

READING : 17CURRENCY MANAGEMENT : AN INTRODUCTION...

L.O.S. (a) Analyze the effects of currency movements on portfolio risk & return ;

L.O.S. (b) Discuss strategic choices in currency management ;

L.O.S. (c) Formulate an appropriate currency management program given financial mkt conditions & portfolio objectives & constraints ;

L.O.S. (d) Compare active currency trading strategies based on economic fundamentals, technical analysis, carry-trade, and volatility trading ;

L.O.S. (e) Describe how changes in factors underlying active trading strategies affect tactical trading decisions ;

L.O.S. (f) Describe how forward contracts & FX (foreign exchange) swaps are used to adjust hedge ratios ;

L.O.S. (g) Describe trading strategies used to reduce hedging costs & modify the risk-return characteristics of a foreign-currency portfolio;

L.O.S. (h) Describe the use of cross-hedges, macro-hedges, and minimum-variance hedge ratios in portfolios exposed to multiple foreign currencies;

L.O.S. (i) Discuss challenges for managing emerging mkt. currency exposure;

SECTION - (1) : Introduction

- Cult. of Global Asset Allocation & shedding the Home Country Bias.
- Global Asset Allocation (GAA) - opportunity for Higher Return & Diversification - However, exposes us to Currency Risk.
- Success of Global Portfolio Mgmt (GPM) - critically depends upon effective currency risk management.
- Sectional classification of the reading.
 - Section - (2) : FX Review.
 - Section - (3) : Currency effect on Portfolio Risk & Return.
 - Section - (4) : Strategic Decision regarding Currency Risk Management.
 - Section - (5) : Tactical Decisions regarding CRM.
 - Section - (6) : Tools of Currency Risk Management.
 - Section - (7) : Issues in Emerging mkt. Currencies.
 - Section - (8) : Summary.

SECTION - ② : FX Review.

No Q&A, but Basic concepts need for the sections to follow, and for real life.

The hierarchy for Base Currency is :-

- ① Euro
- ② GBP
- ③ AUD
- ④ NZD
- ⑤ US\$

Exchange Rate Quotations are usually in 4 decimal places -

$$US\$ / EURO = 1.0450 / 1.0455$$

Here - 1.04 - is called the Handle while 50 or 55 - are called PIPS.

Ofcourse some exchange rates are in 2 decimal places -

$$JPY / GBP : 132.25 / 132.50$$

Forward Rate are obviously quoted as forward points (+/-) - representing fwd. premium or discount.

These points are scaled as per the last decimal point of the spot

quote (i.e. decision about dividing by 10,000 or 100).

• (Imp) FX swap ;

→ How is it different from Currency swap?

— It is short term and involves no exchange of interest payments unlike Currency swap.

→ Two types of FX Swap.

• Matched FX Swap.

↓
Buy GBP 1 million spot & sell GBP 1 million fwd.

↓
Rate for the spot leg = Avg. of Bid & Ask.

↓
Rate for the fwd. leg = Rate for the spot (+/-) Relevant fwd. points.

Mis-matched FX Swap.

↓
Buy GBP 1 million spot & sell GBP 1.2 million - 6 months forward.

↓
slightly different rates as compared to the matched FX swap

(to be done in sec-6).

SECTION - ③ : Currency effect on Portfolio Risk & Return.

• Single Foreign Asset

$$R_{DC} = \left\{ [(1+R_{FC})(1+R_{FX})] - 1 \right\} \times 100\%$$

where,

R_{DC} → Return from in Domestic currency.

R_{FC} → Return in Foreign Currency Asset.

R_{FX} → Return in Foreign Currency

Also, $R_{FC} = \frac{P_1}{P_0}$ and $R_{FX} = \frac{S_1}{S_0}$

assumes Base currency in the Quotation is Foreign Currency

$$\sigma_{DC} \cong \sqrt{\sigma_{FC}^2 + \sigma_{FX}^2 + 2 \times Y \times \sigma_{FC} \times \sigma_{FX}}$$

• Portfolio of Foreign Assets ;

Step ① : Calculate R_{DC} & σ_{DC} for each exposure.

U must be knowing the weights of the different exposures.

$$R_p = \sum w_i \cdot R_{DCi}$$

$$= (w_X \cdot R_{DCX}) + (w_Z \cdot R_{DCZ}) \quad [\text{E.g.}]$$

$$\sigma_p = \sqrt{w_X^2 \cdot \sigma_{DCX}^2 + w_Z^2 \cdot \sigma_{DCZ}^2 + 2 \cdot w_X \cdot w_Z \cdot \rho \cdot \sigma_{DCX} \cdot \sigma_{DCZ}}$$

[Pg: 35 / Illustrations]
 (Pg: 63)

Hedge Ratio = $\frac{\text{Amt. of Derivative position together taken for hedging}}{\text{Amt. of the underlying exposure}}$

Case (1) : If there is strong correlation b/w R_{DC} & R_X , there is little diversification benefit.
 Hence Hedge Ratio should be higher.
 E.g. - Fixed Income, as an Asset class

Case (2) : If there is a low correlation b/w R_{DC} & R_X , there is already an inbuilt benefit of diversification.
 So, Hedge Ratio may be low.
 E.g. - Equity - especially Export Oriented firms.

The author also mentions that during crisis situations, there is a flight taken towards safe haven i.e. destinations like US\$ etc. Hence, a multi-currency global portfolio may always keep some long exposure in such safe haven currencies such as US\$. When everything crashes, it will to some extent save us.

To calculate $E(R_p)$ and σ_p ex-ante for the future - its a daunting task. U require all the R_{fc} 's and all the R_{fx} 's, σ_{fc} 's & σ_{fx} 's and all the correlations - obviously u can't take historical data as it is ----- a lot of judgement is reqd.

Section (2) - Extra

Marked to Market Value of a forward Contract ;

Step (1) Calculate new fwd. rate of offsetting position.

Step (2) Cash flow on the settlement date.

$$= \left[F_c(T) \approx K \right] \times \text{Amt. of Fwd. Contract.}$$

↓
 $F_0(T)$

Step-① : Mark to mkt. value of the fwd. Contract 2

P.V. of step ② @ the Libor Rate of the other currency i.e. the currency in which u get the profit or loss in step ②

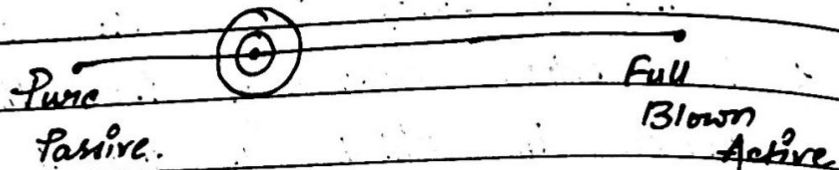
[Qs 3 & 4] & 5.

• Why FX swap? (Imp)

- Bcz of Roll Over Requirement of a Forward Contract.

SECTION - (4) : Strategic Decisions

(1) Imagine a Currency Risk spectrum starting from pure passive to full blown active.



- Which point on this spectrum do we position ourself & how much latitude or flexibility around that point should we provide?
- What is the Benchmark for evaluating CRM?
- What hedging tools are allowed?
- What's the frequency of re-balancing?

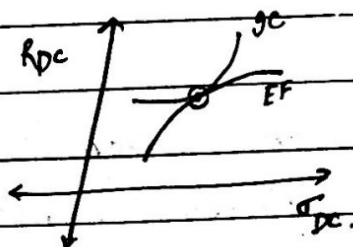
These are strategic decisions which depend upon investors Obj. & Const. as well as investors belief regarding currency mkt. efficiency.

(a) BELIEF ;

- Exchange Rates are mean-reverting in the long run — No need to hedge.
- In the short run — Exchange Rates can be very volatile ; we should hedge 100%.
- Currency mkt have pockets of inefficiency — i.e. scope of harvesting α — Active CRM recommended.

(b) OPTIMUM FOREIGN CURRENCY PORTFOLIO ;

- (a) Theoretically one may choose the wts. as well as the Hedge Ratio by the typical portfolio optimization process.



- (b) However practically this is almost impossible. Hence we take it as a 2-step process :-

Step ①: choose the wts of exposures in different currency mkt., assuming that the currency exposure is fully hedged i.e.

$$R_{DC} = R_{FC}$$

$$\& \quad \sigma_{DC} = \sigma_{FC}$$

Thus for a US based hedge fund deciding to invest in the BRICS economies, the strategic wts. decided may be :-

- Brazil - 15%
- Russia - 10%
- India - 30%
- China - 20%
- South Africa - 25%

Step ②: Now decide upon the currency exposure or the Hedge Ratio -

- Brazil - 90% ± 10%
- Russia - 100% ± 15%
- India - 80% ± 5%
- China - 100% ± 5%
- South Africa - 70% ± 10%

1) Our focus is on step ②.

However please remember that usually the Benchmark portfolio is a 100% currency hedged portfolio - for evaluating CRM, known as the Neutral portfolio (unlike the e.g.

mentioned above)

Anyway, the choice regarding the strategic positioning of the portfolio along the currency risk spectrum depends upon :-

(a) Clients considerations ~

- His horizon — if short term, Higher Hedge Ratio.
- Risk aversion — if higher, Higher Hedge Ratio.
- Liquidity needs — if higher, then higher Hedge Ratio.
- His faith — skeptical the beneficial owner (client) of the expected benefit of active CRM : higher hedge ratio.

(b) Mkt. Considerations ~

- Volatile financial mkt. — higher hedge ratio.
- * cheaply a hedging program can be implemented — higher hedge ratio.

Note:- * Costs involved in hedging programme.

(c) Portfolio Composition

• Fixed Income Assets - since these are strongly related to currency movements, there is no inbuilt benefit of diversification. Hence higher hedge ratio.

Costs involved in Hedging programme:

→ Trading Costs : Bid/Ask spread, Dealers commission, Roll-over charges, opportunity cost of holding cash, administrative cost of the infrastructure.

→ Opportunity Cost i.e. Regret : - U have hedged 100% currency risk but when currency moves in a certain direction, u repent that u could have earned by keeping the exposure unhedged in that direction.

Note: Practically speaking, choice of Hedge ratio is like choosing how much insurance & type of insurance.

... take
... Do we insure against all risks & are we using the perfect insurance policy?

— Of course not because the costs of insurance are prohibitively high.

Similarly you cannot hedge 100% of currency risk at all times.

5) Locating the portfolio along the Currency Risk Spectrum — Walk the talk.

— strategies for implementing strategic decision making.

Strategy ① : Passive Hedging.

Step 1) There is a Benchmark stated in the IPS — usually 100% currency hedged Benchmark — also known as Local Index.

Step 2) Passive Hedging involves keeping the currency exposure of the portfolio — as close to the Benchmark i.e. being Benchmark neutral.

step 3) Of course due to RfE - periodic rebalancing will be reqd. as stated in the OPS.

Goal: We don't want to play on RfE.

We want to keep costs as low as possible & focus on RfE.

Strategy 2: Discretionary Hedging.

step 1) Benchmark Portfolio - usually 100% hedged as regards Currency.

step 2) Latitude allowed - say +/- 10%. However if u. exercise this latitude based on ur market opinion, please remember u'll be evaluated based on the Benchmark.

E.g. US based Hedge Fund - investing in the BRICS economies - our earlier e.g.

Suppose he expects INR (₹) to appreciate in the short run.

(How does he expect this - - - - -)

Section - (5) - So, he will sell ₹ forward equal to only 75% of the ₹ exposure rather than 80%.

~~CRUX: Please generate α i.e. enhanced return through Active CRM~~

CRUX: Please focus on protecting the portfolio but if u get some opportunity of enhancing returns via CRM - do it to a limited extent.

Strategy (3) : Active Currency Risk Mgmt.

step (3) / Benchmark -

step 2. / greater latitude around the Benchmark. - say +/- 25%.

CRUX: U are expected to have currency forecasting skills
 use them to generate α .
 ofcourse within the risk boundaries outlined in the IPS.

Strategy ④ : CURRENCY OVERLAY (V.Imp.)

It means outsourcing CRM to an external specialist

Case 1) Manager A : portfolio manager
- constructs a portfolio of Foreign Currency Assets with no hedging.

Manager B : has been told to hedge 100% of Manager A's exposure

Case 2) Manager A : same as above

Manager B : has been told to carry out Active CRM - say $\pm 10\%$ - but only in those currencies to which Manager A's portfolio is exposed.

Case 3) FX or Currency - as an Asset class
[V.Imp.]

Manager A \rightarrow same.

Manager B \rightarrow Carry out α search
in any currency i.e. even
those currencies to which existing
portfolio is not exposed.

Case 4) α & β separation;

Manager A \rightarrow constructs a portfolio of
Assets & carry out CPM
as per IPS.

Manager B \rightarrow separately hired to
generate α in the domain
of currency as an Asset class.

Case 5) same as Case 4 - but we
have multiple Currency
specialists hired to generate α .

V.V. Imp.

Note: In Case (5), this entire exercise is
justified - if the sources of α
generation by these multiple managers
- are uncorrelated with Asset
class of the overall portfolio & other
sources of α generation in the
overall portfolio.

Final Discussion on Currency as an Asset Class :-

What's the Benchmark for these
Currency specialists for performance
evaluation?

- Difficult stuff There
are vendors who have started
creating Currency style indices -

Style Index ① : Active CRM,
using Global Macro.

Style Index ② : Active CRM,
using Technical Analysis.

Style Index ③ : Active CRM,
using Volatility Trading.

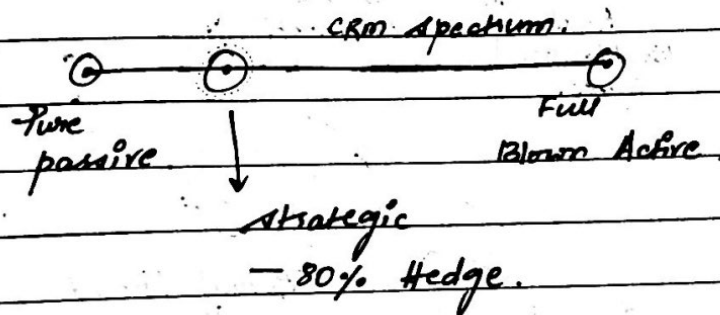
Style Index ④ : Active CRM,
using Carry Trade.

Thus, if a specialist has
been appointed as a carry
trade manager, his benchmark
could be style index ④.

However all these are better said than done because these indices are not broad based & suffer from various biases.

SECTION - (5) TACTICAL DECISIONS REGARDING CRM...

* Part - (1) : Introduction



∴ Tactical CRM is basically the freedom or latitude provided by the clients GPS - around the strategic Hedge Ratio.

- Tactical CRM is basically Active

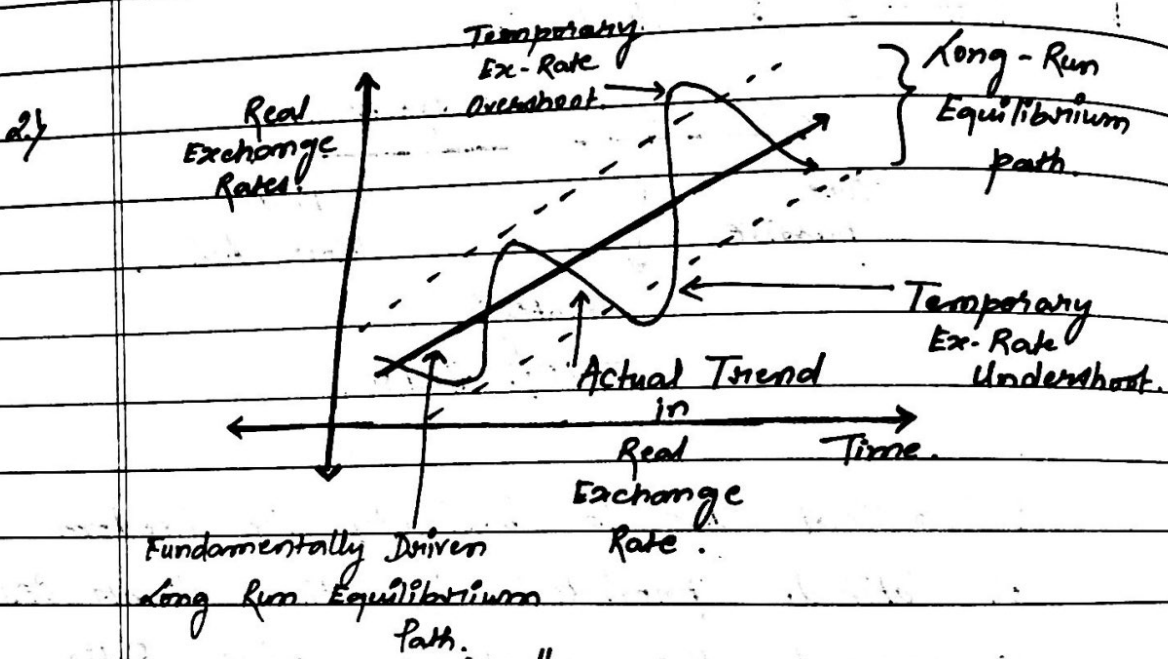
CRM : It requires a mkt. view i.e. :-

- View based on Economic fundamentals.
- View based on Technical.
- Carry Trade.
- Volatility Trading.

PART - (2) : ECONOMIC FUNDAMENTALS

1/ Assumptions ;

- Rational participants.
- Efficient currency mkt.
- Currency values - depends upon economic factors & this relationship can be modeled.



Interaction of the long term & short term factors in Exchange Rate.

3/
$$\text{Real Exchange Rate} = \frac{\text{Nominal Ex Rate}}{\text{Price Ratio}}$$

1) Fair Value of Real Ex Rate - determined by some fair value model like PPP.

2) Actual Ex: Rate hovers around the Fair Value Anchor.

3) Currency Appreciation should occur when :-

- Fair Value \uparrow
- Presently Actual $<$ Fair Value
- Nominal ^{or Real} Int. Rate differential \uparrow
- Inflation Differential \downarrow
- Risk premium differential \downarrow

* PART - (3) : VIEW BASED ON TECHNICAL

1) Assumptions :

- Past prices can be used to predict future price movements -
No need to look at the economic factors of Part (2) bcz they are all captured in the past price.
- Price patterns are repetitive.

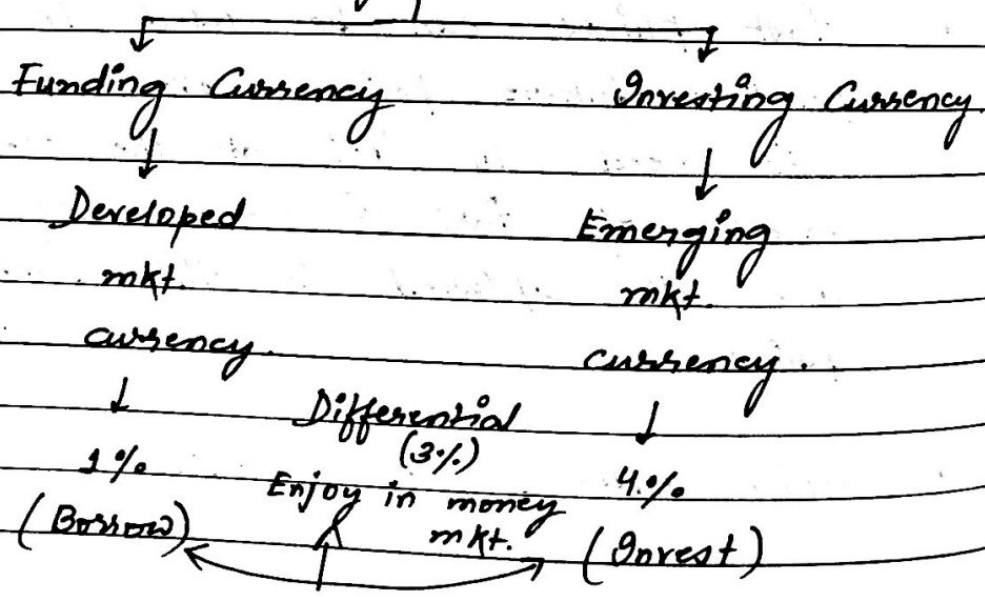
• Technical Analysis is a timing decision - not pricing.

2.1/ Tools of Technical ;

- Trend Oriented - i.e. Moving Averages (Golden Cross, Dead Cross).
- Overbought or Over sold positions based on Oscillators like - RSI (Relative strength Index) & Stochastic.
- Support & Resistance

2.2/ PART - (A) : Carry Trade.

1.1/ Level (2) style :



Obviously, Funding Currency will be @ fwd. premium of 3% & Investing currency will be @ fwd. discount of 3%. ↓

Come - suffer in the foreign exchange mkt
↓

But - - - - - I will not go over there.

- I will remain unhedged.

• As per Uncovered IRP, "F" is an unbiased estimator of "E(s)".

So, Uncovered IRP is saying that even if u don't hedge - u will suffer in the FX mkt.

• People carrying out carry trade are betting against Unc. IRP i.e. they believe that either funding currency will depreciate or appreciate by less than 3%. This is the same thing as saying that either Investment currency will appreciate or depreciate by less than 3%. ∴ We are enjoying in the money mkt. & not suffering that much in the FX mkt...

----- Good repetitive gains.

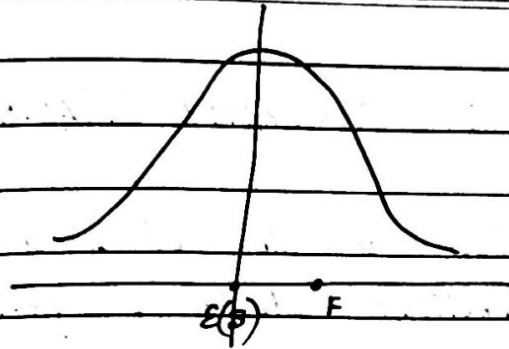
But one fine morning there is flight to safety (as indicated by the volatility filters) i.e. reversal or unwinding of Carry Trade
----- steep fall in investing currency i.e. rise in funding currency - resulting in massive losses especially in these amplified leveraged portfolios. - crash risk - negative skew.
- This needs to be tackled by using volatility filters.

a.) TRADING THE FWD. BIAS :

- Sell the currency spot which is trading at a fwd. premium.
- Buy the currency spot which is trading at a fwd. discount.

Quotation : A/B

Suppose B is the low yielding currency.

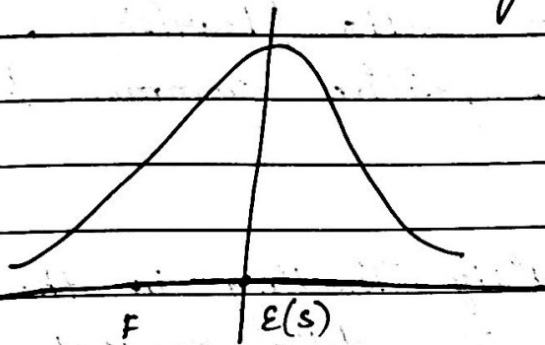


$$E(s) < F$$

\therefore buy spot.

Quotation - A/B.

B is the investing currency.



$$E(s) > F$$

\therefore sell spot.

According to people, who carry out Carry Trade, fwd. premium or discount - are always overstated.

* PART - (5) VOLATILITY TRADING ;

1) When u do C^+ , u come to have positive delta, positive vega, positive gamma & negative theta

2) When u do P^+ , u have negative delta (bearish), positive vega, positive gamma & negative theta.

3) Volatility Trading in the purest sense is delta neutral i.e.

combining options with the underlying or other Derivatives so that $\Delta = 0$.

So, volatility trading is trading with a view on Volatility.

Case (i) Expect Volatility to rise.

Strategy (1) : Buy Call on 1 million CHF (Quotation : CAD/CHF - its a fifty [0.5] delta Call [ATM]) and sell CHF & ~~0.5~~ 0.5 million fwd.

- This position has a zero delta, positive gamma, positive vega & -ve theta.

strategy (2) : Buy 50 Δ straddle i.e.
Buy C^+ & P^+ ATM of
equal amt. This position has zero
delta, positive gamma, positive
vega & negative theta.

strategy (3) : Protective Put.
i.e. P^+ , S^+ in the same
amount.

- This position has +ve delta,
+ve gamma, +ve vega & -ve theta.

strategy (4) : Buy a 25 delta
strangle (out of money
put & call - buying) :-

This position has zero delta,
+ve gamma, +ve vega & -ve theta.

strategy (5) : Bull Call spread.

- 50 Δ C^+ , 25 Δ C^-

\downarrow (at the money) \rightarrow (out of the money)
-vega, gamma, theta are strong

: This position has +ve delta, net
vega +ve, net gamma +ve & net
 $\theta \rightarrow$ -ve

... & so on...

Case (ii) Volatility is expected to fall

1) Volatility in the current discussion is a separate product. We can have volatility overlay specialist - just as we studied currency overlay.

2) Authors empirical observation regarding - speculation vs hedging in volatility :-

speculative volatility trading are usually net option sellers.

hedging vol. traders are usually option buyers.

EOC:s / Pg: 96 (1-9).

Two additional points :-

A currency overlay specialist may have a basket of funding & investing currencies where weight of each component will be based on mkt. view.

→ Overweigh that funding currency which are going to relatively depreciate.

→ Overweigh that investing currency which is going to relatively appreciate.

- In Vol. Trading, the trader can have a joint view on the direction of price & direction of volatility. :-

Jan'2020 - We are bearish on ₹ & expecting high volatility.....
 may engage in a Bearish Put spread :- -ve delta & +ve Vega.

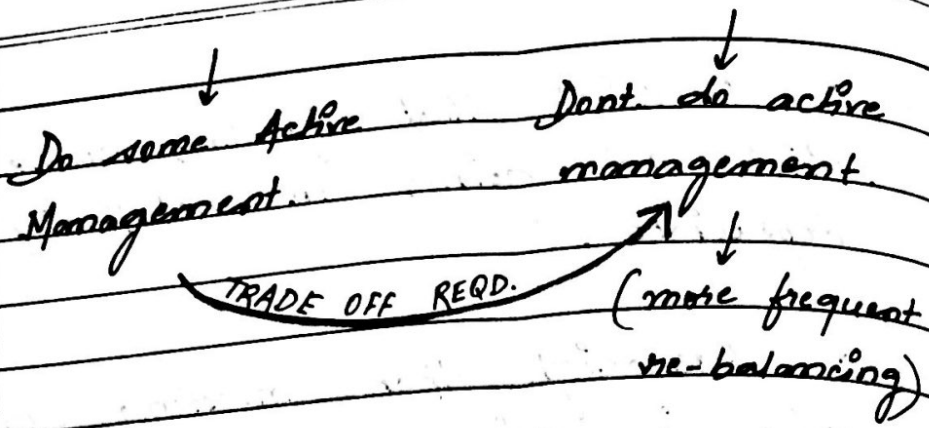
SECTION - (6) : TOOLS OF CRM

i.e. How to trade the por?

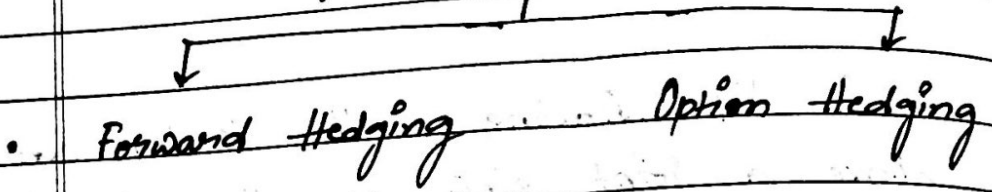
1) Mentality need in this section :-

• How do I reduce Hedging Cost?

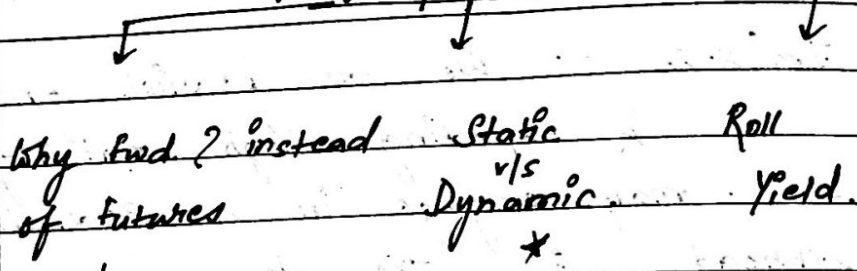
• How do I reduce the pb of Underperformance



Topic layout
 w/m inform

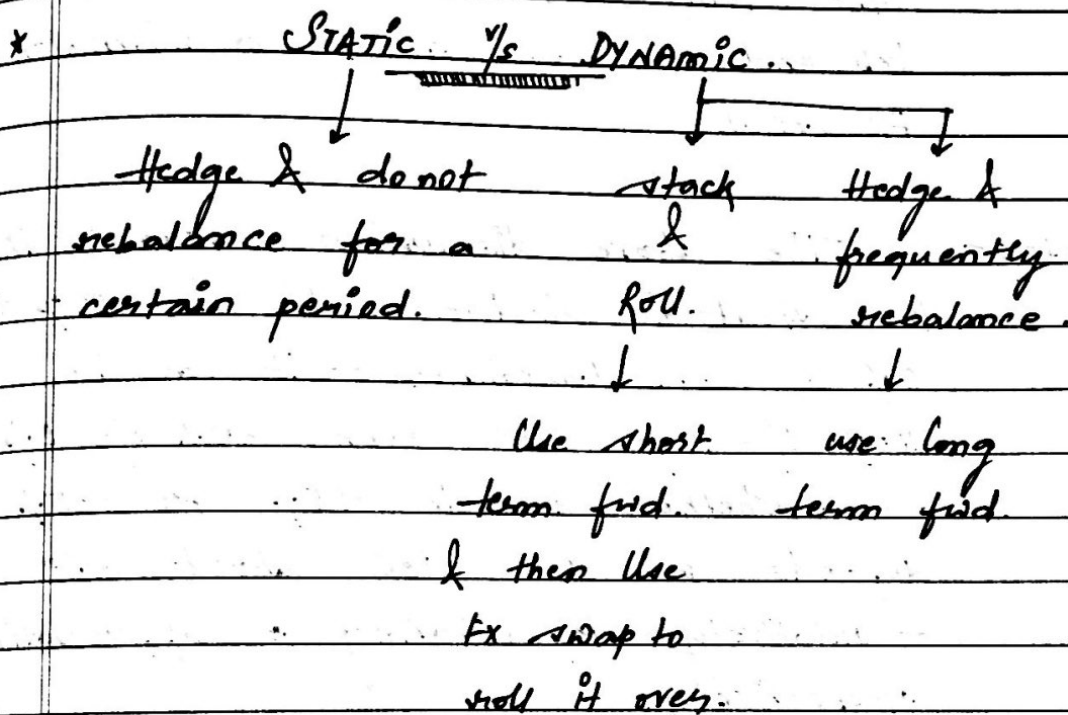


Do Fwd Hedging



- Customization
- No Margin Requirements.
 (subject to Central Counter-Party feature)
- Higher liquidity in case of Currency funds.
- In fact Quotation

of Futures may not be available in the desired Currency pairs - also Volume in fwd. is higher in the Currency mkt.



E.g. Foreign portfolio (DC = US\$) - Long Exposure of GBP 80m on 1st Jan - 6m hedging reqd.

- static - sell GBP 80m : 6m forward & then do nothing - but the exposure amt. is changing - let it change - we perhaps believe in Mean Reversion

stock & hold : On 1st Jan : sell
 GBP 80m - 1m fwd.
 2 days prior to Jan end
 maturity, exposure = GBP 90m
 ... Buy GBP - 80m spot to
 cancel the existing fwd. & sell
 GBP (90m) - 1 month fwd. i.e. for
 Feb end ... so its a mismatched
 FX swap.

Note:- The above discussion assumes that
 the strategic hedge ratio is 100% +/-
 0% ... remember - it can be
 100% +/- 10% or even 70% +/- 5%
 ... whether to do +5% or -5%
 depends on our view about GBP
 - relatively depreciating or appreciating
 respectively.

• Dynamic long term hedge with
 frequent rebalancing :-

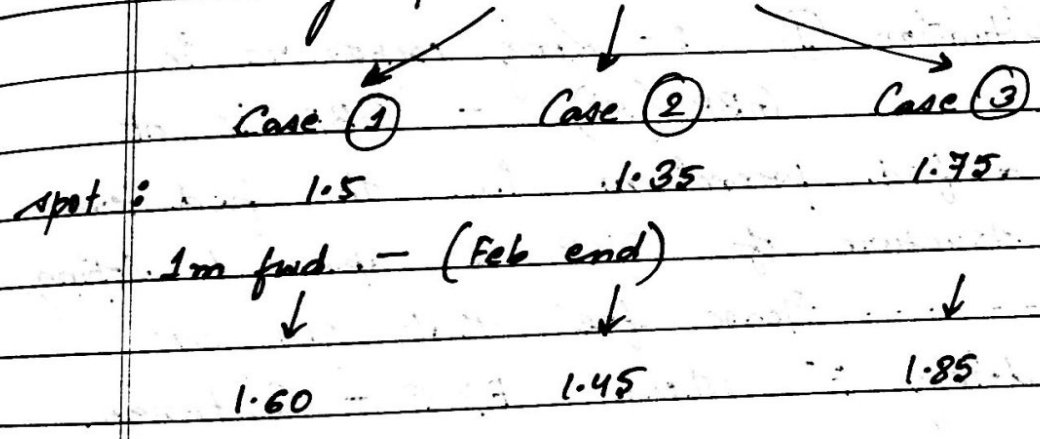
E.g. Sell GBP 80m 6m fwd.
 At the end of Jan - GBP exposure -
 90m ... U should sell 5 month
 fwd. - extra 10m ... [once again
 we are assuming 100% hedge ratio +/-
 0%].

Note:- Out of the above (3), cash flow in between is only occurring in the "Stack & Roll" - because over there we are cancelling the fwd. contract.

ROLL YIELD ;

1st Jan : spot : US\$ 1.5 / GBP
1st Feb : US\$ 1.6 / GBP

Sold 1 m fwd. GBP - 80m @ 1.6
Two days prior to Jan end ;



In Case (1) ;
 Δ spot : 0 Roll yield = +0.1

In Case (2) ;
 Δ spot = 0.15 Roll yield = 0.1

In Case (3) ;
 Δ spot = -0.25 Roll yield = 0.1

∴ Overall Return ;

Cases			
①	0.1	② 0.25	③ -0.15

Please understand that the overall return is arising when u are comparing F^- @ 1.6 - done on 1st Jan with S^+ done @ 1.5/1.35/1.75 @ the end on Jan.

[squaring off the fwd. position]

When is Roll yield positive?

Situation ① :- Long exposure in GBP (S^+) - GBP is at a fwd. premium i.e. the fwd. term structure of GBP is upward sloping
----- Please feel that you are doing F^- where $F > S$ - Contango.

Situation ② :- Short exposure in CHF (S^-) → CHF is at a fwd. discount i.e. the fwd. term structure of CHF is downward sloping
----- Please feel that you are doing F^+ and $F < S$ i.e. Backwardation.

Note :- In the opposite cases as above - Roll yield is negative.

Calculation of Unannualised Roll Yield;

$$= \left[\frac{F - S_0}{S_0} \right] \times 100\%$$

While doing this, ensure that exposure currency is the Base Currency. Also, the sign i.e. (+) or (-) will depend upon theory - not maths. [i.e. the position matters - short, long].

Also remember that $\frac{F - S}{S} \times 100\%$ is approximately equal to δ the periodic interest rate differential as per Covered Interest Rate Parity.

E.g. We are short in AUD [DC = US\$]
- Exposure maturity : 3 months.
Interest Rate : US\$ - 2% AUD - 5%.
What is the unannualised roll yield?

Soln Roll yield is positive (S^- , F^+).
AUD Int. > US\$ Int. \therefore AUD is at a fwd. discount.

i. Unannualized Roll yield
= periodic differential interest rate.

$$= \frac{5-2}{12} \times 3$$

$$= 0.75\%$$

E.g. What about Tactical CRM - using Roll Yield Concept?

• If Roll yield is positive - Hedge more than strategic requirement.

• If Roll yield is negative - Hedge less than strategic requirement.

What about Tactical CRM - based on Currency forecast?

• $E(S) > F$ and we have long exposure to the currency
--- i.e. we need to sell fwd.

--- In this case - we should underhedge as $E(S) > F$.

• $E(S) < F$ and we have a long exposure to the currency
--- i.e. In this case in order to hedge $\frac{1}{2}$ i.e.

selling fwd. — we should over hedge.

E.g. — Pg: 38/E.g. (4)

Notes: —

ly Three things have been expressed as similar by the Author: —

CARRY
TRADE

TRADING A FWD.
BIAS

ROLL
YIELD.

- Borrow low yield currency & invest in high yield currency.
- Buy currency trading @ a fwd. discount & sell currency trading @ a fwd. premium.

dy How to choose rate in an FX swap?

Spot Rate (£/\$) : 72.40 / 72.90

1m Fwd. points : 70 / 80

Case (1) : Matched FX swap

Buy \$10,000 spot & sell £10,000 fwd.

— Rates : ??

Avg. Rate for the spot leg = 72.65

So,

$$\begin{aligned} \text{Sell 1m fwd : Rate} &= \\ &\text{Rate for the spot leg} \\ &+ \text{Fwd. points (Bid)} \\ &= 72.65 + 0.70 \\ &= 73.35 \end{aligned}$$

Case (2) Mis matched FX Swap ;

where fwd. amt. is bigger
 E.g. Buy \$10,000 spot & sell
 \$12,000 - 1m fwd.

DIFFERENT.

* Logic : since fwd. amt. (12,000) is bigger - whichever side u are using for the fwd. (i.e. sell so Bid Rate) - the same side u are suppose to use for the spot (i.e. Bid again - no avg. rate)

$$\begin{aligned} \text{Rate for the spot} &= 72.40 \\ \text{Rate for fwd.} &= (72.40 + 0.70) \\ &= 73.1/\$ \end{aligned}$$

Case (3) i. Mis-matched FX swap, where the fwd. amt. is lower.

E.g. Buy \$10,000 spot & sell \$8,000 - 2 m fwd.

Soln Rate for the spot leg = 72.90 (Ask rate)
 Rate for fwd. = $(72.90 + 0.70)$
 = 73.60.

- Spot Buy (Ask Rate) \rightarrow Normal.
 Fwd. Sell (Bid. points.)

OPTION HEDGING ;

i) Comparison between Options & Fwds ;

Note :- Please assume that we have a long exposure in the currency -

So, if u hedge via F^- - u are blocked opportunity or regret cost can be high if favorable movement takes place.

Instead, we can hedge via P^+ (u may remember S^+ , P^+ is a protective put).

Case ① If the spot goes down, put is exercised & we are protected

Case ② If spot rate goes above strike price - put lapses & we enjoy the upside potential.

Note: - Niche jaane se P^+ bachaega
& upar jaane se - enjoy karne ka mauka mil jaega

However, options are costly -
as we have to pay premium -
--- Cost of insurance.

Q) How can we reduce hedging cost or modify Risk Return profile?

(a) Under or Over-Hedge fwd: depending on mkt. view, level of risk aversion of the client, hedging cost etc.

Style ①: If currency is expected to appreciate - under hedge.

Style (2) : Currency is at a fwd. premium
i.e. short yield positive - Over Hedge.

Style (2) : Over Hedge when the rate goes up
& Under Hedge when the rate goes down.

All this ensures positive convexity
i.e. gains are bigger - losses are smaller.

(b) Buy Out of the Money (OTM) put -
instead of ATM put :-

Lower Option premium but less
downside protection.

(c) Bear Put spread ;

- P^+ @ ATM & P^- @ OTM.

: Lower hedging cost but lower
downside protection.

(d) COLLAR ;

- C^- @ a higher x and
 P^+ @ a lower x

: This is a range fwd. contract &
is known as short risk reversal

This means long risk reversal involves C^+ @ a higher X and P^- @ a lower X .

(c) SEAGULL SPREAD ;

- Combination of Collar and Bear Put spread.

- This involves : P^+ @ 500 ,
 P^- @ 400 and C^- @ 700

Together this is known as short seagull spread i.e. selling the wings.

If we have a situation wherein we are afraid of the rate rising, we will choose long seagull spread i.e. Buy the wings & sell the Body.

(f) Use Exotic Options ;

• These are options with non-standard features.

• Knock-In Options ;

C^t
S = 100 X = 115 & Barrier = 120

Case (1) S goes above 115 but does not go above 120. Suppose it goes to 118
Payoff = 0

Case (2) S goes above 120 & then finally stops @ 118
Call exercised
Payoff = (118 - 115) = 3

Case (3) S goes above 120 & finally lands @ 113
Call lapses & Pay off = 0

Knock-Out Options ;

- The option gets worthless if the Barrier is breached.

Binary, Digital, All or Nothing Option ;

- These options have a constant pay off i.e. Pay off = K or 0 depending upon whether option is exercised or not.

DATE: / /

c) Portfolio of Multiple Foreign Currencies;

If we have a portfolio of multiple currencies, we should not hedge each currency. There may be correlation b/w the currencies such that there is a natural hedge.

E.g. US Based Fund.

<u>Particulars</u>	<u>AUD</u>	<u>NZD</u>
• USD equivalent exposure.	\$ 10m	- \$ 10m.
• R_{FC}	5%	4%
• Expected R_{FX}	3%	2%
• r_{FC} (Investment in T-bills)	0%	0%
• r_{FX}	7%	9%

Correlation between the (2) = 0.9
Calculated expected R_{DC} & r_{DC} ?

Soln

AVD.

$$R_{DC} = [(1.05)(1.03)] - 1$$

$$= 8.15\%$$

$$\sigma_{DC} = (\sigma_{FX})(1 + R_{FX})$$

$$= (7)(1.05)$$

$$= 7.35\%$$

NXD.

$$R_{DC} = [(1.04)(1.02)] - 1$$

$$= 6.08\%$$

$$\sigma_{DC} = (\sigma_{FX})(1 + R_{FX})$$

$$= (7)(1.04)$$

$$= 7.28\% \quad 7.36\%$$

Logic behind the formula: -

$$\sigma_{DC} = (\sigma_{FX})(1 + R_{FX})$$

→ This is used when $r_{FC} = 0\%$

and we are going to earn some return on FX. ∴ Our exposure

is increased by the amt. of return expected. Hence s.d. on both -

existing σ_{FX} & $(1 + R_{FX})$ #

Portfolio:

$$R_{DC} = \text{weighted avg.}$$

$$(1 \times 8.15) - (1 \times 6.08)$$

$$= 2.07\%$$

$$\sigma_{oc} = \sqrt{(1)^2 \cdot (7.35)^2 + (-1)^2 \cdot (9.86)^2 + 2(1)(-1)(0.9) \times (7.35)(9.86)}$$

$$= 4.22\%$$

- This is less than σ_{oc} of each
 ... shows the immense benefit
 of Diversification.

Notes:- Please do read summary of
 this section from Core
 [from Fuds. & Options].

OTHER ISSUES :

1) **CROSS HEDGE** : Exposure on x -
 Hedged via "y" -
 because x & y are correlated.

Best e.g. - Natural Hedge :
 Long on AUD & Short on NZD.

E.g. Hedge a diversified stock
 portfolio using Index futures. [Nifty
 v/s
 stocks
 picked
 up
 by You]

E.g. Hedging Airline Turbine Fuel Risk
 via Crude Oil Futures.

This exposes us to Residual Risk $(1 - \rho^2)$
 and Model Risk (Correlations may change
 in future).

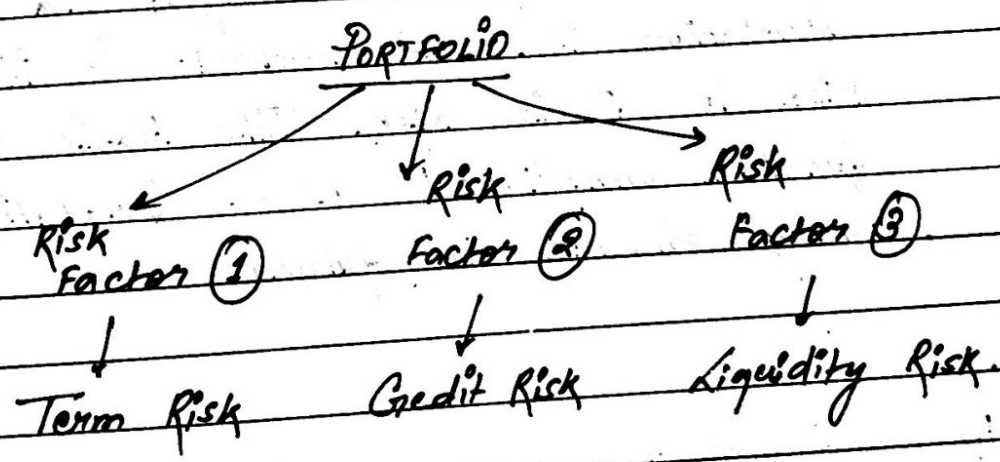
2) **PROXY HEDGE** : Same as Gross Hedge
 - However if the ρ : digs into the distinction then :-

(a) In Gross Hedge, u sell one foreign currency exposure into another foreign currency.

(b) In Proxy Hedge, u sell foreign currency exposure into home currency.

3) **MACRO HEDGE**

Why?
 - Bcz we are thinking about the entire portfolio & not individual constituents.



Another way of decomposing portfolio to risk factors : Scenario Analysis
 In what scenarios, portfolio can underperform.

E.g. of Macro Hedge;

- Long position in Gold, to hedge against CRASH Risk.
- Volatility Overlay Manager maintains long Vega to hedge against the risk of Volatility spiking.
- Hedging Currency risk via a basket of Currencies - say \$ index.

Note:- Whenever the underlying exposure & hedging instrument are not the same (E.g. AUD exposure hedged via NZD), Correlation is not perfect & it gives rise to Basis Risk. This Basis risk is further amplified as - Correlation may change in future.

4.) Minimum Variance Hedge Ratio [MVHR]

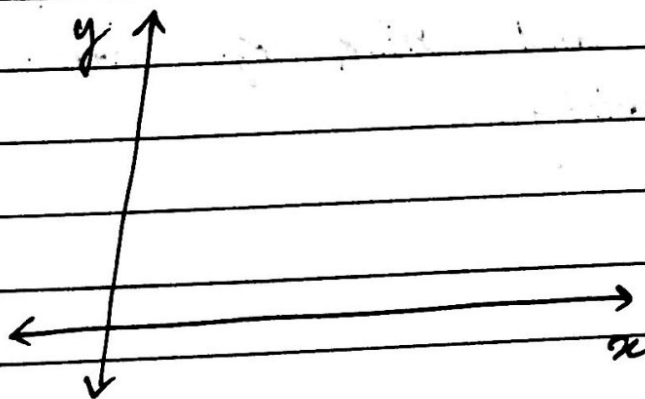
(a) Let us understand this via a non currency example:-

Air Line Co :-

will require 500 barrels of ATF in future - afraid of ATF price rising - should buy ATF futures. However ATF futures illiquid or not available. So, firm decides to buy Crude Oil Futures -

Past Data :-

<u>Period.</u>	$x = \% \Delta$ in Crude Oil Futures - Hedging Instrument	$y = \% \Delta$ in spot price of ATF. - Exposure
:	:	:
:	:	:
:	:	:
:	:	:
:	:	:
:	:	:
:	:	:
:	:	:
:	:	:



$$\hat{y} = b_0 + b_1 x$$

$$\hat{y} = 0.2 + 0.9(x)$$

No. of Crude Oil Futures barrel
that we should buy =

$$= \text{Exposure} \times \text{Hedge Ratio}$$

$$= 500 \times 0.9$$

$$= 450 \text{ barrels (F+)}$$

Of course the ρ may not give us
the regression eqn. but instead
provide :-

$$\text{s.d. of "x"} = 12\%$$

$$\text{s.d. of "y"} = 10\%$$

$$\text{Correlation Co-efficient} = 0.94$$

$$\therefore \text{MVHR} = 0.94 \times \frac{10}{12} \quad \left[\frac{\sigma_y \rho}{\sigma_x} = \beta \right]$$
$$= 0.78$$

Obviously there is Basis Risk since
 $\beta \neq 1$ and risk of non-
stationarity.

(b) Lets come back to Currency ;

Direct Hedge

CHF exposure hedged via CHF Contract

- $\beta = 1$
and $MVHR = 1$

Indirect Hedge

Gross Hedge i.e. AUD exposure hedged via NZD

Imagine US fund
 $\therefore R_{DC}$ is in US\$
i.e. y and x is R_{FX} of NZD.

$\beta \neq 1$

$\therefore MVHR \neq 1$

[c] So, $MVHR$ is a mathematical technique based on OLS (Ordinary Least Squares] Regression b/w R_{DC} and Hedging instrument - - - - -
- - - - - the slope of such regression is $MVHR$ and it minimises the variance of R_{DC} .

[d] Since $R_{oc} \approx R_{re} + R_{rx}$ (approx)
 The concept of MVHR seeks
 to optimize the co-movement of
 R_{re} & R_{rx} :-

Situation (1)

Importing Country - \therefore b/w R_{re} & R_{rx}
 - positive

--- This means exposure is
 amplified & \therefore $MVHR > 1$

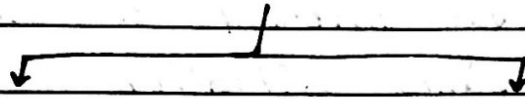
Situation (2)

Exporting Country :-

\therefore b/w R_{re} & R_{rx} - negative

\therefore Exposure is getting
 cancelled out. \therefore $MVHR < 1$

SECTION - (7) Issues in EMERGING mkt ECONOMIES.



- What are the issues?
- How to tackle them?

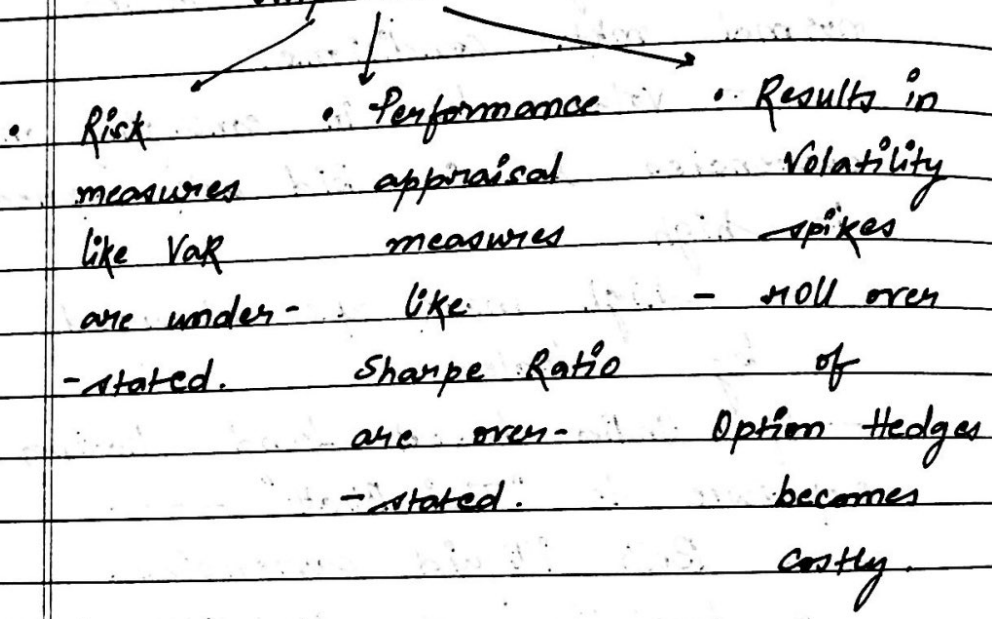
[a] WHAT are the ISSUES?

- High Trading Costs even under normal mkt. conditions.
 - volume low in emerging mkt. currencies & ∴ Bid ask spread is high.
 - high mark ups charged by dealer.
 - If India based fund having exposure to "Thai Bhatt" - - - -
 - - - Both illiquid currencies.
 - ∴ Quotation of INR/THB - not efficiently available - - - -
 - - - Hence have to do a Cross Trade i.e. INR/^{US\$}THB & US\$/THB
 - ∴ This also results in significant transaction costs.

• Liquidity Evaporation when trades are over crowded
... say Reversal of Carry Trade in a panic situation
easy entry, difficult exit.

• Return distribn of Emerging mkt. currencies -
Leptokurtic & negatively skewed

- Implications :



• We are generally having long exposure in Em. currencies
... higher yield ... fwd. discount.
... [DRP] ... when we sell it
fwd. - we are suffering negative roll yield.

• We in our own world feel that we are enjoying the benefits of diversification by having the basket of emerging mkt. currencies that's based on Correlations measured in normal time periods. But these correlations spike during crisis & the benefit of diversification is not available exactly when it is most needed.

• There is also an issue of EM Currencies supported artificially by Govt. intervention, capital controls and pegging These Govts do not have the caliber to maintain such support in periods of extreme crisis.

[6] How To TACKLE THESE ISSUES ;

- The sobri is Non deliverable Fwd. Contracts.

- Imagine Capital Controls i.e. restriction by the EM Govt. regarding using its Currency. We can avoid this problem by entering into a Cash settled Fwd.

Contract & the settlement currency is
the developed mkt. currency.

[Sims gut feeling is saying that
currency will come in paper (1)
this time].