

Output and the Exchange Rate

Chapter 16

1. Goods market equilibrium (DD)
2. Money market equilibrium (AA)
3. Equilibrium
4. Shocks
5. Current account

1 Goods Market Equilibrium

1.1 Components of aggregate demand

$$D = C(Y - T) + I + G + CA\left(\frac{EP^*}{P}, Y - T\right)$$

- Note: simplifies IS-LM by omitting effect of the interest rate on C and I
- Net exports (CA) in dollar terms

$$(P \times EX) - (EP^* \times IM)$$

- Net exports (CA) in real terms

$$EX - \left(\frac{EP^*}{P} \times IM \right) = EX - (q \times IM)$$

- Effect of an increase in q on CA
 - Foreign goods are relatively more expensive – agents switch to domestic goods – increasing EX and reducing IM – raising CA
 - Direct effect of increase in q is to raise real value of imports reducing CA
 - Assume first effect dominates, so increase in q raises CA

1.2 Demand = Output (DD schedule)

- Keynesian Cross

$$Y = D = C(Y - T) + I + G + CA\left(\frac{EP^*}{P}, Y - T\right)$$

- DD schedule = relationship between E and Y , other variables constant, such that goods market equilibrium holds
 - on Keynesian Cross, consider effect of an increase in E on D
 - higher E makes foreign goods relatively more expensive, switching spending onto domestic goods, raising equilibrium Y

– as E increases, Y must increase for goods market equilibrium

- Shifts in DD schedule

2 Asset (Money) Market Equilibrium

2.1 Components

- Interest rate parity

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

- Money market equilibrium

$$\frac{M}{P} = L(Y, R)$$

2.2 Asset market equilibrium (AA schedule)

- Combine interest rate parity and money market equilibrium

$$\frac{M}{P} = L\left(Y, R^* + \frac{E^e - E}{E}\right)$$

- AA schedule = relationship between E and Y , other variables constant, such that asset market equilibrium holds
 - Using interest rate parity and money market equilibrium consider increase in Y
 - Higher Y raises money demand, requiring higher R to return money demand to fixed real money supply

- R increases only if E falls
 - Therefore as Y increases, E falls for money market equilibrium
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- Shifts in AA

2.3 Full-employment output (long-run value of equilibrium output)

- Exogenous and changes only with technology shock (Y_f)
- Simplifies by ignoring
 - Effect of real exchange rate (q)
 - Effect of endogenous changes in labor supply
 - Effect of changes in the capital stock due to investment

3 Equilibrium

3.1 Short-run

- Y and E must yield equilibrium in goods markets and asset markets
- P is fixed
- Output can be away from potential

3.2 Long-run

- Y and E must yield equilibrium in goods markets and asset markets
- P adjusts so that output is at potential

4 Monetary Expansion

4.1 Temporary (E^e fixed)

- AA shifts right
- Domestic currency depreciates, raising q , switching spending toward domestic goods, raising output
- Long-run, money supply returns and equilibrium values return

4.2 Permanent (E^e takes on long-run equilibrium value)

- Monetary neutrality implies that in LR P and E increase, so E^e increases
- Shock is M up and E^e up
- Both shift AA up implying larger AA shift than for temporary shock
- Domestic currency depreciates, raising q , switching spending toward domestic goods, raising output

- Long-run – P increases
 - reducing $\frac{M}{P}$, shifting AA partway back
 - reducing q shifting DD left as agents switch spending back toward foreign goods
 - equilibrium with E , E^e , and P up proportionate to the increase in M and $Y = Y_f$

5 Fiscal Expansion

5.1 Temporary (E^e fixed)

- G increases raising demand for domestic goods, shifting DD right
- Y increases, raising money demand, requiring R up for goods market equilibrium
- Increase in R requires E down, domestic currency appreciation

- The appreciation reduces q , switching some of the increased spending toward foreign goods so output rises less than the multiplier times the increase in G
- LR - G returns and all values return to initial ones

5.2 Permanent (E^e takes on long-run equilibrium value)

- Effect on E^e
 - Increase in G raises relative demand for domestic goods reducing long-run value for q
 - Reduction in long-run value for q reduces long-run value for E , reducing E^e
 - Increase in G has no effect on R^* or on Y_f so no other effects on E^e

- Increase in G shifts DD right as before
- Reduction in E^e shifts AA down
 - Goods market equilibrium

$$Y = C(Y - T) + I + G + CA\left(\frac{EP^*}{P}, Y - T\right)$$

increase in G offset by decrease in q can leave output unchanged

– Money market equilibrium

$$\frac{M}{P} = L\left(Y, R^* + \frac{E^e - E}{E}\right)$$

If E fell less than E^e falls, then Y would rise, implying a need for P to rise over time. However, money market equilibrium implies no change in P in the long run. Therefore, E and E^e fall by same amount and output is unchanged.

6 Current Account (XX Curve)

6.1 Graph

$$CA \left(\frac{EP^*}{P}, Y - T \right) = 0$$

- Increase in Y raises demand for imports, reducing CA
- To return CA to zero, need E up, making foreign goods more expensive, switching spending to domestic goods
- Graph for $CA = 0$ requires E up as Y increases

- XX is flatter than DD

$$Y = C(Y - T) + I + G + CA\left(\frac{EP^*}{P}, Y - T\right)$$

- Increase in Y increases domestic output more than demand for domestic goods creating excess supply
- Increase in Y increases import demand, reducing CA
- Increase in E makes foreign goods relatively more expensive, returning CA to 0.
- However, still excess supply for domestic goods
- To eliminate excess supply need larger increase in E so $CA > 0$.

- Along XX , $CA = 0$
 - Above XX , E is high or Y is low, implying surplus
 - Below XX , E is low or Y is high, implying deficit
- Shifts in AA
 - General
 - Compare magnitudes for AA with magnitudes for DD

6.2 Shocks

- Monetary expansion (permanent)
 - AA shifts right
 - Above XX , so current account surplus
 - Note the effect of exchange rate depreciation, creating a surplus, dominates the effect of the increase in output, creating a deficit

- Fiscal expansion
 - DD shifts right
 - if permanent AA shifts down
 - Below XX , so current account deficit
 - Both exchange rate appreciation and possible output increase serve to decrease the current account balance

7 Other considerations

7.1 J - Curve

- real exchange rate depreciation immediately worsens the current account as prices react before quantities
- over time quantities adjust, and get effect in the model

7.2 Incomplete pass-through

- failure of the Law of One Price (LOOP)
- implies q might not change with exchange rate as much as in our model