ECON 1550 International Finance

Output and the Exchange Rate in the Short Run

Behavioral equations in the goods market

Demand for domestic goods

Equilibrium in the goods market

A short-run model of the goods market

Exogenous variables

Variable	Description
E	Nominal exchange rate
I	Investment
G	Government spending
T	Taxes
P	Price level
P^*	Foreign price level
Y^*	Foreign income

Endogenous variables

Variable	Description	Equation	Type of equation
Y	Income, production	$Y = D$	Equilibrium condition
Y_D	Disposable income	$Y_D \equiv Y - T$	Identity
EX	Exports	$\mathrm{EX} = \mathrm{EX}(\underset{(+)}{q}, \underset{(+)}{Y^*})$	Behavioral
IM	Imports	$\mathrm{IM} = \mathrm{IM}(\underset{(-)}{q}, \underset{(+)}{Y_D})$	Behavioral
CA	Current account	$CA \equiv \mathrm{EX} - \mathrm{IM} = \mathrm{CA}(\underset{(+)}{q}, \underset{(-)}{Y_D}, \underset{(+)}{Y^*})$	Identity
D	Demand for domestic goods	$D \equiv C + I + G + CA$	Identity
A	Domestic demand	$A \equiv C + I + G$	Identity
C	Consumption	$C = \mathrm{C}(\underset{(+)}{Y_D})$	Behavioral
q	Real exchange rate	$q \equiv \dfrac{EP^*}{P}$	Identity

DD Curve

$$Y = D$$

$$Y = C + I + G + CA$$

$$Y = \underset{(+)}{\mathrm{C}}(Y_D) + I + G + \underset{(+)\ (-)\ (+)}{\mathrm{CA}}(q, Y_D, Y^*)$$

$$Y = \underset{(+)}{\mathrm{C}}(Y_D) + I + G + \underset{(+)\ (-)\ (+)}{\mathrm{CA}}(EP^*/P, Y_D, Y^*)$$

Short-run FX and money market model

Exogenous variables

Variable	Description
R^*	Foreign interest rate
E^e	Expected exchange rate
Y	Real income
M^s	Money supply
P	Price level

Endogenous variables

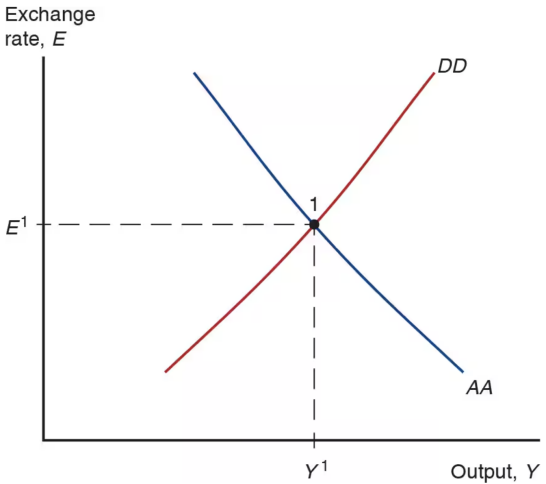
Variable	Description	Equation	Type of equation
E	Exchange rate	$R = R^* + \frac{E^e}{E} - 1$	Equilibrium condition
R	Domestic interest rate	$M^d/P = \mathrm{L}(R, Y)$	Behavioral equation
M^d	Money demand	$M^d = M^s$	Equilibrium condition

AA Curve

$$\text{(UIP):} \qquad R = R^* + \frac{E^e}{E} - 1$$

$$\text{(MS)} = \text{(MD)}: \qquad \frac{M^s}{P} = \mathrm{L}(R, Y)$$

Short-run Equilibrium in *AA*-*DD* model



Example: DD Schedule

$$\underset{(+)}{\mathrm{C}}(Y_D) = 1 + 0.75Y_D$$

$$\underset{(+)}{\mathrm{EX}}(\underset{(+)}{q}, \underset{(+)}{Y^*}) = 0.15 + 0.5q + 0.1Y^*$$

$$\underset{(-)}{\mathrm{IM}}(\underset{(-)}{q}, \underset{(+)}{Y_D}) = 0.1 - 0.2q + 0.12Y_D$$

$$Y_D = Y - T$$

$$q = \frac{EP^*}{P}$$

How to find the DD schedule

Example: AA Schedule

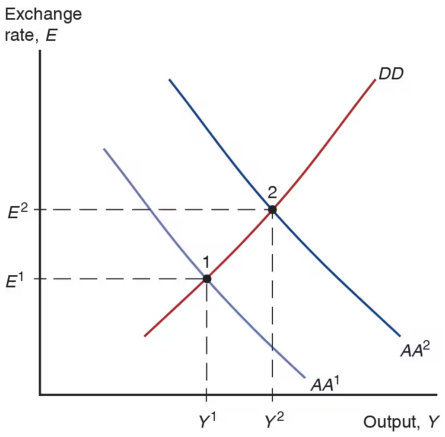
$$R = R^* + \frac{E^e}{E} - 1$$

$$\frac{M^d}{P} = \frac{M^s}{P}$$

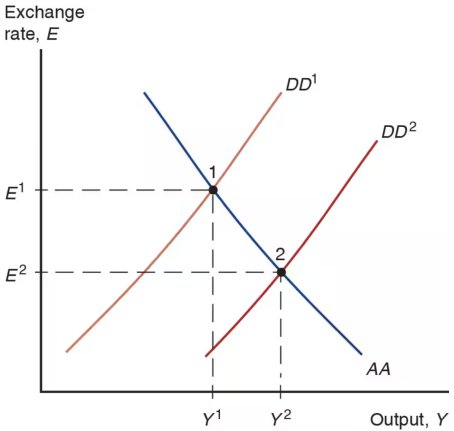
$$\begin{aligned}\frac{M^d}{P} &= \mathrm{L}(\underset{(-)}{R}, \underset{(+)}{Y}) \\ &= 1.1 - R + 0.05Y\end{aligned}$$

How to find the AA schedule

Temporary Change in Monetary Policy



Temporary Change in Fiscal Policy



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$$Y_D = Y - T$$

$$q = \frac{EP^*}{P}$$

- Plug in given C, EX, IM, Y_D, q into the equilibrium condition for the goods market $Y = C + I + G + \text{EX} - \text{IM}$ to get:

$$Y = 1.05 + 0.63(Y - T) + 0.7\frac{EP^*}{P} + I + G + 0.1Y^*$$

- Solve for E to get the DD curve:

$$E = \frac{1}{0.7}\frac{P}{P^*}\left(-1.05 + 0.37Y + 0.63T - I - G - 0.1Y^*\right)$$

Example: AA Schedule

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

$$\frac{M^d}{P} = \frac{M^s}{P}$$

$$\frac{M^d}{P} = \mathrm{L}(\underset{(-)}{R}, \underset{(+)}{Y}) = 1.1 - R + 0.05Y$$

- Plug in UIP into money market equilibrium condition:

$$\frac{M^s}{P} = 1.1 - \left(R^* + \frac{E^e}{E} - 1\right) + 0.05Y$$

- Solve for E to get the AA curve:

$$E = \frac{E^e}{2.1 - \frac{M^s}{P} - R^* + 0.05Y}$$

Full AA-DD Model

$$\text{DD Schedule:} \quad Y = \mathrm{C}(Y - T) + I + G + \mathrm{CA}(EP^*/P, Y - T, Y^*)$$

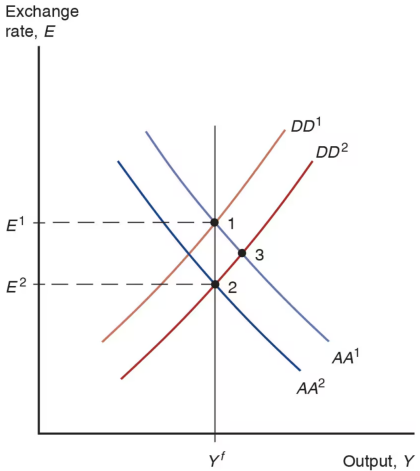
$$\text{AA Schedule:} \quad \frac{M^s}{P} = \mathrm{L}\left(R^* + \frac{E^e}{E} - 1, Y\right)$$

$$\text{Phillips Curve:} \quad \pi = \pi^e + \alpha(Y - Y^f)$$

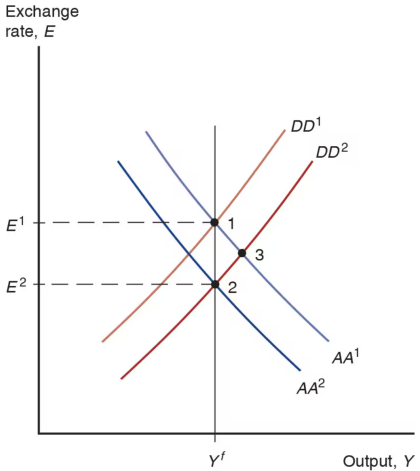
$$\text{Definition of inflation:} \quad \pi_t = \frac{P_t}{P_{t-1}} - 1$$

$$\text{Definition of expected inflation:} \quad \pi_t^e = \frac{P_{t+1}^e}{P_t} - 1$$

Permanent Shifts in Fiscal Policy

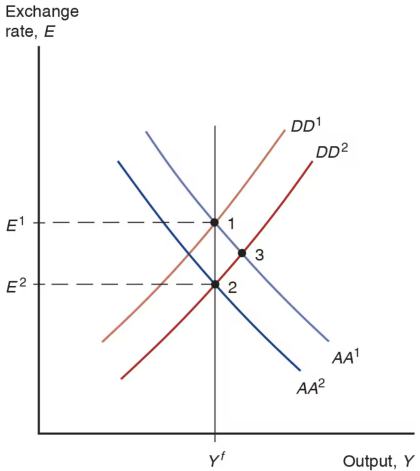


Permanent Shifts in Fiscal Policy



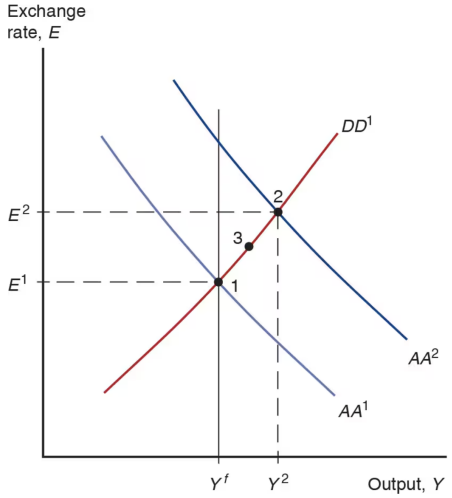
- Start in a medium run equilibrium at point 1 with $R_0 = R^*$ and $E_0^e = E^1$
- Increase in G shifts DD to the right
- At point 3, exchange rate is lower than E_1
- Since the shift in DD is permanent, appreciation at point 3 is also expected to be permanent
- E^e must also go down
- Lower E^e shifts AA down
- But how much?

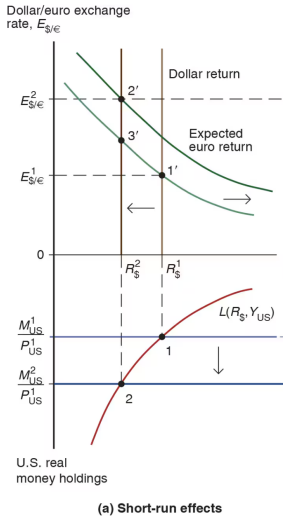
Permanent Shifts in Fiscal Policy



- There are no more shifts expected to occur, E^e remains constant
- Real money supply is constant
- Long run real money demand must stay unchanged
- Then P never changes
- MS=MD implies R does not change
- UIP implies E does not change either
- If Y must be equal to its original level Y^f, AA^1 must shift to AA^2

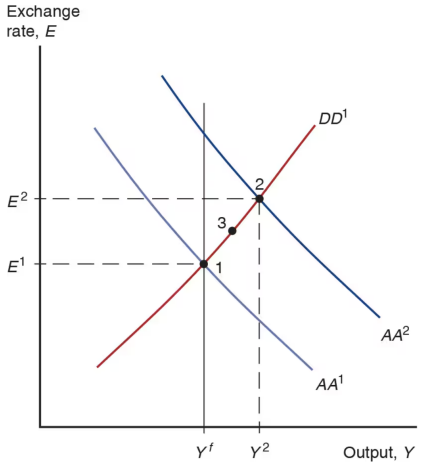
Permanent Shifts in Monetary Policy

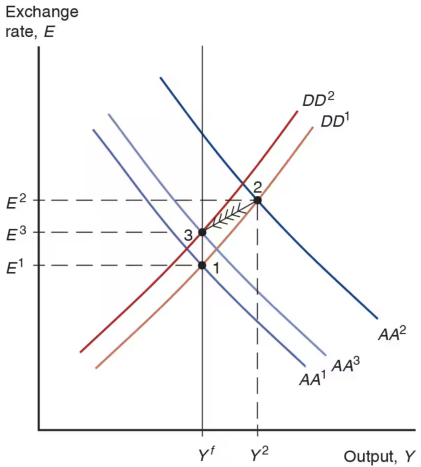




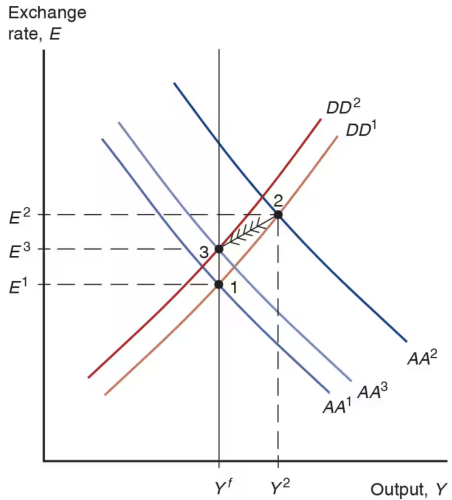
(a) Short-run effects

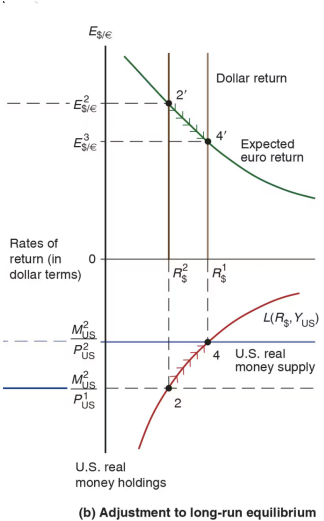
Permanent Shifts in Monetary Policy





Permanent Shifts in Monetary Policy





DD Schedule with Tariffs