What are Currency Options

JSE

DERIVATIVE MARKET

Currency Derivatives

Currency Options

www.jse.co.za

Johannesburg
Stock Exchange

An Option is a powerful financial tool because it is optional for the purchaser, but binding for the seller. Options are a useful tool for the transferral of risk. Buying and selling Options allow those who don't want to take the risk of an adverse currency fluctuation to pass on the risk to speculators or Option writers in a simple and cost effective way.

Currency Options are derivative contracts that grant the purchaser the right but not the obligation to trade a Currency Futures contract at a predetermined date in the future (closeout) at a prearranged price (strike), regardless of where the underlying market is trading.

The Currency Options traded on the currency derivatives trading platform are based on the underlying Currency Future contracts on a one-to-one basis.

This implies that Option holders have the right but not the obligation to enter into a Currency Futures contract at the strike price chosen in advance.

Currency Option premiums fluctuate with movements in the underlying spot and futures exchange rates.

The two most common types of Currency Options are Call Options and Put Options.

Call Options

A Call Option contract grants the purchaser the right but not the obligation to buy the underlying Currency Future at a predetermined price at a predetermined date.

Put Options

A Put Option contract grants the purchaser the right but not the obligation to sell the underlying Currency Future at a predetermined price at a predetermined date.

All Options have several basic features in how they are quoted

The major components of Option contracts are:

- Expiry date

  This is the day on which all Options for the specified contract date will expire. The expiry months specified for foreign currency derivative contracts are March, June, September and December. All currency derivative contracts expire two business days prior to the third Wednesday of the expiry month or, if that day is not a business day, then the previous business day.

  These dates correspond with the Currency Futures market close-outs when all the contracts for that expiry are cash settled.

- The underlying securities

  Options may be traded on any Currency Future (CF) listed on the JSE's Currency Derivatives market. Options trade like other derivatives with buyers making bids and sellers making offers. You can trade Options on the exchange rates of the Rand against the: United States Dollar, Great Britain Pound, Euro, Australian Dollar and Japanese Yen and the Canadian Dollar.

Glossary

- **In-the-Money:** When the underlying asset's price is higher than the strike price a Call (buy) Option is said to be "in-the-money".
- **Out-the-Money:** When the underlying asset's price is less than the strike price, a Call (buy) Option is said to be "out-the-money".
- **At-the-Money:** When the underlying asset's price is equal to the strike price a Call (buy) Option is said to be "at-the-money".
- **Delta:** Is a number between -1 and +1 also called the hedge ratio the amount a particular derivative's value will move for a R 1 move in the underlying.
- **Gamma:** One of several mathematically complex risks to the seller of Options.

Note: *For reasons of simplicity, Options are held to expiry in all the examples. Also, the examples do not account for commission costs, transaction fees and margin requirements.*

- Exercise/Strike price

This is the pre-determined price at which you buy or sell the underlying currency if the Option is exercised. The strike price is expressed in Rand per one unit of foreign currency. To improve liquidity Currency Derivatives only allows strike prices with 1 cent intervals. Examples would include R 7.80 per Dollar or R 7.81 per Dollar.

- Premium

The premium is simply the price the purchaser pays in order to get the right and not the obligation. It serves as an insurance premium for the seller of the Option.

Investors wishing to trade Currency Options are required to pay a premium. Please note that this premium is a wasting asset and once the trade is entered into it is gradually paid to the seller and never returned to the purchaser. The premium is like an insurance premium, it's the price you pay for the right but not the obligation to buy a Currency Futures contract at a guaranteed price at close-out. The premium is calculated using the modified Black-Formula for pricing Options on Futures (the Black-Formula is a variant of the standard Black-and-Scholes Option pricing formula).

Currency Options are cash settled, European-style Options that may only be exercised at expiration.

Currency Option premiums are expressed in Rand per Currency Futures contract. A useful way of analysing the premium you paid (especially to see simply what your breakeven point is) is to divide the Option's premium per contract by 1 000 in order to see the cents per foreign currency unit paid. This number will be in ZAC (South African Cents) per unit of foreign currency (ie. 1 Dollar, 1 Pound etc.).

- A premium of R 300 for a Call Option on the Dollar with a strike price of R 7.50 is equal to 30 cents per Dollar (ie.R 300/1 000 = R 0.30)
- Your breakeven point is R 7.50 + R 0.30 = R 7.80.
- Because you have paid 30c per Dollar in premium you need the expiry price to rise to 30c above your strike price in order to break even.

Options' premiums are collected through the JSE's daily M-T-M (Mark-to-Model) process. They flow between counterparties as variation margin over the life of the contract. The maximum loss for Currency Option purchasers is the amount of premium paid for the contract.

Option Premium example:

One Currency Futures contract equals 1 000 units of the foreign currency ie. US$ 1 000, GBP 1 000 etc. Currency Futures are quoted as Rand per foreign underlying ie. R 7.80 per US Dollar. Option contracts are quoted as Rand per Currency Futures contract. The minimum tick for the Currency Future is settled to four decimals. This represents 1/100th of a cent equivalent to 10 South African Cents (ZAC) per Currency Futures contract.

Example: R 7.9851 per US Dollar:

- If the US Dollar moves to R 7.9852 (1st decimal place) you have made 10 cents per contract (one tick size movement).
- If the US Dollar moves to R 7.9861 (2nd decimal place) you have made R 1 per contract.
- If the US Dollar moves to R 7.9951 (3rd decimal place) you have made R 10 per contract.
- If the US Dollar moves to R 8.9851 (4th decimal place) you have made R 100 per contract.

- Initial margin and variation margin

Initial Margin

Currency Option initial margin requirements (IMRs) are very similar to Currency Future initial margin requirements (IMRs). The initial margin is a "good faith" deposit that both buyers and sellers deposit with the exchange. They earn interest on this deposit and it is returned to them upon closure of the position. Initial margin ensures that both parties fulfill their obligations in respect of the relevant transaction. IMRs are recalculated once a month by the exchange, using the JSE's portfolio scanning methodology. It is often quoted as a percentage of the underlying contract's nominal value. It is the Exchange's estimate of the maximum one day loss for each side of the position.

Variation Margin

Variation margin fluctuates each day, depending on the change in value of the position. The reasoning behind daily margining is to ensure that each day the full losses and gains will be transferred to/ from both sides of the position. Because of daily variation margining at each day's close the position is fully valued for both parties. This prevents a situation where the risk exists of a default on several days' or even weeks losses. Because of daily margining banks and companies do not have to carry any additional provisions for default on their balance sheets.

Settlement

Currency Options are cash settled, European-style Options that may only be exercised at expiration. They are quoted and traded in Rand and never physically settled due to exchange control regulations (ie. you never receive the physical foreign currency).

All Options are automatically exercised at expiration if they are R 0.01 or more "in-the-money", ie. if you bought an R 8.50 Call Option and the close-out price was R 8.5001 you would be automatically exercised into the Futures contract at R 8.5000.

If held to expiration (usually the third Monday of the expiry month, or the previous business day if the Monday in question is a public holiday) the Option holder of a Call Option will automatically receive a cash payment if the exchange rate is above the strike price. Similarly, the Option holder of a Put Option will automatically receive a cash payment if the exchange rate is below the strike price.

Options that are not "in-the-money" will not be settled. Therefore the Option holder will merely lose the premium amount paid over the life of the contract.

As Currency Options are cash settled at expiration there is no physical delivery process involved. The settlement formula for a Currency Option (at expiration) is as follows:

Call Option example:

An importer is concerned that the Rand will weaken against the Dollar. He needs the Rand to trade at a specific price to ensure his production price is more than his selling price.

If the Dollar/Rand spot exchange rate is currently trading at R 9.00 and the Currency Future at R 9.15.

Then buy a ("at-the-money") Call Option with a strike price on the Future of R 9.15 and at a premium of R 240.00 per Option contract (with a volatility of 25%).

The Rand weakens:

- On a future date the Rand Currency Future is trading at R 10.20
- Exercise your Option and buy the Currency Futures Contract at R 9.15

At expiration:

- Call Option = (Exchange rate – strike price) x 1 000 units of the underlying
  = (R 10.20 – R 9.15) x 1 000
  = R 1 050.00
- Profit = R 1 050.00 – R 240.00 (premium)
  = R 810.00

Put Option example:

An exporter is concerned that the Rand is going to strengthen against the Dollar. If the Dollar/Rand spot exchange rate is currently trading at R 9.00 and the Currency Future at R 9.15.

Buy a "at-the-money" Put Option with a strike price on the Future of R 9.15 at a premium of R 240.00 per Option contract (with a volatility of 25%).

The Rand strengthens:

- On a future date the Rand Currency Future is trading at R 8.30
- Exercise your Option and sell the Rand Future at R 9.15

At expiration:

- Put Option= (Strike price – exchange rate) x 1 000 units of the underlying
  = (R 9.15 – R 8.30) x 1 000
  = R 850.00
- Profit = R 850 – R 240 (premium)
  = R 610.00

If in either of the examples above the value of the Option was not in-the-money (a profitable position), then the buyer would merely not exercise the Option and would only lose the premium paid for the risk cover (i.e. R 240).

Trading

Currencies are a natural market as there are always buyers and sellers. Importers want their home currency to be as strong as possible and exporters want their home currency to be as weak as possible. For example, when exporting you would prefer the $/R to be at $ 1 to R 9.00 as opposed to $ 1 to R 17.00.

There are two main classes of participants in any derivatives market: hedgers and speculators. Hedgers want to minimise the risk of currency fluctuations. Speculators aim to be rewarded for taking on the risk of currency fluctuations.

How to use Currency Options

The table below illustrates how a speculator could use Currency Options. A hedger would usually take the opposite side of the deal as he wants certainty around his future payables or receivables and has a pre-existing exposure to hedge.

Forecasted future exchange rate against the Rand:

Higher (Rand weakens)	Lower (Rand strengthens)
Buy Calls	Sell Calls
Sell Puts	Buy Puts

When buying a Currency Future you are long the Dollar and short the Rand. For example you will earn a profit if the Rand moves from R 7.60 to R 7.70 per Dollar. So in the Currency Options market, buying a Call Option means the trader is estimating a weakening of the Rand relative to the Dollar.

In the left hand column, the speculator thinks that the Rand will weaken relative to the Dollar by the December 2013 expiry. He would buy Call Options slightly above or at the current forward rate.

The Hedger would choose a different trade to the speculator (even with the same view on the currency's future price movements) as they have a pre-existing underlying exposure which they would like to hedge against.

In our example Frank is an Apple Farmer and has recently sold his apples in the US. He will only receive his final payment in Dollars in two months time. Frank is estimating a strengthening of the Rand relative to the Dollar and wants to guarantee a more favourable rate to convert his dollars at. The Rand Dollar Currency Future is trading at R 8.70/US$ and Frank is worried that it could decline to R 8.30/US$. He is owed US$5,000,000 by the supermarket chain that he sold his produce to in the United States. If the Rand moves to R 8.30 per US Dollar he will lose R 0.40/US$ (R 8.70/US$ – R 8.30/US$). R 0.40 per Dollar x US$ 5,000,000 = R 2,000,000 loss.

So Frank phones up his currency broker in order to buy some Put Options. He buys 5 000 Put Options at the current forward rate strike price of R 8.70 per US$ for R 200.00 per Option.

Total premium = (20 cents/US$ x US$ 1,000)
= R 200.00 per Option x 5,000 Options
= R 1,000,000 premium paid for the Option.

When Frank's Option expires the Rand has strengthened to R 8.25/US$ so he transacts in the spot market and receives US$ 5,000,000 x 8.25 = R 41,250,000.

His Currency Options contract pays him out as he is "in-the-money"!

His breakeven point = spot – Option premium
= R 8.70 – R 0.20
= R 8.50

Put Option = (Strike price – exchange rate) x 1 000 units of the underlying
= (8.70 – 8.25) x 1000
= R 450.00 per contract

R 450.00 x 5,000 contracts = a profit of R 2,250,000

His total profit is R 1,250,000 as he paid R 1,000,000 for the Option.

If he had not used the Option he would have lost:

R 8.70 x 5,000,000= R 43,500,000

R 8.25 x 5,000,000= R 41,250,000

R 43,500,000 – R 41,250,000 = R 2,250,000

By purchasing the Option he reduced his foreign exposure risk to R 1,000,000. If Frank had entered into a Futures contract he could have got the price movement wrong and lost money.

If, for example, the currency moved to R 8.90 per Dollar and he had shorted (sold) he would have lost 20c per Dollar x 5,000,000 = R 1,000,000, which would be matched by his gain on the foreign currency translation.

If the same movement occurred with the Rand and he had the R 8.70 Put Option position detailed above he would have made R 1,000,000 from his currency translation gain less the R 1,000,000 he paid for his Option.

By the judicious use of Options he capped his maximum loss at R 1,000,000 and had unlimited exposure to upside beyond the R 1,000,000 premium.

Consider the following scenarios at expiration:

a) In scenario A they manage to maintain the R 80,000,000 value of the portfolio but there is a 12% rise in the Dollar. At expiration, on 14 June 2013, the $/R exchange rate is R 8.96. In this case, the R 80,000,000 portfolio is worth just US$ 8,928,571.43 – a loss of US$ 1,071,428.57.

   After exercising the Option on expiry, the investor will receive an amount of:
   Call Option settlement = (R 8.96 – R 8.00) x 1 000 = R 960.00 x 10,000 Options = R 9,600,000.

   Therefore, the investor's 10,000 Call Options are now worth R 9,600,000 which offsets the loss of (US$1,071,428.57) in the Dollar value of the portfolio of SA shares because of the change in the exchange rate and the investor's cost of R 5,200,000 for the purchase of the Options.

   What is the net cash flow:
   = R 9,600,000 – R 5,200,000
   = R 4,400,000
   = R 4,400,000/R 8.96
   = US$ 491,071.43
   as apposed to R 1,071,428.57

b) In Scenario B the Hedge fund's managers have invested the portfolio successfully and their concerns about a negative currency fluctuation proved unfounded. An 8% rise in the share value of the R 80,000,000 portfolio is worth R 6, 400,000.

   The portfolio is now worth R 86, 400, 000.

   The rand is now at R 7.90 and their Dollar denominated portfolio is now worth 86,400,000 / 7.90 = US$ 10,936,708.86

   However the Put Options expire worthless and the fund has lost the R 5,250,000 premium. The loss is compensated for by the gain on the exchange rate and in the value of the portfolio.

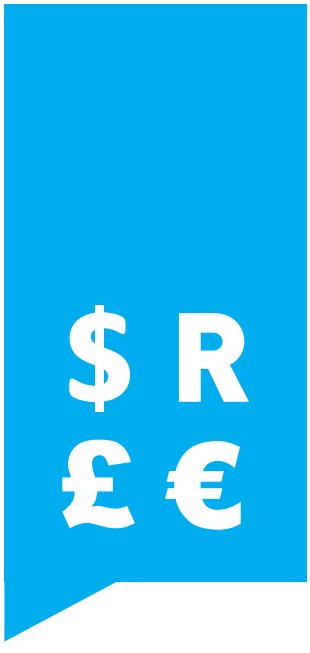
   Again, there is no obligation to hold the Options until expiration, they can be sold in the market at any time if the investor's strategy changes.

Hedging overseas cash flows – SA exporter

More and more firms (both large and small) now have to buy and sell goods across national borders. More often than not payment is made using foreign currency. Depending on the time it takes to pay or receive the money, what was once an economically viable transaction often becomes less profitable due to an adverse currency fluctuation. Several businesses have made huge losses on transactions by not hedging part or all of the currency risks of a transaction.

The question is how to take out insurance on the transaction, while benefiting from any profitable currency movement. The answer is Options.

One of the key benefits of Options is the way that different Options can be combined to provide a unique risk profile unobtainable in almost any other way. One of the most popular and useful of these structures is the Zero Cost Collar. Please contact your broker for more information on Zero Cost Collar structures.



Options pricing

Main components of an Options premium

The premium of an Option has two main components: intrinsic value and time value.

Intrinsic value (Calls):

When the underlying asset's price is higher than the strike price a Call (buy) Option is said to be "in-the-money."

Intrinsic value (Puts):

If the underlying asset's price is less than the strike price, a Put (sell) Option is "in-the-money." Only "in-the-money" Options have intrinsic value, representing the difference between the current price of the underlying asset and the Option's exercise/strike price.

Speculating with Currency Options

Buying Call Options to profit from a rise in the US Dollar

The value of a Call Option tends to rise as the value of the underlying currency increases. As a result, the holder will earn a profit if the value of the Call Option at expiry is higher than the premium paid for the Call (in other words, if the expiry price is above the strike price plus the premium paid). If the expiry price is lower, the holder's loss is always only limited to the premium paid.

Assume that an investor anticipates that the US Dollar will strengthen against the Rand. The US$/ZAR is $ 1/R 8. The investor purchases 10 Call Options for a premium of 37 cents per Dollar.

Total premium = 37 cents/US$ x US$ 1 000 x 1/100
= R 370.00 x 10 Options
= R 3700.00

At expiration, the US$/ZAR Futures exchange rate has risen to R 8.50. The investor will realise a return of:

Call Option settlement = (R 8.50 – R 8.00) x 1 000
= R 500.00 x 10
= R 5 000.00

The investor has turned his R 3 700.00 investment into a R 5 000.00 payout, which represents a profit of R 1 300.00 (R 5 000.00 – R 3 700.00). This represents a return of 35% (1 300/3 700) which equals a 35.1% compared with a 6.25 % change in the underlying exchange rate.

If, however, the USD/ZAR Futures exchange rate declines below the strike price of R 8.00 at expiration, the Options expire worthless and the holder cannot lose more than R 3 700.00 (the amount of premium paid).

Hedging

Currency Options are effective tools for investors and companies to hedge currency exposures. The owner of a non Rand asset, such as a US equity portfolio, stands to lose money in Rand terms if the US Dollar depreciates against the Rand. Currency risk can be hedged by buying a Put Option on the dollar, as the value of the Option should increase if the Dollar falls.

Conversely, the holder of a non Rand liability (for example: an investor who plans to buy a property in the US) faces the risk of the US Dollar rising against the Rand, which would increase the liability in Rand terms.

An investor can hedge this risk with a Call Option on the Dollar, which should increase in value if the Dollar rises.

The number of Options needed to hedge a given amount of foreign exchange risk:

- Number of Options = foreign exchange amount to hedge/contract size of the Option/delta of the Option
- Cost of the Options in Rand = number of Options x Option premium per unit of foreign currency x 1 000 units of underlying

Note: Option premium is always quoted in Rand per contract on the JSE.

Hedging a Dollar denominated South African equity portfolio

Consider, for example, a Hedge Fund who holds a US Dollar denominated South African equity portfolio worth R 80,000,000 on 14 November 2014. With an exchange rate of R 8.00/$ the portfolio is worth $ 10,000,000. If the Rand weakens, the US investors will incur a loss in the value of their portfolio in Dollar terms.

The fund can hedge against this risk by buying Dollar Call Options as follows:

- Number of Call Options to buy = 10,000,000/1 000 = 10,000 Options
- The investor buys 10,000 US$/ZAR June 13 R 8.00 Call Options at a price of R 520.00 per contract or (52 cents per dollar.)
- Cost of the Options = 10,000 x R 520.00 = R 5,200,000

The hedge represents an investment of R 5,200,000 in the Call Options, which can be thought of as the investor paying 8% as an insurance premium on the equivalent US$ 10,000,000 portfolio.

Time value:

Prior to expiration, any premium in excess of intrinsic value is called time value. Time value is the amount an investor is willing to pay for an Option above it's intrinsic value, in the hope that at some time prior to expiration its value will increase because of a favourable change in the price of the underlying asset. The longer the amount of time for market conditions to work in the investor's favour, the greater the time value.

There are six major factors that influence Option premiums. The factors having the greatest effect are:

- A change in the price of the underlying asset
- Strike price
- Time to expiry – this influences the time value of the Option as the longer the time to expiry results in more trading time for your Option to pass it's strike price.
- Volatility of the underlying asset
- Risk free interest rate is already built into the Currency Future price. The relative risk-free interest rate has a big effect on the Currency Future price as they are the basis for pricing Currency Future contracts, shown by the formula on the right.

Changes in the underlying asset price can increase or decrease the value of an option. These price changes have opposite effects on Calls and Puts. For instance, as the value of the underlying asset rises, a Call will generally increase and the value of a Put will generally decrease in price. A decrease in the underlying asset's value will generally have the opposite effect.

The **strike price** determines whether or not an Option has any intrinsic value. An Option's premium (intrinsic value plus time value) generally increases as the Option becomes further *"in-the-money"* and decreases as the Option becomes more deeply *"out-the-money"*.

Time until expiration. As discussed above, time until expiration affects the time value component of an Option's premium. Generally, as expiration approaches, the levels of an Option's time value, for both Put Options and Call Options, decreases or "erodes." This effect is most noticeable with "at-the-money" Options.

The relative has a small but measurable effect on Option premiums. This effect reflects the "cost of carry" of the foreign currency – the interest that might be paid for margin or received from alternative investments (such as a government bond).

- Intrinsic Value = Current Underlying Asset Price – Strike Price (Calls)
- Intrinsic Value = Strike Price – Current Underlying Asset Price (Puts)
- Time Value = Option Premium – Intrinsic Value

Note: Options must be "in-the-money" in order to have intrinsic value.

The above shows a simplified analysis of an Option's value. The first line illustrates the intrinsic value of a Call Option. The second line indicates the value of a Put Option. The third line illustrates that any extra value above intrinsic value is referred to as time value.

Volatility

The Implied Volatility used to calculate the Option's premium is a very important factor in deciding whether to buy or sell Options.

Volatility is an indicator to the investor of the range that an underlying asset's price has fluctuated in a certain period. The official mathematical definition of volatility is: "the annualised standard deviation of an underlying asset's daily price change."

There are two types of volatility: historical or statistical volatility and implied volatility.

Statistical or historical volatility – is a measure of actual asset price changes over a specific period of time.

Implied Volatility – is a measure of how much "the marketplace" expects the asset price to move. It is calculated by working out what average estimate of volatility has been and is used as the input for the average premiums paid for Options (hence the term *implied*).

Implied Volatility – is a key input of the Black-Scholes and many other Option pricing models.

In the Black-Scholes model, volatility is defined as the annual standard deviation of the underlying relative exchange rates.

Options pricing to calculate premiums

Option pricing is a complicated field of mathematics in its own right.

Options pricing is complicated because it deals with unknown future liabilities. The liabilities are unknown because the sellers will not be liable to make a payment if the Option expires "out-the-money" but may have to make a large payment if the Option expires "in-the-money".

Essentially the problem is similar to that faced by insurance actuaries who have to decide how likely their policy holder's are to have a car crash and how much they should charge to insure them at a profit.

Let's look at a Currency Option in the same way as an insurance premium. Each month you have to pay your insurance premium for your cover.

If you wanted insurance cover for your car for a year the insurers would charge you at least 12 months worth of premiums and if they were feeling generous they will probably present value that sum.

The formula for pricing an Option is like an insurance premium.

Some of the inputs need to include how long they are insuring your car for (the time until expiry of the Option), what neighbourhood you live in, where you park at night (the volatility) and current interest rates are also a factor. They also apply excess rates (the strike price).

Option pricing is very similar to this example. The most common and well known model is the Black and Scholes Option Pricing Formula for which the authors won a Nobel Prize.

Black and Scholes found a way to mathematically simplify the risk of selling the Option using one major risk parameter called implied volatility. Implied volatility is an estimate of how volatile the price of the underlying asset that the sellers are writing an Option on will be. Volatility is stated as a percentage on an annualised basis.

The Black-Scholes Formula

The Black-Scholes formula was a breakthrough model for pricing Options. This formula can be used to calculate a theoretical value for an Option using current exchange rates and the Option's strike price, expected interest rates, time to expiration and expected asset volatility.

While the Black-Scholes model does not perfectly describe real-world Options markets, it is still often used in the valuation and trading of Options.

The variables of the Black-Scholes Formula are:

- Exchange rate/Futures price
- Strike price
- Time remaining until expiration – expressed as a percent of a year
- Current risk-free interest rate
- Implied volatility measured by estimated annualised standard deviation.

The JSE currently calculates the value of each Option position using the Modified Black Formula for pricing Options on Futures. It is a variation of the Black Scholes model which is slightly simpler to use. The Modified Black formula can be found at the website cited in the footnote.[1]

All derivative contracts are based on an unknowable value at some point in the future. Because of this uncertainty the most important factor in their pricing is the cost of hedging. Hedging means that no matter what the price movement of the underlying asset is, the person who sold you the derivative should be able to cover it.

For Futures contracts this cost of hedging is called the "Cost of Carry." The Cost of Carry is an estimate of what the derivative seller will have to pay to hold the underlying asset until the expiry date, therefore being able to settle the contract with almost no risk. This is usually quoted as an interest rate and will vary from seller to seller depending on their cost of borrowing money. On top of this cost a profit margin is added.

1 http://www.quantnotes.com/fundamentals/ futures/optionsonfutures.htm.

With Options the future exposure is far less certain than with a Futures contract. With a Futures contract the exposure is certain, as you can see in the following example:

Big Bank PLC has sold one Option on the USD/ZAR contract with a strike price of R 8.00 per US$. If the contract expires at R 7.9999 per US$ they need exactly zero Dollars to hedge their risk. If the contract expires at R 8.0001 they need one thousand US Dollars to hedge their risk (because Currency Futures are cash settled the risk is less to the seller. In the above example the bank is actually on the line for 10 cents).

Traditionally, hedging a short Options position uses a technique called delta hedging. Delta is a number between -1 and +1, also called the hedge ratio. This ratio is the amount a particular derivative's value will move for a R1 move in the underlying. If an Option has a Delta of 0.7 then the derivative will move 70c for each R 1 that the underlying moves. To hedge the risk effectively you need to have 0.7 of the underlying to hedge the risk of the derivative.

When sold an "*at-the-money*" Call/Put Option has a ***Delta*** of approximately 0.5 (negative for Puts and positive for Calls). This means that for each Option sold the seller should buy/sell half of the asset required as the position could move into or out of the money. When an Option is deep in the money prior to expiry the Option's ***Delta*** approaches 1. Futures are always a ***Delta 1*** position. This means that the Option writer/seller needs to have 1 underlying asset per 1 Option as it is a virtual certainty that your Option will be exercised.

This risk of holding either far too much cover or far too little cover at expiry is called ***Gamma***. It is one of the risks to the seller and the reason why the buyer must pay a premium to purchase an Option. Gamma is just one of several mathematically complex risks to the seller of Options. They are called "The Greeks" because each of these interconnected risks have been assigned a letter of the ancient Greek alphabet as it's mathematical symbol. They enable the user to convert abstract risks into Rand and Cents measures.

Managing the Greeks is a large part of an Option Seller's job. The seller's estimate of the risks attached to each of these factors (individually and jointly) is the base component of the premium the purchaser will pay. On top of this basic cost a profit margin is added.[2]

The other "Greeks" include "Rho", the sensitivity of the value of an Option to changes in the risk free interest rate and "Vega", the sensitivity of a position's value to a 1% move in volatility.

2 For more on "the Greeks" see http://en.wikipedia.org/wiki/Vega_(finance)#Vega

Currency Derivatives Specifications	
Name	j-Rand: Currency Derivatives
Contract	Foreign Currency/Rand Currency Option contracts e.g. $/R
Underlying Instrument	Foreign Currency/Rand Currency Future contracts e.g. $/R
Codes	e.g. Dec 14 ZAUS
Contract Months	Standardised: March, June, September and December Non-Standardised: Contracts can be listed for any day on request as long as the minimum size is 1 000 contracts of the foreign underlying
Listing Programme	Near, middle and far contracts. Specials on demand
Expiry Dates and Times	At 10h00 New York time (i.e. 16h00 in SA winter and 17h00 in SA summer) two business days prior to the 3rd Wednesday of the expiry month (or the previous business day if that day is a public holiday). The JSE offers special contracts on demand for contracts that fall outside the current expiries.
Expiration Valuation Method	10 Iterations, arithmetic average of the underlying spot taken every 30 seconds for a period of 5 minutes, ending at 10h00 New York time. (SA Summer: 16h31 – 17h00 and SA Winter: 15h31 – 16h00).
Types	Calls and Puts, Naked and Delta Options and Exotic Structures
Contract Size	USD: 1 000 nominal (minimum 10 contracts traded); JPY: 100 000 nominal (minimum 10 contracts traded); USD (Maxi)/ZAR: 100 000 nominal (minimum 3 contracts traded)
Quotations	Naked Options (premium): Rand's per contract Delta trades: Volatility to 2 decimal places
Strike Prices	Expressed in the same unit as the underlying futures contract price/quotation. i.e. Expressed in Rand's per one unit of foreign currency
Strike Price Intervals	Strike price intervals are set to R 0.01
Option Premiums	As determined from the Modified Black Option Formula
Premium Quotation	Option premiums are quoted in Rand's per contract.
Minimum Price Movement	USD/ZAR: R0.01/$ x $1 000 x 1/100= R0.10; Delta trades: R 0.0001 JPY/ZAR: R0.01/¥ x ¥100 000 x 1/100 = R0.10; Delta trades: R 0.000001 USD (Maxi)/ZAR: R0.01/$ x $100 000 x 1/100 = R0.10; Delta trades: R 0.000001
Exercise Style	European style. Options may be exercised only on the expiration contract.
Exercise Settlement	Cash Settled in ZAR
Initial Margin Requirements	As determined by JSE Portfolio Scanning Methodology
Mark-to-market	Explicit Daily Modified Black Option Formula Using Super Derivatives volatility skew
Exchange Fees	Sliding Scale: See structure on http://www.jse.co.za/currenciesfees.aspx
Market times	As determined by the JSE (09h00 – 17h00).
Volatility skew	Determined using Super Derivative's option data
Automatic exercise	All "in-the-money" Options which are in the money at expiry are automatically exercised into their underlying Futures contracts

Useful links and reference works

http://www.jse.co.za/Markets/Currency-Derivatives-Market.aspx

For all derivatives the best known standard text is Options, Futures, and Other Derivatives (5th Edition) (Hardcover) by John C. Hull (Author) it's now in the 7th Edition. His website is http://www.rotman.utoronto.ca/~hull/

Currency Derivatives Margin requirements:
https://www.jse.co.za/downloadable-files?RequestNode=/YieldX/IRC_Margin_Requirements

Currency Derivatives Trading costs:
https://www.jse.co.za/content/JSEPricingItems/Currency%20Derivatives%20Trading%20Fee%20Schedule.pdf

Currency Derivatives End of Day Mark to Market:
https://www.jse.co.za/downloadable-files?RequestNode=/YieldX/Dailystats

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