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ON

FOREX

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Foreign exchange constitutes the largest financial market in the world.

TIM Weithers : “Foreign Exchange:-It’s not difficult; It’s just confusing”

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INTRODUCTION

- ✓ FOREX market has no central marketplace
- ✓ Business conducted electronically & globally
- ✓ Principal dealers -larger commercial banks & investment banks
- ✓ A company buys/sells foreign currencies via commercial banks
- ✓ Participants- individuals, firms, and banks
- ✓ Simply stated, exchange of currencies of different countries takes place in FX mkt.
- ✓ Using trends to forecast exchange rates is not productive

DATA

In London in 2007 \$1,359 billion of currency changed hands each day. (Annually, it will be \$340 Trillion). New York accounted for \$664 billion of turnover per day.
<http://www.onlineniraj.blogspot.in/2015/11/triennial-central-bank-survey-on-forex.html>

I think, the issues in major currencies in FX market could be:

1 Which are the most important currencies for the FX market?

2 Does every country have its own currency?

3 How many currencies are out there?

4 Do the prices of currencies move freely or are exchange rates “pegged” or “fixed”?

5 For those floating exchange rates, how much do their prices fluctuate?

6 Can you actually trade every currency?

The United States Dollar
The Euro
The Japanese Yen
The Great Britain Pound
The Swiss Franc

1

No, because of lack of
confidence & faith in a
currency.

2

3

There are around 200
currencies.

Some countries have decided to fix or
“peg” the exchange rate between their
currency and that of another country.
Eg: Argentina

4

Most exchange rates today
are determined
by market forces, intervention
by central banks

5

No, Some countries limit or
restrict trade in their money.

6



Exchange Rate

It is the rate at which one currency can be exchanged in another.
It describes how much one currency can buy another currency.

Forex Quote Style and Types of Quotes**Direct**

Uses the domestic currency as the price currency and the foreign currency as the base currency.

Home currency varies against per unit of a foreign currency.

1 USD = INR 65

Direct Quote for India

Indirect Quote for USA

*European
quote*

Indirect

Uses the domestic currency as the base currency and the foreign currency as the price currency.

Foreign currency varies against per unit of a home currency.

1 INR = USD0.1534

Direct Quote for USA

Indirect Quote for India

*American
quote*

Quote Style

FX rates are quoted **TWO**-way

USD/INR = 65.4550 – 65.5560

Generally, the quote is given up to 4 decimal points except for JPY

Market maker always buys at low and sells at high

Always talk w.r.t. to currency which is being bought or sold (base currency).

Quoted exchange rates are nominal exchange rates

Here:

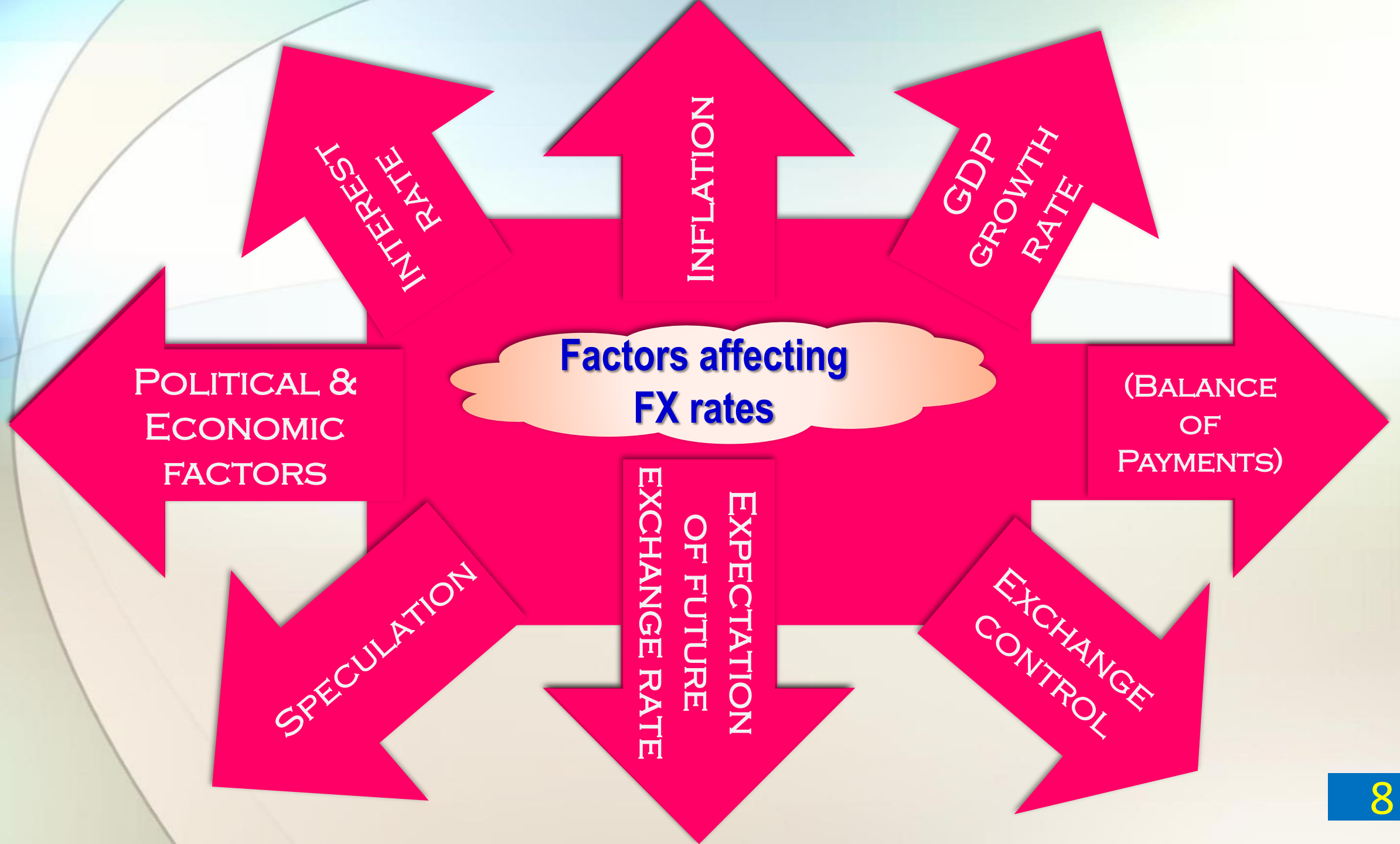
- 1) USD is the base currency
- 2) INR is the price currency
- 3) 65.4550 is bid rate
- 4) 65.5560 is ask rate
- 5) Market is ready to buy 1 USD @ INR 65.4550 and sell 1 USD @ INR 65.5560
- 6) Difference of .1010 INR represents spread/bid-offer margin.
- 7) Spread represents the risk of pricing the exchange of two currencies at a given time

Convention

Practically, we do follow ACI* Convention in quoting FX rates

First currency before oblique is the **base** and the **second** currency is the **price** [Ref. above example]

*(Association Cambiste Internationale)





Approach	Condition Assuming Mobile Capital	Result ↓ Depreciation ↑ Appreciation
Balance of payments	Persistent deficit Persistent surplus	↓ ↑
Mundell–Fleming	Expansionary monetary policy Restrictive monetary policy Expansionary fiscal policy Restrictive fiscal policy	↓ ↑ ↑ ↓
Monetary approach	Monetary expansion Monetary contraction	↓ ↑
Asset market approach	Persistent deficit Persistent surplus	↓ ↑

- An economic downturn as a result of a depreciation of a country's currency and instability in exchange rates.
- Currency crises do not appear to be anticipated, although there are warning signs.
 - Deterioration of trade balance
 - Decline in foreign exchange reserves
 - Higher rates of inflation
 - Increase in money supply
 - Private credit growth
 - Boom–bust cycle in financial markets



Warning
signs

Why 2 way ?

Price is available for buyer & sellers

Limits the profits margin of the quoting bank

Quoting bank cannot take advantage by manipulating prices

Comparison can be done instantly

Lends depth & liquidity

Rule: Always talk appreciation/depreciation with respect to BASE Currency



Appreciation

In case the result is positive, then base currency has appreciated

It is the gain in value of one currency relative to another currency.

Depreciation



In case the result is negative, then base currency has depreciated

It is the loss in value of one currency relative to another currency.

$$\% \text{ change} = \frac{\text{New value} \textit{ minus Old value}}{\text{Old value}}$$

We do have an error called **Sigel's Paradox** which states that -

“The appreciation in one currency is not exactly equal to depreciation in another currency.”

Q. Countries prefer fixed or flexible exchange rates?

Countries prefer fixed exchange rates because

- **Stability** in international prices for the conduct of trade
- **Anti-inflationary**, requires country to follow restrictive monetary & fiscal policies
- **Credibility**, if central banks maintain large international reserves to defend fixed rate
- Fixed rates may be maintained @ rates inconsistent with economic fundamentals. For example, Asia these days...



Vostro A/C**Your A/c with Us**

A/C maintained in local currency by an overseas bank

Nostro A/C**My A/c with U**

A/C maintained by the bank with its overseas branch for settlement of foreign currency

Loro A/C**Their A/c With U or Us**

A third bank's Nostro account with you

Mirror A/C

Reflection of the Nostro account maintained in the local currency as well as in foreign currency

BOB India opens a current
a/c in \$ with Citi bank NY



BOB will say \$ A/c as Nostro A/c

Bank of Japan opens a
current a/c in INR with
HDFC India



BOJ will say it as Vostro A/C

Cash or Today
Transaction

The settlement that takes place on same date of transaction

TOM
Transactions

The settlement that takes place on one working day after the date of transaction

Spot
Transaction

The settlement that takes place on two working day after the date of transaction

Forward
Transaction

The settlement that takes place after the Spot date

For cross rates please visit my write up on my blog

<http://onlineniraj.blogspot.in/2014/07/short-cutmethod-to-calculate-cross.html>

Key Currency Cross Rates		Late New York Trading Wednesday, September 28, 2005					
	Dollar	Euro	Pound	SFranc	Peso	Yen	CdnDlr
Canada	1.1729	1.4119	2.0733	0.9072	.10806	.01037	...
Japan	113.15	136.21	200.01	87.520	10.424	...	96.470
Mexico	10.8542	13.0663	19.187	8.3957	...	.09593	9.2543
Switzerland	1.2928	1.5563	2.2853	...	.11911	.01143	1.1023
U.K.	.56570	.6810	...	.4376	.05212	.00500	.48232
Euro	.83070	...	1.4684	.64255	.07653	.00734	.70826
U.S.	...	1.2038	1.7677	.77350	.09213	.00884	.85260

Source: Reuters **WSJ World Key Currency Cross Rates**

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Currency Pair

Symbol	Currency pair	Trading terminology
GBP / USD	British Pound / US Dollar	"Cable"
EUR / USD	Euro / US Dollar	"EURO"
USD / JPY	US Dollar / Japanese Yen	"Dollar Yen"
USD / CHF	US Dollar / Swiss Franc	"Dollar Swiss"
USD / CAD	US Dollar / Canadian Dollar	"Dollar Canada"
AUD / USD	Australian Dollar / US Dollar	"Aussie Dollar"
EUR / GBP	Euro / British pound	"Euro Sterling"
EUR / JPY	Euro / Japanese Yen	"Euro Yen"
EUR / CHF	Euro / Swiss Franc	"Euro Swiss"
GBP / CHF	British pound / Swiss Franc	"Sterling Swiss"
GBP / JPY	British pound / Japanese Yen	"Sterling Yen"
CHF / JPY	Swiss Franc / Japanese Yen	"Swiss Yen"

Source: eknowledgeocean.com. The contributor expresses his sincere respect to Amit Sir from whose site the content has been incorporated & this has been presented only for knowledge purpose and not for any copy right violation and commercial activities, hence readers are requested to consider for this.

DETAILED DISCUSSION ON:

- 1) INTEREST RATE PARITY
- 2) PURCHASING POWER PARITY
- 3) FISHER EFFECT
- 4) INTERNATIONAL FISHER EFFECT
- 5) EXPECTATION THEORY

IRP

An interest rate is the price of money.

Simply, it is the cost of borrowing money or the return from investing/depositing money.

The interest rate differential between two countries (say \$ interest and ₹ interest) should be same for exchange risk should be equal to the percentage difference between forward exchange rate and spot exchange rate.

This theory holds till there is no restriction on moving money from one economy to another.

Practically, dealers set the forward prices by comparing the differences between \$ interest and ₹ interest.

To be precise, when money market and currency are in equilibrium then any interest rates differential should be equal to the % difference in forward exchange rates and spot exchange rate, i.e., there won't be any question of earning riskless profit otherwise arbitrageurs will earn riskless profit.

IRP Theory relates to a condition of equality of returns on comparable money market instruments. *IRP relates Spot Rate and Forward Rate using two countries' risk free rates.*

*Difference in
interest rates*

$$\frac{(1 + R_q)}{(1 + R_b)}$$

--- equals ---

*Difference between
forward and spot rates*

$$\frac{FR_{Rs/\$}}{SR_{Rs/\$}}$$

For clarity we may take an example

Suppose an investor has \$100000 at the beginning of the year to be invested for a period of 1 year. Let us say \$ interest rates on deposits equals 2% p.a. on the other hand Indian deposits offer attractive interest rate of 10% and exchange rate is Rs.50 per \$. Now it is to be decided where the amount should be invested.

[Assuming that the investor is free to invest in any country]

Case I: If the investor invests in US: Amount at the end of the period will be as $100000 \times 102\% = \$102000$
(100000 as principal plus 2000 as interest)

Case II: If he wishes to invest in India:

-First he has to convert the \$ amount into Rupee amount, i.e. he has to buy corresponding rupees, hence he can buy $100000 \times 50 = \text{Rs.}50,00,000$.

-Now he will invest the amount @ 10%, finally at the year end he will have $\text{Rs. } 50,00,000 \times 110\% = 55,00,000$ (50,00,000-principal + 5,00,000-interest) in his hand.

Finally, what the theory tells us is that two investments should offer almost exactly same rate of return.

Hence at last the investor has to convert the ₹ amount generated into \$, and we do not know what will be the exchange rate at the year end.

Now see how this theory helps us. *As per this theory we can fix today the price at which the ₹ amount to be sold.* Such rate(price) fixed today is the forward rate.

The one year forward rate is 53.9216*. Therefore, by selling Rupees generated at the year end, the investor will be sure to earn $5500000/53.9216 = \$101999$.

Now see how 53.9216 is computed as forward rate between \$ and ₹.

For every \$ invested you will get $(1 + R_{\$})$ and investing in India you will get $SR \times (1 + R_{₹})/FR$ and these have to be equal so as to prevent arbitrage.

Some Formulae:

- (i) $(FR-SR)/SR = (R_q - R_b)$ [here, q means quote currency means and b stands for base currency]
[Satisfying the first line of the theory]
- (ii) $FR = SR * [1 + (R_q - R_b)]$ [solve first formula]
- (iii) $(1+R_b) = SR * (1+R_q)/FR$ [This formula will give exact result while the above formula gives approximate result]
- (iv) $FR/SR = (1+R_q)/(1+R_b)$ [solve iii]
- (v) $(FR-SR)/SR = (R_q - R_b)/(1+R_b)$ [converting formula at point (i) from approximate to exactness]
- (vi) $FR = SR * [1 + (R_q - R_b)]^t$ [In case we have t periods and IRP approximation]

Note: There are not 5 formulae, only two –giving approximate and accurate results.

PPP

Basically, we have seen that IRP theory is used in obtaining Forward Rate. But we have not discussed how spot rate is determined. Thus, this theory helps in this issue.

There are two forms of PPP-**(i)** Absolute Form of PPP & **(ii)** Relative Form of PPP

Absolute Form of PPP

The basic idea behind this theory is that a commodity costs the same regardless of what currency is used to purchase it or where it is selling. This is a straight forward concept. *Loosely, speaking as per this theory 1\$ will buy same number of say, burger anywhere in the world.*

Assumptions required to hold absolute PPP true

- o The transaction cost of trading – shipping, insurance, spoilage & so on must be zero.
- o There must be no barrier on trading-no tariffs, taxes or other political barriers.
- o The goods traded (burgers) in one place (economy) must be identical to the burger traded in another economy.



Basket of goods in India



Basket of goods in USA

As per PPP cost of these goods in India and USA should be same, subject to some assumptions



Hamburger in India



Hamburger in USA

Practically, Absolute PPP will not hold true (ignoring some exceptions) because the assumptions of this theory are rarely met.

Let's be clear with some cases:

If the burger in India costs Rs. 100 in India and exchange rate is Rs.50 per \$, then the same burger should cost Rs.100/50=\$2 in America.

Formally discussing:

Let S_0 be the spot exchange rate between Rs. & \$ [exchange rate is quoted as Rs./\$]

$P_{\$}$ be the current price in US

$P_{\text{₹}}$ be the current price in India

Then absolute PPP says that

$$P_{\text{₹}} = S_0 * P_{\$}$$

If in case the actual exchange rate is Rs.40/\$ then with \$2 a trader in America would buy a burger in America and ship it to India and sell the same in India @ Rs.100 per burger and convert the Rs.100 into \$, as a result of which he will get $100/40 = \$2.5$, hence he is gaining \$0.5 in this transaction.

Since, the trader is making riskless profit and the burgers start moving from US Market to India as a result of which there will be reduced supply of burgers in US and the prices will start rising in US economy at the same time India will lower the price of burger due to increased supply, this will continue till equilibrium is maintained in these two economies. At last the exchange rate quoted will be expected to rise from Rs.40

Relative Form of PPP

This theory does not tell us about what determines the absolute level of exchange rate, moreover, it tells what determines the change in the exchange rate over the given period.

Strictly speaking, this theory implies that the differential inflation* rate is always identical to the change in spot rate.

Hence change in exchange rates is determined by the difference in the inflation rates of two countries, i.e. any difference in the rates of inflation will be offset by a change in exchange rate.

If so then let, S_0 be the current spot exchange rate at t_0 [₹/\$]

$E(S_t)$ be the expected exchange rate in t periods

i_q be the inflation in quote currency [$i_{₹}$] & i_b be the inflation rate in base currency [$i_{\$}$]

Now by definition,

$$[E(S_t) - S_0] / S_0 = [i_q - i_b]$$

Solving this we get,

$$E(S_t) = S_0 * [1 + \{i_q - i_b\}]$$

$$E(S_t) = S_0 * (1 + i_q) / (1 + i_b)$$

*Inflation is the general increase in the average level of prices in the economy; it is typically reported, like interest rates, on an annual or annualized basis.

Note: *For validity of Relative PPP, validity of Absolute PPP is not mandatory. It is already discussed that Absolute PPP will hold true for rare goods, we shall be focusing more on relative PPP.*

For example, if prices are rising by 1.0% in the United States and by 6.0% in Mexico, the number of pesos that you can buy for \$1 must rise by $1.06/1.01 - 1$, or about 5.0%. Therefore purchasing power parity says that to estimate changes in the spot rate of exchange, you need to estimate differences in inflation rates.

Note: *If inflation and interest differential are equal then PPP and IRP would give same result.*

“A change in the expected inflation rate causes the same proportionate change in the nominal interest rate; it has no effect on the required real interest rate.”

This theory tells us the relationship between nominal rates, real rates and inflation. Thus with the help of this theory we can review more carefully the relation between inflation and interests. It is obvious that the investors are ultimately concerned with what they can buy with their money, they need compensation for inflation.

Nominal/Money Return : It indicates the rate which money is growing. Nominal rates are called nominal because they have not been adjusted for inflation. It includes inflation. Transactions can be done in the market taking the basis of this return.

Real Return: This return is without inflation. It indicates the rate at which the purchasing power is growing. These are the rates which have been adjusted for inflation.

Example: You have Rs. 1000 today and if you invest the same amount you will be with Rs. 1155 at the year end. And with the same Rs. 1000 you can buy 20 hamburgers at the beginning of the year. Assume the inflation rate to be 5%. (i.e. the price is expected to go up by 5% during the year.) Now the question arises here about the impact of inflation.

See the calculation here:

Investment at $t_0 = 1000$

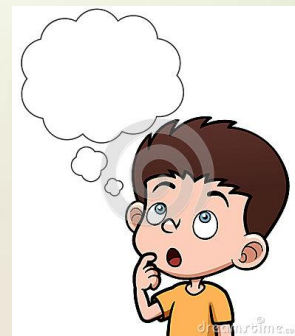
At year end you will get 1155

Then we can say that nominal interest rate (money return) is $(1155 - 1000) / 1000 = 15.5\%$

At the beginning you can buy 20 hamburgers [cost per hamburgers is $1000 / 20 = 50$]

Due to rise in price you have to pay $50 * 1.05 = 52.50$ for 1 hamburgers at year end.

If you want to buy the hamburgers at the end with your invested amount then you can buy $1155 / 52.50 = 22$ hamburgers only.



What I would like to concentrate is that despite of 15.50% increase in my investment my purchasing power have gone up by 10% only because of inflation. Frankly speaking I am really 10% rich only.

I'm Worried!



It can also be stated that with 5% inflation, each of the Rs. 1155 nominal dollars we get is worth 5% less in real terms.

Hence the real Rs. Value of our investment is $1155/1.05=1100$ only.

The nominal rate on an investment is the % change in number of rupees you have.

The real rate of the investment is the % change in how much you can buy with your rupees-ie, the % change in your buying power.

Now I would like to make relationship using these 3 terms (real rate, nominal rate & inflation) and the credit for this goes to the *great economist [Irving Fisher](#)*.

Fisher effect tells,

$$(1+R)=(1+r)*(1+i) \text{ [This is the domestic Fisher effect]}$$

Where,

R=Nominal Risk Free Rate

r= Real Risk Free Rate [Fisher assumed this rate to be constant across the countries]

i=Inflation Rate

Finally solving above equation we will get,

$$r=(R-i)/(1+i)$$

{(1+i) is the discounting factor, r is constant, if we ignore (1+i) in the denominator because the denominator will be slightly more than one, if done as said, then result of (R-i)/(1+i) will be approximately equal to (R-i), then we will get $R \sim r+i$, means 'R' is directly proportional to 'i' since 'r' is constant}

Fisher on arriving to the conclusion says that investors are not foolish. They do care about the impact of inflation & know that inflation reduces purchasing power and, therefore, they will demand an increase in the nominal rate before lending money.

A rise in the rate of inflation causes the nominal rate to rise just enough so that the real rate of interest is unaffected. In other words, the real rate is invariant to the rate of inflation.

Fisher is of the view that 'r' will remain constant irrespective of inflation but not all economists would agree with Fisher that the real rate of interest is unaffected by the inflation rate. Practically 'r' differs as per economic conditions of the country.

This theory is based on the idea that a country with a higher interest rate will have a higher rate of inflation ultimately it causes its currency to depreciate. In theoretical terms, this relationship is expressed as an equality between the expected % change in exchange rate and the difference between the two countries' interest rates, divided by one plus the second country's interest rate.

This tells us that the difference in returns between the home country and a foreign country is just equal to the difference in inflation rates.

Mathematically,

$$(1+R_{fc})/(1+R_{hc})=(1+i_{fc})/(1+i_{hc})$$

Because the divisor approximates 1, the expected percent exchange rate change roughly equals the interest rate differential.

$$i_{fc} - i_{hc} = R_{fc} - R_{hc}$$

Difference in
interest rates

$$\frac{(1+R_{fc})}{(1+R_{hc})}$$

---- equals ----

Expected difference
in inflation rates

$$\frac{(1+i_{fc})}{(1+i_{hc})}$$

**International
Fisher Effect**

=

**Relative
PPP**

+

**Fisher
Effect**



Interest differential
should be offset
difference in
exchange rates

Inflation Differential should
be offset by difference in
exchange rates (i.e diff.
betn. Spot rate and
expected spot rate)

If 'r' is constant
then higher
interest rate is
due to higher
inflation



Nominal Interest
Rates decides
future spot rate

Inflation diff. decides
future spot rates

If 'r' is constant then
inflation diff. equals
nominal intt. diff

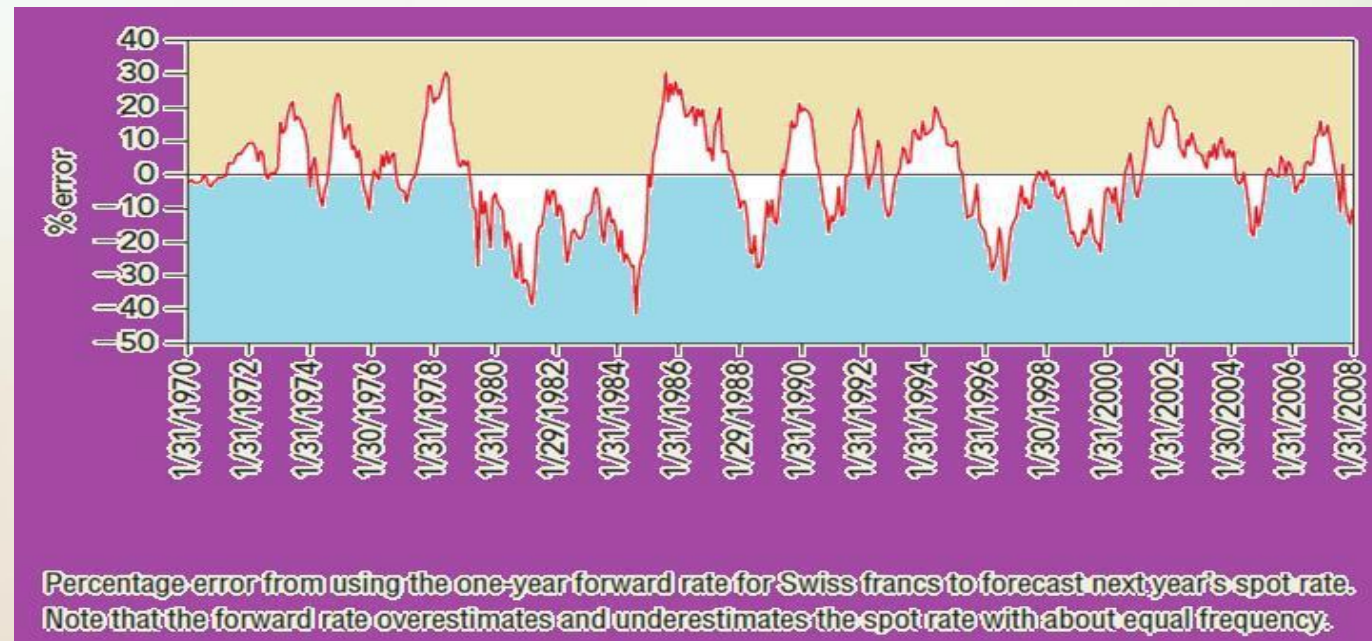
This theory tells that 'today's forward rate' is going to be the 'future spot rate'.

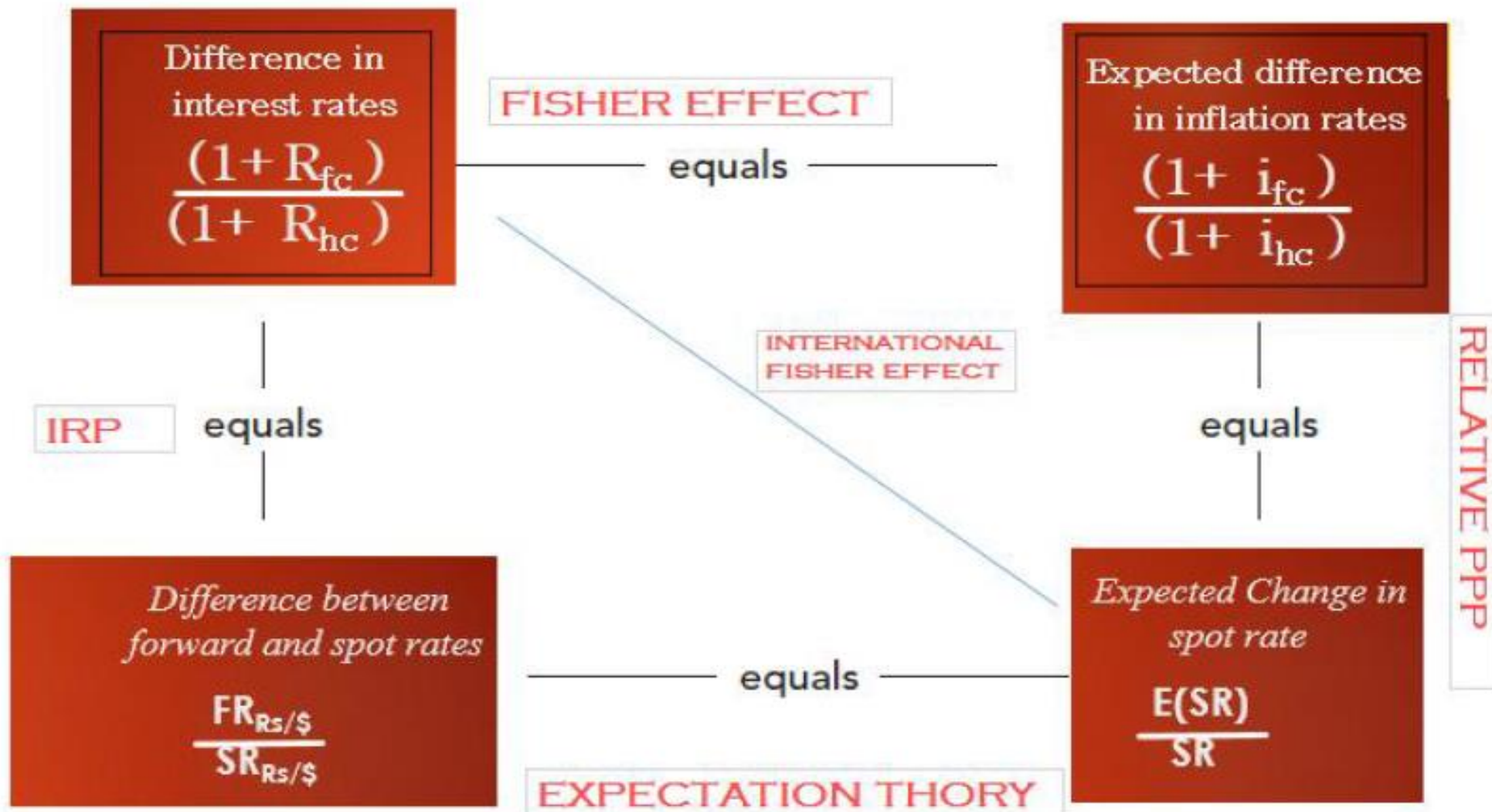
If this theory holds then $FR = E(S)$

Economists and scholars based on their experience and research over the period have seen that forward rates moreover exaggerate the likely change in the spot rate. When FR predicts that the SR will rise in future, then the FR is over estimating the Future SR and vice versa then SR will change as per the prediction, however many researchers have found that, when the forward rate predicts a rise, the spot rate is more likely to fall, and vice versa.

You may refer "*K. A. Froot and R. H. Thaler, "Anomalies: Foreign Exchange," Journal of Economic Perspectives 4 (1990), pp. 179–192*" So, this finding is *not* consistent with the expectations theory.

Because of this we say "forward rate is an unbiased predictor of future spot rate".





THANK YOU

Contributor/write up may be reached @

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