

BOP - basics

BOP is the record of the transactions of the residents of a country with the rest of the world.

The current A/c records trade in goods and services as well as transfer payments. The trade bal. simply records trade in goods. Adding trade in services and net ~~some~~ transfers, we arrive in current A/c bal.

Simple rule for BOP accounting is that any transaction that gives rise to a payment by a country's residents is a debit item in that country's BOP.

The current A/c is in surplus if exports exceeds imports plus net transfers to foreigners.

Capital A/c records purchase and sales of assets such as stocks, bonds and land. There is a capital A/c. surplus also called a net capital inflow when our receipts from the sale of stocks, bonds, land and other assets exceeds our payment for our own purchase of foreign assets.

External A/c must balance.

If a country runs a deficit in its current a/c, spending more abroad than it receives from ROW, the deficit needs to be financed by selling assets or by borrowing abroad. These sales of assets or borrowing imply that the country is running a capital a/c surplus.

Thus any current a/c deficit is necessarily financed by an offsetting capital inflow.

$$\text{Current A/c deficit} + \text{Net cgl inflow} = 0;$$

Thus if a country has no assets to sell, if it has no foreign currency reserves to use up and if nobody will lend to it, then the country has to achieve balance in its current a/c.

A current a/c deficit can be financed by put residents selling off assets abroad or borrowing abroad or it can be financed by the government which will run down its reserves of foreign exchange by selling foreign currency in the foreign exchange market.

Remember

BOP surplus = $\uparrow$ in official exchange reserves
 = Curr. acc. surplus + Private Net (p) inflow

Exchange Rates

Fixed Exchange Rates

In a fixed exchange rate system, foreign central banks stand ready to buy and sell their currencies at a fixed price in terms of some other currency.

The fact that the central banks were prepared to buy or sell any amt of dollars at these fixed prices or exchange rates means that market prices would indeed be equal to fixed rates.

Intervention

It is the buying or selling of foreign exchange by the central bank.

What determines the amt of intervention?
 The BOP does so.

If there is BOP deficit, the central bank will run down its reserves to meet the deficit. However, if a country

persistently runs deficit in BOP, then central bank eventually will run out of reserves of foreign exchange and will be unable to continue its intervention.

Before that point is reached, central bank will devalue its currency.

Flexible Exchange rate System

Here the central bank allows the rate to adjust to equate the SS and DP for foreign currency. The term flexible rates and floating rates are used interchangeably.

(Note) ↑

Floating can be clean where the central bank completely allows the market forces to determine the exchange rate (in that case, official reserves transactions are zero). or it can be managed (or dirty) where official intervention is made by bank (here official reserves trans are non-zero).

Terminology

value of currency

↑

↓

In fixed rate	<u>Revaluation</u>	<u>Devaluation</u>
flexible rate	<u>Appreciation</u>	<u>Depreciation</u>
then 1 ₹ = 70 \$	1 ₹ = 80 \$	1 ₹ = 60 \$
now 1 ₹ = 60 \$	1 ₹ = 85 \$	

Exchange rate measures

The effective exchange rate index measures any nominal exchange rate. But to know if our goods are becoming relatively cheaper or more expensive than foreign goods, we also have to take into a/c what happened to prices here and abroad.

Here we look at the real effective exchange rate or simply real exchange rate.

The real exchange rate is the ratio of foreign to domestic price measured in same unit.

$$R = \frac{e P_f}{P}$$

Price abroad measured in dollars
— Price of good in domestic country in dollars.

Where P = price level

P_f = price level abroad

e = dollar price of foreign exchange

Trade in goods, mkt equilibrium & BOT.

In a closed economy domestic spending determines domestic output

In an open economy spending on domestic goods determines domestic output

Spending by domestic residents
 $= A(Y, i) = C + I + G$

Spending on domestic goods
 $= A(Y, i) + NX(Y, Y_f, R)$
 How?

$$NX = X - Q$$

Exports depend on foreigner's income level and the real exchange rate R as well as
 Imports depend on our income & R

$$\text{Hence } NX = X(Y_f, R) - Q(Y, R) = NX(Y, Y_f, R)$$

As $Y \uparrow$, $Q \uparrow$, $NX \downarrow$.
 $Y_f \uparrow$, $X \uparrow$, $NX \uparrow$.
 $R \uparrow$, $X \uparrow / Q \downarrow$, $NX \uparrow$.

Note: The $\uparrow$ in import dd caused by a one dollar increase in income is called marginal propensity to import.

Earlier an $\uparrow Y$ led to $\uparrow$ consumption by the value of multiplier. But in the open economy a proportion of the same will go for imports.

Hence IS curve will be steeper compared to that of a closed economy.

IS curve: $Y = A(Y, i) + NX(Y_f, Y, R)$

$\uparrow NX \Rightarrow \uparrow \text{in AD} \Rightarrow IS \rightarrow$ and vice versa.

Depression effects

Say govt spending $\uparrow$, then $Y \uparrow \Rightarrow \uparrow$ as a part will be used for imports $\Rightarrow Y_f \uparrow \Rightarrow NX \uparrow$ (as $X \uparrow$).

Say $R \uparrow$ will $\uparrow NX$ and $\uparrow Y$ (reduce foreign income).

(Refer table 6.3 from text)

Capital Mobility

Perfect capital mobility - Capital is perfectly mobile internationally, when investors can purchase assets in any country they choose quickly with low transaction cost and in unlimited quantities.

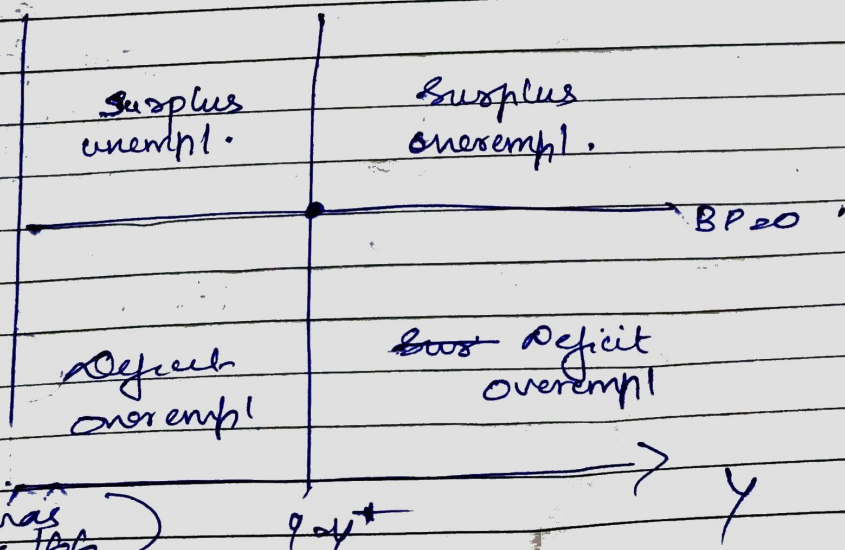
BOP and Capital Flows

We know $BP = NX(Y, Y_f, R) + CF(i - i^f)$

Remember that when capital mobility is perfect, the domestic and foreign interest rates cannot get out of line, so in eq, we find $i = i^f$.

External and internal balance

External bal $\Rightarrow i = i^f$ that is $BP = 0$
 Internal bal $\Rightarrow$ full empl. i.e. $Y = Y^*$



Perfect cap mobility under fixed exchange rate.

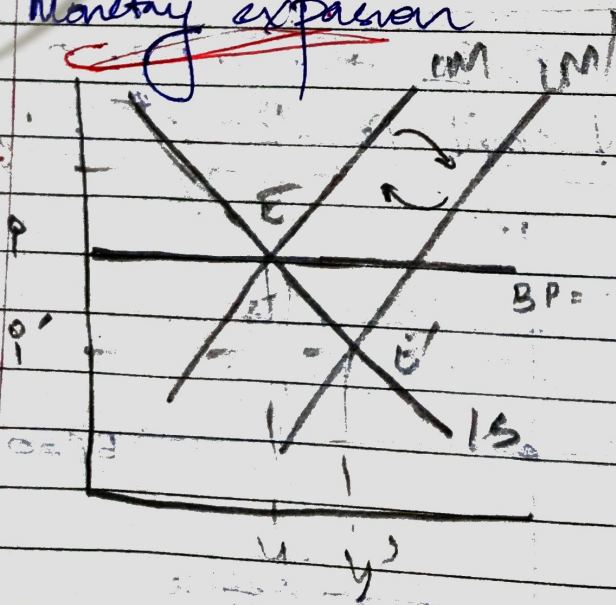
Impossible Trinity

* Perfect capital mobility * Fixed exchange rate * Autonomous money ss.

Only 2 of the 3 is possible at a time.

Under fixed exchange rate and perfect cap mobility a country can't pursue an independent monetary policy. Int rates cannot move out of line with those prevailing in the mkt. Any attempt of independent mon policy will lead to capital flows and a need to intervene until int rates are back in line.

Monetary expansion



$LM \rightarrow i \uparrow$, capital outflow
 tendency of deval
 but since R ;
 Sell foreign money
 Money ss $\downarrow$ i.e. LM
 $i \uparrow$ fill $i = i^*$

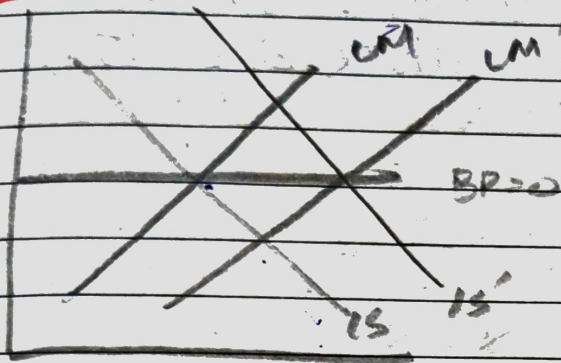
Mon policy ineffective

$$NX = (Y, Y, R)$$

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Fiscal expansion



$IS \rightarrow i \uparrow$
 capital inflow
 tend of deprec.
 selling dom curr.
 $CM \rightarrow$

Fiscal exp effective

Perf capital mobility and flexible exchange rate

Here we take flexible exchange rate and fixed domestic price which is a misleading combination as most changes in nominal exchange rates with a relatively low inflation rate is in fact change in real exchange rate. This won't hold if nominal exchange rate and domestic price change in the same proportion.

$$R = \frac{E P_f}{P_d}$$

2 points are to be noted when it is fixed exchange rate.

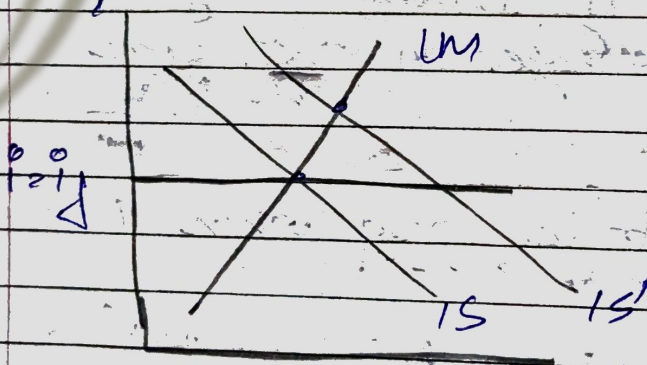
- $BOP = 0$ (any CAD is fixed by P_d and P_f inflow)
- Exogenous M^s (independent of Cent Bank to alter M^s).

Also an add even is that investors do not expect exchange rate to change (Read footnote in pg 170)



Any pt below $i = i_f \Rightarrow i < i_f$
 $\Rightarrow$ capital outflow $\Rightarrow$ Deficit
 $\Rightarrow R \downarrow$ (depr) $\Rightarrow NX \uparrow$ (as our products are cheaper) $\Rightarrow AD \uparrow$ thus $IS \rightarrow$

Fiscal expansion / $\uparrow$ in foreign dd.

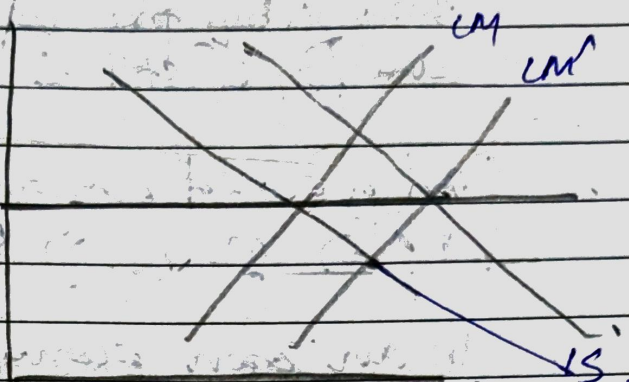


$(G \uparrow / NX \uparrow \text{ or in Govt } A \uparrow) \Rightarrow IS \rightarrow \Rightarrow i \uparrow \text{ i.e. } i > i_f$

$\Rightarrow$ Capital inflow $\Rightarrow R \uparrow \Rightarrow NX \downarrow$ (as our products are costlier) $\Rightarrow AD \downarrow$ thus $IS \leftarrow$

changes in Money stock expansion

$M \uparrow \Rightarrow P \downarrow \Rightarrow i \downarrow$
 $\Rightarrow$ Capital outflow
 $\Rightarrow$ BOP deficit
 $\Rightarrow R \downarrow$
 $\Rightarrow NX \uparrow$ (as our prod as cheaper)



$\Rightarrow AD \uparrow \Rightarrow IS \rightarrow$

Fiscal policy are ineffective whereas monetary policy are effective.

Beggar Thy Neighbor Policy and competitive depreciation

depreciation backed change in trade balance affects the trade bal of the other countries as well
 (as $R \uparrow \Rightarrow NX \uparrow$ as $\uparrow \Rightarrow NX \downarrow \Rightarrow AD \downarrow$)

Remember: If the business cycles of the nations involved are highly synchronized then exchange rate movements will not contribute much

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Here we ~~take~~ assume the assn of fixed price (by price we mean price of domestic currency) & still e. ad p. are given.

In a closed economy

$$P \uparrow \Rightarrow \frac{M}{P} \downarrow \Rightarrow I \uparrow \Rightarrow I \downarrow \Rightarrow AD \downarrow$$

In an open economy

$$P \uparrow \Rightarrow \frac{M}{P} \downarrow \Rightarrow I \uparrow \text{ and } \text{dom goods exp} \downarrow \begin{matrix} I \downarrow \\ NX \downarrow \end{matrix} \Rightarrow AD \downarrow$$

So there is an addl channel.

Also we know

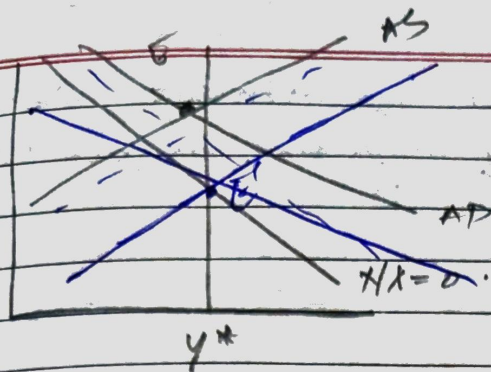
$$\text{if } Y(\text{say}) \uparrow \Rightarrow Q \uparrow \Rightarrow NX \downarrow \Rightarrow P \downarrow \Rightarrow \text{X still Equilibrium}$$

→ simple price adj. mechanism

Trade balance equilibrium schedule $(NX=0)$ is a downward sloping line, assumed to be flatter than the AD curve.

Remember $P \downarrow \Rightarrow X \uparrow$ is possible only if X and Q are relatively sufficiently responsive price changes.

The possibility of ~~the~~ ^{the} ~~lower~~ ^{higher} value of exports as $P \downarrow$ (i.e. when they $\uparrow$ the price of exports put down to such an extent that value of exports are $\downarrow$) is assumed to not occur.



At E, we have
unempl (as well
as trade balance
deficit).

Financing adjustment

Such adjusting the deficit can be done
via using ~~the~~ forex, foreign borrowing,
automatically or via policies.

Automatic adjustment

Take the demand side.

At E $\Rightarrow$ Deficit $\Rightarrow$ DD for foreign exchange $>$ its SS $\Rightarrow$ Govt
Cent Bank need to sell forex $\Rightarrow$ High priced
money $\Rightarrow$ $M \downarrow \Rightarrow$ $LM \leftarrow \Rightarrow$ $AD \downarrow$.

① This can be 'sterilized' if the CB buys
bonds of the same amount but for
the total being left as usual.

So $AD \downarrow$.

Supply side

At E is to left of $Y = Y^* \Rightarrow$ unempl $\Rightarrow$ $w \downarrow$
 $\Rightarrow$ $p \uparrow$ (to keep $\frac{w}{p}$) $\Rightarrow$ $AS \uparrow$.

These changes continue until it meet at E.

This is the classical adjustment process. It may take very long time as real variables change slowly.

Policies.

Policies to create emp/ current trade balance and policy to create trade surplus will affect employment.

So we must be expenditure switching policy.

One policy was tariff but now it's not highly recommended due to GATT/WTO regulation.

So we must focus on other expenditure switching policies.

We know $NX = Y - (C + I + G)$

We also know $Y_D = C + S$

where $Y_D = Y - T + TR$

Assume $TR = 0$.

$$\Rightarrow Y - T = C + S$$

$$Y = C + S + T$$

$$\Rightarrow NX = C + S + T - C - I - G$$

$$\Rightarrow NX = S - I + (T - G)$$

Budget Surplus

$$\Rightarrow NX = S - I \quad \text{or} \quad (G - T)$$

↓
Budget deficit

Expenditure reducing policy inside budget cutting

→ If S and I are constant then change in budget will translate 1-1 change in external bal. Hence budget cutting can make changes in ext deficit (but it also changes S & I) hence more complete model is required.

Devaluation - later

Crawling peg exchange rates

When a country experiences inflation above its trading partner, with fixed exchange rate.
 $\Rightarrow$ Steady loss in competitiveness

Crawling peg exchange rate policy is when exchange rate is depreciated at a rate roughly equal to the inflation differential b/w the country & its trading partners.

$$\text{i.e. } R = \frac{e \cdot \frac{P_f}{P}}{P}$$

raising e at the same rate as $\frac{P_f}{P}$ is rising.

Remember: Exchange rate policy is at best a supplementary tool.

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Foreign Exchange market is the market in which individuals, firms and banks buy and sell foreign currencies or foreign exchange.

Functions of foreign exchange

(i) Transfer of funds (or PP) from one nation and currency to other.

Remember that a nation's commercial bank — Read from text —

Foreign Exchange Rate

> Equilibrium Foreign Exchange Rates

\$ — dom currency

€ — foreign currency

Exchange rate of \$ and € or R is equal to no. of dollars needed to purchase one €.

i.e. $R = \frac{\$}{\text{€}}$ — (If $R=1 \Rightarrow \$=1 \Rightarrow$ 1\$ required to buy 1 €)

Under flexible exchange rate, market determines R .

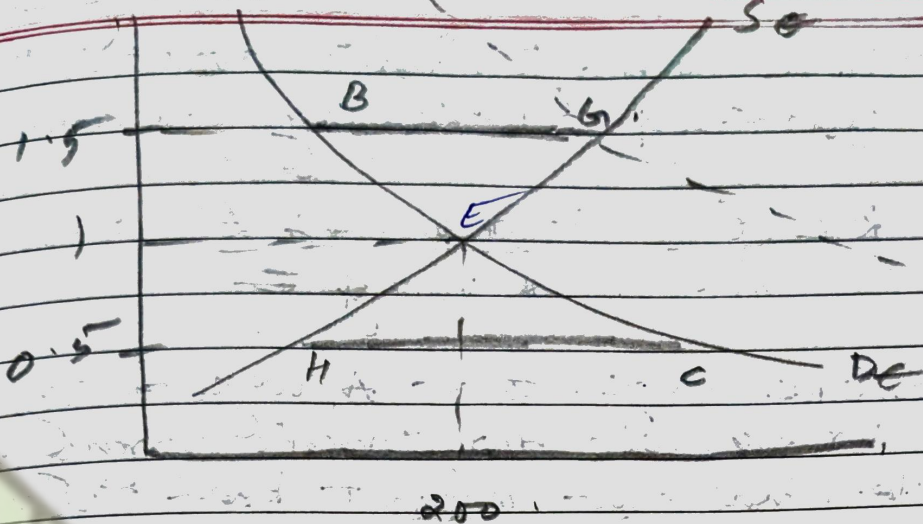
Horizontal axis — qty of €

Vertical axis — \$ price of € i.e. $R = \frac{\$}{\text{€}}$

Note US ~~dom~~ - dom country -
 A - dom currency

$\therefore \text{€} \leftarrow \text{US}$ foreign

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Note US $d_{\text{€}}$ for € is $\downarrow$ sloped and as
 $\downarrow$ exchange rate $\Rightarrow$ fewer € required to buy
 € , cheaper for US residents for import and investment
 US $s_{\text{€}}$ $\leftarrow$ is $\uparrow$ sloped for opposite reasons

Here eq. is at $R=1$ where eq. qty is 200.

If exchange rate goes above $R=1$ ($\Rightarrow$ excess $s_{\text{€}}$)
 then € would come down till it reaches $R=1$.
 If exchange rate goes below $R=1$ (excess $d_{\text{€}}$),
 then € would go up till it reaches $R=1$.

If it doesn't happen, then we would have to
 impose restrictions on demand for € .
 Or the US central bank will have to satisfy the excess
 $d_{\text{€}}$ by running out its reserves.

Now if DD curve shifted to have equilibrium at G
 where $R=1.5$. This implies depreciation of
 dollars as it implies now it takes more dollars
 than before to buy € .
 Thus deprec refers to $\uparrow$ in the domestic
 price of the foreign currency. (Opp for appreciation)

Exchange rate b/w 2 currencies other than \$ (say \$/£ and £/\$) • Considering £ as dom currency

$$R = \frac{\text{£}}{\text{\$/}} = \frac{\text{\$/ value of £}}{\text{\$/ value of £}}$$

Effective exchange rate: - A weighted avg of exchange rates b/w domestic currency and the nation's most important trade partners, with weights given by relative importance of nation's trade w/ each of these trade partners.

Arbitrage

the exchange rate b/w any 2 currencies is kept the same in diff monetary centres by arbitrage (by purchase of currency where it's cheaper and selling it where it's costlier). This will ultimately lead to excess dd (price) and excess ss (price) respectively in those places equalising the prices.

For eg: \$ read test

Exchange rate and BOP (Depr $\Rightarrow$ Deficit) - read from text

Forward

Spot rates - where payment and receipt of ~~exch~~ con. 2 days (spot rates).

An agreement today to buy/sell a specified amount of foreign currency at a specified future date - forward rates (usually 3 months).

The dd for and supply of forward foreign exchange arise in the course of hedging from foreign exchange speculation and from covered int. arbitrage.

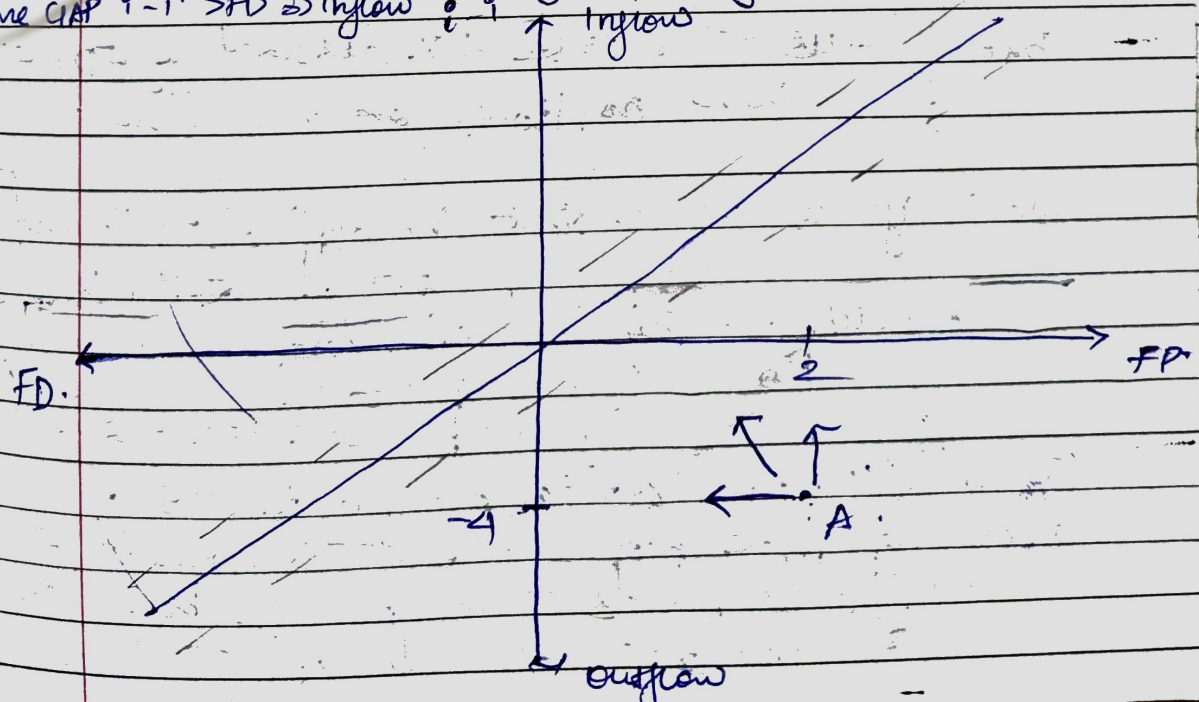
if $FR < SR \Rightarrow$ Forward discount demand curve
 $FR > SR \Rightarrow$ " premium " " "

$FDOS \quad FP = \frac{FR - SR}{SR} \times 100$ %

$y +ve \Rightarrow FP$ to express it on a yen basis
 $y -ve \Rightarrow FD$

Currency swaps - v.v.m.p (carefully read)
 spot sale and forward repurchase

Forward int. arbitrage parity (see technique)
 where $i^* - i^* > FD \Rightarrow$ Inflow $i^* < i^* \Rightarrow$ Outflow



FR
SR

At A below CAP $i - i^* < FP \Rightarrow$ outflow.
slowly $\downarrow$ as DD for forward price $\uparrow$ $i^* \uparrow$ int $\downarrow$

parity condition

$$i - i^* = \frac{FR}{SR} - 1$$

$$FP = \frac{FR}{SR} - 1$$

At A

Now its in FP; they need from my $\Rightarrow$ slowly, SR $\uparrow$
(due to dollar $\downarrow$)

explanation

Say $i = i_{IND} = 6\%$ } example of
 $i^* = i_{USA} = 10\%$ } $i^* > i$ & $i - i^* > 0$
but this not enough to ensure inflow/outflow
 $i - i^* > / < / = FP$ or not?

$$\text{Here } i - i^* = -4\%$$

But if US dollar is @ 4% discount & $FD = 4\%$ then no flows on CAP line

Now if it such that int diff = -4% and

overall 6% gain if one invest in US bonds (Covered)
Dom yield = 6%
For yield $> 10\% + 2\% = 12\%$
 $FP = 2\%$ reading

So what happens capital outflow to US.
More and more people want US bonds $\Rightarrow$
d $\downarrow$ for US bonds $\uparrow \Rightarrow$ price of bonds $\uparrow$
 $\Rightarrow$ int rate starts $\downarrow$ & $i^* \uparrow$ decline

Also $9\% \rightarrow 10\%$

Also we say $FP = 2\%$

Say $SR = 80$

$FR = 80.4$

} 3 months contract

$$\text{then } FD/FP = \frac{80.4 - 80}{80} \times 4 \times 100$$

$$= \frac{0.4}{80} \times 400 = 2.0\% \\ = 2\%$$

Also as people want to invest in bonds, they want more US dollars $\rightarrow$ excess demand for US dollars in spot market so that they can buy quickly and sell it (swap) in forward market in order to buy bonds (worry first so as to keep the contract and future payment).
So excess demand of dollars in forward market $\rightarrow FR \downarrow$

$$FP = \frac{FR}{SR} \downarrow \Rightarrow FP \downarrow$$

$SR \uparrow$

Hence there to changes will make the capital flow more to purchasing.

Uncovered
arbitrage

dom $(1+i) = \frac{(1+i^*) E^e}{E}$ foreign
parity is wrong is the yield diff

$$1+i = (1+i^*) (i + \frac{E^e - E}{E})$$

$$1+i = (1+i^*) (1 + \frac{E^e - E}{E})$$

$$1 = 1^* + \frac{E^e - E}{E}$$

$$\Rightarrow \frac{E^e - E}{E} = 1 - 1^*$$

~~$1+i^*$~~

$$\frac{1 - 1^*}{1 + 1^*} = \frac{E^e - E}{E} = \text{LIAM}$$

$$\approx 1 - 1^* = FP$$

~~Alternatively~~ (Appendix)

$$K (1+i/4) \approx (K/SR) (1+i^*/4) FR \quad \text{--- (1)}$$

- K — amt of cpl invested
- i — dom int rate
- i^* — foreign int rate
- SR — spot rate
- FR — fwd rate

LHS gives value of investment when K amt of capital is invested domestically (ie $K + i \cdot K$)

The RRS gives the dom. currency value of the interest when the same amount of capital is invested abroad for 3 months with foreign exchange rate covered.

∴ ① try to find also the $\pm$ of 1 and $\pm$ by 4.
we get CIAM per dollar per year.

$$1 + i = \frac{FR}{SR} (1 + i^*)$$

$$\frac{(1 + i)}{1 + i^*} = \frac{FR}{SR}$$

$$\frac{1 + i}{1 + i^*} - 1 = \frac{FR}{SR} - 1$$

$$\frac{1 + i - 1 - i^*}{1 + i^*} = \frac{FR - SR}{SR}$$

$$\frac{1 - i^*}{1 + i^*} = \frac{FR - SR}{SR}$$

sum for FR

$$FR = \frac{(1 - i^*)}{1 + i^*} SR + SR$$

$$CIAM = \frac{1 - i^*}{1 + i^*} - \frac{FR - SR}{SR}$$

Purchasing Power Parity Theory

Absolute PPP Theory

It postulates that the equilibrium exchange rate b/w 2 currencies is equal to the ratio of the price levels in the 2 nations.

ie $R = \frac{P}{P^*}$

R - Exchange rate (spot rate)

P - General price level in home country

P^* - " " " " " foreign "

Acc to law of one price, a given commodity should have the same price (so that PPP of 2 countries is at parity) in both countries when expressed in terms of same currency.

Suppose $P = ₹ 40$

$R = 80$

$\frac{₹}{\$} \times 41$

$P^* = \$ 0.75$

P (in terms of $\$$) $\rightarrow ₹ 60$

So one softdrink costs ₹ 40 in India and ₹ 60 in US. Then people'd buy softdrink from India and sell it to US and ultimately arbitrage takes place and the price ratio will be equalized.

Limitations

- Ignores capital & C
- Commodity basket diff of diff countries
- There are non tradable goods.
- Obstruction to trade exists in reality -

Relative PPP theory

It postulates that the change in exchange rate over a period of time should be proportional to the relative change in price levels in the two nations over the same time period.

$$R_0 = \frac{P_0}{P_0^*} \quad R_1 = \frac{P_1}{P_1^*} \quad \begin{matrix} 0 - \text{base period} \\ 1 - \text{subseqt period} \end{matrix}$$

$$\frac{R_1}{R_0} = \frac{P_1/P_0}{P_1^*/P_0^*} = \frac{P_1 \times P_0^*}{P_0 \times P_1^*} = \frac{P_1/P_0}{P_1^*/P_0^*}$$

$$\text{Now } \frac{P_1}{P_0} - 1 = \frac{P_1 - P_0}{P_0} = \pi_e$$

$$\frac{P_1}{P_0} = 1 + \pi_e$$

$$\text{Similarly } \frac{P_1^*}{P_0^*} = 1 + \pi^*$$

$$\frac{R_1}{R_0} = \frac{R_1 - R_0}{R_0} + 1 = \hat{R} + 1$$

↳ rate of depr.

$$1 + \dot{R} = (1 + \pi) (1 + \pi^*)$$

$$\dot{R} \approx \pi - \pi^*$$

So exchange rate depr is shown as absolute change in inflation rate over specific periods.

Rel PPP theory: $R_t = \frac{P_t / P_0}{P_t^* / P_0^*} \cdot R_0$

Note: Existence of capital flows, trans costs and other obstructions to free flow lead to rejection of absolute PPP. A change in these lead to rejection of relative PPP theory.

Limitations

Balassa - Samuelson effect -

The ratio of price of nontraded to price of traded goods is systematically higher in developed economies than developing ones.

As general price index includes prices of both tradable and nontradable goods & services and price of latter are not equalized by international trade but are relatively higher, the relative PPP theory will tend to predict overvalued exchange rates for developed & undervalued for developing nations.

$$P = P_T^\alpha \cdot P_{NT}^{1-\alpha}$$

$$P^* = P_T^{\alpha} \cdot P_{NT}^{1-\alpha}$$

$$R = \frac{P}{P^*} = \left(\frac{P_T}{P_T^*} \right)^\alpha \left(\frac{P_{NT}}{P_{NT}^*} \right)^{1-\alpha}$$

Structural changes are also limitations

Why do deviations from PPP die out slowly?
Despite all the globalization that has occurred during the past 2/3 decades, int'l comm mkt are still much less integrated.

Note: ... well - individual

① PPP works for highly loaded comm, less well for all loaded comm ~~structure~~ and not well with all goods (including NT).

② PPP truly works well ~~over~~ very long periods of time
③ PPP works well in case of mon. instability and inflationary period but not ~~other~~ during mon. stability or during structural reforms.

Monetary Approach (Johnson and Mundell)

This represents an extension of domestic monetarism (from Chicago school) to int. economy in that it views BOP as an essentially monetary phenomenon.

Mon Under Fixed exchange rate

Rel

Egm: $m^d = m^s$

Now $MV = PY$

$M\bar{V} = PY$

($\bar{V}$ is const in short run)

$M = \frac{1}{V} PY$

$M^d = kPY$

M^d - qty demanded of nominal money

k - desired ratio of nominal money held to nominal national income (or $1/V$)

why V is velocity of circulation of money

$\left\{ \begin{array}{l} P - \text{dom price level} \\ Y - \text{real output} \end{array} \right.$

$\Rightarrow PY = \text{Nominal nat income}$ (assumed to be at / around full empl in long run)

$M^s = m(D+F)$

$u(M^s = mH)$

M^s - nation's total money ss -
 m - money multiplier

D - domestic cur

F - foreign assets

$D+F$ is the nations monetary base / high powered money ..

under fractional reserve bank system every dollar injected will create an addl m times credit in the economy where $(m = \frac{1}{CRR})$

$$M^d = kPY$$

$$M^s = m(D+F)$$

say $PY \uparrow$ i.e. GDP $\uparrow$
 $\Rightarrow M^d > M^s$

$$\Rightarrow kPY > m(D+F)$$

$\Rightarrow$ either $D \uparrow$ or $F \uparrow$

$y \leftarrow D$, then $F \uparrow \Rightarrow$ BOP surplus.

Thus $M^s > M^d \Rightarrow$ BOP deficit (provided dom. mon authorities do not eliminate it)

$$PY = 1000$$

$$V = 5 \Rightarrow k = 1/5 = 0.2$$

$$\Rightarrow kPY = 200$$

$$M = 5$$

$$H = 40$$

$$D = 20$$

$$F = 20$$

$$M^s = 5 \times 40 = 200$$

$$\Rightarrow M^d = M^s$$

$$if PY = 1100$$

$$kPY = 220$$

$$M^s = 200$$

$$Excess d = 20$$

To address if it LB buys bonds then no gold bond
 bgn = 20 24. No foreign intervention

If can buy 25 bond the $D \uparrow$ by 2, then BOP surplus by 2.
 If can bank doesn't act at all, then BOP surplus by 4.