AGGREGATE DEMAND

1. Aggregate Demand in the Open Economy

- Mondell-Fleming Model: an international version of the IS-LM model
 - The SR model of national income including the effects of international trade and finance
 - The behavior of an economy depends on the exchange-rate system it has adopted

2. The Mundell-Fleming Model

- The key assumption: *small open economy with perfect capital mobility*
 - the interest rate in this economy is determined by the world interest rate (*r* = *r* *)
- (1) The Goods Market and the IS* Curve
 - The goods market:
 - → $Y = C(Y T) + I(r^*) + G + NX(e)$
 - $NX(\varepsilon) \rightarrow NX(e)$

b/c price levels at home and abroad are fixed

- The IS* curve slopes downward (fig. 12-1)

b/c $e \uparrow \rightarrow NX \downarrow \rightarrow Y \uparrow$

(2) The Money Market and the LM* Curve

- LM* curve:
$$(\frac{M}{P}) = L(r^*, Y)$$

→ "vertical" b/c the exchange rate does not enter into the LM curve (fig. 12-2)

(3) Equilibrium

- Goods market equilibrium condition: IS* curve
- Money market equilibrium condition: LM* curve
- \rightarrow Equilibrium exchange rate & income (fig.12-3)
 - Exogenous variables: G, T, M, P, r*
 - Endogenous variables: e, Y

3. The Small Open Economy under Fixed Exchange Rates

- Bretton Woods system: an international monetary system under which most governments agree to fix exchange rates in the 1950s and 1960s.
- How a Fixed-Exchange-Rate System Works
 - The commitment of the central bank to allow the money supply to adjust to whatever level will ensure that the equilibrium exchange rate equals the announced exchange rate
 - The fixed exchange rate governs the money supply (fig. 12-7)

(1) Fiscal Policy (fig. 12-8)

- Expansionary fiscal policy $\rightarrow Y \uparrow$
 - equil. $e > \text{fixed } e \rightarrow M \uparrow \rightarrow \text{equil. } e = \text{fixed } e$
 - *cf*) the closed economy: $G \uparrow \rightarrow Y \uparrow$

(2) Monetary Policy (fig. 12-9)

- Expansionary monetary policy \rightarrow no effect on *Y*
 - equil. $e < \text{fixed } e \rightarrow M \downarrow \rightarrow \text{equil. } e = \text{fixed } e$
 - *cf*) the closed economy: $M \uparrow \rightarrow r \downarrow \rightarrow I \uparrow \rightarrow Y \uparrow$

(3) Trade Policy

- Trade restrictions (Tariff or import quota) $\rightarrow Y \uparrow$ $\rightarrow NX \uparrow$
 - \rightarrow equil. e > fixed e
 - $\rightarrow M \uparrow \rightarrow$ equil. e = fixed e

4. The Small Open Economy under Floating Exchange Rates

- Floating exchange rates: the exchange rate is allowed to fluctuate freely in response to changing economic conditions
- (1) Fiscal Policy (fig. 12-4)
 - Expansionary fiscal policy $\rightarrow e^{\uparrow}$ & no effect on *Y*
 - e^{\uparrow} b/c capital flows in from abroad (upward pressure on domestic interest rate)
 - \rightarrow the relative price of domestic goods \uparrow
 - → $NX \downarrow$ offsets the effects of the expansionary fiscal policy on income
 - *cf*) the closed economy: $G \uparrow \rightarrow Y \uparrow$

(2) Monetary Policy (fig. 12-5)

- Expansionary monetary policy $\rightarrow e \downarrow \& Y \uparrow$
 - $e \downarrow b/c$ capital flows out of the economy (downward pressure on domestic interest rate)

 \rightarrow the relative price of domestic goods \downarrow

 $\rightarrow NX \uparrow \rightarrow Y \uparrow$

cf) the closed economy: $M \uparrow \rightarrow r \downarrow \rightarrow I \uparrow \rightarrow Y \uparrow$

(*3*) *Trade Policy* (*fig.* 12-6)

- Trade restrictions (Tariff or import quota)
- $\rightarrow NX \uparrow \rightarrow e \uparrow \&$ no effect on *Y*

5. Should Exchange Rates Be Floating or Fixed?

- Most economists have favored a system of floating exchange rates
- In recent years, some have advocated a return to a fixed exchange rate
- The role of monetary policy
 - Fixed rates: the single goal of maintaining the exchange rate at its announced level
 - Floating rates: monetary policymakers free to pursue other goals; stabilizing employment (output) or price
- Advocates of fixed exchange rates
 - EXRA uncertainty makes int'l trade more difficult
 - Irrational and destabilizing speculation by int'l investors

6. The Mundell-Fleming Model with a Changing Price

IS*:
$$Y = C(Y - T) + I(r^*) + G + NX(e)$$

LM*: $(\frac{M}{P}) = L(r^*, Y)$

- Aggregate Demand: negative relationship b/t P and Y

$$P \downarrow \rightarrow \left(\frac{M}{P}\right) \uparrow \rightarrow LM^* \text{ shifts to the right (fig. 12-12)}$$
$$\Rightarrow e \downarrow \& Y \uparrow$$

- SR and LR equilibria in a small open economy (fig. 12-13)

AGGREGATE **S**UPPLY

- The aggregate supply behaves very differently in the short run than in the long run
- Economists disagree about how best to explain AS in the SR
- A common theme about what makes the SR and LR AS curves differ
- A common conclusion that the SRAS curve is upward sloping b/c frictions of macroeconomics

1. Two Models of Aggregate Supply

- Some market imperfection (friction) causes the output of the economy to deviate from the classical benchmark
 - \rightarrow SRAS is upward sloping rather than vertical
 - → Shifts in SRAS cause the level of output to deviate temporarily from the natural rate

AS:
$$Y = \overline{Y} + \alpha (P - P^e), \ \alpha > 0,$$

- where p^e : the expected price level
 - α : how much output responds to unexpected change in the price level

(1) The Sticky Wage Model

- Friction: the sluggish adjustment of nominal wage
 - e.g., long-term contracts, implicit agreements on limited wage changes
 - If the nominal wage (W) is stuck and $P \uparrow$

 \rightarrow real wage $(W/P) \downarrow$

- \rightarrow Firms hire more workers
- \rightarrow The additional labor produces more output
- AS curve (fig. 13-1)
 - Firms and workers set W based on the target real wage (ω) and on their expectation of the price level (P^e)

 $\rightarrow W = \omega \times P^e$

• Real wage: $W/P = \omega \times (P^e/P)$

 \rightarrow the real wage deviates from its target if $P^e \neq P$

- Labor demand: $L = L^d (W/P)$
- Production function: Y = F(L)

 \rightarrow AS: $Y = \overline{Y} + \alpha (P - P^e)$

- Friction: The prices of goods and services adjust slowly

e.g., long-term contract, menu cost

- Firm's pricing decision rule:
 - → firm's desired price(p) depends on the price level(P) and the aggregate income(Y)
 e.g., P↑ → p↑ (b/c production cost ↑)
 Y↑ → p↑ (b/c demand ↑)

 $\Rightarrow p = P + \beta(Y - \overline{Y}),$

where β measures how much the firm's desired price responds to the level of aggregate output

- Two types of firms
 - a) flexible prices (1-s): $p = P + \beta(Y \overline{Y})$
 - b) sticky prices (s): they announce their prices in advance based on their expectations

$$\rightarrow p = P^e + \beta (Y^e - \overline{Y}^e)$$

- $\rightarrow p = P^e$ assuming $Y^e = \overline{Y}^e$ for simplicity
- The overall price level: $P = sP^{e} + (1 - s)[P + \beta(Y - \overline{Y})]$ $\Rightarrow AS: Y = \overline{Y} + \alpha(P - P^{e}) \text{ where } \alpha = s/[(1 - s)\beta]$

(3) Implications

- Although the two models of aggregate supply differ in their assumptions and emphasis, their implications for aggregate output are similar

 \rightarrow AS: $Y = \overline{Y} + \alpha(P - P^e)$

- If $P > P^e \rightarrow Y > \overline{Y}$ and if $P < P^e \rightarrow Y < \overline{Y}$ (fig. 13-3)
- How shifts in AD lead to SR fluctuations (fig. 13-4)
 - The unexpected expansion in AD causes the economy to boom in the SR
 - However, the economy returns the natural level of output in the LR at a much higher price level
 - → LR monetary neutrality and SR monetary non-neutrality are perfectly compatible in this model

2. New Keynesian Economics

- Keynes: abandon the classical presumption that wages and prices adjust quickly to equilibrate market
- Aggregate demand is a primary determinant of national income in the short run
- New Keynesian economists develop more fully the Keynesian approach to economic fluctuations

→ Accept IS-LM model as the theory of aggregate demand and try to refine the theory of aggregate supply
→ How wages and prices behave in the short run by identifying more precisely the market imperfections that make wages and prices sticky and that cause the economy to deviate from its natural rate
→ Stickiness makes the SRAS curve upward sloping
→ Fluctuations in aggregate demand cause SR fluctuations in output and employment

- Examining the microeconomics behind SR price adjustment

1) Small Menu Costs and Aggregate-Demand Expenditure

Menu cost: costs of price adjustment that lead firms to adjust prices intermittently rather than continuously
 → Even though menu costs are small for the individual firm, they can have large effects on the economy as a whole

- Aggregate-demand externality: macroeconomic impact of one firm's price adjustment on the demand for all other firms' products
 - Price reduction by one firm \rightarrow lowers $P \rightarrow$ raises real money balances \rightarrow expands aggregate income \rightarrow raises aggregate demand
- Small menu costs can make prices sticky in the presence of aggregate-demand externality
 - Stickiness can have a large cost to society
 - However, the firm ignore the externality when making its decision

 \rightarrow Sticky prices may be optimal for those setting prices, even though they are undesirable for the economy as a whole

2) Recessions as Coordination Failure

- In recession, output is low, workers are unemployed, and factories sit idle

→ It is possible to imagine allocations of resources in which everyone is better off

- Coordination problem can arise in setting of wages and prices because those who anticipate the actions of other wage and price setters
- Example
 - A fall in money supply
 - Decide whether to cut its price
 - Each firm's profit depends not only on its pricing decision but also on the decision made by other firms

		Cut price	Keep high price
Firm 1	Cut price	Firm 1 makes \$30 Firm 2 makes \$30	Firm 1 makes \$5 Firm 2 makes \$15
	Keep high price	Firm 1 makes \$15 Firm 2 makes \$5	Firm 1 makes \$15 Firm 2 makes \$15

Firm 2

- Outcomes

If each firm expects the other to cut its price, both will cut prices, resulting in the preferred outcome
If each firm expects the other to maintain its prices,

both will maintain their prices, resulting in the inferior outcome \rightarrow "Coordination Failure"

• Coordination is often difficult because the number of firms setting prices is large

 \rightarrow Prices can be sticky simply because people expect them to be sticky, even though stickiness is in no one's interest

3) The Staggering Wages and Prices

- Not everyone in the economy sets new wages and prices at the same time (→ Staggering)
- Staggering slows the process of coordination and price adjustment

→ makes the overall level of wages and prices adjust gradually, even when individual wages and prices changes frequently

3. Inflation, Unemployment, and the Phillips Curve

- The goals of economic policy makers
 - \rightarrow low inflation and low unemployment
 - \rightarrow However, tradeoff b/t inflation and unemployment

 \rightarrow "SR Phillips curve" (fig. 13-6)

 $\pi = \pi^e - \gamma(u - u^n) + v$

inflation = expected inflation - γ× cyclical unemployment + supply shock

> γ: a parameter measuring the response of inflation to cyclical unemployment rate

- The causes of rising and falling inflation
 - Demand-pull inflation: cyclical unemployment exerts upward or downward pressure on inflation

 \rightarrow Low unemployment pulls the inflation rate up

• Cost-push inflation: Adverse supply shocks are typically push up the costs of production

CONSUMPTION

- Consumption decision is crucial for SR analysis because of its role in determining aggregate demand
- Fluctuations in consumption are a key element of booms and recessions
- C = C(Y T): too simple to provide a complete explanation of consumer behavior
- more thorough explanation of what determines aggregate consumption
- Keynesian consumption function
 - \rightarrow C = f (current income)
- Recent work
 - → C = f (current income, wealth, expected future income, interest rate,)

1. Keynes's Conjectures

- 1) The marginal propensity to consume (MPC = c) is between zero and one
- 2) The average propensity to consume (APC = C/Y) is a decreasing function of income
- 3) Income is the primary determinant of consumption and interest rate does not have an important role

 $\rightarrow C = \overline{C} + cY, \quad \overline{C} > 0, \quad 0 < c < 1 \text{ (fig. 16-1)}$

- The early empirical successes
 - Surveys of households support Keynes's conjectures
- The consumption puzzle (fig. 16-2)
 - Studies of long time-series found that APC did not vary systematically with income (Kuznets)
 - SR and LR consumption functions
 - Needed to explain how these two consumption functions could be consistent with each other

2. Intertemporal Choice (Fisher)

- When people decide how much to consume and how much to save, they consider both the present and the future (tradeoff)
- Households must look ahead to the income they expect to receive in the future and to consumption they hope to be able to afford
- Fisher's intertemporal choice model
 - the constraints consumer face
 - \rightarrow interest rate, future income
 - the preference they have
 - how these constraints and preferences together determine their choices about consumption and saving

3. Life-Cycle Hypothesis (Modigliani)

- Income varies systematically over people's lives
- Saving allows consumers to move income from those times in life when income is high to those times when it is low
- (1) The Hypothesis
 - A consumer lives *T* years and earns income *Y* until she retires *R* years from now
 - Consumer's lifetime resources: initial wealth (W) + lifetime earnings (RY)
 - Assume that she wishes to achieve the smoothest possible path of consumption over her lifetime
 - → divides this total of W + RY equally among T years and each year consumes

C = (W + RY)/T = (1/T)W + (R/T)Y

→ An extra \$1 of income per year raises consumption by \$ (R/T) per year, and an extra \$1 of wealth raises consumption by \$ (1/T) - The economy's consumption function depends on both wealth and income (fig. 16-10)

 $C = \alpha W + \beta Y,$

where α : MPC out of wealth, β : MPC out of income

- (2) Implications
 - a) The intercept(αW) of the consumption function depends on wealth
 - b) $APC = C/Y = \alpha(W/Y) + \beta$
 - Wealth does not vary proportionately with income in the SR
 - But, over the long periods of time, wealth and income grow together (fig. 16-11)

 \rightarrow constant (W/Y)

 \rightarrow constant APC

- c) The life-cycle model can predicts that saving varies over a person's lifetime (fig. 16-12)
 - → If the consumer smoothes consumption over her life, she will save and accumulate wealth during her working years and then dissave and run down her wealth during retirement

4. Permanent-Income Hypothesis (Friedman)

- Consumption should not depend on current income alone
- People experience random and temporary changes in their incomes from year to year

(1) The Hypothesis (PIH)

- Permanent income is the part of income that people expect to persist into the future (average income)
 - e.g., A good education provides a permanently higher income
- Transitory income is the part of income that people *do not expect* to persist (random deviation from Y^P)
 - e.g., Good weather provides transitorily higher income
- A consumer's current income Y

 $\rightarrow Y = Y^P + Y^T$

where Y^P : permanent income, Y^T : transitory income

- PIH: Consumption should depend primarily on permanent income, b/c consumers use saving and borrowing to smooth consumption in response to transitory changes in income → Consumption is proportional to permanent Income

$$\rightarrow C = \alpha Y^P$$

(2) Implications

a) PIH solves the consumption puzzle by suggesting that the Keynesian consumption function use the wrong variable

i.e., current income \rightarrow permanent income

- b) $APC = C/Y = \alpha Y^P/Y$
 - APC depends on the ratio of permanent income to current income
 - SR fluctuations in income are dominated by transitory income
 - But, over the long periods of time, the variation in income comes from the permanent component

 \rightarrow constant APC