Comparing Futures and Forwards for Managing Currency Exposures in a South African Context

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For internationally oriented firms or individuals that choose to eliminate the effects of fluctuating exchange rates, either currency forward contracts or currency futures can be used to fulfil this requirement. Both tools essentially lock in prospective exchange rates, thereby eliminating both risk and opportunity, and thus eliminate currency risk completely.

Though similar in their result, futures and forwards have a number of institutional differences that may foster different preferences among different users. This research paper strives to highlight those differences, allowing the selection between these two alternatives to be made on a rational basis.

CURRENCY FUTURES DISPENSATION IN SOUTH AFRICA

Currency futures were launched predominately as a retail product. The initial dispensation granted by the Minister of Finance in 2007 allows individuals to trade over and above their foreign allocation allowance stipulated by the South African Reserve Bank. Individuals, in other words, have no limits to the value traded in the currency futures market.

The Minister of Finance in his 2008 budget speech extended the currency futures qualifying audience to include all South African corporate entities. Corporate entities, including limited or unlimited companies, private and public companies, close corporations, partnerships, trusts, hedge funds and banks are authorised to trade currency futures with no restrictions on the value traded. Corporate entities do not need to apply to Reserve Bank for approval to trade the currency futures nor do they have to report their trades.

Unfortunately, pension funds and long term insurance companies are subject to their 15 % foreign allocation limits while asset managers and registered collective investment schemes are subject to their 25% foreign allocation limits.

[1] The original report was by Ira G. Kawaller, the president of Kawaller & Company, LLC, published during April 2003 entitled: “Comparing Futures and Forwards for Managing Currency Exposures”. Dr Kotzé expanded and adapted this report to give it a South African perspective.

JUSTIFICATION FOR A FUTURES MARKET

From an economic point of view, the function of a futures market is to allow for the transfer of risk. These markets have the special function of allowing those who do not wish to take the risks to nevertheless run their business enterprises. Take a farmer who has acquired considerable skills in agriculture but is totally put off by the prospect of volatile prices in the grain market. Futures allow him to exercise his skills - growing the normal crop risks, which he bears anyway. In short, the futures markets enable many productive entrepreneurs and businessman to operate without exposing themselves to risks greater than they are willing to bear. This holds true for importers and exporters as well. Hedging their currency exposures allows them to focus on their core businesses and not on the by-products of currency risks which can have unexpected consequences

The futures market is also valuable to the economy in that it facilitates "price discovery" and the rapid dissemination of prices. In a traditional forward market contracts are not standardised and are entered into "over the counter" between buyers and sellers. The prices at which forward contracts are fixed are not relayed to the market because they are "private" deals. Price determination in the overall market is therefore not as efficient as it could be and buyers and sellers cannot be sure that they are getting the best possible price. In the futures market, by contrast, the competitive nature of the market ensures that commodities trade at or very close to what the market thinks they are worth, and the smallest market user has as much knowledge as the largest user as to the current value attached to the commodity.

FUTURES VS. FORWARDS

A forward contract is one where the buyer and the seller agree on a price, but the actual transfer of payment for property is deferred until a later time. Forward contracts are arranged between two principals with complete flexibility as to exactly what property is being transferred and when the transfer will occur.

In contrast, futures contracts are transacted in the arena of a futures exchange. Transactions must be made in prescribed increments (i.e., whole numbers of futures contracts covering a designated "size" per contract), where the price-setting capability applies to a limited number of prospective settlement dates [Ko 02]. Transactions take place at the best bids and offers provided by the exchange members who trade through an electronic trading system. Using internet trading systems, clients of exchange members, trade directly onto the exchange via the exchange’s “direct market access” (DMA) platform.

Cash flow obligations are very different for forward contracts and futures contracts. With a forward contract, a price is established on the trade date; but cash changes hands only on the value (or settlement) date, when, as agreed, the buyer pays the seller and takes possession of the property. With a futures

contract, the change in value of the futures is passed between the two parties to the trade following movements of the futures price each day, making use of the clearinghouse[2] as an intermediary. Appendix A explains the mechanics of an exchange that enables a buyer and seller to transact with one another. Also explained are the risk mitigation processes employed by derivatives exchanges.

When the futures price rises, the buyer (who holds the long position) "earns" the change in value of the contract, and the seller (the short-position holder) loses. Opposite adjustments are made when the futures price declines. This daily cash adjustment thus collects from the loser and pays to the winner each day, with no extension of credit whatsoever. The daily Rand value that changes hands is called the "variation margin." For a more detailed explanation see Appendix B.

This cash-flow aspect of the futures contact is perhaps the most difficult conceptual hurdle, as well as the hardest operational feature, for a potential futures market user. Maintaining a futures position requires that the position taker, both the buyer and the seller, be ready and able to pay funds into the clearinghouse (via a broker) each day that the futures position generates losses.

Alternatively, efficient participation in the futures market requires that the trader/hedger be ready and able to employ funds that may be generated from profitable futures positions. Naturally, the former situation is the one that would cause potential problems. Due to the high leverage nature of the futures contract, the cash-flow requirements of a losing futures position may be quite onerous. The futures participant must either have the cash readily available or have the prearranged capability of financing this cash flow requirement. The "silver lining" to this process is that the cash requirement fosters a discipline that focuses attention on a market situation as it is happening-not months after the fact when it is too late to take corrective action.

Parties to forward contracts may require some form of collateral security in the form of compensating balances or a performance letter of credit. With futures contracts, customers must provide their brokers with initial margin. Initial margin is a Rand value per contract and is set by the exchange. These amounts are determined through a statistical analysis and are estimates about what losses are possible in the future – usually 1 trading day. Participants are required to lodge margins with the exchange which are sufficient to cover these possible future losses. Should the losses eventuate and the participant be unable to bear them, the margin is available to the exchange to meet the shortfall. The Rand value of initial margin requirements vary depending on the particular futures contract traded; and this amount is adjusted as volatility conditions change [Ko 05].

[2] Clearing houses in all countries use a common set of safeguards to limit the likelihood of defaults by clearing members and to ensure that if defaults do occur, the clearing house has adequate resources to cover any losses and to meet its own payment obligations without delay.

Currency futures transactions tend to be used primarily as price-setting mechanisms rather than as a means of transferring property. That is, when using futures contracts, buyers and sellers typically offset their original positions prior to the delivery date specified by the contract, and then they secure the desired currency via a spot market transaction. This offset of the futures hedge is accomplished simply by taking a position opposite from the initial trade. For example, if one were to enter a long futures position, the offset would require selling the futures contracts. Conversely, if one started with a short position, offset would be arranged by buying the contracts. The complete buy/sell (or sell/buy) is referred to as a "round turn" and, with the completion of a round turn, commissions are charged on a "per contract" basis.

Please note that, for Rand futures specifically, no physical exchange of currencies ever takes place even on the expiration date - the contract is cash settled; that is, following the final trading session (on the third Monday of the expiry month), one last mark-to-market and cash adjustment takes place.

The size of the commission is negotiated, reflecting the amount of support and assistance that the broker provides, as well as the volume of trade generated by the customer. On the forward side, commissions may or may not be charged, depending on whether the trade is arranged directly with the dealer or if a broker serves as an agent. Importantly, it is not safe to assume that direct dealing necessarily reduces transaction costs. Often, the use of a broker-whether a futures broker or an interbank currency broker- allows customers to access more competitive market prices than they can otherwise. The factor most likely to determine whether futures or forwards provide the better prices is the size of the required transaction.

ECONOMICS OF HEDGING WITH CURRENCY FUTURES

The difference between hedging and speculating relates to risk existing before entry into the futures/forward market. The speculator starts with no risk and then enters into a transaction that takes on risk in order-one hopes-to make profits. The hedger, on the other hand, starts with a pre-existing risk generated from the normal course of his or her traditional business. Futures (forwards) are then used to reduce or eliminate this pre-existing exposure. These contracts may be used to hedge some or all of such risk, essentially by fixing the price or exchange rate associated with the relevant exposure. Once so hedged, the manager is insulated from the effects of subsequent changes in the exchange rate, either beneficial or adverse.

As of October 2010, 8 different currency futures contracts are listed and actively traded at the JSE. They are:

1. USA Dollar Futures
2. British Pound Futures
3. Euro Futures
4. Australian Dollar Futures

5. Japanese Yen Futures
6. Swiss Frank Futures
7. Canadian Dollar Futures
8. Chinese Yuan Futures

EXHIBIT 1: *Perfect Long Futures Hedge*

Exposed to the risk of strengthening Rand – weakening US Dollar. The EXPORTER
Size: $10,000
Hedge Instrument: 10 long futures contract

Exchange Rate and Interest Rate Data

	Initiation of Hedge	Liquidation of Hedge
Transaction Date	June 2 2010	Sep 13 2010
Spot Value Date	June 4 2010	Sep 15 2010
Futures Delivery Date	Sep 15 2010	Sep 15 2010
Spot Price (ZAR/USD)	7.6405	7.1398
Futures Price	7.8313	7.1398

Results
Rands obtained for $10,000 on Sep 15: $10,000 x R7.1398/$ = R71,398.00
Hedge result: $10,000 x (R7.8313/$ -R7.1398/$) = R6,915
Effective exchange rate = (R71,398 + R6,915)/$10,000 = R7.8313/$

Strictly speaking, each futures contract locks in an exchange rate for a specific value date or delivery date. This result is demonstrated above in Exhibit 1, which shows the case of the hedger (exporter) who initiates a long hedge of 10 futures contracts on June 2 to protect against a weakening US Dollar. The size of the exposure is $10,000 (equal to 10 futures contracts), and the desired value date is precisely the same as the futures delivery date (Sep 15 2010).

Following a 10% rise in the strength of the Rand, the Rands are purchased at the new, lower FX rate; but profits on the hedge foster an effective exchange rate equal to the original futures price. At the time the hedge is initiated, highest quality bank customers would likely find the price of the forward contract for the same futures value date to be virtually identical to the futures contract, so an analogous trade with a forward contract with the same settlement date in September would foster the same economic result. Lesser quality (i.e., smaller) customers, however, might find discriminatory pricing in forward markets, resulting in a slightly disadvantaged outcome.

Of course, the assumption that the currency requirement coincides with the futures value date schedule is overly restrictive. A more likely scenario would be one in which the hedge value date differs from the available futures delivery (value) dates. In such cases, it may seem that forward contracts have an advantage over futures, given the flexibility to select a value date that

coincides precisely with the exposure being hedged. This judgment typically turns out to be overstated, however, and thus this preference may not be justified. Even when using forwards, the date for which the currency exchange is expected to take place may need to be altered, so additional transactions might be required, adding to the cost of the currency hedge. Also, many users of forwards have to "bundle" their exposures, thus having individual forward contract hedges cover the exposures of several planned cash transactions. The capacity to select a specific value date therefore involves somewhat of a compromise.

EXHIBIT 2: *Long Futures Hedge: Early Liquidation, Strengthening Rand*

Exposed to the risk of strengthening Rand – weakening US Dollar. The EXPORTER.
Size: $10,000
Hedge Instrument: 10 long futures contract

Exchange Rate and Interest Rate Data

	Initiation of Hedge	Liquidation of Hedge
Transaction Date	June 2 2010	Sep 13 2010
Spot Value Date	June 4 2010	Aug 31 2010
Futures Delivery Date	Sep 15 2010	Sep 15 2010
Spot Price (ZAR/USD)	7.6405	7.3645
Futures Price	7.8313	7.3922

Results
Rands obtained for $10,000 on Aug 31: $10,000 x R7.3645/$ = R73,645.00
Hedge result: $10,000 x (R7.8313/$ -R7.3922/$) = R4,391
Effective exchange rate = (R73,645 + R4,391)/$10,000 = R7.8036/$

When the hedge value date differs from one of the available futures delivery dates, the hedger simply initiates a futures hedge with the contract that expires as soon as possible after the desired currency exchange date. The hedge would then simply be liquidated before expiration.

Mechanically, when the need for the currency is at hand, the hedger would secure the desired currency using the spot market and simultaneously offset the futures hedge. An example is shown above in Exhibit 2. Here, as before, the hedge is initiated on June 2; but now the hedge must take possession of the Rands on 31 August - approximately three weeks prior to the expiration of the September futures contract. On August 31 the hedger simultaneously sells the required $10,000 with a spot market trade at a price of R7.3645/$ and offsets the futures hedge at a price of R7.3922/$. At the time of the hedge liquidation or offset, the difference between futures and spot prices (the basis) thus equals R0.0277. The consequence of this non-convergence is that the effective exchange rate realized from hedging the futures is R7.8036/$ - a difference of 0.0277 from the original futures price.

The outcome shown is predicated on the assumption that the differential between U.S. interest rates and South African interest rates present in the market on June 2, when the futures value date was 105 days away, remains in effect on August 31, when the futures have 15 days to go before expiration. Relatively higher South African (versus U.S. interest rates) on August 31 would have fostered a higher effective exchange rate, and vice versa. Clearly the futures hedge necessarily has some small degree of uncertainty in terms of the ultimate exchange rate realized; but this incremental effect can be either beneficial or adverse.

Again, the hedger might have chosen to operate with a forward contract rather than with the futures. When the need for the currency arises before the futures value date, however, the relevant forward price would not be the same as the futures price. Typically, interbank market forward prices are quoted as spot prices plus some premium (or less some discount), where premiums and discounts are expressed as "forward swap points," or "swap prices." In this example where the desired currency exchange is scheduled for September 2, the swap points would likely be roughly proportional to the basis, where the constant of proportionality would reflect the ratio of time to the desired forward date divided by the time to the futures delivery date. In this case, that ratio is 90/105. The forward pricing, therefore, could be estimated as follows[3]:

Future basis = 7.8313-7.6405=-0.1908 (for 105 days)
Approximate swap price = -0.0050 x (90/105) = -0.1635 (for 90 days)
Approximate forward price = 7.6405 +0.1635 = 7.8040 (for 90 days)

Thus, the hedger should be comparing a forward price of R7.8040/$ for a September 2 settlement with a September futures contract, traded at R7.8313/$ but expected to realize an effective exchange rate of R7.8036/$ as a consequence of early liquidation. It should be clear, then, that the effective rate realized from a futures hedge will likely be quite close to the outcome of a forward hedge (i.e., within a few basis points – 4 basis points in our example) irrespective of whether the timing of the risk coincides with the futures value date schedule.

For completeness, Exhibit 3 starts with the same problem as that shown in Exhibit 2. In this case, however, we hypothesise that the Rand weakens against the Dollar. Regardless, comparing Exhibits 2 and 3 shows the same effective exchange rate whether the Rand appreciates or depreciates. This example thus demonstrates the robust outcome of a futures hedge. That is, once hedged, the hedger is indifferent about the prospective direction of exchange rates in the future, as the effective rate (R7.8036/$ in this case) is unaffected by subsequent spot market moves[4].

[3] Actual forward prices quoted may differ somewhat from this estimate; but the closer the hedge value date is to the futures value date, the greater the confidence one should have for this approach to estimation.

[4] This conclusion requires that the hedge is implemented with no rounding error, and it assumes consistent basis conditions upon hedge liquidation regardless of the level of spot exchange rates.

Exhibit 3: *Long Futures Hedge: Early Liquidation, Weakening Rand*

Exposed to the risk of strengthening US Dollar
Size: $10,000
Hedge Instrument: 1 long futures contract

Exchange Rate and Interest Rate Data

	Initiation of Hedge	Liquidation of Hedge
Transaction Date	June 2 2010	Sep 13 2010
Spot Value Date	June 4 2010	Aug 31 2010
Futures Delivery Date	Sep 15 2010	Sep 15 2010
Spot Price (ZAR/USD)	7.6405	8.1562
Futures Price	7.8313	8.1839

Results
Rands obtained for $10,000 on Aug 31: $10,000 x R8.1562/$ = R81,562.00
Hedge result: $10,000 x (R7.8313/$ -R8.1839/$) = -R3,526
Effective exchange rate = (R81,562 – R3,526)/$10,000 = R7.8036/$

Note: The general rule for choosing the "correct" futures contract month is to pick the contract expiration concurrent with or immediately following the desired date of the actual currency conversion. For example, if you plan to make an actual conversion on November 1, the closest futures contract expiration following November 1 is available with the December contract.

Liquidity conditions, however, may justify a departure from this practice when the planning horizon extends beyond the date for which futures contracts are actively traded. In these cases, hedges temporarily rely on nearby futures positions. After deferred contracts (i.e., later expirations) develop greater liquidity, the original hedge contract is offset and a new position is established in the more distant contract month. This process is called "rolling the hedge." It necessarily introduces a certain amount of uncertainty in that the price differentials between successive futures expirations (i.e., "spread prices") cannot be known with certainty before the roll.

CONCLUSION

Choosing between futures contracts and forward contracts for managing currency exchange rate risk involves consideration of a number of trade-offs. Perhaps most important is the fact that forwards lock in a prospective exchange rate with virtual certainty. Futures contracts, on the other hand, will foster approximately that same exchange rate. The source of risk for the futures contract pertains to the uncertainty associated with the size of the basis at the time the futures hedge needs to be liquidated. Depending on prevailing interest rate differentials in the market at that time, this uncertainty may prove to be beneficial or adverse.

Beyond this consideration, a further issue deals with hedge management practices. Forwards tend to be maintained consistently until the value date arrives when currencies are then exchanged even when the forwards are generating losses. The mark-to-market aspect of futures and the required

daily cash settlements tend to foster a re-examination of the desirability of hedging when hedges generate losses, thus allowing for the curtailment of these losses. Put another way, futures provide greater flexibility in that they are more easily offset than forwards if the need for hedging is obviated. And finally, futures have the ancillary benefit that they do not introduce any added credit risk for the hedger as a consequence of the rigorously practiced marking-to-market requirement, while forwards do.

APPENDIX A
What is Margin, Novation and Safcom?

From the introduction we deduce that margining is an important part of the risk management process utilised by an exchange. Let's define what we mean by "margin". To minimize credit and market risk to the exchange, derivative traders must post margin.

Margin helps derivative exchanges to avoid credit and market risk, i.e., the chance of one or more counterparties to a trade, defaulting on their obligations. They accomplish this in two ways. Firstly, all trades on an exchange are settled or "cleared" through a clearinghouse which may be a separate legal entity to the exchange itself. The JSE's clearing house is SAFCOM. The clearinghouse acts as the principal counterparty to all trades through an exchange. Thus, it interposes itself as the 'buyer to every seller' and the 'seller to every buyer' – known as novation. Through novation Safcom guarantees to its members the financial performance of all contracts traded. SAFCOM becomes the guarantor of all futures transactions allowing members participants to deal freely with each other without counterparty credit risk constraints. This process is graphically shown in Fig. 1.

Secondly, exchanges employ a system of margining. Accordingly, a counterparty to a transaction on an exchange is required to pay a sum over to it at the inception of the derivative transaction to cover any potential losses arising from a default.

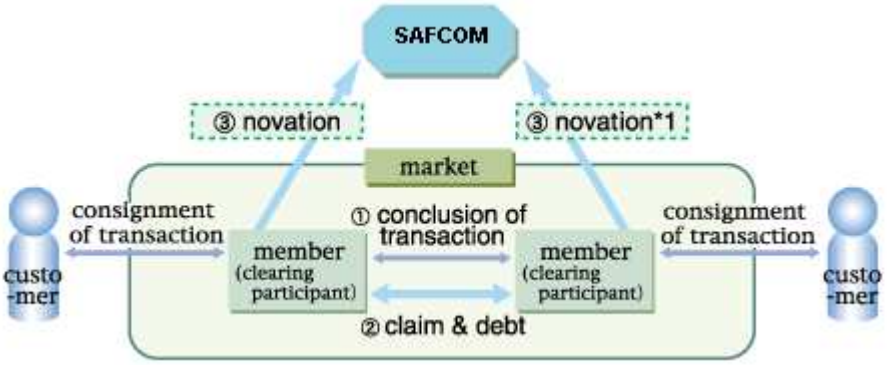


Figure 1: The clearing house (Safcom) becomes guarantor to each trade – the process of novation.

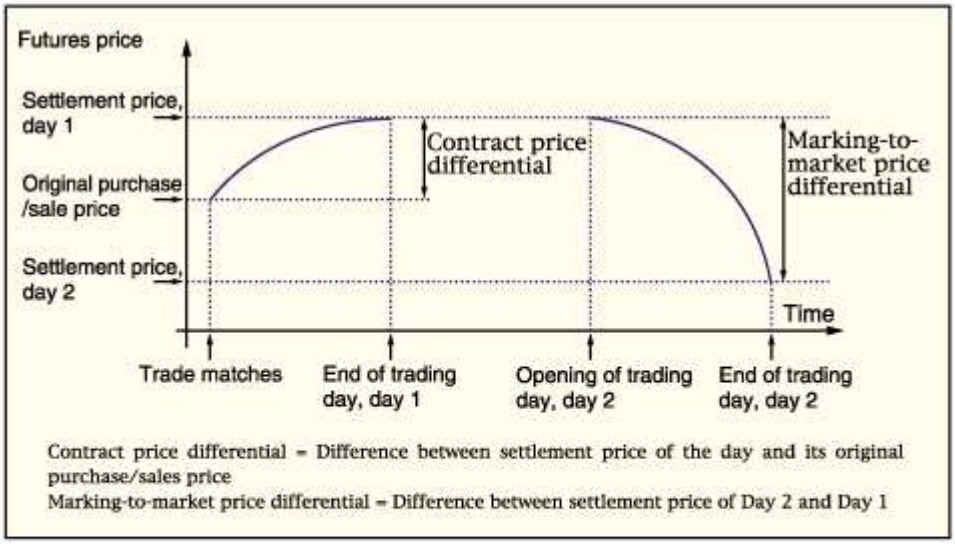
There are 5 different types of margin:

1. Initial Margin: is the amount of money determined by the clearing house on the basis specified by the risk management committee (RMCO) and held in respect of the aggregate position of a member or a client – this is paid by both buyers and sellers. Initial margin shall be paid to, or by, a member or client whenever the risk of loss changes with respect to the aggregate position (it is also called a good faith deposit). This margin is reinvested at a competitive rate and at close out of the positions of the client/member the initial margin is paid back plus the interest earned for the period. The initial margin may be reduced or increased based on changes in the margin parameters.
2. Variation Margin: is paid by the members or clients on a daily basis as the result of the mark-to-market process of the clients'/members' position. Mark-to-market refers to the present loss/profits of the position.
3. Additional Margin: clearing members may require additional margin from his members and members may require additional margin from their clients.
4. Retained Margin: Member may require a client to deposit retained margin with him which may be used to furnish initial and additional margin requirements.
5. Maintenance Margin: The client may have to top up his account with the member with maintenance margin. The client has to pay an amount of money to restore additional margin when the additional margin has been used to meet payments of variation margin.

APPENDIX B
Initial and Variation Margin

Risk management may be defined as identifying the risks of loss in a portfolio and ensuring that the losses can be borne. In the case of a futures exchange, market risk management is performed in two steps: marking-to-market and margining.

Marking-to-market ensures that all losses up to the present are absorbed. Participants with losses are required to make cash payments to the exchange equal to their losses – this is called variation margin. Safcom operates under the T+1 method of "pays and collects", meaning that all profits/losses (change in value) in all accounts is received or paid by clearing participants by noon of the business day following the day the change occurred. This entire process goes a long way to insure market integrity and is graphically depicted in Fig. 2.



(Contract price differential) = ((Settlement price of the day - original purchase/sales price) × Number of contracts purchased × Conversion factor) - ((Settlement price of the day - original purchase/sales price) × Number of contracts sold × Conversion factor)

(Marking-to-market price differential) = ((Settlement price Day 2 - Settlement price Day 1) × Number of contracts purchased × Conversion factor) - ((Settlement price Day 2 - Settlement price Day 1) × Number of contracts sold × Conversion factor)

Figure 2: Marking-to-market and variation margin

The exchange then also estimates what losses are possible in the future – usually 1 trading day. Participants are required to lodge margins with the exchange which are sufficient to cover these possible future losses – this is called initial margin. Should the losses eventuate and the participant be unable to bear them, the margin is available to the exchange to meet the shortfall.

There are two stages to estimating possible future losses and the initial margin requirements:

- The exchange does a statistical analysis of historical market moves and subjective assessments of the state of the market. They express the maximum anticipated price and volatility moves between the present and the next mark-to-market day.
- Secondly, the exchange re-values each position at this maximum anticipated price and volatility at the next mark-to-market day. The margin covers this maximum conceivable mark-to-market loss that the position (entire portfolio) could suffer.

This is called the "Spread Margining" methodology and is in use at most derivative exchanges across the globe. This methodology is similar to a Value-at-Risk (VAR) analysis[5] [Al 01].

[5] Value at Risk is defined as the potential market loss in a portfolio over a specified period of time – usually 1 or 10 days. The analysis is based on volatility and correlation.

An exchange controls the risk exposure (manages the risk) by changing the margin requirements. In times of uncertainty or high volatility, margins should be adjusted higher whilst in quite times it can be adjusted lower. At all times, the exchange will want to be confident that it has allowed for the sudden unanticipated shocks which characterise the markets [Sa 07].

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