employee exercise behaviour. This in itself creates inaccuracy, because the estimates are generally subjective. Also, the expected life of the option, being nothing

more than an artificial construct to facilitate the use of a model not originally meant to be used for this purpose, is also uniformly shorter than the contractual life. This means that an option which is OTM and close to reaching its expected expiry, will have little value even though in reality the contractual expiry is some time away and the option could still end up being ITM (West, 2005).

The CRR binomial tree (or lattice) model offers a more robust and flexible way to value ESO's. It was originally developed as a simplified extension of the BS model and was aimed at extending its usefulness beyond some of its rigid confines. The CRR lattice model divides the time to option expiry into smaller increments and discrete future share price paths. At any time point the share price can diverge in one of two possible paths (Hull, 2005). The discretisation of the option term and the share price path is precisely what makes the CRR lattice model more flexible. This effectively enables the incorporation of different conditions and inputs at each discrete interval. For instance, the model can handle better early exercise conditions without the need to artificially adjust the contractual expiry date. Also, employee attrition rates can potentially be incorporated into the valuation by setting some predetermined conditions at each discrete interval (Oldfield, 2008). In fact, as will become evident in Chapter 4, employee attrition rates (i.e. the fact that some employees leave the company prior to vesting and, as a result, forfeit their options), being a *non-market related* factor, are dealt with in a specific way by IFRS2 – they are actually not incorporated into the fair value of the options on grant date. However, the CRR lattice model offers enough flexibility for this to be done inside the model. It is also more robust in terms of handling market related performance conditions which, as will become evident, are becoming more and more prevalent in share-based incentive schemes. Another advantage is the ability to use varying inputs at each discrete interval. For instance, one of the main constraints of the BS model is that it assumes constant volatility for the term of the option. In reality this is never the case. Volatility itself is volatile and changes through time. Option markets are well aware of this phenomenon and adjust for it by using *volatility skew* in the case of equities – i.e. OTM puts have higher implied volatility compared to OTM call, or put simply options with lower strikes exhibit higher implied volatility than those with higher strikes (Hull, 2005). A lattice model enables the use of *local volatility*, i.e. different volatility for each discrete time interval, which is more technically correct. More granular and accurate versions of the lattice model also exist where the lattice is trinomial – at each discrete interval the share price path can diverge into three possible paths rather than just two (Hull, 2005).

Hull and White (2003) have proposed a valuation model for standard ESO's which is well suited to accommodate the early exercise behaviour displayed by employees. It is based on the more flexible trinomial lattice version and effectively treats and ESO as a combination of two exotic options – a *gap*

option[2] and an *up-and-out barrier call*[3] *option* with a *rebate*. To incorporate the potential for early exercise, Hull and White assume that the employee will exercise the option with a strike K as soon as the share price (S) reaches a level (called M), and the option becomes deep ITM, which level offers sufficient incentive for the employee to cash out by exercising. The value M will be different for different employees, but can be based on historical estimates (Hull *at al*., 2003). The gap option comes to life on grant date and expires on the vesting date. On the vesting date, the gap option will pay the difference between S and K, conditional on S being above M. If S is below M, the gap option will expire worthless. At this point the barrier option will come to life, conditional on S being below M (alternatively, if S is above M, the gap option will have paid out and the barrier option simply will not come to life). Between the vesting date and the contractual expiry date of the ESO if S ever trades at or above M, the barrier option will *knock-out* (cease to exist) and will simultaneously pay a rebate equal to the difference between M and K. If S never touches M before the option expires, on the expiry date the option will simply pay MAX(S – K, 0) – i.e. the pay-off of a standard call option (van Zyl *at al*., 2007). The elegance of the HW model for valuing ESO's comes from the fact that it provides the ability to incorporate several conditions at the same time – early exercise (via the M factor), employee attrition rates at each discrete interval on the trinomial lattice, as well as potentially other varying inputs.

The Monte Carlo technique is decidedly the most flexible model. It is a numerical technique for valuing options via the use of simulations, in contrast to analytical formula-based ones such as BS. An almost infinite amount of option pay-off profiles can be created over single as well as multiple underlying assets. As such, the MC method is perfectly suited for the valuation of more complex share-based schemes with intricate performance conditions. An example of such an instrument is the *indexed* ESO. This option is premised on the concept of relative company performance. It is built as a way to avoid simply rewarding managers for luck. Unlike the strike price of a standard ESO which is fixed on grant date, the strike of the indexed option is referenced off an index of comparable companies and can reset upwards during the option term as that index performs well. In doing so it ensures that at expiry the option will only be ITM and deliver a payment if the company has outperformed the respective index of comparable companies (Meulbroek, 2001). The MC valuation method is perfectly suited for such a complex multi-asset pay-off profile. Interestingly, such an option introduces another dimension to the valuation inputs – the correlation between the share price of the company and that of the basket/index of comparable companies.

[2] A gap option has two strikes – one which determines the pay-off and another one which determines whether the option can be exercised. It is effectively a form of a knock-in barrier option.

[3] An up-and-out call is a call option which exists only as long as the up-and-out barrier has not been breached. If the barrier is breached, the option knocks out and ceases to exist. A rebate is sometimes offered to the buyer as compensation.

From what has been discussed so far, it is evident that factors such as the longer terms of ESO's, the early exercise behaviour of employees and also the employee attrition rates make valuing ESO's challenging. During the initial proposals for revising the accounting standards to make expensing of share-based payments mandatory, it was these factors which created a substantial debate. Opponents of expensing felt that the guidelines proposed to deal with such complexities (discussed in more detail in Chapter 4) were arbitrary and would lead to inaccurate representation of share-based payments in the financial statements of companies (Sacho *at al*., 2004). In this context, several academics have proposed a substantially different approach to looking at valuing and expensing ESO's. Bulow and Shoven (2005) have proposed that ESO's should be treated and expensed similarly to the single largest component of compensation – the salary. Salaries are simply expensed in the income statement as they are paid in each accounting period. The company does not calculate the expected present value of its future labour costs and then amortize that value over the employees projected future years of service. Instead it simply expenses what it pays the employee at the end of each accounting period (Bulow *at al*., 2005). Following from this, Bulow and Shoven (2005) propose that companies should expense the value of ESO's whose term is only equal to the next accounting period (e.g. quarterly or semi-annually). At the end of each accounting period the company will re-value the ESO's by extending the term to the end of the succeeding accounting period and using the prevailing share price. This simpler approach effectively means that the term of the ESO is shortened dramatically. It achieves the following:

- It obviates the need to calculate long-term inputs such as implied volatility and dividend yield. These can be calculated much more accurately in the short-term.
- It is also no longer necessary to calculate long-term employee attrition rates. The quantity of the ESO's can simply be adjusted as when employees leave the firm and forfeit their options.
- In addition, the possibility early exercise does not have to be factored in any longer.
- Lastly, the ESO will effectively be marked to market based on the prevailing share price at the end of each accounting period, therefore eliminating the bias towards a grant date valuation as prescribed by the current accounting standards (Bulow *at al*., 2005).

As will become evident from Chapter 4, the accounting standards ultimately put in place work substantially differently from the exceedingly simple approach proposed by Bulow and Shoven (2005).

Chapter 3 – Types of Share-based Incentive Schemes

The long-term share-based incentive schemes which have been used and are to a large extent still being used in South Africa can be split into different categories based on two key features:

1. The form of equity participation: appreciation vs. full participation (or full quantum)
2. The method of settlement: shares vs. cash

As will become evident in this chapter, there is overlap between the categories – e.g. an appreciation scheme can be either cash or share settled.

3.1 Appreciation Schemes

The key feature of most appreciation schemes is that they offer some form of optionality to the employee. In such schemes shares or options are granted or sold to the employee at the grant date market value. Ultimately, the value received by the employee is equal to the net gain (appreciation) of the share price between the grant date and the exercise date. Historically appreciation schemes have almost exclusively incorporated only time-based vesting conditions and some form of staggered vesting – e.g. a third of the grant vesting between year 3 and year 5 (Bezuidenhout, 2006). Schemes are now starting to increasingly incorporate performance-based vesting conditions. Presented below are several examples of appreciation schemes with their specific features.

3.1.1 Share Options (ESO's)

As discussed previously, ESO's are effectively call options on the shares of the respective company which issues them to the employee. They give the employee the right to purchase the company shares for the strike price on or before a particular date in the future. Normally the options are granted to the employee free of any payment. A typical ESO scheme will have the following parameters:

- Eligibility terms
- The maximum quantity of options which can be granted to employees
- The quantity of options granted so far to employees
- The grant date
- The strike prices of the options
- The attached vesting conditions
- The vesting date (dates if vesting is staggered)
- The expiry date

The eligibility terms define the category of employees eligible for an ESO grant. In SA historically ESO's have been largely reserved for executive directors and senior management.

In the past ESO's have been issued with a strike price at a discount to the prevailing share price on the grant date (Lie, 2005) and (Holman *at al*., 2010). Given the corporate scandals in the US related to option back-dating and much stricter corporate governance, rules this practice has largely been abandoned. Strike prices are normally set equal to the closing share price on the grant date (ATM). In the context of share price volatility, some companies chose to reduce the dominance of one single date when it comes to setting the strike. Instead they use either an average of the of the closing share prices over a period of say the 20 days preceding the grant date, or alternatively the VWAP over a similar period.

ESO's are normally settled with shares – i.e. when the employee exercises an option which is ITM and has intrinsic value, they pay the strike price and receive shares of the company. Interestingly, it is also standard practice in the US, especially in the case of financial institutions with a trading desk, for the employee wishing to simultaneously exercise the option and sell their shares, to issue a limit order to the desk in terms of the specific share price level where exercise should take place for ITM options. Exercise is not carried out until this level is reached. When the level is reached, the option is exercised and the shares are sold in the open market simultaneously, thus reducing market risk for the employee (Holman, 2012, pers. comm.). A variation of share settlement takes place when the ESO is net-settled with shares. Here instead of paying the strike price, the employee receives an amount of shares with Rand value equal to the intrinsic value of all the options they are exercising. ESO's can also be settled only with cash. In this instance, upon exercise, the company will simply pay the intrinsic value of the options in cash to the employee. Cash settled options are called *Share Appreciation Rights* (SAR's) and have become more and more prevalent recently for a number of reasons.

Dilution is an important factor to consider when it comes to share-based incentive schemes. In the past companies were less reticent when it came to issuing large ESO grants which can be highly dilutive. Shareholders globally, especially large institutional ones, have gradually woken up to the fact that such instruments can erode the value of their shareholding and have applied significant pressure on companies to design more efficient incentive schemes (Icely, 2006). One of the reasons why SAR's schemes have become more popular is precisely because they are less dilutive and offer more flexibility to the company. Cash settled SAR's are not dilutive because no new shares are issued by the company. That said, even with a SAR net-settled with shares, the amount of shares the company may have to issue to the employee upon exercise is on average only about 1/3rd of that for a normal ESO. The company also has the flexibility to choose between cash and share settlement. Another important reason SAR's have gained in popularity is their tax treatment. Cash settled share-based

incentives can potentially be tax deductable in the hands of the company while share settled ones are not (Icely, 2006).

3.1.2 Share Purchase Schemes

In this type of scheme the employee is given a loan by the company to purchase shares at prevailing market value. To eliminate credit risk, the loan is secured by the employee pledging their shares back to the company. Normally the loan cannot be repaid prior to a specific date in the future, similar to a time-based vesting condition. Dividends paid on the shares may be used to reduce the loan amount. One of the inherent disadvantages of this scheme is that if the share price declines subsequent to the employee having taken the loan to purchase the share, a loss can occur. Another disadvantage is the fact that with the implementation of changes to the tax legislation, the loan extended by the company to the employee creates an unfavourable tax treatment in the hands of the employee. For these reasons, such schemes are hardly used any more (Bezuidenhout, 2006).

3.1.3 Deferred Delivery Schemes

These schemes are very similar to normal ESO's, except for one important feature. Upon exercise, payment for the shares by the employee and their delivery by the company is deferred to some future date. Prior to the actual delivery of the shares, the employee receives no dividends. These schemes were designed specifically to get around Section 8A of the Tax Act No 58 of 1962 and generate CGT for the employee rather than income tax. Exercise would normally take place shortly after grant date and, given that the option is unlikely to be deep ITM, little income tax would be paid on the option gain. CGT would be paid when the shares are finally paid for and delivered in several years time (Bezuidenhout, 2006). In contrast to Section 8A, in terms of Section 8C a taxable event occurs upon vesting of the equity instrument and not exercise. Vesting would not be considered to have taken place until all conditions have been satisfied and shares have been delivered. Therefore, with the arrival of Section 8C of the Act, deferred delivery schemes effectively became obsolete.

3.2 Full Quantum Schemes

Full quantum schemes involve the outright issuance of shares to the employee at zero or par value (which is normally negligible). Such schemes can have either time-based or performance based vesting conditions or both. The main difference relative to appreciation schemes is that there is no optionality in full quantum schemes – the employee receives the full performance of the share as opposed to that of a call option on the share. As such, the pay-off is linear and there is no embedded leverage. They are more commonly settled with shares, but there are instances where a full quantum scheme is settled in cash. There are also versions where, although the employee receives the full

performance of the share, dividends are not paid on the grant. Such an instrument has the pay-off of a call option with a zero strike price or otherwise called LEPO – Low Exercise Price Option.

3.2.1 Restricted Shares

Restricted shares, together with performance shares (see below) are becoming increasingly common. A value in currency is awarded to the employee which is then converted to a quantity of shares based on the prevailing share price at the time of granting. In this instance vesting is time based and some form of staggering is often put in place.

3.2.2 Performance Shares

Performance shares work similarly to restricted shares, except for the fact that they vest based on certain performance conditions. Normally there is a performance measurement period (or release cycle) of usually three to five years. The final amount of shares which will vest to the employee will depend on the extent to which the performance conditions have been met (Bezuidenhout, 2006). Historically re-testing of performance conditions was considered acceptable with a corresponding potential extension of the vesting period to allow more time for conditions to be met. In light of tightening corporate governance rules (King III Code in SA specifically), this practice has largely stopped.

Performance conditions can broadly be divided into market related and non-market related. Non-market related conditions tend to be company specific and absolute or target-based. Examples of commonly used non-market related performance conditions are (PWC, 2011):

- Target EPS
- Target ROE or ROIC
- Target EBITDA or cash flow

A grading system can be implemented where shares vest to the employee proportionally depending on whether the condition is simply met, exceeded marginally or exceed substantially. Market related conditions can be either absolute or relative. Relative conditions are increasingly gaining in popularity. Examples of market related performance conditions are (PWC, 2011):

- Share price return
- TSR (share price return as well as dividends paid)
- TSR relative to an industry benchmark or a bespoke basket of peer companies

3.2.3 Deferred Bonus

With a deferred bonus scheme the employee is encouraged to defer a portion of their annual cash bonus and replace it with shares which have a vesting period attached. In return, the employee is granted a number of additional shares by the company. The vesting conditions of the shares can be either time-based or performance-based or sometimes both (Icely, 2006). This type of scheme encourages employees to gradually build a significant equity stake in the company. It is effectively a short-term incentive which can convert to a long-term one should the employee chose to do so.

3.3 Appreciation vs. Full Quantum – the Debate Continues

As mentioned previously, in the last five or so years ESO's have received a considerable amount of scrutiny. Originally designed to align managerial incentives with those of shareholders, their often visible failure to do so has been hard to accept. Full quantum schemes have been put forward as a replacement and have gained in popularity. Some of the key benefits listed by proponents are:

- They are less dilutive. For a given value in currency, the employee receives fewer shares as opposed to options. In addition, it has been argued that options were seen as "costless" by companies which has led to them issuing excessive amounts of ESO's to employees (Jensen *at al*., 2004). However, it is interesting to note that this assumes that investors lack the sophistication to evaluate the real cost of the ESO's issued by companies, which is not likely. Admittedly, disclosure today is significantly improved allowing investors to discount the value of ESO's even more precisely (Booth, 2009).
- Following on from the fact that options have embedded gearing and offer limited loss in return for potentially unlimited gain, together with fact that companies have gone through periods of excessive issuance (see above), critics of ESO's have pointed out that during bull markets executives have enjoyed enormous returns at the expense of shareholders. In this context it has been put forward that full quantum schemes provide a more balanced and symmetric pay-off and put managers in exactly the same position as shareholders. Another alternative which has been used by companies in the US is to cap the maximum gains which ESO's can offer (e.g. 125% of the strike price, if issued ATM) (Crotty *at al*., 2006).
- Actual shares provide a relatively stable incentive regardless of the stock price. In contrast, the value of an ESO's is highly sensitive to where the share price is relative to the strike price. If the option is deep ITM, it will behave similar to a share (high Delta). However, if the option is deep OTM it will have a low Delta and will largely insensitive to share price movements. In the past this has often forced companies to *re-price* ESO's (lower the strike price at some point in the life of the option) in an attempt to restore some value and Delta in *underwater*

(OTM) options. This in turn has often led to an outcry by shareholders given that it runs contrary to the spirit of ESO's to start with – pay for performance (Hall *at al*., 2003).

- Full quantum schemes tend to reduce managerial incentives to engage in risky behaviour. As stated above, volatility is one of the key inputs into option valuation and Vega is the sensitivity of the option with respect to changes in volatility. A rise in volatility increases the value of the option. In a real life context ATM or slightly OTM ESO's have no intrinsic value and high Vega. As such, managers are incentivised to undertake riskier projects (since risk equates to volatility) and increase the value of their options (Hall *at al*., 2003). At the same time, advocates of stock options point out that managerial behaviour can also potentially become too conservative. This can be sub-optimal for sufficiently diversified shareholders who have a preference for CEO's who maximise returns even if it means that more individual companies may suffer losses (Booth, 2009).
- Several studies have indicated that managers who hold options tend to favour share repurchases above dividend payments, since options do not entitle the holder to dividends. Therefore, an actual shareholding through a full quantum share scheme can provide an incentive to pursue a more balanced dividend policy for managers (Hall *at al*., 2003).

Although full quantum schemes seem to offer some distinct advantages, they certainly also have a cost attached and it would be simplistic to assume that they can automatically replace appreciation schemes. It is, however, evident that they have become more popular and ESO issuance has declined globally (PWC, 2011). It is likely that this trend will continue and that companies will invest more time designing more specific schemes to attain certain internal staffing goals and performance targets.

Chapter 4 – Accounting Treatment of Share-based Incentives

Expensing of share-based payment in company financials became mandatory in terms of the revised Statement of Financial Accounting Standards No. 123 (SFAS 123R) in the US and the International Financial Reporting Standard 2 (IFRS2) globally in 2005. Provided below is brief history of the accounting treatment of share-based incentives prior to the arrival of these standards.

4.1 United States

In 1972 the Accounting Principles Board (APB) in the US, the predecessor to the FASB, issued a standard called APB Opinion No. 25 (APB 25). APB 25 was criticised for prescribing inconsistent treatment for similar instruments (Sacho, 2003). It broadly categorised incentive plans into fixed and variable based on the level of certainty of the quantity of shares to be issued and other parameters. It specified that that for *fixed ESO plans* (where the share quantity, the strike price and the vesting date are known from the onset) only the intrinsic value, if any, was to be expensed in the company income statement on a straight line over the vesting period. This meant that zero expense would be recognised by the company on ESO's issued ATM or OTM. Conversely, for *variable plans* (where the number of shares is not fixed on grant date – e.g. SAR's or performance-based ESO's) an expense would have to be recognised regardless of the moneyness of the option. Consequently, in order to capitalise on this accounting loophole and recognise zero expenses, the majority of US companies adopted the practice of issuing ATM or OTM ESO's under fixed plans, in the process artificially inflating earnings and sacrificing performance-based conditions (Sacho, 2003).

In 1995, FASB Statement No. 123 (SFAS 123) was issued. It recommended the recognition of the fair value of ESO's in financial statements by using Black-Scholes or similar methodology and expensing this fair value over the vesting period. However, having been subject to political pressure and lobbying from US companies, it still allowed the use of the APB 25 methodology (grant day intrinsic value). If a company chose to continue to use APB 25, the effects of ESO's on profit and EPS had to be disclosed in a note to the financial statements as if the fair value method had been used. Needless to say, most companies in US chose this *disclosure-only* alternative (Sacho, 2003). As accounting scandals began to unfold (e.g. Enron and World.com), however, more and more companies began using the fair value expensing method.

In late 2004, the FASB released the Statement of Financial Accounting Standards No. 123 Revised – SFAS 123R. It superseded both APB 25 and SFAS 123 and became effective on June 15th 2005. It effectively made fair-value measurement and expensing of share-based payments mandatory in the US.

4.2 International Financial Reporting Standards – Share Based Payments (IFRS2)

Until 2000 the accounting rules in most developed countries prescribed the disclosure approach for dealing with share-based payments to employees. South Africa was also no exception. *AC 116 – Employee Benefits* stipulated disclosure of the details of share-based incentive schemes used by SA companies, as well as the dilution effect on EPS, however, recognition and expensing was not mandatory (Sacho, 2003). In July 2000, the IASB and the accounting standards boards of the US, UK, Australia, Canada and New Zeeland issued a joint discussion paper which proposed that where shares or share options are issued to employees as compensation, the fair value of these grants should be expensed. As part of setting common accounting standards in Europe and globally, in 2001 the IASB added a project to its agenda that would lead to an exposure draft (ED). In 2002 *ED 2 – Share-based Payments* was released for comments. This ultimately resulted in the publishing of IFRS2 – Share-based Payments which came into force in January 2005 and was also adopted in South Africa. The overall approach is broadly similar to SFAS 123R. In terms of IFRS2 share-based payments to employees are fair-valued on grant date and are charged through the income statement over the vesting period (Zheng, 2007).

4.3 IFRS2 – Basic Framework

What types of share-based payments are covered?

IFRS2 covers a wider spectrum of payments than simply those to employees. It covers all of forms of share-based payments for goods and services supplied to the reporting entity (Hern, 2006), including:

- Employee share or share option schemes – employees are defined widely and include others providing similar services
- Share-based payments to parties other than employees who have supplied goods or services to the entity
- Payments to be settled in cash or other assets at amounts which depend on share values (e.g. SAR's)

How are share-based payments categorised?

Share-based payments are divided into three basic types (Hern, 2006):

1. Equity-settled: where goods and services are paid for with shares or share options
2. Cash-settled: where in return for receiving goods and services the entity incurs a liability for amounts based on the price of the entity's shares
3. Transactions which may be settled with either cash or equity at either party's discretion

How is fair value measured?

In terms of transactions with employees, IFRS2 states that the expense should be measured on the date on which the equity instruments are granted and should be based on the fair value of the equity instruments granted since it is usually not possible to estimate reliably the fair value of the employee's services (Bezuidenhout, 2006). Market prices should be used where they are available. In the absence of observable market prices, a valuation technique such as an option pricing model should be used. IFRS2 does not specify a particular valuation model. It does, however, require techniques to be consistent with generally accepted valuation methods and incorporate all factors and assumptions that knowledgeable and willing parties should consider. Established models developed to value exchange traded options such as BS, Binomial Trees and MC may need to be modified to reflect the specific characteristics of ESO's (Hern, 2006).

How are equity-settled instruments treated?

The fair value of equity-settled instruments which do not vest until certain conditions have been met is calculated on the grant date and is expensed in the income statement over the vesting period (or until all conditions have been met), with a credit to shareholder's funds. The full value of grants with no vesting conditions is expensed immediately. It is important to note that the fair value of equity-settled instruments is not re-estimated at each reporting date. Only the estimate of the extent to which vesting conditions are expected to be met in order to determine the number of options/shares used in the calculations is updated (see treatment of vesting conditions below) (Hern, 2006).

How are cash-settled instruments treated?

The fair value of the liability resulting from cash-settled instruments is measured on grant date and is expensed over the vesting period (if any). In contrast to equity-settled instruments, this fair value is re-estimated at each reporting date and the liability is adjusted – "true-up" method.

What is the treatment of awards with a cash or equity alternative?

In the presence of awards with a settlement alternative, the entity accounts for them either as equity or cash-settled (charge to the income statement and debit to equity or liabilities) based on the entity's estimate of likely settlement and past practice with similar transactions (Hern, 2006).

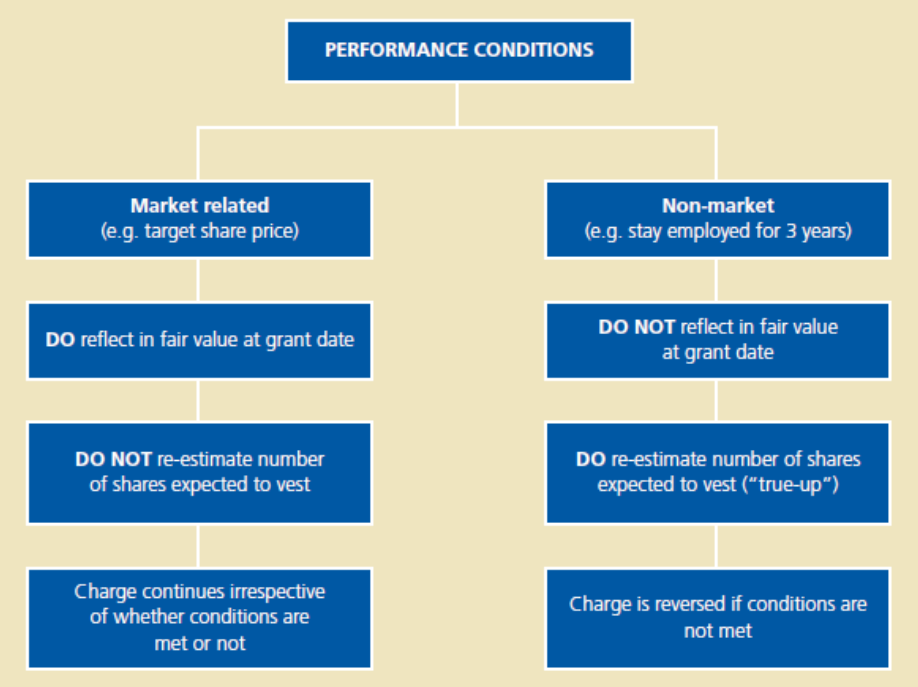
How are vesting conditions treated?

Vesting conditions are broadly divided into *market-based* and *non-market-based*. Examples of non-market-based vesting conditions are time-based (length of service) vesting, as well as EPS, revenue, EBITDA, ROE, ROIC internal company targets. Market-based vesting conditions are normally related to the share price of the company or other observable market rates (share prices, indices, etc). Examples are share price return, TSR, TSR relative to peer companies or an established market benchmark.

Non-market-based conditions are not taken into account into estimating the fair value of the instrument at grant date. Instead, at each reporting date the entity needs to re-estimate the number of instruments expected to vest and make adjustments if necessary so that ultimately the amount expensed should be based on the actual number of instruments which have vested. Such adjustments are based on the best available estimates.

Market-based conditions are taken into account into estimating the fair value of the instrument at grant date. The number of instruments expected to vest is not subsequently re-estimated at each reporting date and neither is the expected vesting period (if the length of this period is subject to a market-based condition).

Figure 1 – Diagram summarising the treatment of vesting conditions (Deloitte, 2007)



How are valuations inputs estimated?

IFRS2 does not prescribe a specific method when it comes to estimating valuation model inputs. These are left to the entity to estimate, provided that the methodology is reasonable and is based on accepted market practice. For instance, *expected volatility* may be measured by reference to implied volatility observed from exchange traded options. In the absence of a liquid options market on the shares of the company, given the mean reverting nature of volatility, historical volatility can also be used. Alternatively, a combination implied and historical volatility may be applied. Assumptions about *expected dividends* should be based on publicly available information. If the company has never paid dividends and does not expect to do so in the future, then an expected dividend yield of zero can be assumed. For an entity which pays dividends, the historical pattern of increases can be considered. The *risk-free interest rate* can be the yield implied from zero coupon government bonds with the same maturity as the instrument.

4.4 Implications of IFRS2

As is evident from the IFRS2 framework, there are a multitude of implications for companies choosing which type of share-based incentive scheme to implement. The IFRS2 treatment of share-based payments is not without its critics. A number of potential issues have been put forward by detractors of the standard.

No re-estimation of inputs and fair value for equity-settled instruments

The fact that the fair-value of equity-settled instruments is only calculated on the grant date and is not re-estimated on subsequent reporting dates artificially exaggerates the importance of grant date inputs such as the stock price, volatility and interest rates (Bulow *at al*., 2005). For companies with ESO's with a vesting period of 3 to 5 years this can create a substantial distortion of the reported earnings. If the share price rises over the vesting period, the ESO's will become more valuable and the company will be overstating earnings. If the share price declines, earnings will be understated. Similarly, the ESO's will have noticeable vega exposure. If volatility increases, again earnings will be overstated and if it decreases earnings will be understated. For example an ESO's with an expected life of 5 years will have a Delta of approx. 75% and a Vega of approx. 2%. This means that for every R 1 in the share price the value of the option will increase by R 0.75. It also means that for every 1% absolute increase of volatility (e.g. from 30% to 31%), the value of the option will increase by 2%.

Arbitrary treatment of vesting conditions, attrition rates and early exercise

The IFRS2 prescribed methodology for expensing share-based incentives is similar to the commonly used method for valuing a diverse pool of mortgages. As such, a significant amount of subjective estimates of employee behaviour, such as attrition rates and potential for early exercise need to be made by the company. In this context, the suggested remedies to alleviate the weaknesses of models such as BS and CRR Binomial trees often appear arbitrary. For instance, IFRS2 suggests that the option life as used by the model is reduced to an *expected option life* which is a gross oversimplification (van Zyl *at al*., 2007).

The exaggerated importance of the vesting period

According to IFRS2 expensing of share-based payments should take place during the vesting period even though much of the value of instruments may attributable to employment after the vesting date. Options generally do not provide much of a retention incentive when they are deep ITM or deep OTM on the vesting date. However, they represent a tangible benefit to the employee when at or near the money on the vesting date (Bulow *at al*., 2005).

The treatment of equity-settled and cash-settled instruments is different

This creates a potential dilemma for the company when it comes to designing an appropriate scheme. On the one hand, a cash-settled scheme together with frequent true-up of fair value will ensure that the valuation remains grounded in reality. On the other hand, an equity-settled scheme translates to less volatile earnings.

Chapter 5 – Tax Treatment of Share-based Incentives

Tax related matters arising from share-based incentives are dealt with by Sections 8A, 8B and 8C of the Income Tax Act No 58, 1962 (the Act). Sections 8A and 8C deal mainly with general option and share schemes while Section 8B deals with broad-based empowerment share plans. For the purposes of this study, only Sections 8A and 8C are analysed. Section 8C was introduced in October 2004 as a way for the SARS to curb the proliferation of shares schemes which were engineered to get around the stipulations of Section 8A and minimise tax in the hands of the employee.

5.1 Section 8A

Section 8A was introduced into the Act in 1969 and became effective in 1970. It applies to all rights to acquire marketable securities granted to employees before October 2004. Section 8C applies from October 2004 onwards. In an explanatory memorandum in 2004, SARS explained that Section 8A had failed to keep up with the myriad of equity-based incentives developed by companies and also the appreciation of related marketable securities as part of ordinary income (Bezuidenhout, 2006).

In terms of Section 8A, there is no tax event when securities are granted or when they vest. However, tax consequences arise when there is exercise, cession or release of the securities. Any revenue gain from the difference between the market value of the shares upon exercise and the consideration paid for the options/shares needs to be included is then subject to income tax for the relevant tax years in the hands of the employee. Also, in contrast with Section 8C, Section 8A does allow the deduction of losses. Where the shares acquired as a result of exercise, cession or release are subject to disposal restrictions, the employee can chose to defer the payment of tax until such date when the restrictions fall away and the shares can be disposed of. Any loans from the employer to the employee for the payment of any consideration would give rise to taxable benefit (Bezuidenhout, 2006).

The fact that in terms of Section 8A a taxable event occurs at exercise, cession or release, resulted in the proliferation of tax efficient incentive schemes such as deferred delivery schemes. With such schemes the ESO is exercised very early (almost immediately after grant date) which leads to a small taxable gain, taxed on income. Subsequent to exercise, the delivery and payment for the shares is deferred to a later date at which point only CGT is normally paid by the employee. It is likely that such schemes one of the reasons why SARS introduced Section 8C in 2004 (Bezuidenhout, 2006).

5.2 Section 8C

In contrast to 8A, in terms of Section 8C a taxable event occurs upon vesting of the equity instrument and not exercise. The employee needs to include in their income any gain or deduct any loss with respect to the vesting of such instruments. Section 8C further differentiates between *restricted* and *unrestricted* instruments. For instruments subject to restrictions, vesting and a corresponding tax event takes place at the earliest of lapsing of all restrictions, disposal, termination or death. Unrestricted instruments vest at the time of granting. Vesting does not take place if one restricted instrument is disposed of for another. The ultimate disposal of the shares (normally having been received as part of an appreciation or a full quantum scheme) may result in either capital or revenue gain, depending on the intention of the employee (Zheng, 2007).

The figure below is after Zheng (2007) and summarises the tax implications for the employee in terms of Sections 8A and 8C:

Figure 2 – Tax treatment of share-based incentives

<table>
<tr><th rowspan="3">Event</th><th colspan="4">Tax consequence</th></tr>
<tr><th rowspan="2">Section 8A</th><th colspan="3">Section 8C</th></tr>
<tr><th>Unrestricted options</th><th>Restriction on options only</th><th>Restriction on both options and shares or shares only</th></tr>
<tr><td>Grant</td><td>No tax effect</td><td rowspan="2">No distinction between granting and vesting. Gain (or loss) arising from the difference between market value of the option at the time of granting and any consideration paid for the option is included (or deducted from) in the employee's taxable income and is subject to income tax.</td><td>No tax effect</td><td>No tax effect</td></tr>
<tr><td>Option vesting</td><td>No tax effect</td><td>Gain (or loss) arising from the difference between market value of the option at the time it vests and any consideration paid for the option is included (or deducted from) in the employee's taxable income and is subject to income tax.</td><td>No tax effect</td></tr>
<tr><td>Option exercise</td><td>Employee pays income tax on the</td><td>No tax effect</td><td>No tax effect</td><td>No tax effect</td></tr>
</table>

	difference between the market value of the shares at the time of exercise and the consideration paid for the shares and the options.			
Lapse of restriction on the shares	No tax effect	No tax effect	No tax effect	Gain (or loss) arising from the difference between market value of the shares at the time all conditions lapse and any consideration paid for the option and the shares is included (or deducted from) in the employee's taxable income and is subject to income tax.
Sale of shares (assuming capital gain treatment)	The difference between the sale proceeds and the base cost of the shares is treated and taxed as capital gain. The base cost will be the market value of the shares on the exercise date.	The difference between the sale proceeds and the base cost of the shares is treated and taxed as capital gain. The base cost will be the market value of the shares on the option grant date.	The difference between the sale proceeds and the base cost of the shares is treated and taxed as capital gain. The base cost will be the market value of the shares on the date when the restrictions on the options lapse.	The difference between the sale proceeds and the base cost of the shares is treated and taxed as capital gain. The base cost will be the market value of the shares on the date when the restrictions on the shares lapse.

5.3 Tax Deductibility of Share-based Payments

Another important factor to consider is how share-based incentive schemes are taxed in the hands of the company issuing the scheme. Normally in countries such as Canada, UK and New Zealand share-based payments to employees constitute a deductable expense for the company. No such legal precedent exists in South Africa (Bezuidenhout, 2006).

Generally, to claim an income tax deduction several conditions need to be satisfied (Bezuidenhout, 2006):

- Expenditure or loses must actually be incurred;
- In the production of income;
- Such expenditure and losses must not be of capital nature;
- The expenditure and losses must be incurred for the purposes of trade.

In this context, the incurring of expenditure and losses is more easily justifiable in instances where the scheme is either settled with cash or with shares which are purchased by the company in the open market. Conversely, it is more difficult to justify expenditure and losses where the scheme is settled with the issuing of new shares. This adds another layer of complexity in addition to the IFRS2 accounting treatment, when it comes to designing a share-based incentive scheme. It is also potentially the reason why cash and net share settled SAR schemes have gained in popularity in the past several years.

Chapter 6 – Results and Findings

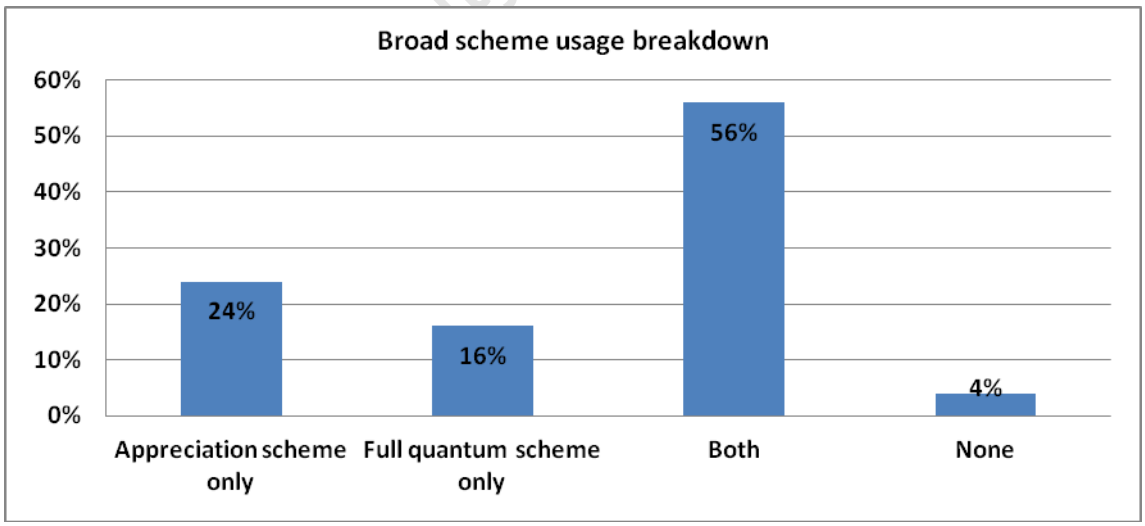
This chapter outlines in detail the various share-based incentive schemes used by the 50 companies chosen for this study, together with some of the specific parameters incorporated in these schemes. It also serves to identify particular trends in terms of, among others, preferred schemes types and method of settlement, general size of schemes relative to issued share capital, the different types of vesting conditions applied to schemes and the valuation models used.

6.1 Prevalent Scheme Types

Of the 50 companies examined only 2 companies do not make use of share-based incentive schemes – Assore Ltd and Reinet Investments CSA. Both companies are investment holding companies which invest in other listed or unlisted companies. They do not operate the companies they hold, have minimal staff component and, as such, share-based incentives are not seen as a necessary ingredient in their remuneration structure. The other 48 companies all use some form of long-term share-based incentives.

Figure 3 below illustrates the broad use of appreciation-type schemes vs. full quantum schemes.

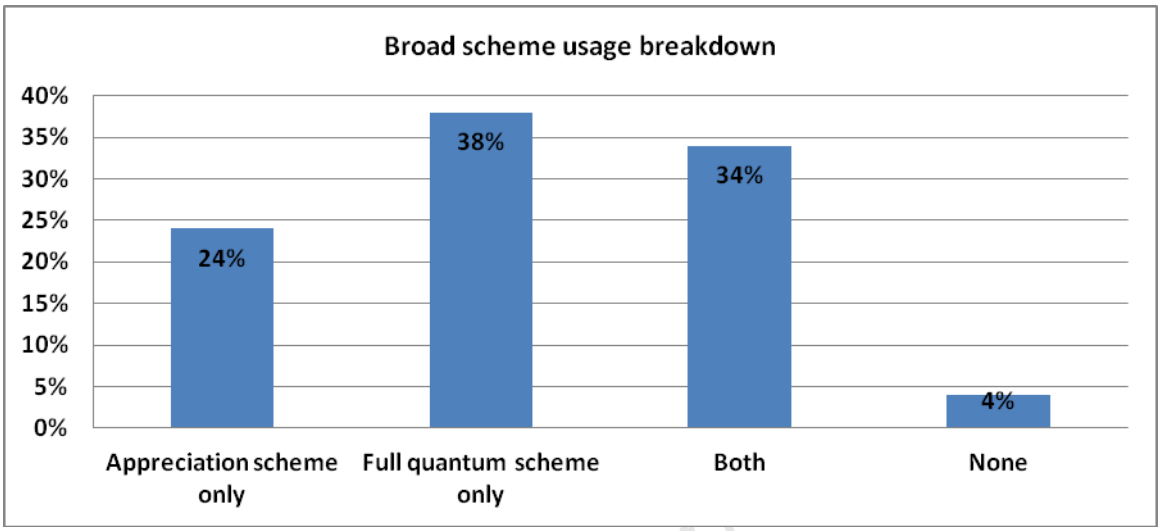
Figure 3 – Use of appreciation schemes vs. full quantum schemes



At first glance, it does not become apparent that full quantum schemes have become more popular in recent years. However, the 28 companies (56% of total) which make use of both types of schemes need to be scrutinised a little further. Of these 28 companies, 11 companies have indicated that they have effectively discontinued their existing appreciation schemes with no further issuance of appreciation instruments taking place. The existing tranches of instruments will be allowed to mature

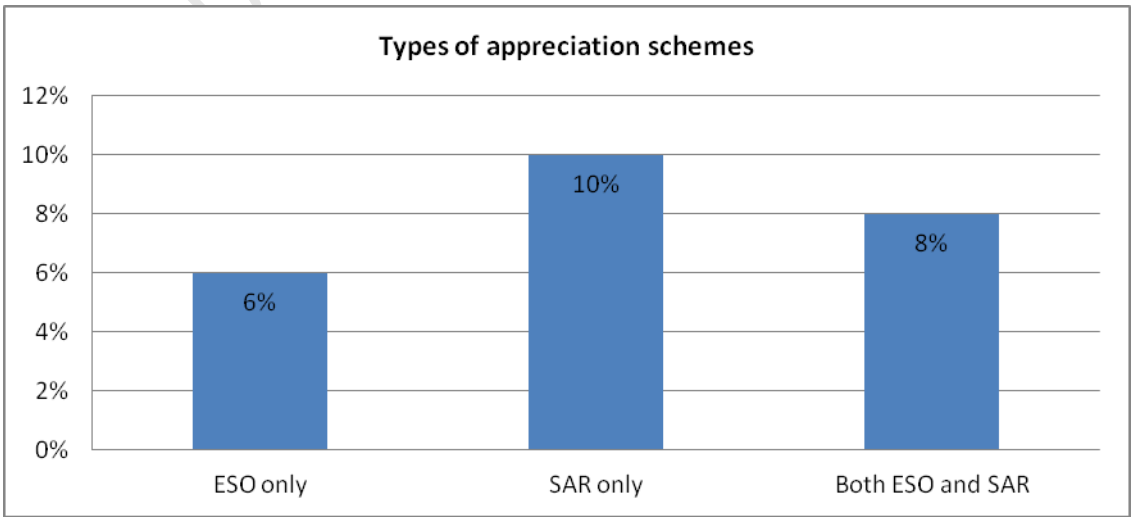
in the next several years and are already being replaced entirely by full quantum schemes. This means that the percentage of full quantum schemes is currently understated. If the appreciation-type schemes these 11 companies still have are excluded from the data, a different picture appears.

Figure 4 – Use of appreciation schemes vs. full quantum schemes (excluding already discontinued appreciation schemes)



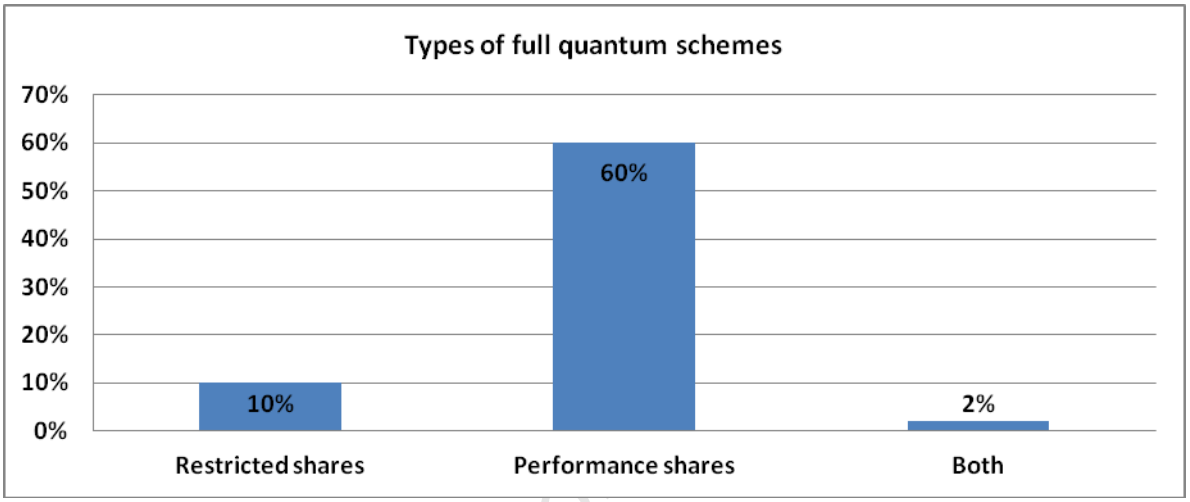
The figure above indicates that full quantum schemes are indeed gaining in popularity. This is further supported by data collected for 70 JSE listed companies by Towers Perrin in a report on global incentives published in 2005 (Towers Perrin, 2005). At that point, 55 of the 70 companies surveyed (or 79%) were still using exclusively appreciation-type share-based incentive schemes. The data also points to the fact that traditional ESO's have experienced a significant decline. Figure 5 bellow shows that of the 50 companies analysed, only 3 companies (or 6%) use exclusively a traditional ESO scheme.

Figure 5 – Types of appreciation schemes



The companies who either exclusively use SAR's or both SAR's and ESO's are also relatively few. As previously mentioned, SAR's offer certain benefits over ESO's, namely less dilution and in instances where they are cash settled – potentially a favourable tax treatment. In the few years after the introduction of Section 8C of the Income Tax Act and also IFRS2, they were often seen as a replacement to traditional ESO's (Icely, 2006). This is also supported by the fact that a number of the companies examined as part of this study indicate that they have migrated their old ESO schemes into SAR's around that period. That being said, the general picture which seems to emerge is one of gradual evolution from ESO schemes to either SAR's or both SAR's and full quantum schemes.

Figure 6 – Types of full quantum schemes



As Figure 6 above illustrates, of the 36 companies (72% of total) which use full quantum schemes (either exclusively or together with appreciation schemes), the overriding majority (30 companies or 60% of total) make use of performance shares. Another 5 companies use restricted shares and 1 company uses both restricted and performance shares. In 2005, Towers Perrin reported that only 5 of the 70 South African companies surveyed (or 7%) were using performance shares as part of remuneration (Towers Perrin, 2005). It is very interesting to see what a significant number of companies have adopted the use of performance shares over the last 5 – 6 years.

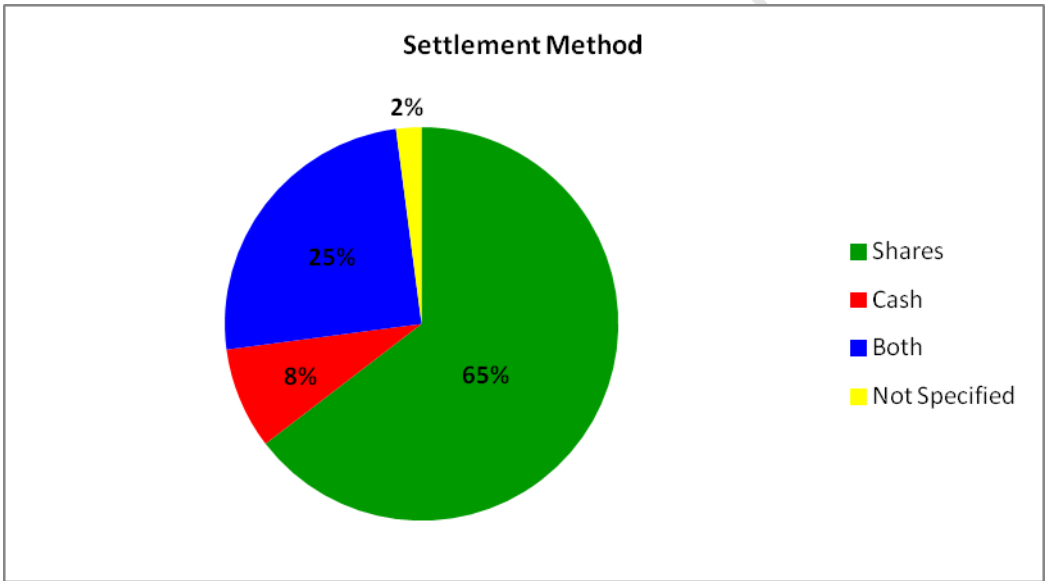
Companies today are faced with a multitude of competing objectives in terms remuneration. Examples are staff retention, aligning incentives of managers with those of shareholders, meeting short, medium and long-term strategic goals. In this context, there has been a gradual move away from the "one size fits all" approach. More time is spent on the design of share-based incentive schemes and companies are starting to use combinations of schemes (PWC, 2011). Of the 50 companies analysed (excluding ones which have residual ESO and SAR schemes, but have indicated that they are moving exclusively to full quantum schemes), 19 (or 38%) operate more than one basic type of scheme. In addition, the overriding majority of companies operate a multitude of different incentive plans (either appreciation-type, full quantum or both) at any given point, aimed at different

employee groups. What is also apparent is the distinct complexity of plans used by large multinational companies. Noticeable also is the more complex and elaborate nature of plans used by financial institutions compared to those of retail or manufacturing companies for example. In the aftermath of the global financial crisis, financial institutions have been subject to much closer scrutiny in terms of employee and executive remuneration, risk taking behaviour and misalignment of incentive. It is likely that this has potentially resulted in a more rapid transformation of their incentive structures and has led to more varied share-based incentives aiming to address previous inconsistencies as well as to appease regulators and the general public.

6.2 Settlement Method

It is interesting to see that the majority of the 48 companies which operate long-term share based incentive schemes settle those schemes with shares.

Figure 7 – Settlement method



As mentioned in Chapter 5, cash settlement has the potential to offer tax deductibility to the company of the resulting scheme expense. However, due to the lack of legal precedent in South Africa, this is not guaranteed and certain conditions need to be satisfied first (Bezuidenhout, 2006). Therefore, although at first glance one would expect tax efficiency to be an important consideration for any company, the proliferation of share settled schemes could be indicative of other factors which might be at play.

The simple fact that full quantum schemes have become so dominant is potentially one of the reasons why share settlement is prevalent. As discussed in Chapter 3, full quantum schemes and consequently shares offer less dilution, less gearing, linear pay-off and better alignment of employee

incentives, compared to ESO's. Even net share settled SAR's offer less dilution than standard share settled ESO's. Another potential reason is the fact that share settled schemes are not fair valued after they are granted in succeeding reporting periods and, as a result, introduce less volatility in the income statement (see Chapter 4 for IFRS2 discussion).

6.3 Size of Share-based Incentive Schemes

Of the 48 companies which operate long-term share based incentive schemes, 25 disclose the maximum amount of shares that can be issued as part of their share-based incentive schemes. Of these 25 companies, 23 form part of the FTSE/JSE Top 40 Index and another 2 companies form part of the sample with lower market capitalisation.

In percentage terms relative to total issued shares, the average maximum allowable scheme size for all 25 companies is 11.5%. The 2 companies which are not TOP40 Index constituents have larger maximum allowable scheme sizes – average of 18.1%. Taken at face value, the average permissible scheme size numbers are cause for concern. They are indicative of the potential for significant dilution if used to the maximum. However, one needs to examine the current usage further. Of the companies currently operating long-term share based incentive schemes, 44 disclose the actual usage of the maximum allowable scheme size (of these 36 are part of the TOP40 Index and 8 are not). This is provided via the quantity of shares which the company may have to issue, should all vesting conditions for all instruments were to be satisfied and all instruments were exercised at the end of the reporting period. As such, the actual usage for all 44 companies is quite low relative to issued share capital – 3.1%. It is again higher for non-members of the TOP40 Index – 6.3%. Usage relative to maximum allowable size (for all the 25 companies who disclose maximum allowable numbers) is 24.5%.

Overall, the picture which emerges from the data is one of relatively contained usage of share-based incentive schemes. In line with global trends (PWC, 2011), JSE listed companies are clearly cognisant of the dilutive effect of share-based payments and, consequently, tend to be relatively sparing with the size of their incentive schemes.

6.4 Vesting Rates, Vesting Periods and Tenor

Long-term share-based incentive schemes by definition have built in vesting periods. Historically the period has served as an employee retention tool, but as of more recently, with the proliferation of performance conditions, this is also the period during which such conditions can be measured.

Broadly, vesting can be divided into cliff-type vesting where the entire scheme tranche will vest, or staggered vesting where portions of the same tranche will vest in successive years (e.g. in 3, 4 and 5 years after grant date).

There appears to be a noticeable difference between the type of vesting incorporated into appreciation schemes as opposed to full quantum schemes, as evidenced by data from the 48 companies examined. Cliff vesting is dominant among full quantum schemes, whereas staggered vesting dominates among appreciation type schemes. Staggered vesting normally commences 2 or 3 years after grant date and the most widely used methods are either vesting rates of 33% over 3 years or 25% over 4 years. Cliff vesting in most instances takes place 3 years after grant date. In cases where a full quantum scheme cliff vests and also has more than one performance condition/criteria, the respective tranche is split into portions assigned to each condition. For example:

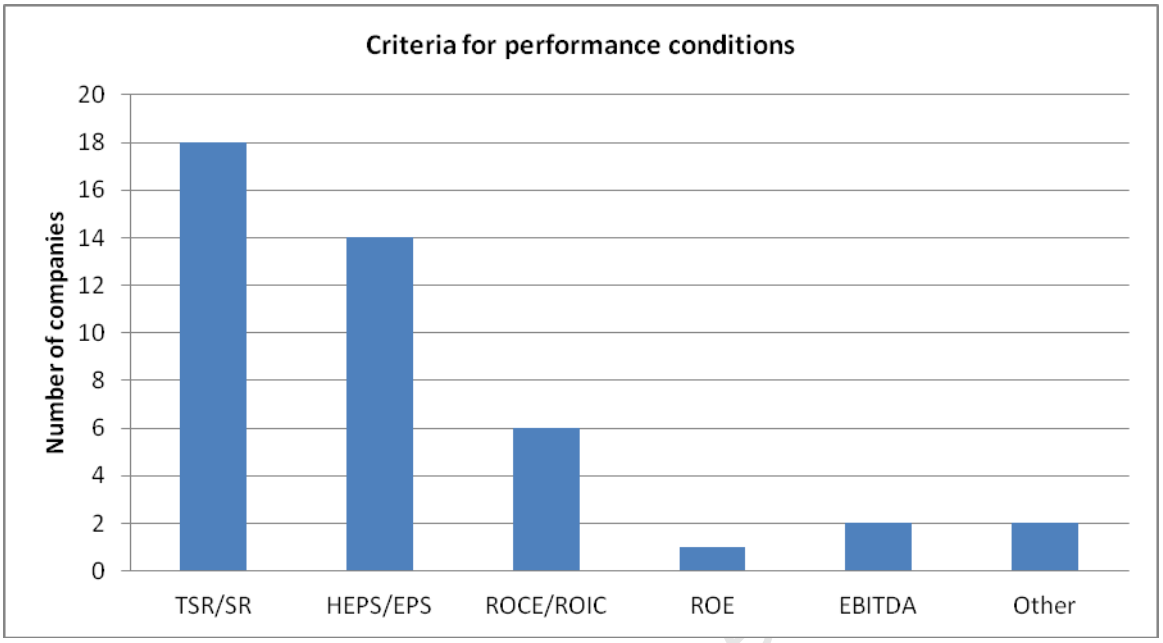
- vesting takes place in 3 years
- 50% of tranche will vest if 5% HEPS growth is achieved over the 3 year period
- the other 50% of tranche will vest if TSR is above that of a group of peer companies over the 3 year period

Given that shares are perpetual instruments, by definition, in the case of full quantum schemes vesting and expiry effectively coincide. Expiry for appreciation instruments tends to take place 6 to 10 years after grant date. The average tenor for appreciation schemes used by the JSE companies examined in this study is 8.2 years, whereas the average tenor for those with full quantum schemes is 3.2 years. It is interesting to note that the extended tenor of appreciation schemes can lead to increased dilution and drag on shareholder value, given that options have the potential to go very deep ITM over a 10 year period. As such, again, it is not surprising to see that full quantum schemes with a reduced tenor have grown in prominence.

6.5 Performance Conditions

Of the 48 companies which operate long-term share based incentive schemes, 11 companies do not use performance conditions of any kind and 8 companies mention, but do not disclose the performance conditions they use. Of the 25 companies who both use and disclose performance conditions, 15 companies (or 52%) use two criteria (e.g. total shareholder return – TSR and headline earnings per share – HEPS). Another 2 companies (or 7%) use three criteria. The criteria used are predominantly market-based with non-market based internal targets being present, but to a smaller degree. Normally in instances where the company uses more than one criterion, it is often a combination of a market-based and a non-market based internal target.

Figure 8 – Different criteria used in performance conditions



As Figure 8 above illustrates, total shareholder return (TSR) and simply shareholder return (SR) are the most popular benchmarks used by companies. TSR and SR are relative market-based performance conditions and are normally compared to those of either an established industry index or a bespoke basket of peer companies. Non-market absolute performance conditions are also popular with headline earnings per share (HEPS) and earnings per share (EPS) being most frequently used. In instances where an absolute non-market condition is present there is normally an internally set target which needs to be attained during the vesting period (e.g. HEPS annual growth needs to be 5%), or a hurdle rate needs to be overcome (e.g. HEPS annual growth needs to be above CPI). In general, performance conditions are much more frequently associated with full quantum schemes (and performance shares specifically), although some of the more recently issued SAR's schemes also on occasion have embedded performance conditions. It also interesting to note that several companies indicate that they have performed reviews of the performance conditions in their schemes and, as a result, have decided to apply more stringent criteria. For instance, simply attaining TSR equal to that of peer companies does not necessarily mean that that vesting will take place. It is outperformance that leads to vesting and the more the benchmark is outperformed the larger part of the tranche vests.

6.6 Share Price on Grant Date

As mentioned previously, studies have indicated that prior to the introduction of the SOX Act and IFRS2 a number of option grants in the US and also other countries globally had been timed retroactively by back-dating the strike price, thus artificially inflating the option pay-off and, in the

process, robbing company shareholders of value (Lie, 2005; and Holman *at al*., 2010). This practice has been eradicated and companies are now forced to provide significantly more disclosure of the specific details of their share-based incentives, including the reference share price used to determine strikes and share quantities.

Of the 48 companies who operate long-term share based incentive schemes, the majority use the share price on the grant date. Strike prices are set ATM (none of the companies indicate that they set strikes at a discount to the prevailing share price) except in instances where the option is a low exercise price option (LEPO) and effectively has a strike of zero. Other methods used to determine the reference price are:

- share price on the date before grant date
- an average closing share price over period preceding the grant date (normally 5 to 20 days)
- VWAP over period preceding the grant date (normally 5 to 20 days)

Incidentally the last two methods are very robust and would certainly be the preferred choice in terms of eliminating any chance of share price manipulation. In addition, they ensure that the reference price is to a lesser extent subject to volatility and general short-term market sentiment.

6.7 Models and Model Inputs

6.7.1 Option Pricing Models

The models most frequently used by the companies which form part of this study are, predictably, Black-Scholes, Binomial and Monte Carlo. One company mentions the use of Bermudan model, which is likely to be an adaptation of the Binomial model. The Black-Scholes model is used mainly for standard appreciation schemes (ESO's and SAR's) exclusively with time-based vesting (i.e. no performance conditions). In such instances, an expected life of the option is normally calculated by the company to account for the possibility of early exercise. The more versatile Binomial model also tends to be associated with more standard ESO and SAR schemes with time-based vesting. Unfortunately, in most instances disclosure is not sufficient to determine whether and how early exercise is incorporated into the binomial tree, except in one instance. The company in question applies a strike multiple of 2.5 to a Binomial model when valuing ESO's. If the multiple is reached at or after vesting, the model assumes that the option will be exercised. This is conceptually analogous to the Hull-White model described in Chapter 2 and is perhaps one of the more ingenious uses of the Binomial model of any of the surveyed companies.

The Monte Carlo model is uniformly used to fair value complex schemes with market-based performance conditions such as relative TSR. It is interesting to note at this point that an instrument whose fair value is contingent on the outperformance of one underlying asset over another will have sensitivity to not only the volatility of the two assets, but also the correlation between them. Yet none of the companies with schemes containing market-based based performance conditions mention the use of correlation as an input into the Monte Carlo model.

One company also indicates that the valuation of their schemes is outsourced to an external party. Another company indicates that they use the valuation provided by the bank which also provides them with hedging instruments for their schemes.

6.7.2 Volatility

The overriding majority of companies who form part of this study use historical volatility as an input to their respective models. In most cases, the term of historical volatility used equates to the term of the instrument (e.g. if the ESO/SAR has a 5 year term, then 5 year historical volatility is used). In some instances the historical volatility term is adjust to match that of the expected life of the option as determined by the company. In addition, four companies apply either simple or exponential moving averages to historical volatility possibly in an attempt to place more emphasis on more recent historical volatility as opposed to volatility further back in time. Only one company mentions the use of 6 month implied volatility as derived from SAFEX traded options. This is somewhat surprising, given that the company in question operates a LEPO-based scheme and, as such, the instruments (being zero strike calls) have no sensitivity to volatility.

6.7.3 Expected Life

There is relatively little disclosure surrounding the methodology used to calculate an expected life for ESO's and SAR's by the companies in this study. The ones who mention the fact that an expected life is supplied to the model simply indicate that it is a management estimate, based on historical experience. In several instances, closer inspection of some of the supplied dates and other parameters, suggests that the expected life may not be calculated – i.e. the more conservative approach of using the actual term of the option may be used.

6.7.4 Interest Rate

Interest rates are decidedly the single model input which presents the least problems in terms of estimation. Liquid and observable interest rate curves, implied from either government bonds or inter-

bank swaps, go out to 30 years and more. With very few exceptions, the majority of companies use the interest rate corresponding with the maturity of the option derived from zero coupon South African government bonds. Four companies indicate that they use the inter-bank swap rate corresponding with the maturity of the option. This is the more technically correct method in the sense that the company writing the options is unlikely to have a credit rating equal to that of the SA government and, as such, swap rates provide a better proxy for the credit risk of the company. In fact, the most technically correct method would be for the company to use its own borrowing cost with similar term as a model input. Conversely, using the lower zero coupon government bond rates tends to overvalue the call option and, in this respect, provides a more conservative accounting estimate. This is more pronounced for longer dated options.

6.7.5 Dividend Estimates

Again, disclosure related to dividend estimation is not particularly significant. Management estimates based on historical experience is most often quoted as the method for deriving dividend estimates. This in itself is not necessarily problematic, given the fact that, unlike interest rates, volatility and early exercise patterns, management does actually have control over the company dividend policy. One company indicates the use of a dividend cover multiple. It is not, however, clear how the company in question estimates the growth of their earnings on the dividend payout will be contingent.

6.7.6 Attrition Rates

Employee attrition rates, similar to expected life, are a distinctly subjective estimate which IFRS2 leaves to the company to construct. There is no mention among any of the companies of the recognition of the inverse correlation which exists between the company share price and employees forfeiting their stock options.

6.8 Valuation Verification

Attempting to re-perform the valuation performed by companies over their share-based incentive schemes at the end of each reporting period is surprisingly difficult. There are several reasons for this:

- Even with enhanced mandatory disclosure rules, it is frequently difficult to establish the exact inputs used in the valuation. Companies often disclose average valuation inputs across a multitude of tranches instead of specific inputs for each tranche. For example a weighted average strike price (or sometimes even just a range of strike prices), a range of expected (or just contractual) lives, a volatility range and an interest rates range will be stated for all tranches issued in the financial year.

- Companies often disclose the year during which a tranche of instruments was issued, but not the exact grant dates.
- Companies often simply disclose the charge to their income statement resulting from the valuation of all scheme tranches in ZAR million, instead of providing detail of the fair value of each tranche of options (in ZAR per option).
- With share settled schemes, given that re-testing of inputs and fair valuing does not take place after grant date, companies simply tend disclose details only for scheme tranches issued over the most recent reporting period.

In this context, re-performing valuations with a good degree of accuracy in most instances is simply not possible.

For the purposes of this study, the re-performing of the valuation of an appreciation scheme was attempted with the aim of gaining more insight into the way companies estimate model inputs and option fair values. The scheme was that of Massmart Holdings Ltd (JSE share code: MSM). This scheme was chosen for the reasonable amount of detail provided in terms of model inputs and fair values. The company issued a sizeable tranche of share options in May 2009 and this tranche was chosen as a test case. The parameters, as indicated by MSM, are:

Grant date:	27th May 2009
Strike price:	R 77.56
Strike price setting method:	ATM relative to share price on date before grant date
Term to expiry:	6 years
Expected life:	3 to 5 years
Settlement method:	shares
Vesting starts:	2 years after grant date
Vesting rates:	25% in 2 years; 25% in 3 years; 25% in 4 years; 25% in 5 years
Valuation model:	Binomial
Fair value on grant date:	**R 22.97**
Quantity issued:	2,719,034
Total tranche value:	R 62,456,211
Volatility used:	34.7%*

Method for volatility estimation:	historical volatility with term equivalent to expected life
Interest rate:	7%*
Dividend yield:	4.1%*

* Volatility, interest rates and dividend yield were only disclosed as ranges by the company for all the tranches issued during the year. The numbers indicated above were extrapolated by the author and may be slightly different from the exact levels used by the company.

The Hull-White model was chosen for the valuation of the above tranche. The main reason for this is the fact that it does not require the estimation of an expected life. It captures the potential for early exercise via the exercise multiple. The parameters used are as follows:

Strike price:	R 77.56
Spot price on grant date:	R 77.01
Option term:	6 years
Time to vesting:	3.5 years (the average for the tranche)
Exercise multiple:	2.8* x strike price
Volatility:	32.3%**
Interest rate:	8.5%***
Dividend yield:	3.75%****
Fair value:	**R 25.53**

* This multiple was suggested by Hull and White (2004) and is related to an average calculated in the US market.

** The volatility used is the 6 year MSM historical share price volatility as of grant date (27th May 2009).

*** The interest rate used is the 6 year inter-bank swap rate as of grant date (27th May 2009).

**** The dividend yield used is the 6 year historical MSM dividend yield as of grant date (27th May 2009).

Several important points emerge from this exercise, namely:

1. The company indicates that the method used to set the strike price is to set it ATM relative to the share price on the date before grant date. On the 26th May 2009 the MSM closing share price was R 77.80. Taken at face value, this means that the option was struck at a discount of 0.31%. Inspection of the 30 days before the grant date shows that MSM did not close at

R77.56 on any of those days. The only remaining possibility is that an intra-day share price level may have been used to set the strike.

2. There is a difference in the volatility used by the company and the historical volatility with term equivalent to that of the option (34.7% vs. 32.3%). This is due to the fact that the company uses an expected life for the option as a method of incorporating the possibility of early exercise. The expected life is shorter than the contractual life of the option and the volatility used by the company is the historical volatility with term equivalent to the expected life. Figure 9 below provides the term structure of historical MSM share price volatility as of 27th May 2009.

   Figure 9 – MSM Historical volatility

Term (years)	Volatility
1.0	42.8%
1.5	40.8%
2.0	37.9%
2.5	36.7%
3.0	36.9%
3.5	35.7%
4.0	34.4%
4.5	34.3%
5.0	33.6%
5.5	33.1%
6.0	32.3%

   As can be seen, historical MSM volatility had a downward sloping term structure at that point. Based on this, the expected life of the option as estimated by the company was approximately 3.9 years. This is a clear example of how a subjective input such as the expected life of the option can cause distortion in other important inputs. In addition, a long term option such as an ESO tends to have substantial vega and even small changes in volatility result in noticeable change in fair value.

3. Similarly to volatility, there is a discrepancy in the interest rate used by the company. To some extent this is again potentially related to the shorter expected life of the option. However, interestingly, closer inspection shows that neither swap rates nor zero coupon bond rates with 3 to 6 year term were as low as 7% (as used by the company) as of 27th May 2009. In this context, given the interest rate sensitivity of the option (Rho), the 7% interest further adds to discrepancy in value.

4. The difference in option premium of R 2.56 equates to a difference of 10% in relative terms. It also translates to a total difference for the tranche of R 6.96 million. What needs to be emphasised here is that:

a. Neither model (Binomial with expected life or HW with an exercise multiple) is entirely immune to subjectivity on part of the user.
b. It is clear that, given the nature and term of share-based incentive instruments, estimating model inputs with a reasonable degree of accuracy is often difficult.
c. In this context, from the company's standpoint, it is more important to ensure that the model used is broadly appropriate for the task at hand and also that inputs are reasonable and tied to reality.

Conclusion

Share-based incentive schemes as an accepted method of aligning shareholder and employee incentives have been around for some time. More recently, market turmoil, accounting scandals increased shareholder awareness and also stronger regulatory scrutiny have succeeded to highlight some of inherent deficiencies of the more traditional share-based incentive schemes such as stock options. This, together with evolving accounting and tax treatment, has precipitated a shift in share-based incentive scheme practices (PWC, 2011).

Globally, several important developments have emerged over the past several years. Overall issuance of stock options has declined. The average size of share-based incentive schemes relative to issued share capital has also declined. There has been a marked move away from simple stock option-type schemes towards less dilutive Share Appreciation Rights and also full quantum share schemes. Another important development are performance conditions which have become increasingly prevalent in terms of grant vesting. Shareholders, regulators and other stakeholders have successfully pushed companies to provide greater amounts performance-based equity at the expense of time-based vesting (PWC, 2011).

This study was aimed at examining the share-based incentive scheme practices of JSE listed companies in a post IFRS2 and Section 8C environment. The objective was to determine if South African listed companies have similar practices to those observed globally and to attempt to ascertain any specific trends. Analysis was based on a sample of 50 large and mid cap companies, with total market capitalisation comprising 76% of the FTSE/JSE All Share Index. A literature review was also performed, encompassing the history and evolution of share-based incentives, methods for valuation and recent developments in their accounting and tax treatment. The areas of focus for the study were defined as follows:

- To examine the accounting and tax treatment of share-based incentives globally and in South Africa
- To examine the current long-term share-based incentive schemes used by JSE listed companies
- To gain an understanding of prevalent scheme types, average scheme size, settlement methods, valuation models used, methods for constructing model inputs and the types of performance conditions used

Based on the data compiled, the following conclusions were drawn:

1. Use of traditional share settled stock options with time-based vesting has declined significantly. Existing ESO's generally have been or are in the process of being replaced with other, more advanced instruments.

2. Share Appreciation Rights with cash or net share settlement have gained in popularity as a less dilutive substitute for ESO's.

3. Full quantum schemes, such as restricted and performance shares, have seen a fairly dramatic ascent and are the most popular choice in terms of offering long-term share-based incentives to employees.

4. Use of performance conditions in relation to the vesting of instruments has also increased significantly at the expense of simpler time-based vesting. In this context, total shareholder return (TSR) relative to a basket of peer companies is the most frequently used benchmark.

5. Share settlement is preferred choice largely due to the proliferation of full quantum schemes.

6. The average size of schemes relative to issued share capital is relatively low, indicating that companies are cognisant of the dilutive potential of share-based payments.

7. Black-Scholes, Binomial and Monte Carlo are the most frequently used valuation models. The Monte Carlo method is used more and more frequently with the increased use of complex performance conditions.

8. In the absence of a liquid exchange traded market for options with longer tenor, companies almost always resort to using historical volatility as a proxy for future volatility.

An area which can form the focus of future more in depth research is the valuation of complex share-based incentive schemes. For example, the use of market-based performance conditions adds another dimension to the valuation process, namely correlation. It would be interesting to ascertain how well understood this variable is in terms of constructing the correct valuation models to incorporate complex outperformance-based payoffs. In addition, as things stand currently, most of the inputs used even for the valuation of more mainstream schemes are distinctly subjective and can potentially be prone to manipulation. It would be interesting to see if a more detailed analysis of inputs and valuation methodology used by companies can reveal any deliberate accounting discrepancies.

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Appendix A

(List of companies chosen for the study)

Share Code	Company	Scheme Type
ABL	African Bank Investments Ltd	Full Quantum
ACL	Arcelormittal South Africa Ltd	ESO
AGL	Anglo American Plc	Some residual ESO. Has moved to Full Quantum.
AMS	Anglo Platinum Ltd	Some residual ESO. Has moved to Full Quantum.
ANG	AngloGold Ashanti Ltd	Full Quantum
APN	Aspen Pharmacare Holdings Ltd	Currently ESO/SAR. Moving to Full Quantum.
ARI	African Rainbow Minerals Ltd	Currently ESO. Moving to Full Quantum.
ASA	ABSA Group Ltd	Moving to Full Quantum
ASR	Assore Ltd	Does not operate a scheme
BIL	Bhp Billiton Plc	Full Quantum/ESO
BVT	Bidvest Group Ltd	ESO
CFR	Compagnie Financiere Richemont SA	ESO
CSO	Capital Shopping Centres	ESO/Full Quantum
EXX	Exxaro Resources Ltd	SAR/Full Quantum
FSR	FirstRand Ltd	SAR/Full Quantum
GFI	Gold Fields Ltd	Previously ESO. Has moved to SAR/Full Quantum.
GRT	Growthpoint Properties Ltd	Full Quantum
HAR	Harmony Gold Mining Co Ltd	Previously ESO. Has moved to SAR/Full Quantum.
IMP	Impala Platinum Holdings Ltd	SAR
INL	Investec Ltd	SAR
KIO	Kumba Iron Ore Ltd	Currently ESO/SAR. Moving to Full Quantum.
LON	Lonmin Plc	Full Quantum
MND	Mondi Ltd	Full Quantum
MSM	Massmart Holdings Ltd	ESO
MTN	MTN Group Ltd	Currently ESO/SAR. Moving to Full Quantum.
NED	Nedbank Group	Some residual ESO. Has moved to Full Quantum.
NPN	Naspers Ltd	ESO/SAR
OML	Old Mutual Plc	ESO/Full Quantum
REM	Remgro Ltd	SAR
RMH	RMB Holdings	SAR/Full Quantum
SAB	Sabmiller Plc	ESO/Full Quantum
SBK	Standard Bank Group	ESO/SAR/Full Quantum
SHF	Steinhoff International Holdings Ltd	Full Quantum
SHP	Shoprite Hodings	SAR
SLM	Sanlam Ltd	Full Quantum
SOL	Sasol Ltd	SAR
TBS	Tiger Brands Ltd	SAR
TRU	Truworths Ltd	ESO / SAR
VOD	Vodacom Group Proprietary Ltd	Full Quantum
WHL	Woolworths Holdings Ltd	SAR/Full Quantum
REI	Reinet Investments SCA	Does not operate a scheme
IPL	Imperial Holdings Ltd	SAR/Full Quantum
DSY	Discovery Holdings Ltd	Currently SAR. Moving to Full Quantum.
TFG	The Foschini Group Ltd	Currently ESO/SAR. Moving to Full Quantum.
LBH	Liberty Holdings Ltd	ESO/SAR
MDC	Mediclinic International Ltd	Previously ESO. Has moved to Full Quantum.

MPC	Mr Price Group Ltd	ESO/Full Quantum
LHC	Life Healthcare Group Holdings Ltd	SAR/Full Quantum
CPI	Capitec Bank Holdings Ltd	ESO / SAR
AEG	Aveng Ltd	Previously ESO. Has moved to SAR/Full Quantum.