

-1

Model : Spending Allocation Model (long-run)  
see pp 27-31.

Theory of how various spending categories are related to real interest rates and other economic variables.

Economic Models:

- simplifications of real world
- like a map is to an actual road.  
A lot of details are ignored depending on where you want to go (local or long-dist.)
- words, tables, graphs, or algebra

Spending Allocation Model describes how GDP is divided among the 4 categories of spending in long-run. The major determinant of the share: Real Interest Rate.

$$Y = C + I + G + NX$$

in LR run  $Y = Y^*$   
 That is, Actual GDP ( $Y$ ) is equal to  
 Potential GDP ( $Y^*$ ).

$$Y^* = C + I + G + NX$$

divide both sides by  $Y^*$

$$\frac{Y^*}{Y^*} = \frac{C}{Y^*} + \frac{I}{Y^*} + \frac{G}{Y^*} + \frac{NX}{Y^*} = 1$$

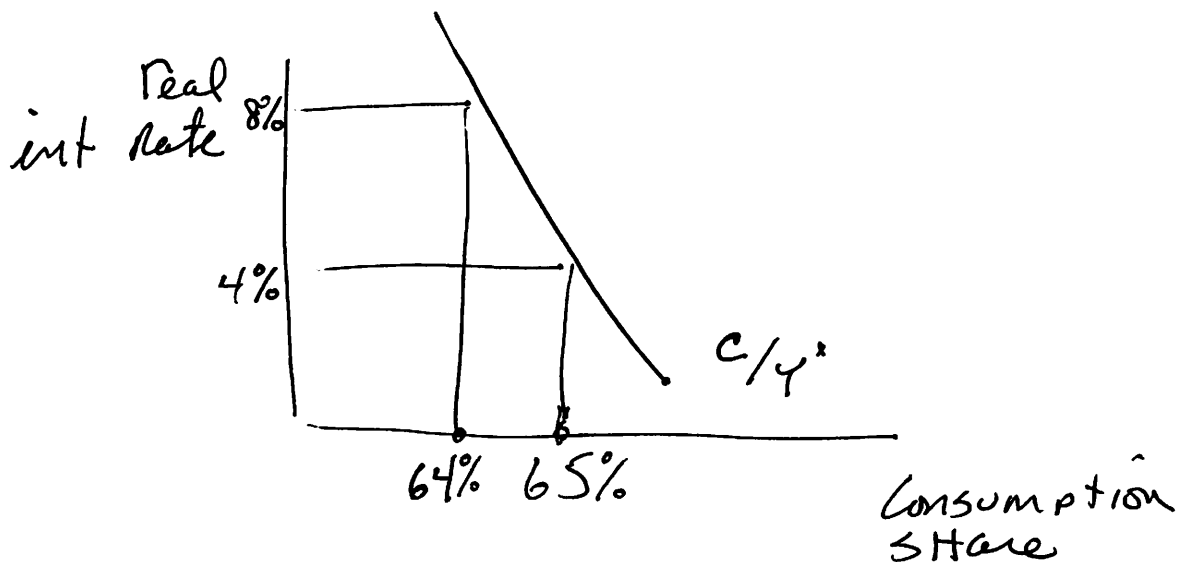
So, if any fraction increases,  
 one or more of the others must  
 fall. Trade-offs

Suppose you earn \$1,000 and  
 spend \$900 (saving \$100)

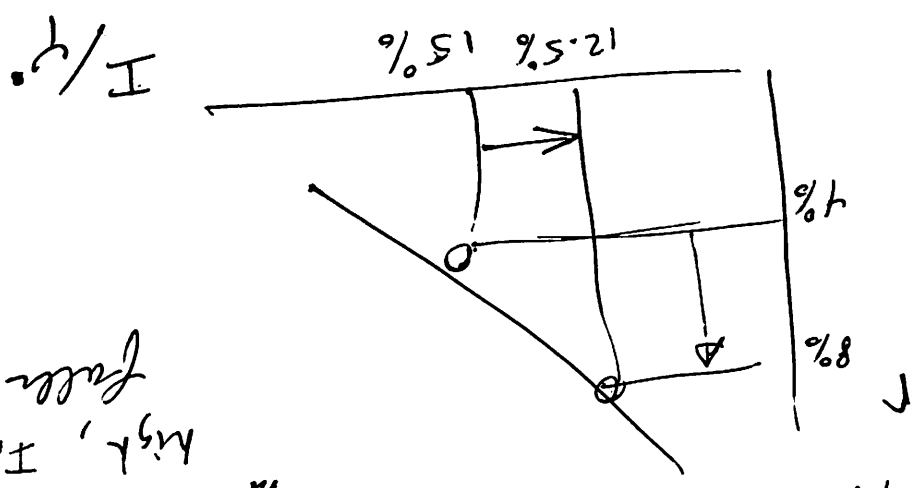
AT 2% interest you get to  
 spend \$102 at end of the period  
 by saving up \$100 today

6% interest you get to spend  
 \$106 at end vs. \$100 today.

Higher  $r \uparrow$ , more future spending  
 you get and more incentive to  
 save (and less incentive to consume  
TODAY)



5 Highs: Tax Credit  
 Expenditures  
 Regulations  
 Expenditures



When rates are high, Investment stays faller.

As real interest rate rises, firms have less incentive to borrow and for purposes of expanding factories, buyers need tools & machines, more consumers want to find houses, more expensive.

Investment

Taxes } Shift  
 Consumer Confidence }  
 other things shift the curve }  
 Change in  $r$  moves you along } Movement along curve.

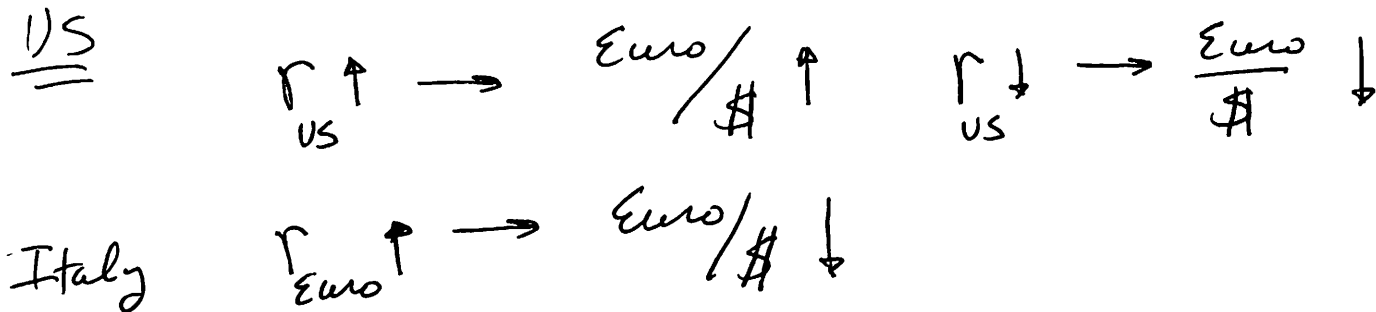
Suppose New York Bank increases  
(Real) interest rate relative to  
Italian Bank.

Funds flow out of Italy (Euros)  
and into New York (\$).

Demand for \$  $\uparrow$  and the \$  
Exchange Rate (P) goes up.

\$ gets more expensive relative  
to Euro because more people  
now prefer \$ vs. Euro.

\$ pays more interest.



Real Interest rate  $i$  Ex. ~~the~~ rate.

Fact 1: When a Foreign investor puts money into a U.S. Bank, she must do so in \$

Italian Investor

New York BANK

Italians  $\rightarrow$  They Exchange Them  $\rightarrow$  Deposit \$ into New York Bank.  
have Euro's for Dollars

┌──────────┐  
" Foreign Exchange"  
Euro for \$  
\$ for Euro.

New York Investor.

has \$  $\rightarrow$  Exchanges \$ for Euro

Italian Bank  
Deposits Euro's in Bank.

# Net Exports

These are also negatively related to real interest rates. The rationale is complicated, though.

- (a) real interest rate affects exchange rate
- (b) exchange rate affects net exports.

Exchange Rate: price of one currency in terms of another

$$\text{Ex. Rate} = \frac{\text{\# units of Foreign Currency}}{\text{\$ 1}}$$

Now: \$1.27 ~~euros~~ to Buy 1 Euro

$$\Rightarrow \text{Ex Rate} \frac{1 \text{ Euro}}{\$1.27} = .7874 \text{ \$/\$}$$

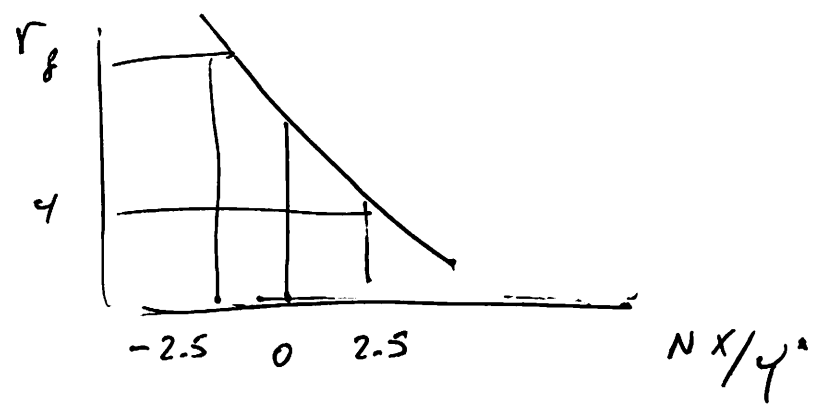
Part 2: Exchange Rate :  $\frac{NX}{Y^*}$  (share of NX)

If US exports become more expensive, we export less - import more.

$$\text{Ex. Rate } \uparrow = \frac{\downarrow \text{Exports} - \text{Imports } \uparrow}{Y^*} < 0$$

$$\text{Exrate } \downarrow = \frac{\uparrow \text{Exports} - \text{Imports } \downarrow}{Y^*} > 0$$

LM Int rate		(Euro/\$) Exch Rate		NX
up	→	up	→	down
down	→	down	→	up





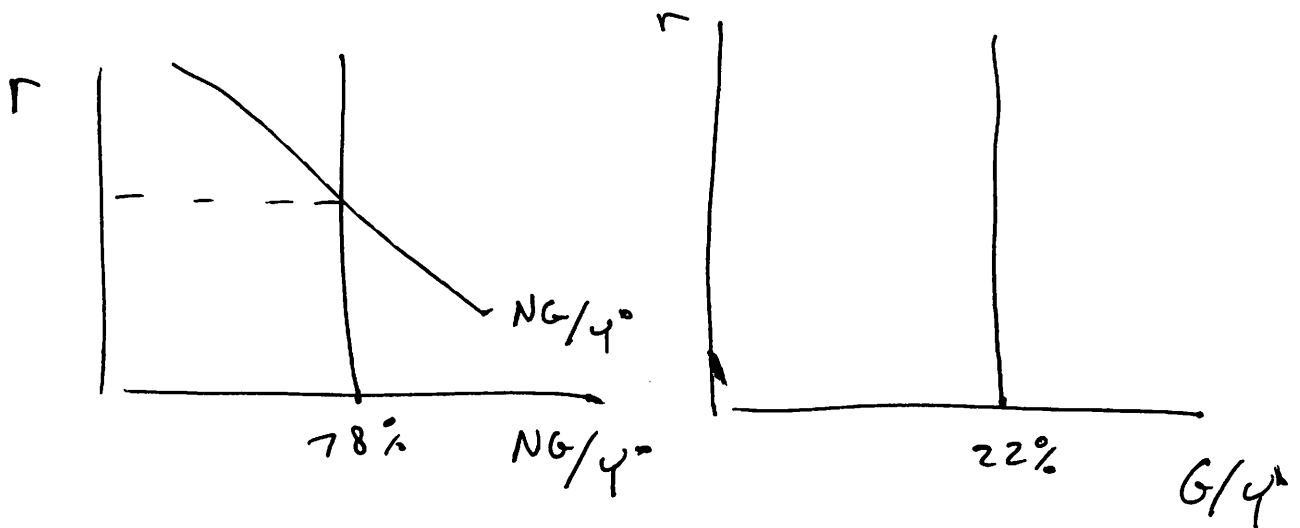
Non government share of GDP

$$\text{Add up } C/Y^* + I/Y^* + N^x/Y^*$$

$$\frac{NG}{Y^*} = 1 - G/Y^*$$

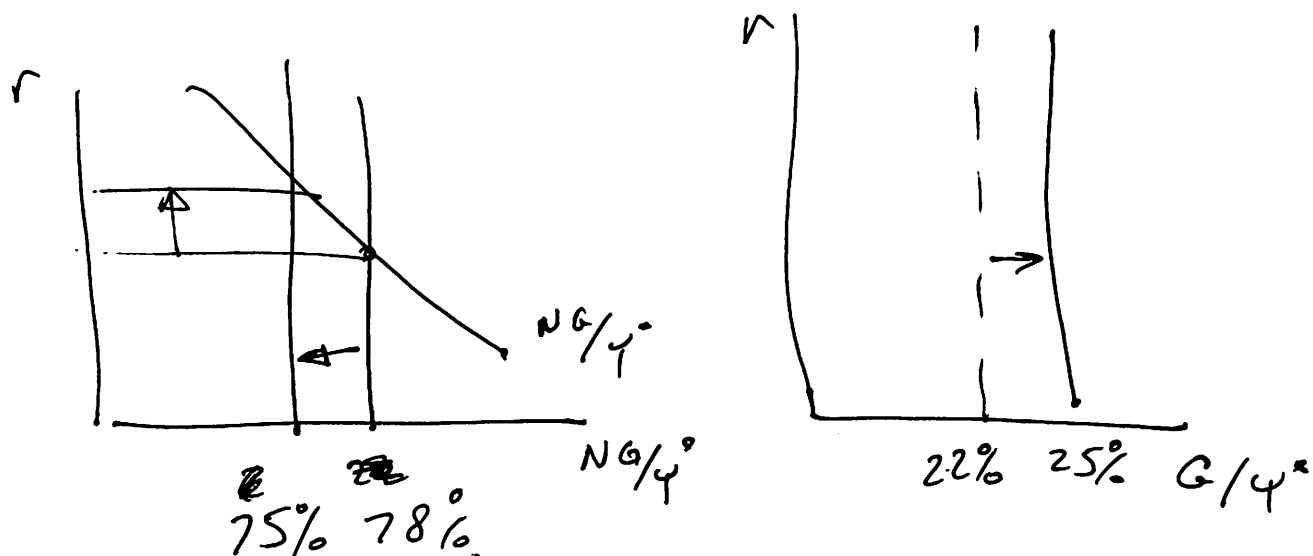
The larger the government's share  
The lower the private sector's.

Assume that  $G/Y^*$  does not depend on  
real interest rate. This implies that  
NG doesn't ~~depend~~ either.



$\therefore$  The equilibrium rate is determined  
by NG share.

So, If  $G/Y^* \uparrow$  what happens to real interest rate?



Real interest rate rises and share of  $C, I, NX$  will fall

In the long-run, as  $G \uparrow$  relative to  $Y^*$  then real interest rate will rise and  $C, I, NX$  will be adversely affected.

Crowding out: As  $G/Y^* \uparrow$   $I/Y^* \downarrow$

## Savings & Investment.

Investment share tends  
to fall as government runs  
larger budget deficit. This is  
easily seen from the Savings  
side of the economy.

$$S = Y - C - G$$

divide by  $Y$

$$\frac{S}{Y} = \frac{Y}{Y} - \frac{C}{Y} - \frac{G}{Y}$$

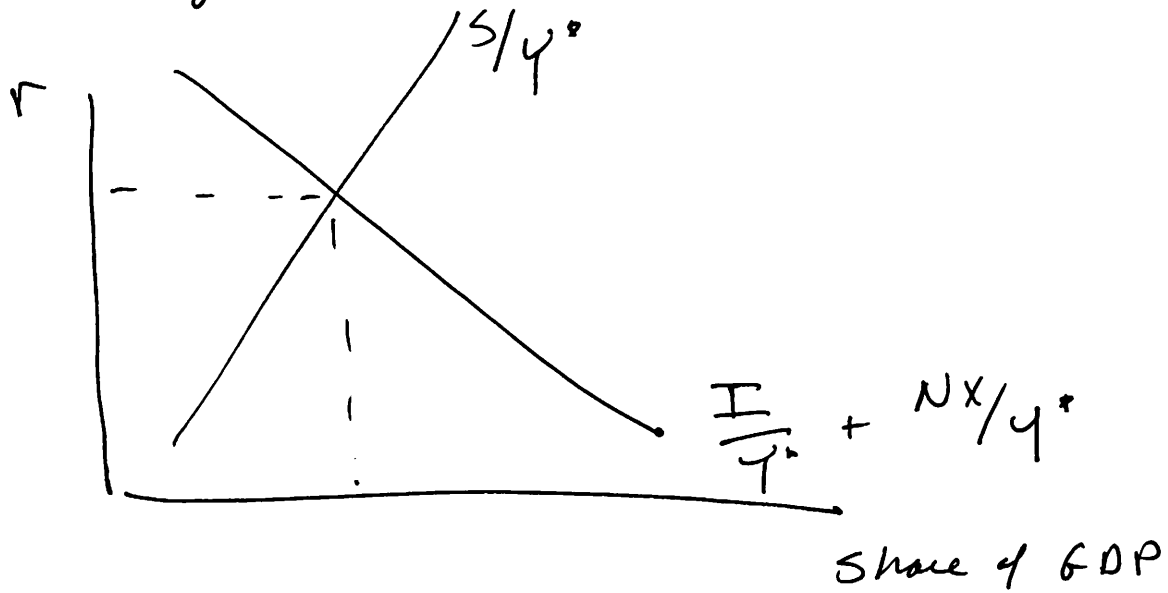
and let  $Y = Y^*$

$$\frac{S}{Y^*} = 1 - \frac{C}{Y^*} - \frac{G}{Y^*}$$

replace 1 with  $\frac{C}{Y^*} + \frac{I}{Y^*} + \frac{G}{Y^*} + \frac{NX}{Y^*}$

$$\frac{S}{Y^*} = \frac{C}{Y^*} + \frac{I}{Y^*} + \frac{G}{Y^*} + \frac{NX}{Y^*} - \frac{C}{Y^*} - \frac{G}{Y^*} = \frac{I}{Y^*} + \frac{NX}{Y^*}$$

Savings rate = Investment share + NX share.



As  $r \uparrow$  we expect people to save a higher share of Inc ( $Y$ )

So,  $S/Y^*$  has pos. slope

If savings rate falls,  $S/Y^*$  shifts left and real Int rate rises.

Recall

$$S = \text{Private Saving} + \text{Govt. Saving}$$

$$S = (Y - C - T) + (T - G)$$

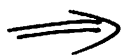
and in terms of shares

$$\frac{S}{Y^*} = \frac{Y - C - T}{Y^*} + \frac{T - G}{Y^*}$$

Private Saving Rate + Govt Saving Rate.

As Budget deficit rises  $G \uparrow$  or  $T \downarrow$

Govt Saving (deficit  $\Rightarrow$  negative) Falls.  $S/Y^*$  falls and int rates rise.



- 1) ~~Private~~ Private Saving increases  $C \downarrow$
- 2) Investment rate falls - lower future growth
- 3) NX falls - we buy more foreign goods and sell less abroad.