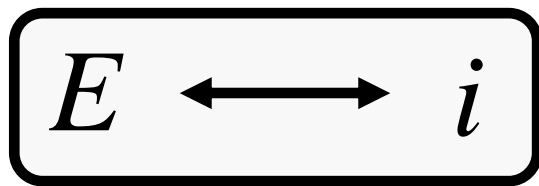


Chapter 18

The Balance of Payments in the Short
Run: Output, Exchange Rates, and
Macroeconomic Policies

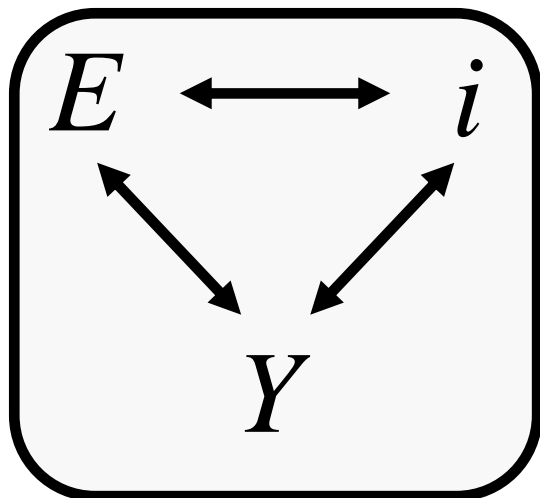
Where Are We Coming From?



\bar{Y}

- Thus far our study of exchange rates has been largely disconnected from the rest of the economy.
 - ♦ In chapters 13–15: we had a simple theory of exchange rates, but we treated output level as given. (Y was fixed.)
 - ♦ Now we address the case where both exchange rates and output can fluctuate in the short run.

Where Are We Going?



- We develop a model that explains the relationships between all major macroeconomic variables in the short run.
- The model we study is an open-economy variant of the well-known IS-LM model.
- The Key assumption of this type of Keynesian model is that prices are “sticky” in the short run, so that output is determined by shifts in demand in the goods market.
- Use model to see how monetary and fiscal policy affect the economy.
- One key lesson is that the feasibility and effectiveness of macroeconomic policies depends on the type of exchange rate regime.

Preliminaries and Assumptions

To simplify the analysis we assume:

- Two countries: home and foreign (ROW, denoted by * on variables)
- Prices fixed in the short run. (so $\overline{\pi^e} = 0$)
 - ◆ Thus, expected inflation is fixed at zero.
 - ◆ And there is no distinction between real and nominal variables.
- Government spending G and taxes T are exogenously set by government.
- Foreign variables (output and interest rate) are taken as given.
- For simplicity, set KA=0, NUT=0, and NFIA =0. (Note that CA= TB then)

• **Fixed exogenous variables:**

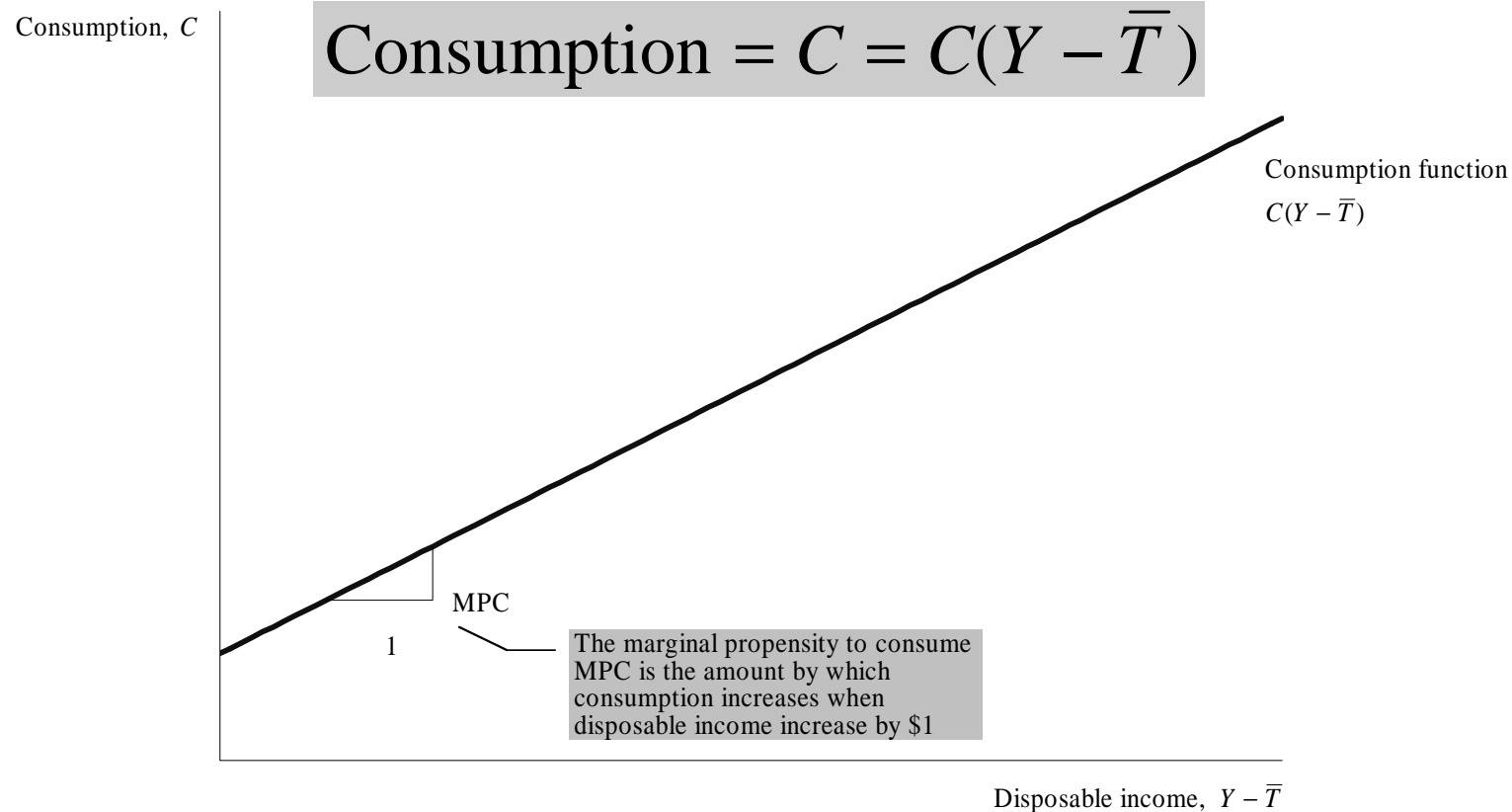
$$\bar{P} \quad \bar{P}^* \quad \overline{\pi^e} = 0 \quad \bar{G} \quad \bar{T} \quad \bar{Y}^* \quad \bar{i}^*$$

1) The Role of Demand

- First goal: understand the determination of the output or income in the Home economy. Driven here by demand.
 - ◆ As we learned in Chapter 16, output (supply of goods) must equals total expenditure (demand for goods).
 - ◆ In turn, the demand for goods and services is made up of four components: consumption, investment, government consumption, and the trade balance.
 - ◆ Demand = C + I + G + TB
- We examine each component of demand in turn and seek to understand its short-run determinants.

a) Consumption Function

We here take the Keynesian approach to consumption:
Level of consumption C fluctuates to some degree
according to the level of current income Y net of taxes T



MPC

- The slope of the consumption function is called the marginal propensity to consume (MPC)
 - ◆ It tells us how much of every extra \$1 of disposable income received by households is spent on consumption.
 - ◆ We generally assume that $0 < \text{MPC} < 1$: when consumers receive an extra unit of disposable income (whether it's a euro, dollar or yen), they will consume only a fraction of it and save the remainder.
 - ◆ For example, if you elect to spend \$0.75 of every extra \$1 of disposable income you receive, your MPC is 0.75.
 - ◆ We can also define the marginal propensity to save (MPS) as $1 - \text{MPC}$, so in this example $\text{MPS} = 0.25$, meaning that \$0.25 of every extra \$1 of disposable income is saved.

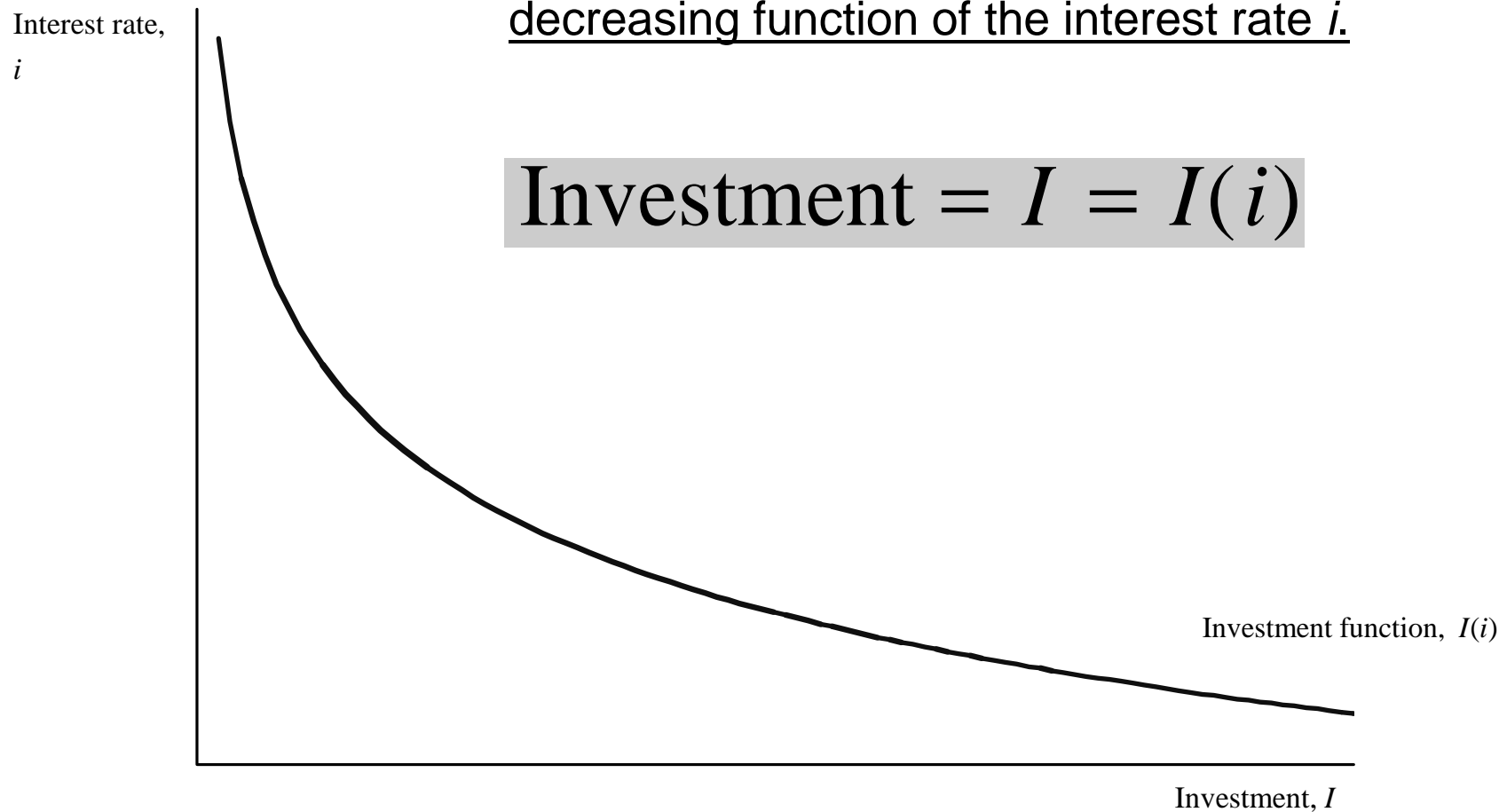
b) Investment

- The simplest model of aggregate investment: firms face an array of possible investment projects with differing real returns. A firm will invest capital in a project only if the real returns exceed the firm's cost of borrowing capital.
- Borrowing cost is the **expected real interest rate**, which equals the nominal interest rate i minus the expected rate of inflation $\pi^e = 0$.
- However, under our simplifying assumption, the expected real interest rate is equal to the nominal interest rate.
- When the expected real interest rate falls we

Investment Function

Hence, our model assumes that investment I is a decreasing function of the interest rate i .

$$\text{Investment} = I = I(i)$$



c) G & T

- Government collects taxes T from private households and spends an amount G on government consumption of goods and services.
 - ◆ Note that G includes only actual spending on actual goods and services; Exclude government transfer programs (will appear later as consumption expenditure).
- If $G=T$ exactly, government spending exactly equals taxes and we say that the government has a **balanced budget**
 $G = \bar{G} \quad T = \bar{T}$
 - ◆ If $T > G$: **budget surplus**
 - ◆ If $G > T$, **budget deficit** (equivalently, a negative surplus of $T-G$).
- Fiscal policy sets these at levels indicated by overbar

d) The Trade Balance

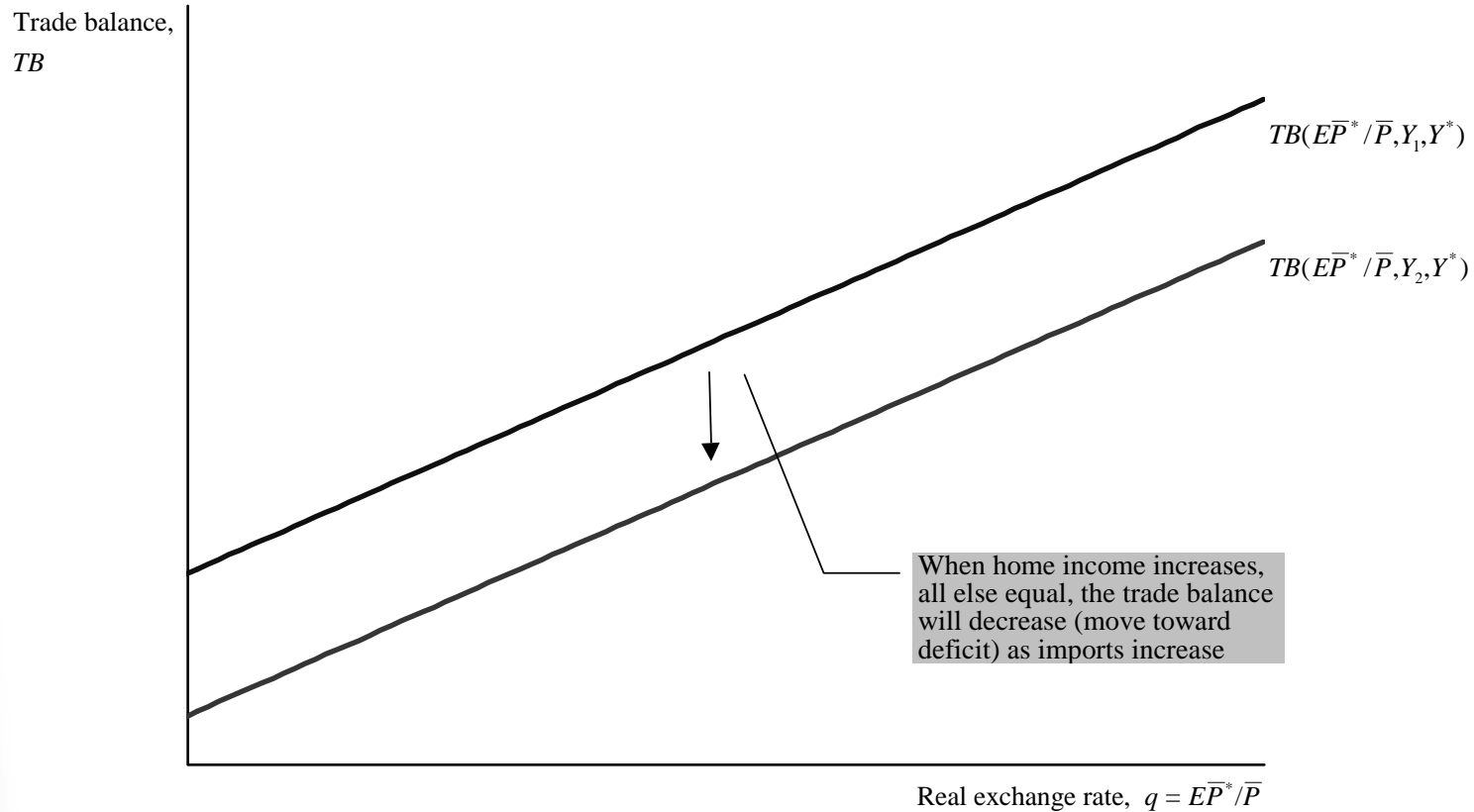
- We consider two things that affect the trade balance:
 - 1) Exchange rate: each of the following will lead to expenditure switching away from foreign goods toward home goods:
 - ◆ rise in P^* : imported goods become more expensive
 - ◆ fall in P : home goods get cheaper
 - ◆ rise in E : more expensive to buy the foreign currency to buy foreign goods.
 - ◆ Putting together, a rise in the real exchange rate $(EP^*/P) \rightarrow \uparrow TB$.
 - 2) Income:
 - ◆ We argued earlier that a rise in home country income raises overall home consumption. Some of this consumption expenditure falls on imported goods. $\uparrow Y \rightarrow \uparrow IM \rightarrow \downarrow TB$
 - ◆ Similarly, a rise in income abroad leads to a rise in foreign expenditure on our exports. $\uparrow Y^* \rightarrow \uparrow IM^* = \uparrow EX \rightarrow \uparrow TB$

Income and The Trade Balance

- Impact of changes in income on the trade balance can also be thought of in terms of the marginal propensity to consume.
 - ◆ Suppose home output rises by an amount $\Delta Y = \$1$, all else equal, and this leads to an increase in home imports of $\Delta IM = \$MPC_F$, where $MPC_F > 0$.
 - ◆ We refer to MPC_F as the marginal propensity to consume foreign imports. For example, if $MPC_F = 0.1$ this means that out of every additional \$1 of income \$0.10=10 cents are spent on imports.
- How does MPC_F relate to the MPC seen earlier?
 - ◆ After a \$1 rise in income, any additional goods consumed have to come from somewhere, home or abroad.
 - ◆ Let MPC_H be the marginal propensity to consume home goods.
 - ◆ Thus, $MPC = MPC_H + MPC_F$
 - ◆ For example, if $MPC_F = 0.10$ and $MPC_H = 0.65$, then $MPC = 0.75$; for every extra dollar of disposable income, home consumers spend 75 cents, 10 cents on imported foreign goods and 65 cents on home goods.

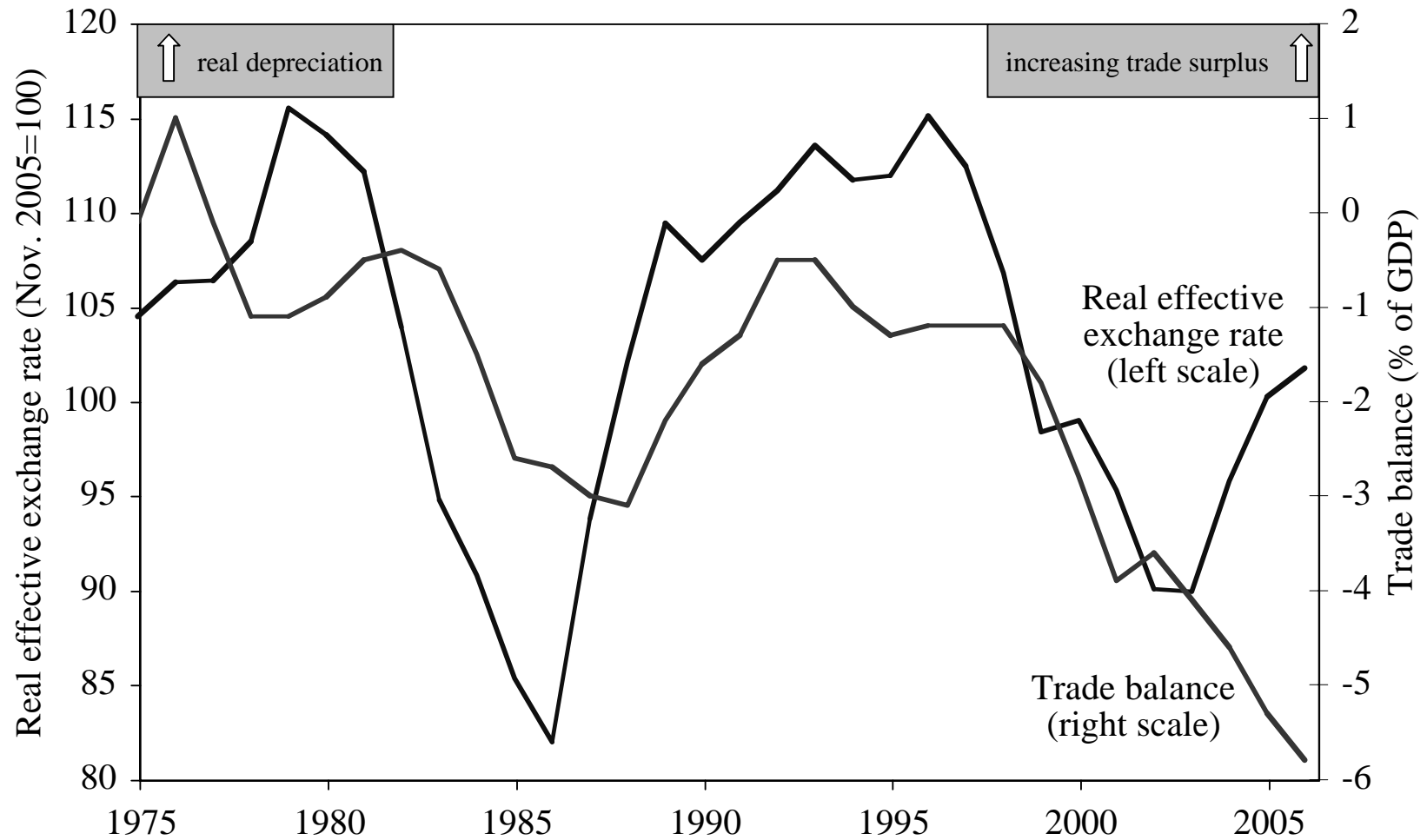
The Trade Balance

Putting this together : $TB = TB(\underbrace{E\bar{P}^* / \bar{P}}_{\text{increasing function}}, \underbrace{Y - T}_{\text{decreasing function}}, \underbrace{Y^* - T^*}_{\text{increasing function}})$



CASE STUDY

The Trade Balance and the Real Exchange Rate in US



CASE STUDY

The Trade Balance and the Real Exchange Rate

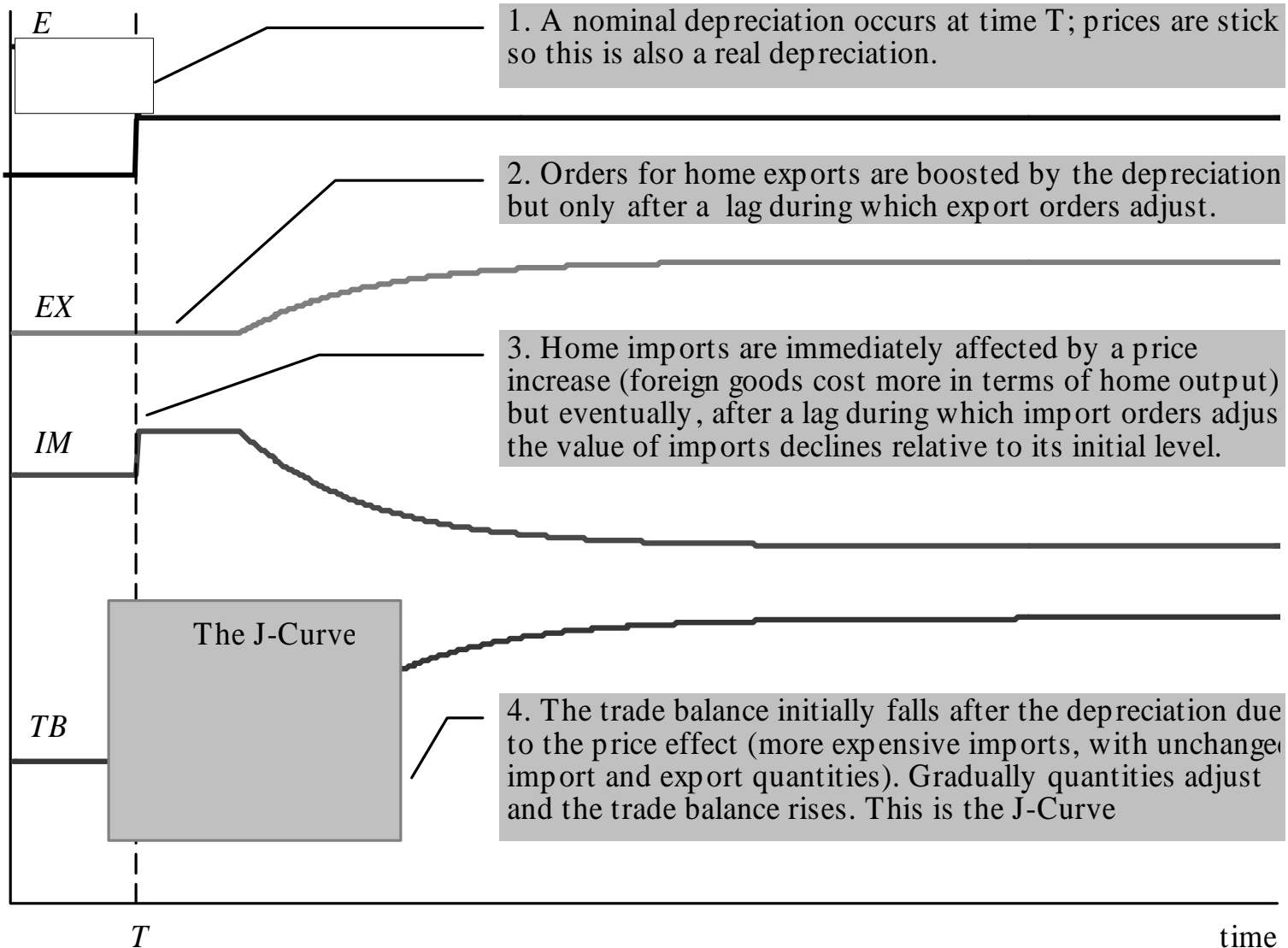
- J-curve: response of TB to a currency depreciation may be an initial decline followed by a delayed rise

$$\text{TB (in \$)} = \text{EX(\$)} - \text{E}(\$/\text{€}) \times \text{IM(€)}$$

Suppose drop in $E(\$/\text{€})$ induces a gradual drop in future import orders. But the dollar value of existing € -imports goes up.

CASE STUDY

The Trade Balance and the Real Exchange Rate



Exogenous Shocks to C, I, and TB

- Shocks can affect each part of demand
- Consumption: wealth shift: stock market raises household wealth, raising consumption relative to current income.
- Investment: optimism about investment opportunities in tech sector in 1990s
- Trade balance: taste shift: in 1970s, high oil prices shifted demand away from large US cars toward smaller Japanese cars: raises TB for Japan.

Goods Market Equilibrium

DEMAND = SUPPLY FOR HOME GOODS

- Equilibrium concept: all goods produced must be willingly demanded and purchased.
 - ◆ If there is excess supply, then firms will produce less.
 - ◆ If excess demand draws down inventories, then firms will start producing more.

- Recall: Demand equals $C+I+G+TB$

- We now require Output $(Y) = D$:

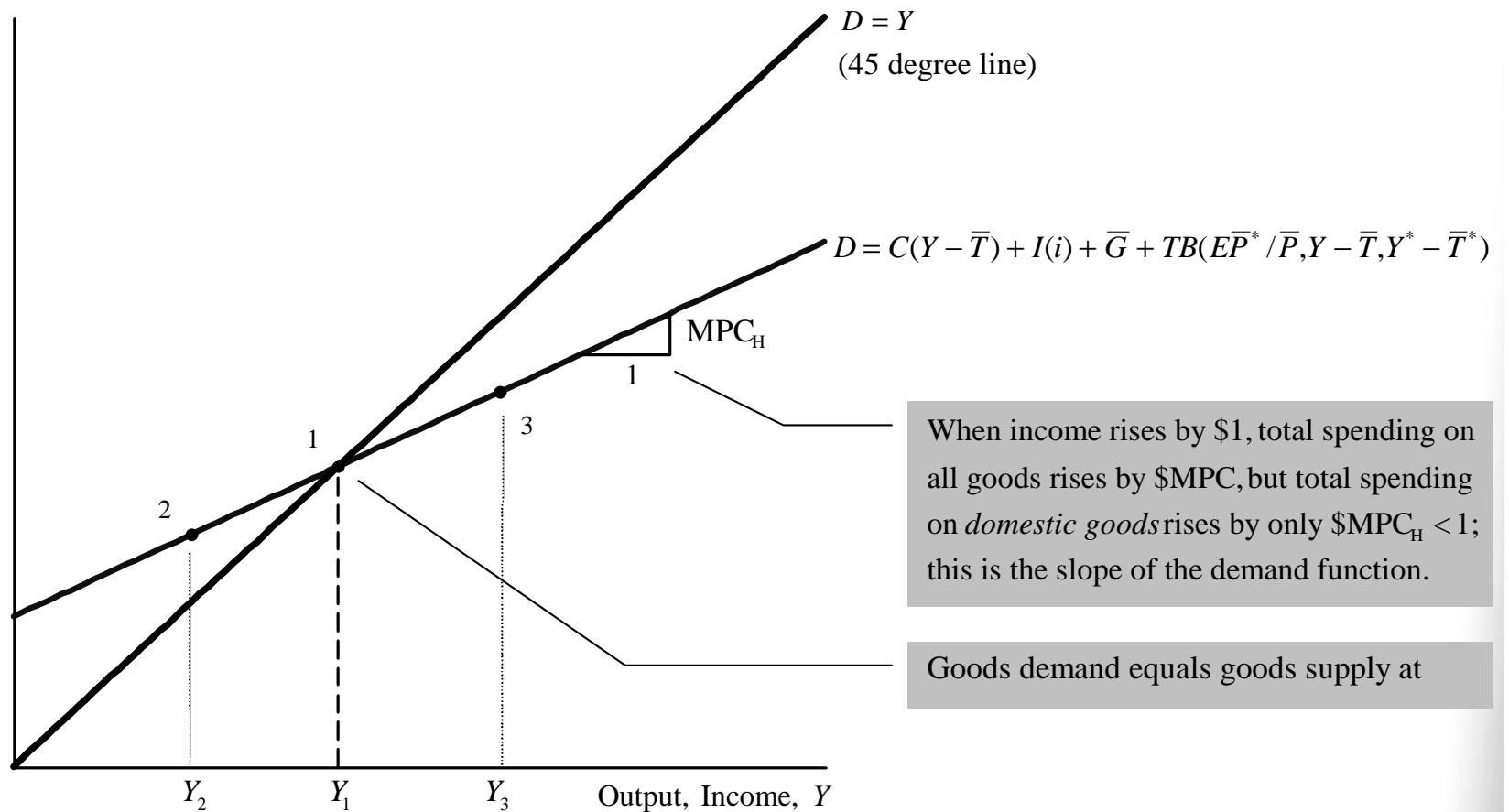
$$Y = C(Y - \bar{T}) + I(i) + \bar{G} + TB \left(\frac{E\bar{P}^*}{\bar{P}}, Y - \bar{T}, Y^* - \bar{T}^* \right)$$

$\underbrace{\hspace{15em}}_D$

- Note that we use Y to represent output (supply) and also income (which affects consumption and import demand).
- Plot this on axes for Demand v. output: Keynesian Cross diagram.

The Keynesian Cross EQUILIBRIUM

Demand, D



When income rises by \$1, total spending on all goods rises by \$MPC, but total spending on *domestic goods* rises by only \$ $MPC_H < 1$; this is the slope of the demand function.

Goods demand equals goods supply at

The Keynesian Cross

Equilibrating process: Note that Firms are willing to supply at the preset price, and quantities adjust to restore equilibrium.

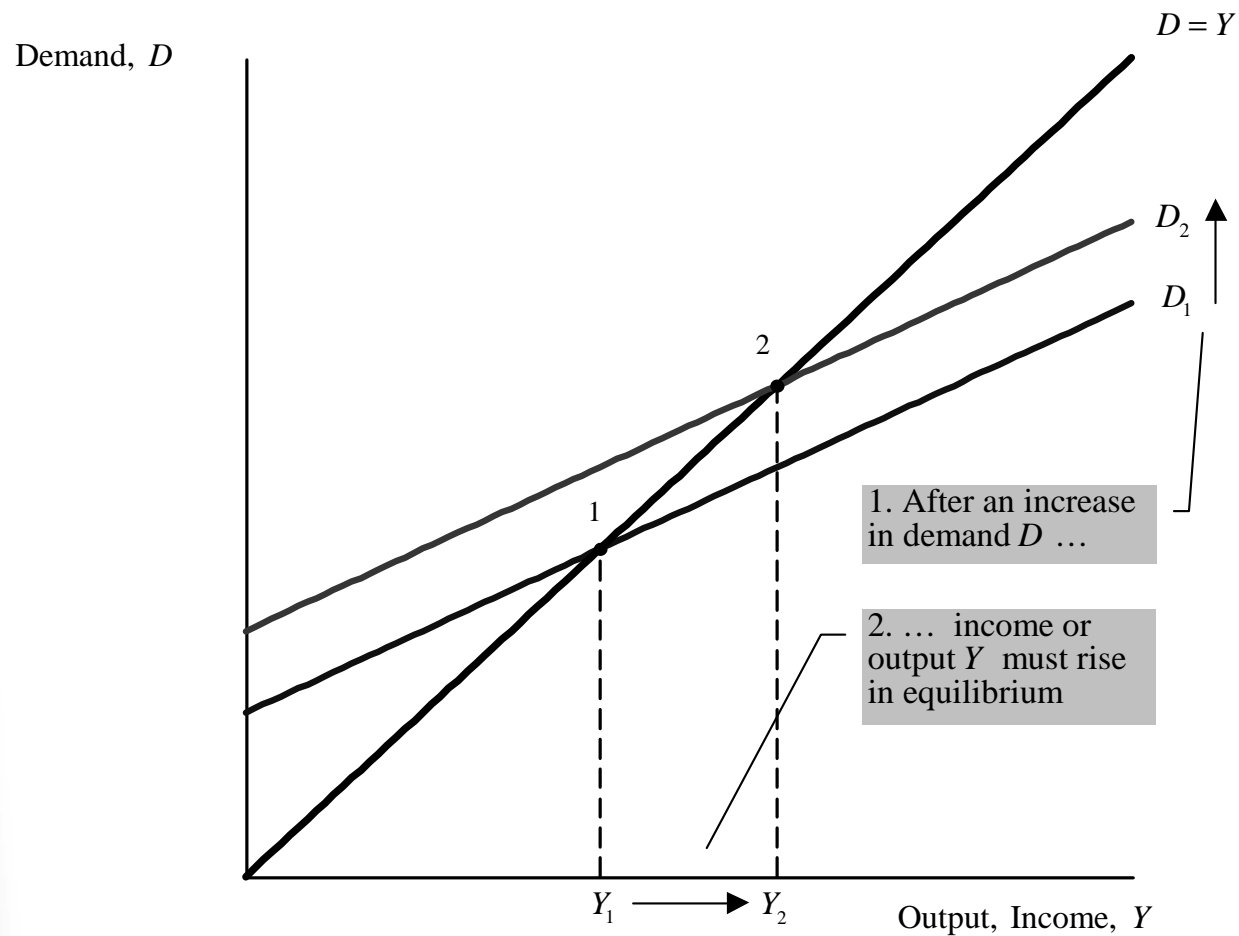
- ◆ At point 2, demand D exceeds supply Y ; as inventories fall, firms expand production and output rises towards Y_1 .
- ◆ At point 3, supply Y exceeds demand D ; as inventories rise, firms cut production and output falls towards Y_1 .
- ◆ To the right of point 1, output tends to fall; to the left of point 1, output tends to rise.
- ◆ Only at point 1 are firms in an equilibrium in which production levels are stable in the short run.

The Keynesian Cross

- The Keynesian Cross also allows us to examine the impact of the other factors on goods market equilibrium.
- Let's look at four important cases:
 - ◆ 1. A fall in taxes (all else equal)
 - ◆ 2. A rise in government purchases (all else equal)
 - ◆ 3. A fall in the interest rate i (all else equal)
 - ◆ 4. A rise in the real exchange rate (all else equal)
- To understand these cases all we have to do is figure out what they do to demand. Turns out they are 4 versions of the same case: D shifts up in all cases

The Keynesian Cross

SHIFTS IN DEMAND



Macro Equilibrium

- Our analysis of demand shows how the level of output in the economy adjusts to ensure a goods market equilibrium, given the levels of each component of demand.
- But there is more than one market in the economy and a **general equilibrium** requires equilibrium in all markets: that is, equilibrium in the goods market, the money market, and the forex market.
- Bring these last two markets into the analysis, and we do that next by using a tool of macroeconomic analysis known as the IS-LM diagram.
- Analyzing equilibria in three markets simultaneously may seem like a tall order, but we shall proceed one step at a time.

Goods and Forex Market Equilibrium: Deriving The IS Curve

- The IS curve shows combinations of output Y and the interest rate i where the goods and forex markets are in equilibrium.
- Derivation: use 3 diagrams
 - A) Keynesian cross diagram
 - B) IS diagram
 - C) Forex market diagram

Deriving the IS Curve

- **Start with considering a fall in the Interest Rate i**
- Forex market
 - ◆ Domestic deposits have a lower return. The exchange rate faces depreciation pressure, and UIP tells us that to maintain forex market equilibrium the exchange rate must rise.
- Keynesian cross
 - ◆ What happens to demand? In panel (a) demand must shift up, for two reasons
 - ◆ First, the lower interest rate encourages investment demand.
 - ◆ Second, the domestic currency depreciation increase demand D via the trade balance due to expenditure switching.

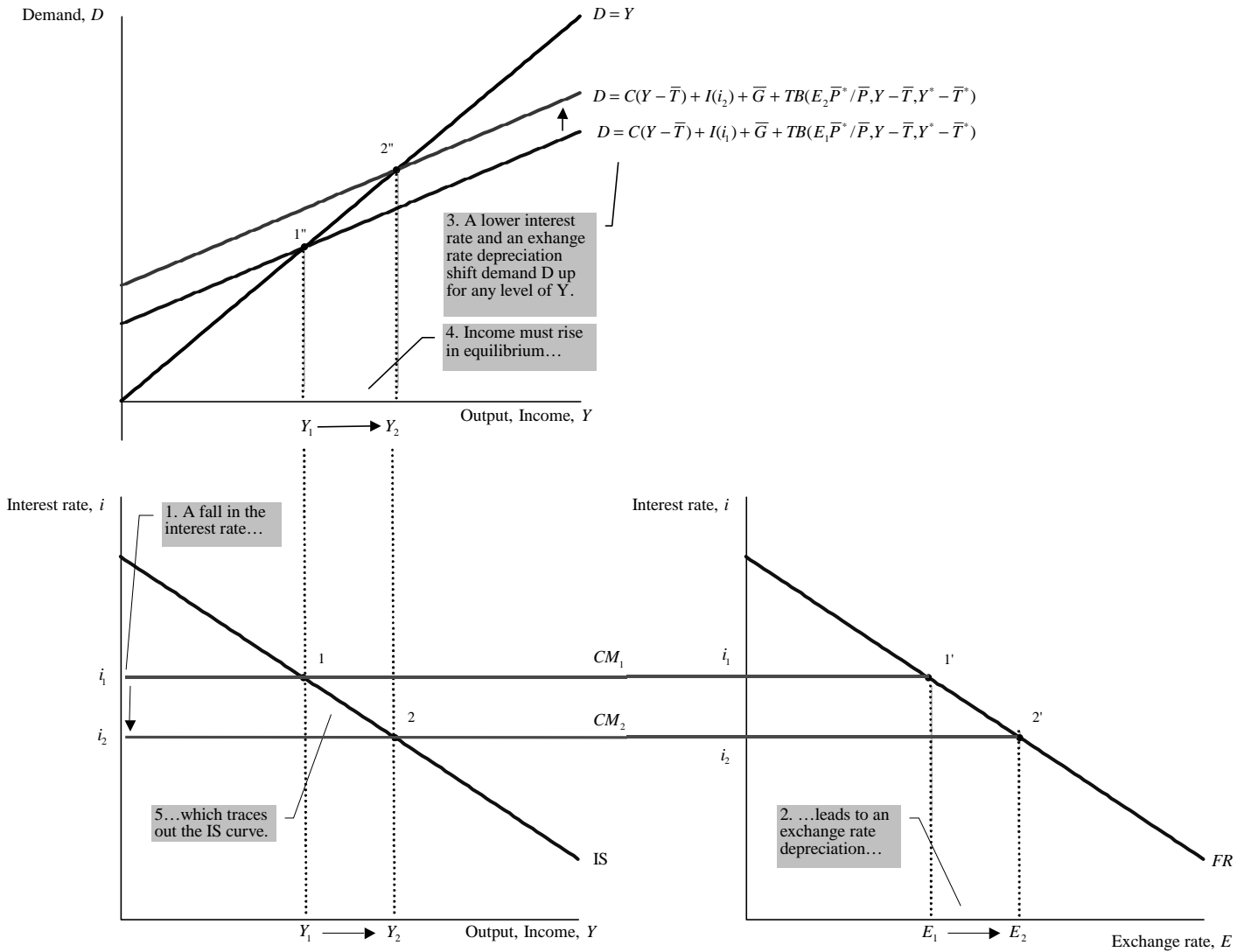
- **A rise in output Y**

- So:
$$\downarrow i \rightarrow \left\{ \begin{array}{l} \uparrow E \rightarrow \uparrow TB \rightarrow \uparrow D \\ \uparrow I \rightarrow \uparrow D \end{array} \right\} \rightarrow \uparrow Y$$

Deriving the IS Curve

- **Conclude: The IS curve is a downward sloping relationship between the interest rate i and output Y .**
 - ◆ Note: In the **open economy**, lower interest rates not only stimulate demand via the traditional closed-economy investment channel; they also stimulate demand via the trade balance, since lower interest rates cause a nominal exchange rate depreciation, which in the short run is also a real depreciation, which stimulates external demand via the trade balance.

The IS Curve



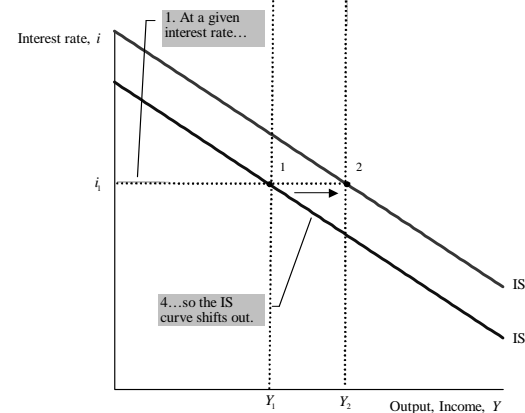
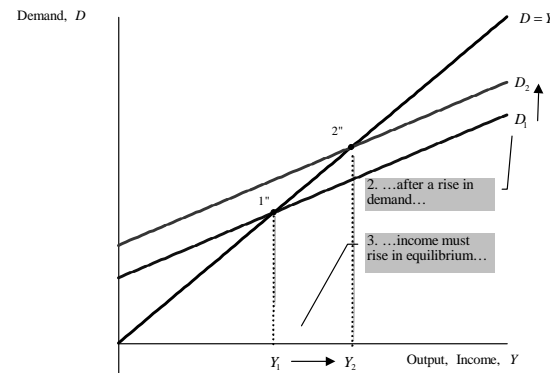
Factors that Shift the IS Curve

- In deriving the IS curve, we treated various demand factors as exogenous.
- The following things shift the IS curve right, because they raise demand for a given interest rate:
 - ♦ rise G.
 - ♦ Fall in T.
 - ♦ rise in the foreign interest rate i^* .
 - ♦ Fall in the given level P , or rise in P^* .

$$IS = IS(G, T, i^*, E^e, P^*, P)$$

Factors that Shift the IS Curve

(a) Goods Market (Keynesian Cross)



(b) IS diagram

Money Market Equilibrium: Deriving The LM Curve

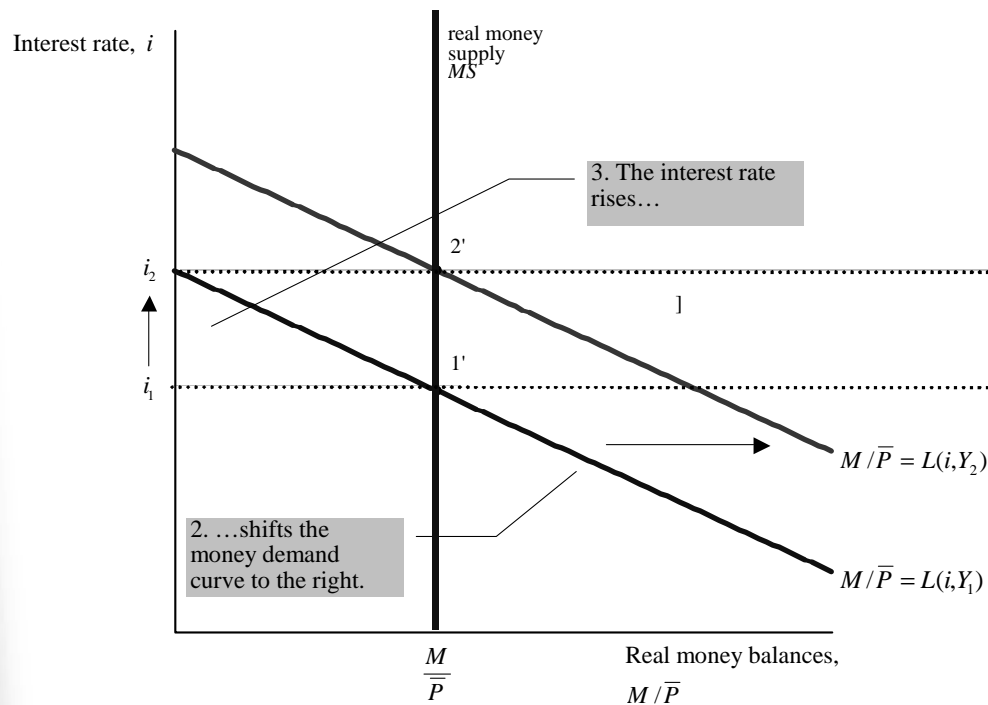
- **LM curve is the combinations of Y and i that ensure equilibrium in the money market.**
- The LM curve is more straightforward to derive than the IS curve, since it is based on material in ch 14 and 15, and is the same as in past closed economy classes.
- Story: consider a rise in income, Y:
 - ◆ This raises money demand
 - ◆ Under the assumption of sticky prices, this bids up the equilibrium interest rate in the money market.

$$\underbrace{\frac{M}{P}}_{\text{real money supply}} = \underbrace{L(i)Y}_{\text{real money demand}}$$

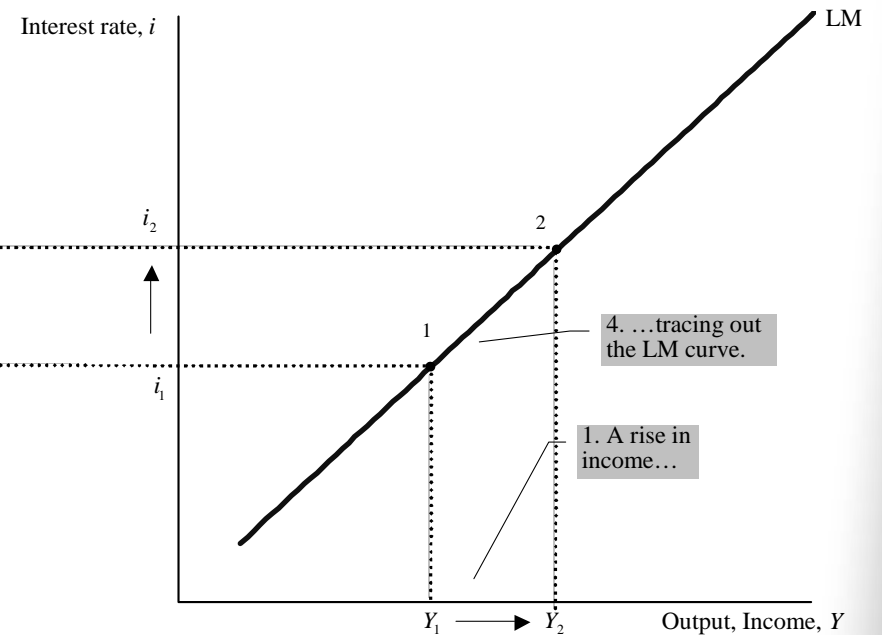
$\uparrow Y \rightarrow \uparrow \text{real money demand} \rightarrow \uparrow i$

Money Market

The LM Curve



(a) Money market



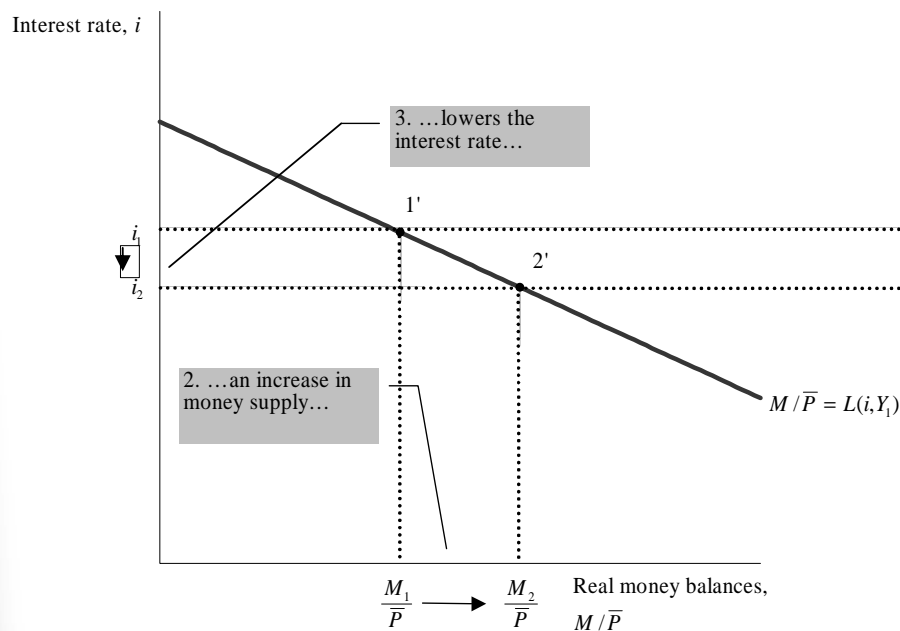
(b) LM diagram

Money Market

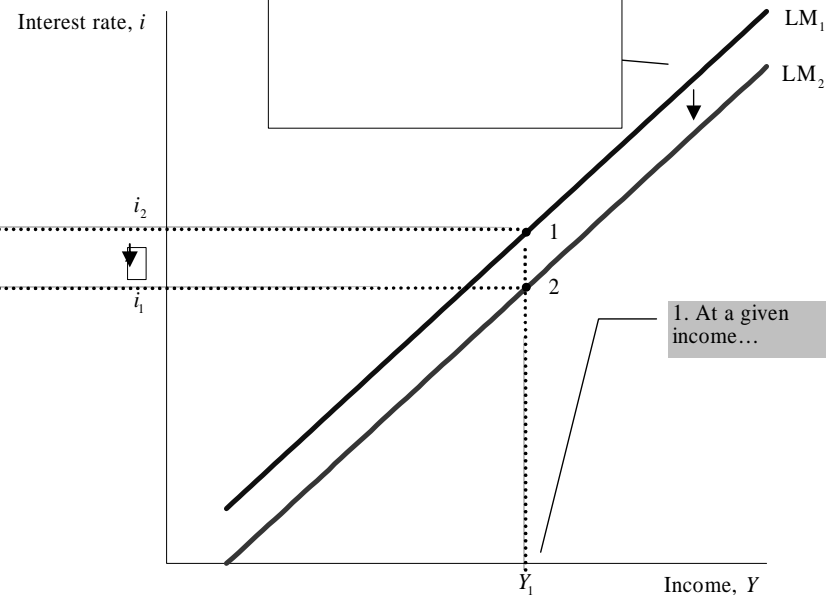
Change in Money Supply shifts LM Curve

What shifts LM curve right:

- Rise in money supply
- Fall in exogenous money demand for reason other than change in Y



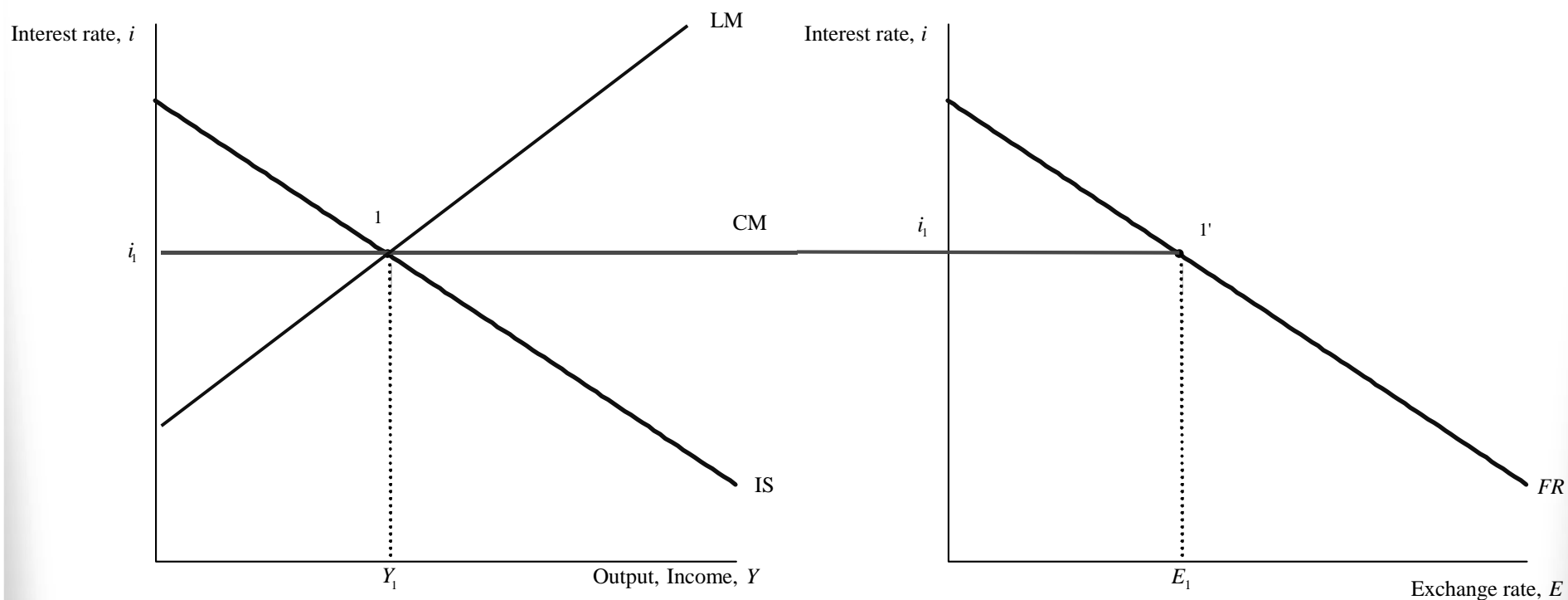
(a) Money market



(b) LM diagram

IS-LM-FX Diagram

Shows equilibrium in 3 markets



(a) IS-LM Model

(b) Forex market

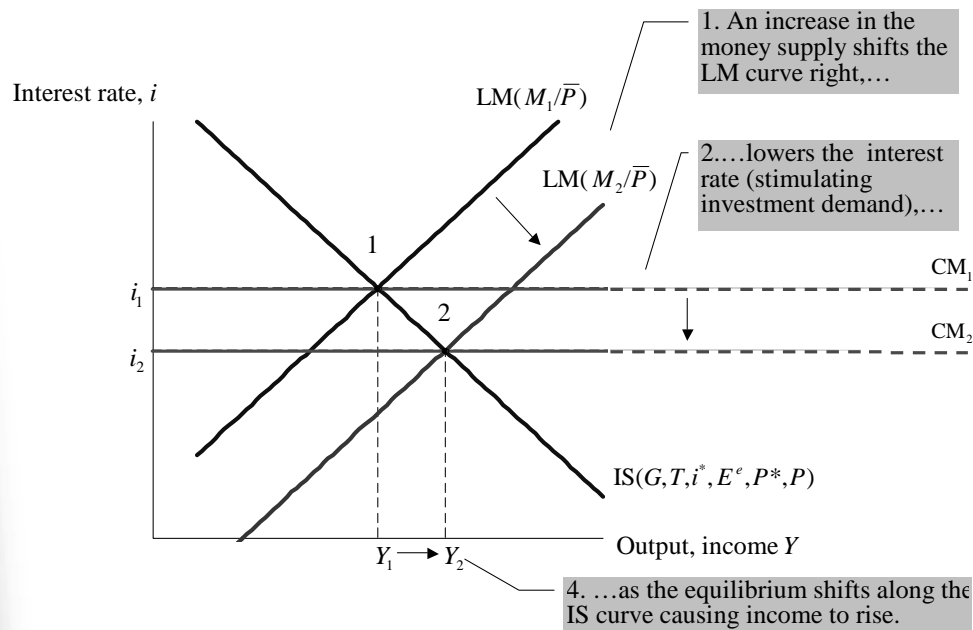
What's the point?

Time to do policy analysis

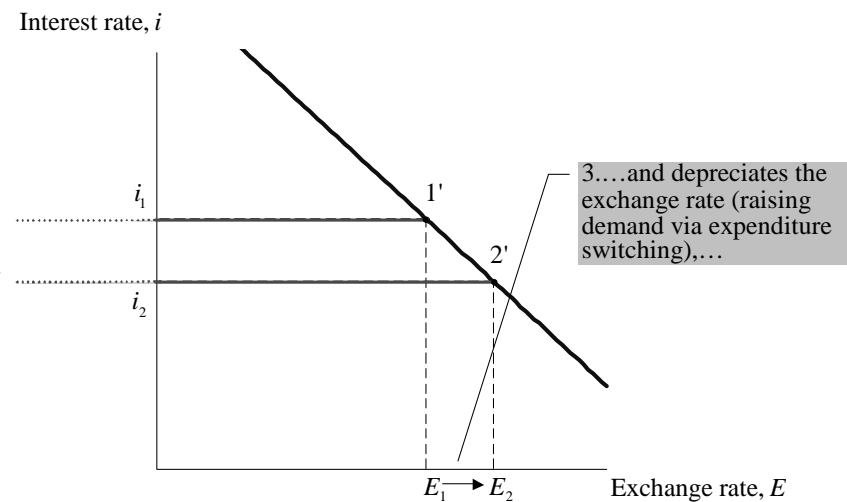
- Two sets of questions
 - ◆ We look at temporary policy changes
 - ◆ Why? Long run changes rules out by
 - Government budget constraint (fiscal policy)
- What is the impact of Monetary Policy
 - ◆ Under floating rates?
 - ◆ Under fixed rates?
- What is the impact of Fiscal Policy
 - ◆ Under floating rates?
 - ◆ Under fixed rates?

Monetary Policy with Floating Rates

(a) IS-LM Model

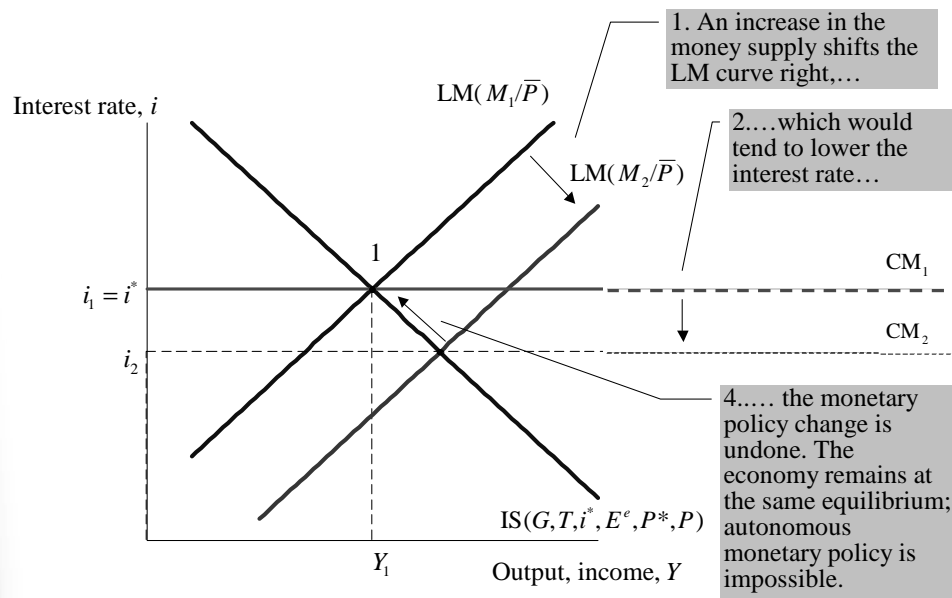


(b) Forex Market

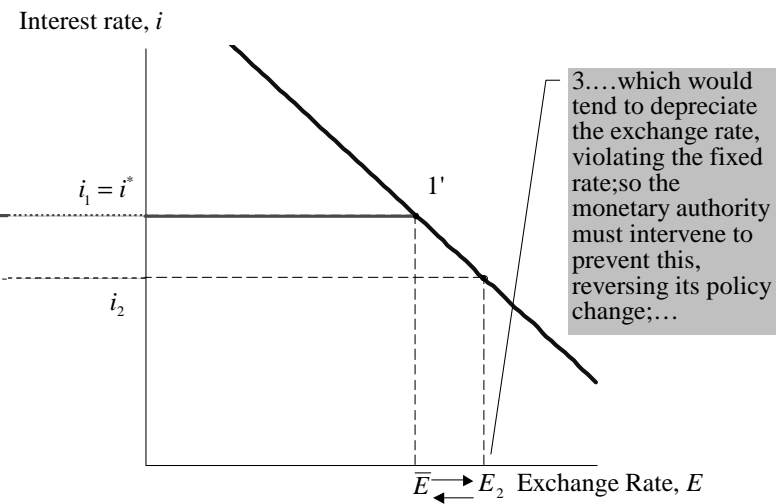


Monetary Policy with Fixed Rates

(a) IS-LM Model



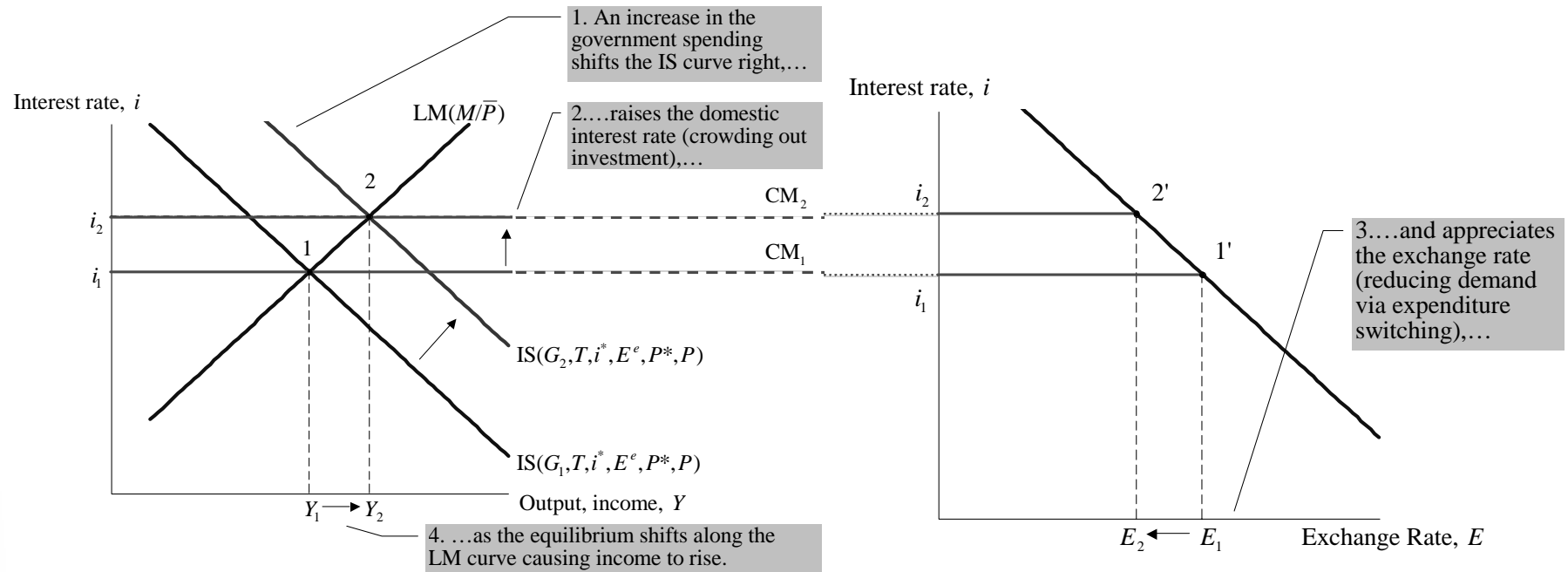
(b) Forex Market



Fiscal Policy with Floating Rates

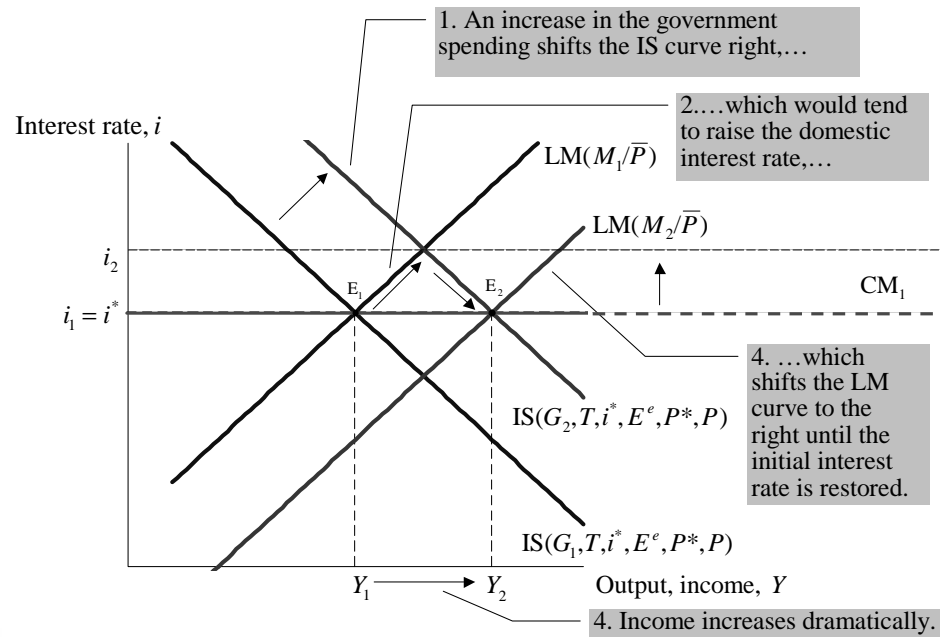
(a) IS-LM Model

(b) Forex Market

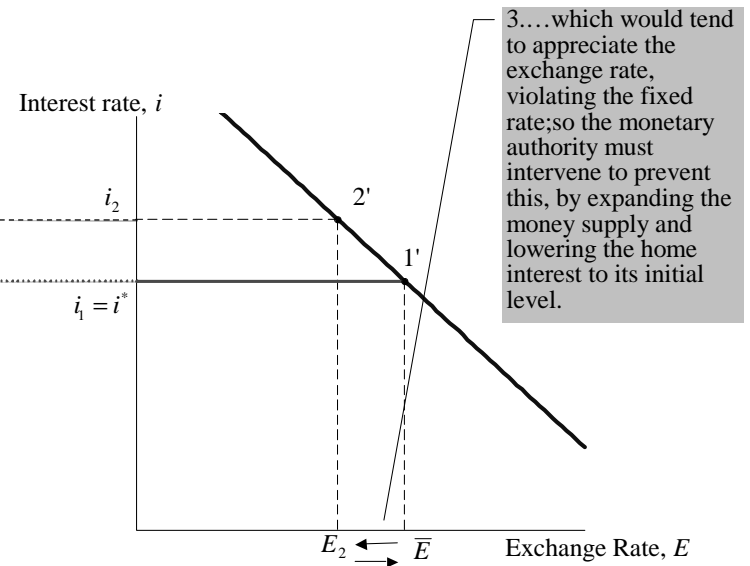


Fiscal Policy with Fixed Rates

IS-LM Model



Forex Market



Policy Summary

Monetary and Fiscal Policy Impacts in the Open Economy IS-LM Model The table shows the effect of a monetary or fiscal expansion on five key variables in the IS-LM model: the interest rate, exchange rate, investment, trade balance, and income (output). The effects depend on whether a country is operating with a fixed or floating exchange rate.

“↑” indicates that the variable rises; “↓” that the variables falls; “0” indicates no effect. The effects would be reversed for contractionary policies.

<i>Exchange Rate Regime</i>	<i>Policy</i>	<i>Impact on:</i>				
		<i>i</i>	<i>E</i>	<i>I</i>	<i>TB</i>	<i>Y</i>
Floating	Monetary Expansion	↓	↑	↑	↑	↑
	Fiscal Expansion	↑	↓	↓	↓	↑
Fixed	Monetary Expansion*	0	0	0	0	0
	Fiscal Expansion	0	0	0	0	↑

* This policy is not feasible.

CASE STUDY

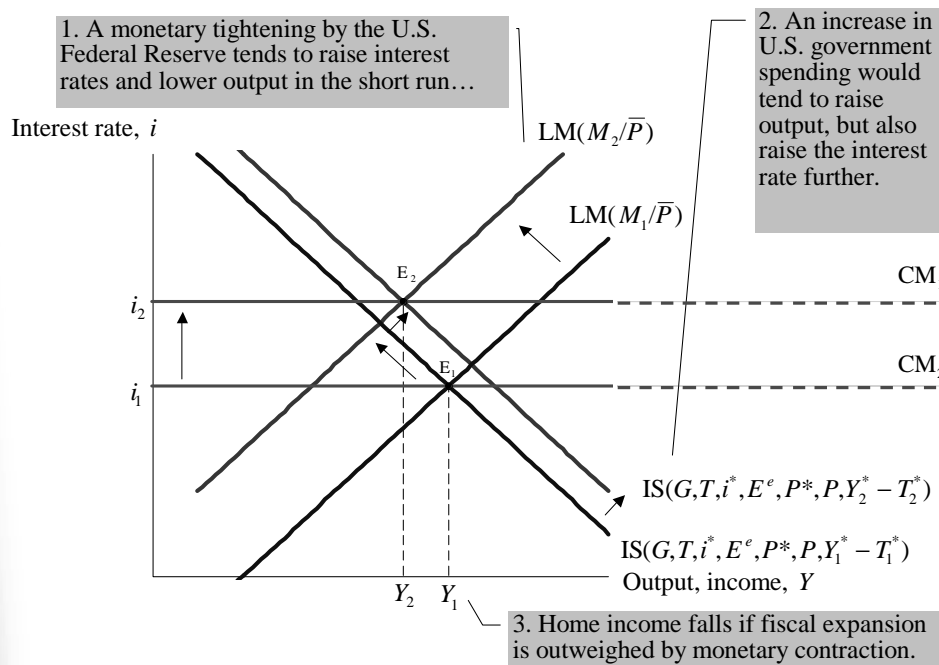
US Macroeconomic Policy 1975–1990

- Monetary policy
 - ◆ High inflation in the 1970s is deeply unpopular
 - ◆ Appoints Volcker as Fed chair to tackle it
 - ◆ Volcker tightens monetary policy **a lot** (into 1980s)
- Fiscal policy
 - ◆ tax cuts
 - ◆ more government spending (especially military spending)
- How do we represent this in our model?
- What are the predictions? What was the reality?

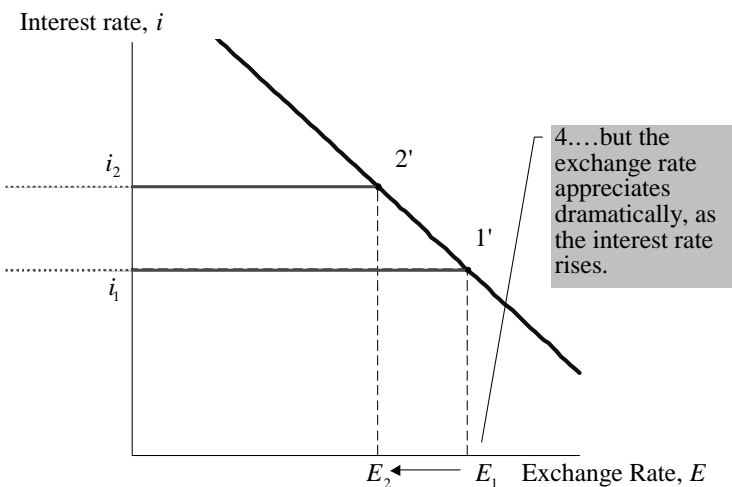
CASE STUDY

US Macroeconomic Policy 1975–1990

(a) IS-LM Model



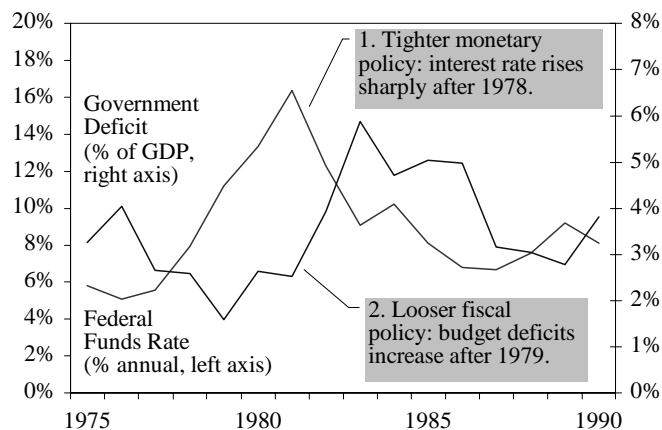
(b) Forex Market



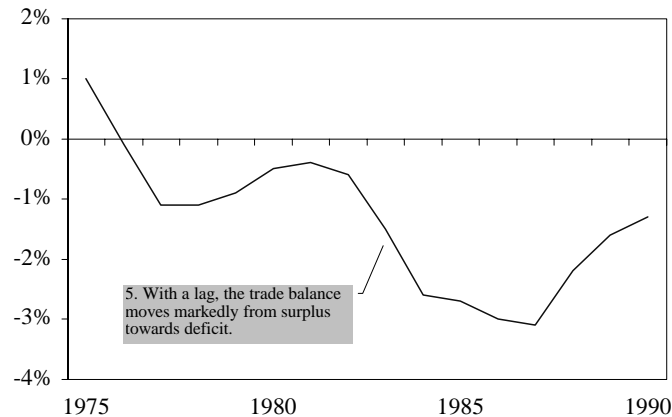
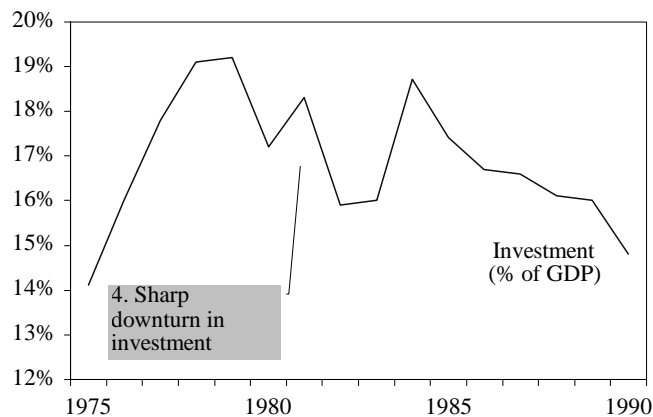
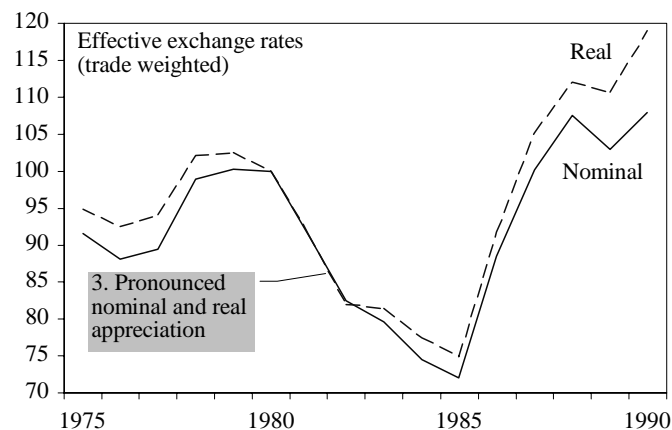
CASE STUDY

US Macroeconomic Policy 1975–1990

(a) Monetary and Fiscal Policies



(b) Exchange Rates



CASE STUDY

Aus/NZ Stabilization Policy after 1997

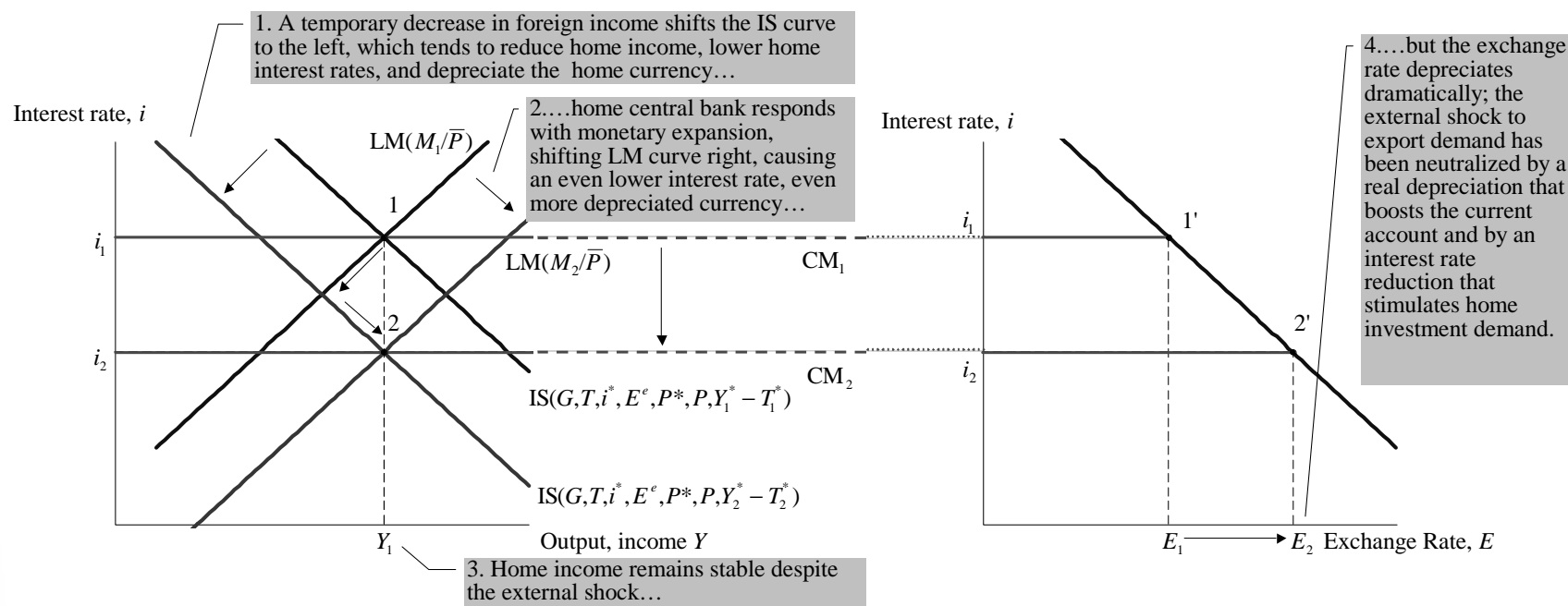
- Asian economics crisis in 1997
 - ◆ Korea, Indonesia, Thailand, Malaysia all suffer economic crises (including exchange rate crises); big recessions
 - ◆ Damage on a smaller scale in rest of the region
- Impact in Australia and New Zealand
 - ◆ Pac-rim includes many major trading partners for Australia and NZ
 - ◆ All of these were hit by big recessions
 - ◆ Their demand for Aus and NZ imports collapsed
- If you are in charge in macro policy in Aus or NZ, what would you do?
 - ◆ Use the IS/LM model
 - ◆ Fiscal v Monetary?
 - ◆ Predictions? reality?

CASE STUDY

Aus/NZ Stabilization Policy after 1997

IS-LM Model

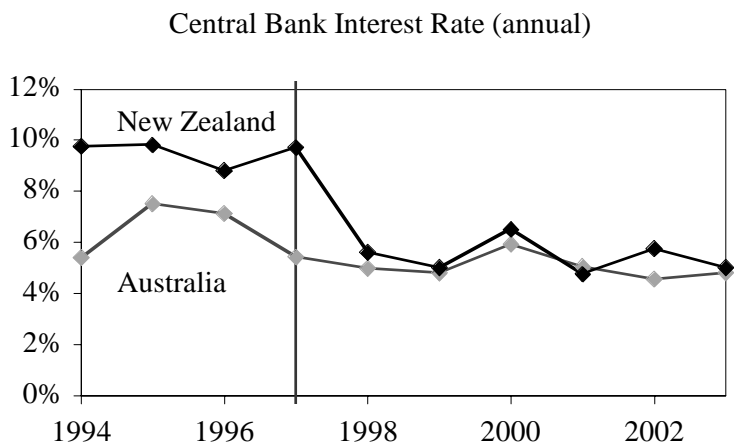
Forex Market



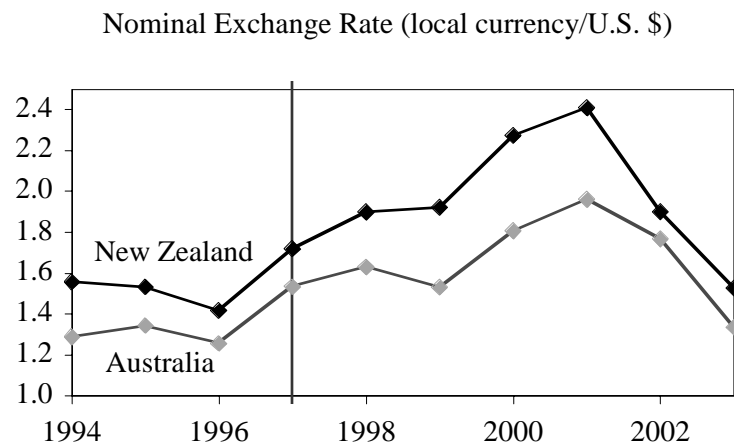
CASE STUDY

Aus/NZ Stabilization Policy after 1997

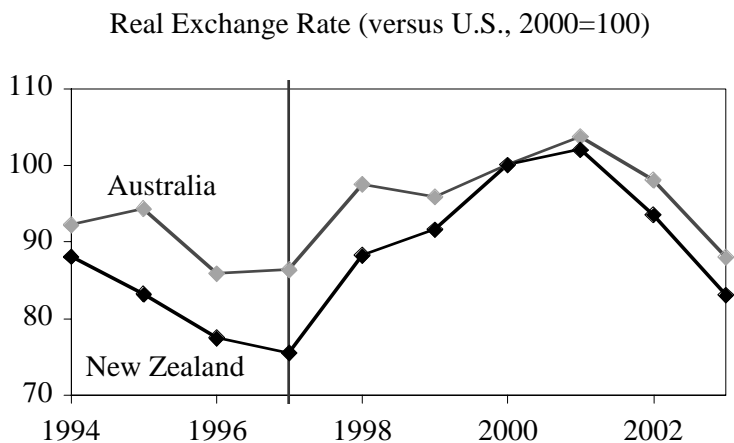
(a) Monetary Policies



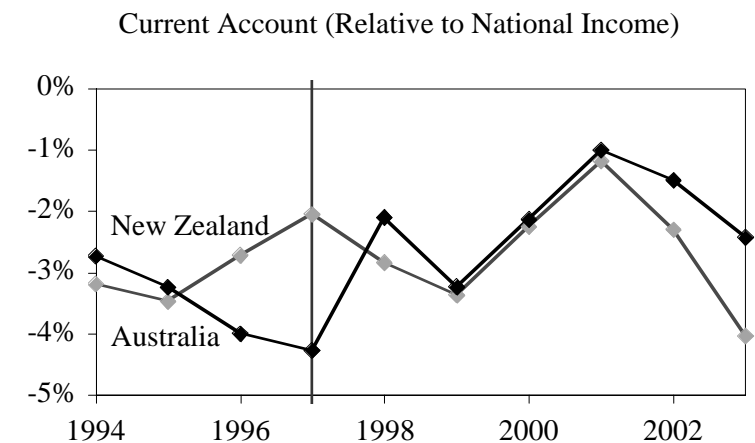
(b) Nominal Exchange Rates



(c) Real Exchange Rates



(d) Trade Balances



Caveats

Problems in Policy Design and Implementation

- The theory shows that policy makers have the power theoretically to keep output steady at its full-employment level with no unemployed resources and no inflation pressure.
- But there are reasons why policy makers should be cautious about using this power.
- 1. Policy constraints. Policymakers constrained by fixed exchange rates or balanced budgets.
- 2. inside lag: it takes time to collect the necessary information and make a decision about policy. (fiscal policy in US is slow)
- 3. outside lag: it takes time for policy action to affect behavior of people in the economy and have the desired effect. (Monetary policy takes 6 months.)
- 4. policy might only affect short term interest rates and exchange rates, but firms plan investment based on long-term
- 5. nominal exchange rates might not affect relative prices and import decisions if firms adjust prices to maintain their market share.