

Goods and Financial Markets:

The *IS-LM* Model

CHAPTER 5

Prepared by:

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5-1 The Goods Market and the *IS* Relation

Equilibrium in the goods market exists when production, Y , is equal to the demand for goods, Z . This condition is called the *IS* relation.

In the simple model developed in Chapter 3, the interest rate did not affect the demand for goods. The equilibrium condition was given by:

$$Y = C(Y - T) + \bar{I} + G$$

5-1 The Goods Market and the *IS* Relation

Investment, Sales, and the Interest Rate

Investment depends primarily on two factors:

- The level of sales (+)
- The interest rate (-)

$$I = I(Y, i)$$

(+, -)

5-1 The Goods Market and the IS Relation

Determining Output

Taking into account the investment relation, the equilibrium condition in the goods market becomes:

$$Y = C(Y - T) + I(Y, i) + G$$

For a given value of the interest rate i , demand is an increasing function of output, for two reasons:

- An increase in output leads to an increase in income and also to an increase in disposable income.
- An increase in output also leads to an increase in investment.

5-1 The Goods Market and the IS Relation

Determining Output

Note two characteristics of ZZ :

- Because it's assumed that the consumption and investment relations in Equation (5.2) are linear, ZZ is, in general, a curve rather than a line.
- ZZ is drawn flatter than a 45-degree line because it's assumed that an increase in output leads to a less than one-for-one increase in demand.

5-1 The Goods Market and the IS Relation

Determining Output

■ Figure 5 - 1

Equilibrium in the Goods Market

The demand for goods is an increasing function of output. Equilibrium requires that the demand for goods be equal to output.

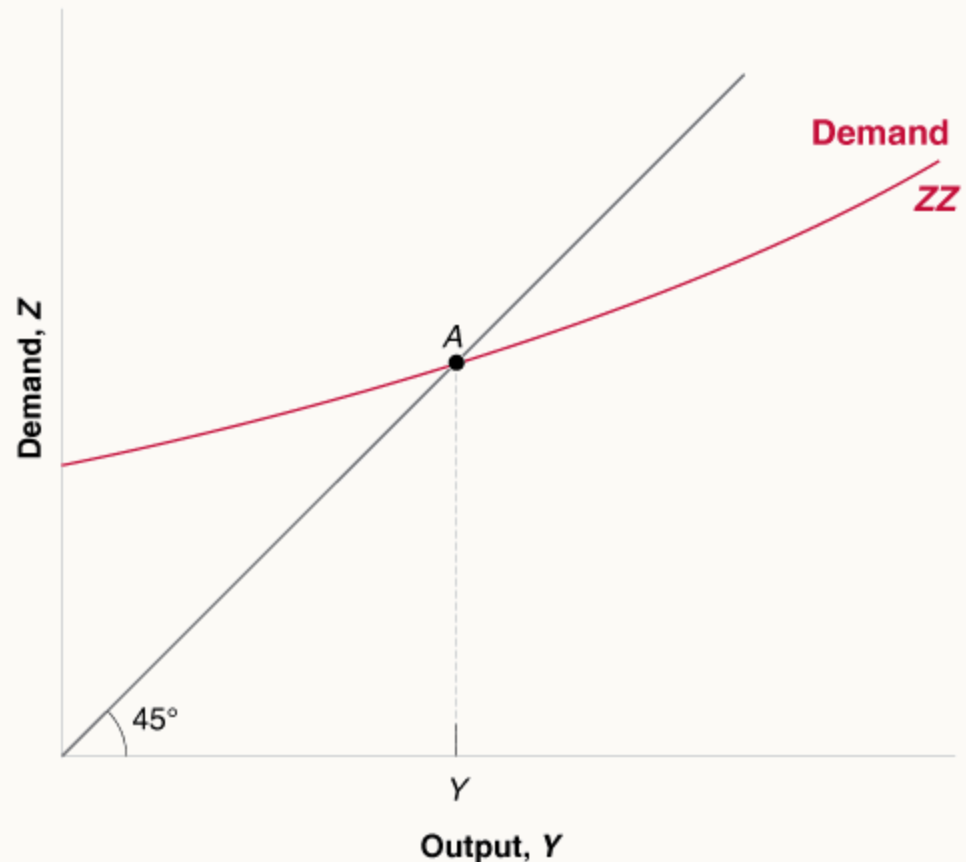


5-1 The Goods Market and the IS Relation

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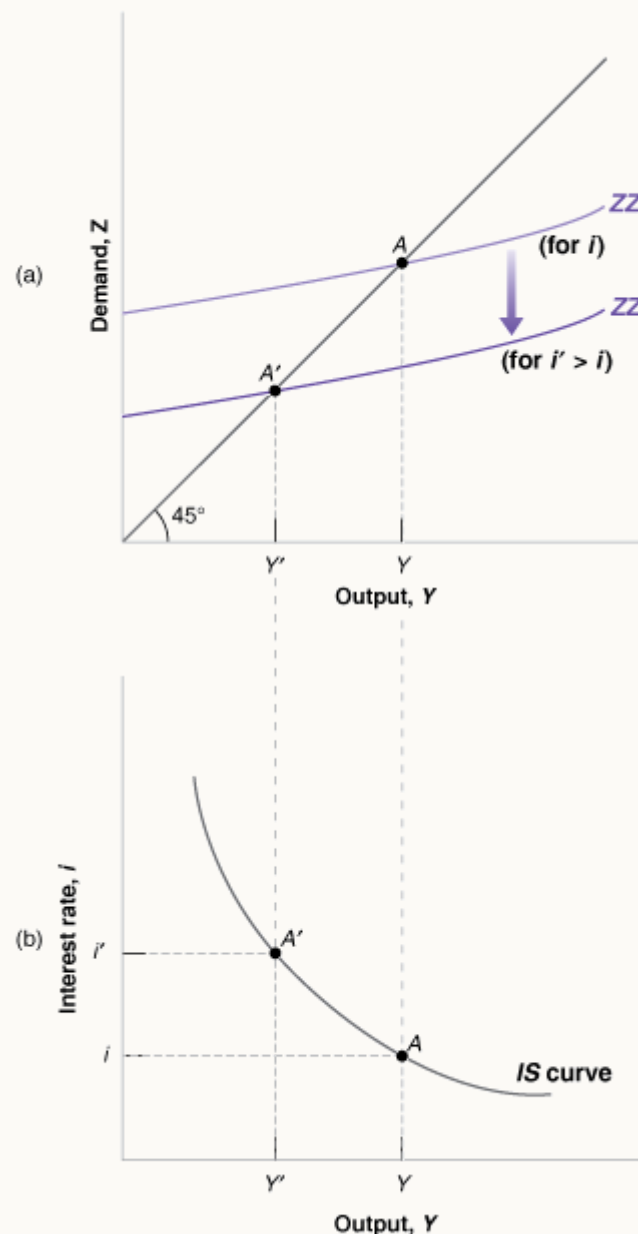
5-1 The Goods Market and the *IS* Relation

Deriving the *IS* Curve

Figure 5 - 2

The Derivation of the IS Curve

- (a) An increase in the interest rate decreases the demand for goods at any level of output, leading to a decrease in the equilibrium level of output.
- (b) Equilibrium in the goods market implies that an increase in the interest rate leads to a decrease in output. The *IS* curve is therefore downward sloping.



5-1 The Goods Market and the IS Relation

Shifts of the IS Curve

We have drawn the IS curve in Figure 5-2, taking as given the values of taxes, T , and government spending, G . Changes in either T or G will shift the IS curve.

To summarize:

- Equilibrium in the goods market implies that an increase in the interest rate leads to a decrease in output. This relation is represented by the downward-sloping IS curve.
- Changes in factors that decrease the demand for goods, given the interest rate, shift the IS curve to the left. Changes in factors that increase the demand for goods, given the interest rate, shift the IS curve to the right.

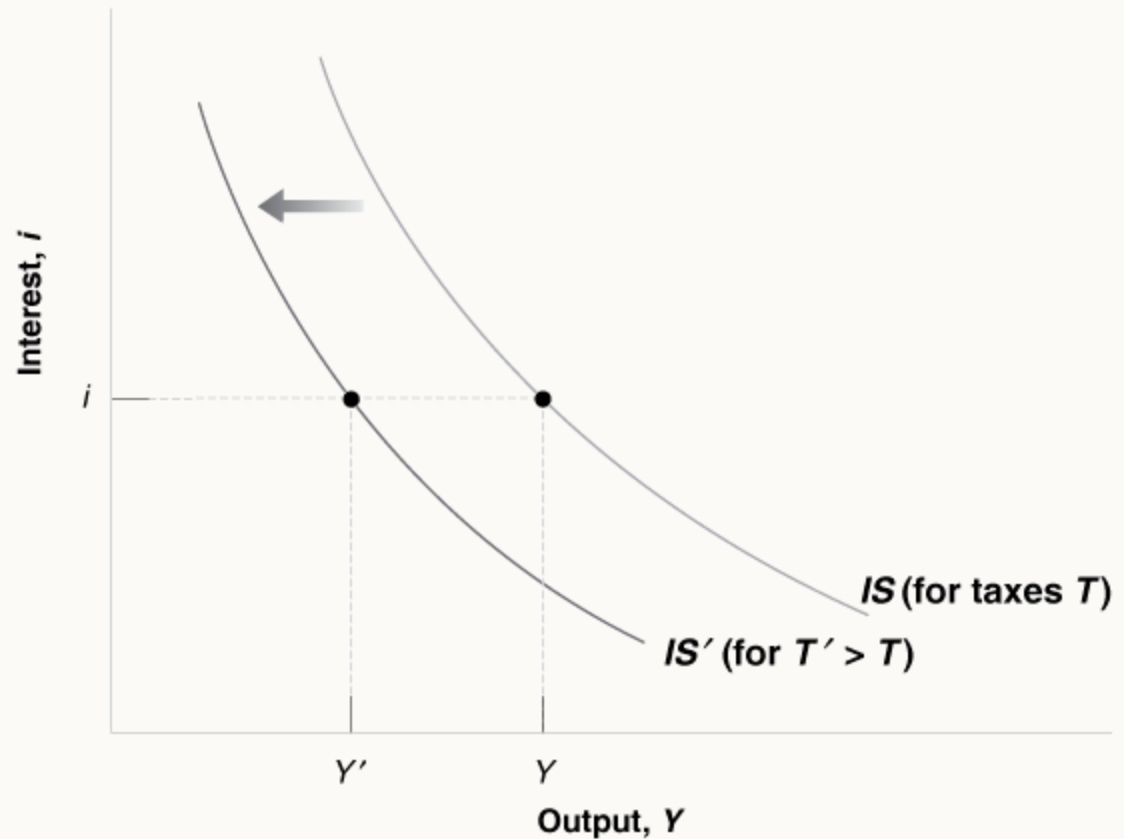
5-1 The Goods Market and the IS Relation

Shifts of the IS Curve

■ Figure 5 - 3

Shifts of the IS Curve

An increase in taxes shifts the IS curve to the left.



5-2 Financial Markets and the *LM* Relation

The interest rate is determined by the equality of the supply of and the demand for money:

$$M = \$YL(i)$$

M = nominal money stock

$\$YL(i)$ = demand for money

$\$Y$ = nominal income

i = nominal interest rate

5-2 Financial Markets and the *LM* Relation

Real Money, Real Income, and the Interest Rate

The equation $M = \$YL(i)$ gives a relation between money, nominal income, and the interest rate.

The *LM* relation: In equilibrium, the *real money supply* is equal to the *real money demand*, which depends on real income, Y , and the interest rate, i :

$$\frac{M}{P} = YL(i)$$

From chapter 2, recall that Nominal GDP = Real GDP multiplied by the GDP deflator:

$$\$Y = YP$$

Equivalently:

$$\frac{\$Y}{P} = Y$$

5-2 Financial Markets and the *LM* Relation

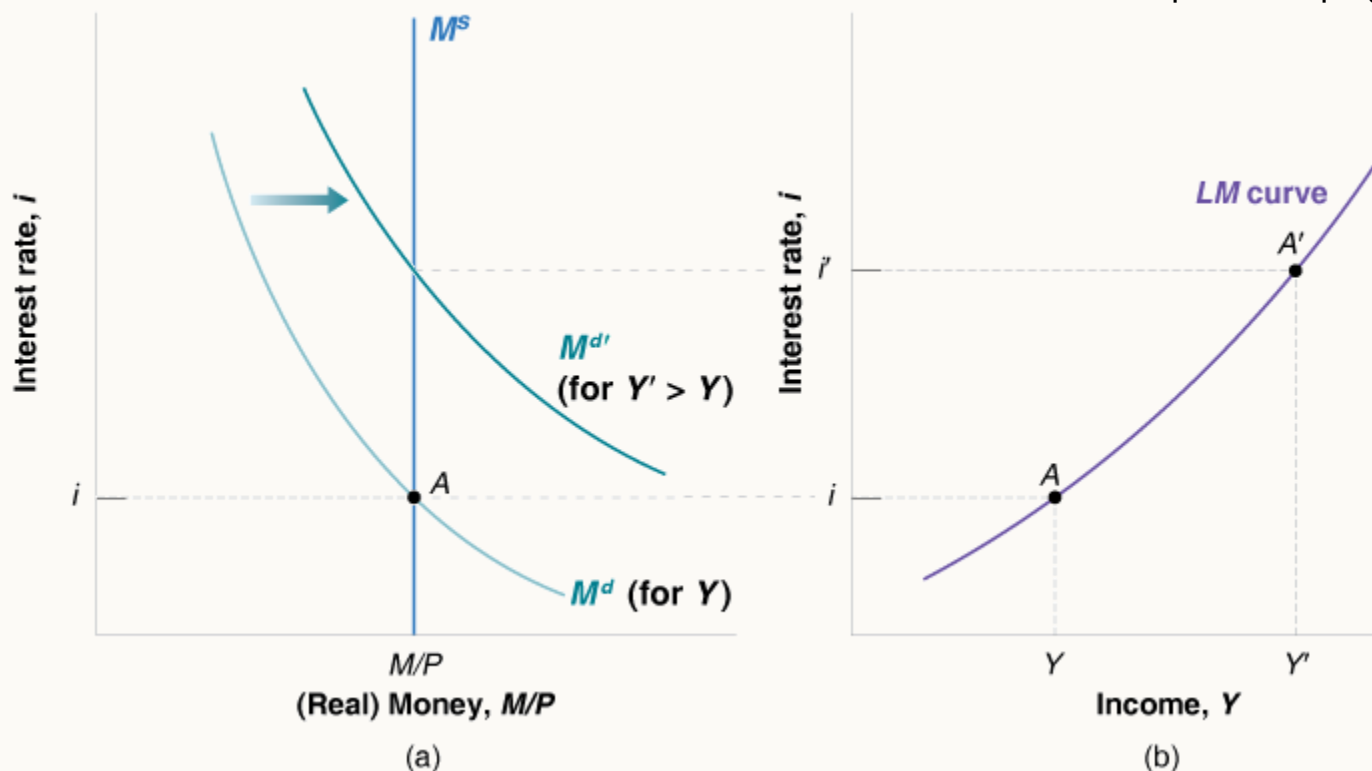
Deriving the *LM* Curve

Figure 5 - 4

The Derivation of the LM Curve

a) An increase in income leads, at a given interest rate, to an increase in the demand for money. Given the money supply, this increase in the demand for money leads to an increase in the equilibrium interest rate.

b) Equilibrium in the financial markets implies that an increase in income leads to an increase in the interest rate. The *LM* curve is therefore upward sloping.



5-2 Financial Markets and the *LM* Relation

Deriving the *LM* Curve

Figure 5-4(b) plots the equilibrium interest rate, i , on the vertical axis against income on the horizontal axis.

This relation between output and the interest rate is represented by the upward sloping curve in Figure 5-4(b). This curve is called the ***LM* curve**.

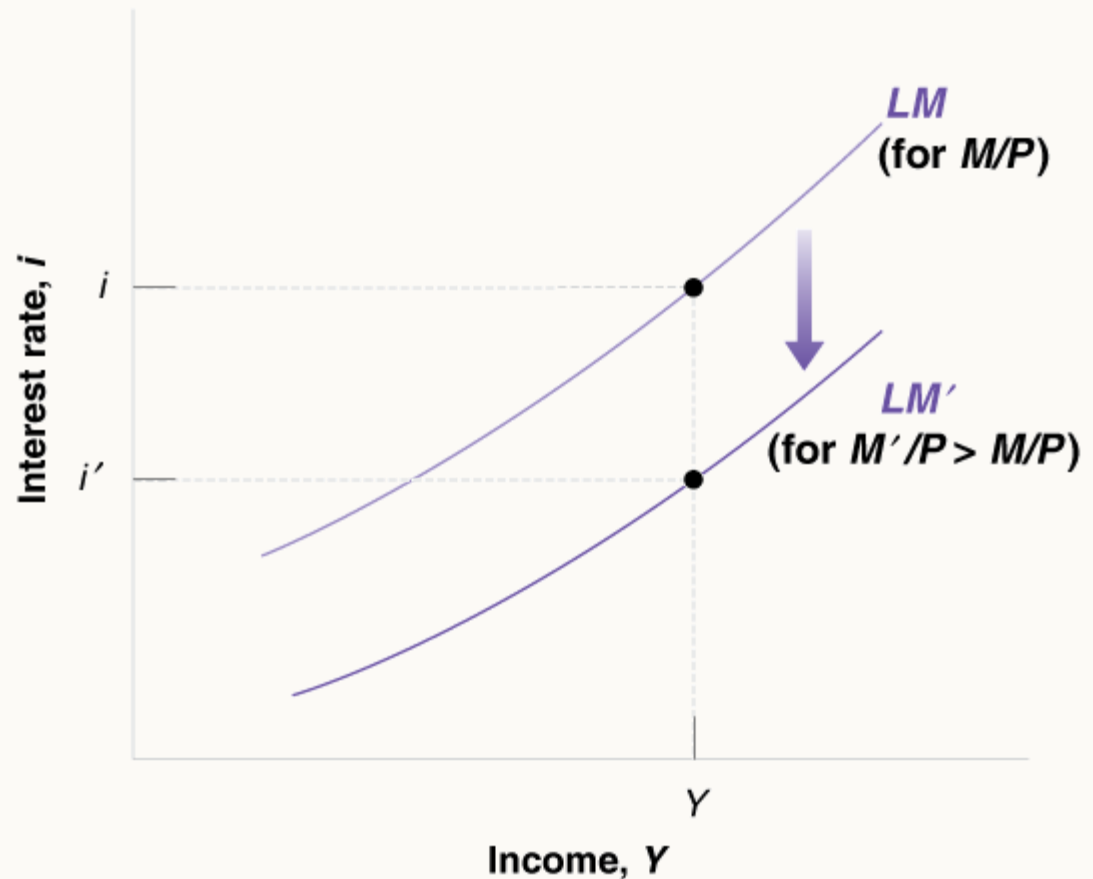
5-2 Financial Markets and the *LM* Relation

Shifts of the *LM* Curve

■ Figure 5 - 5

Shifts of the LM curve

An increase in money causes the *LM* curve to shift down.



5-2 Financial Markets and the *LM* Relation

Shifts of the *LM* Curve

- Equilibrium in financial markets implies that, for a given real money supply, an increase in the level of income, which increases the demand for money, leads to an increase in the interest rate. This relation is represented by the upward-sloping *LM* curve.
- An increase in the money supply shifts the *LM* curve down; a decrease in the money supply shifts the *LM* curve up.

5-3 Putting the *IS* and the *LM* Relations Together

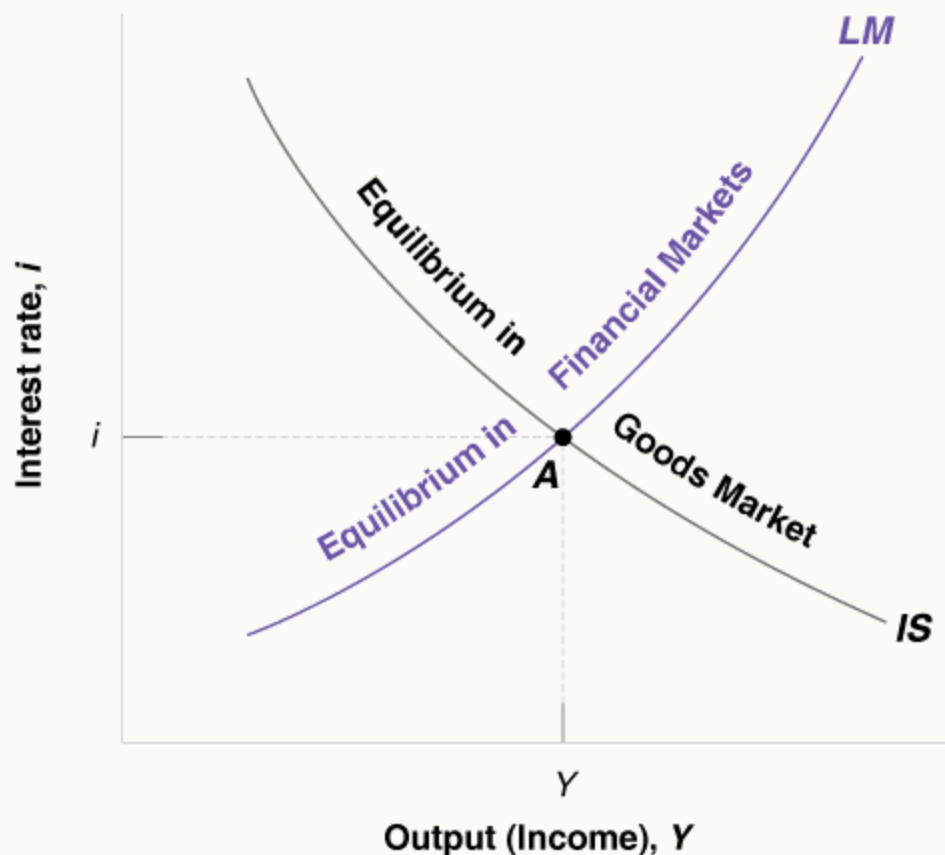
$$IS \text{ relation: } Y = C(Y - T) + I(Y, i) + G$$

$$LM \text{ relation: } \frac{M}{P} = YL(i)$$

■ Figure 5 - 6

The *IS–LM* Model

Equilibrium in the goods market implies that an increase in the interest rate leads to a decrease in output. This is represented by the *IS* curve. Equilibrium in financial markets implies that an increase in output leads to an increase in the interest rate. This is represented by the *LM* curve. Only at point A, which is on both curves, are both goods and financial markets in equilibrium.



5-3 Putting the *IS* and the *LM* Relations Together

Fiscal Policy, Activity, and the Interest Rate

Fiscal contraction, or fiscal **consolidation**, refers to fiscal policy that reduces the budget deficit.

An increase in the deficit is called a **fiscal expansion**.

Taxes affect the *IS* curve, not the *LM* curve.

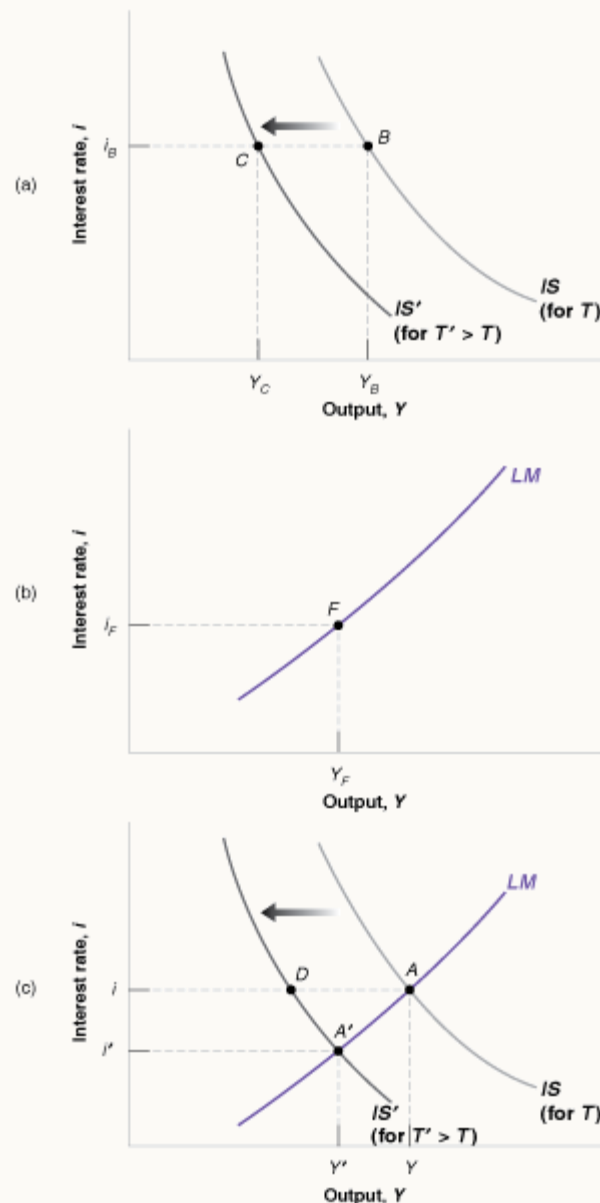
5-3 Putting the *IS* and the *LM* Relations Together

Fiscal Policy, Activity, and the Interest Rate

Figure 5 - 7

The *IS*–*LM* Model

Equilibrium in the goods market implies that an increase in the interest rate leads to a decrease in output. This is represented by the *IS* curve. Equilibrium in financial markets implies that an increase in output leads to an increase in the interest rate. This is represented by the *LM* curve. Only at point *A*, which is on both curves, are both goods and financial markets in equilibrium.



5-3 Putting the *IS* and the *LM* Relations Together

Monetary Policy, Activity, and the Interest Rate

Monetary contraction, or **monetary tightening**, refers to a decrease in the money supply.

An increase in the money supply is called **monetary expansion**.

Monetary policy does not affect the *IS* curve, only the *LM* curve. For example, an increase in the money supply shifts the *LM* curve down.

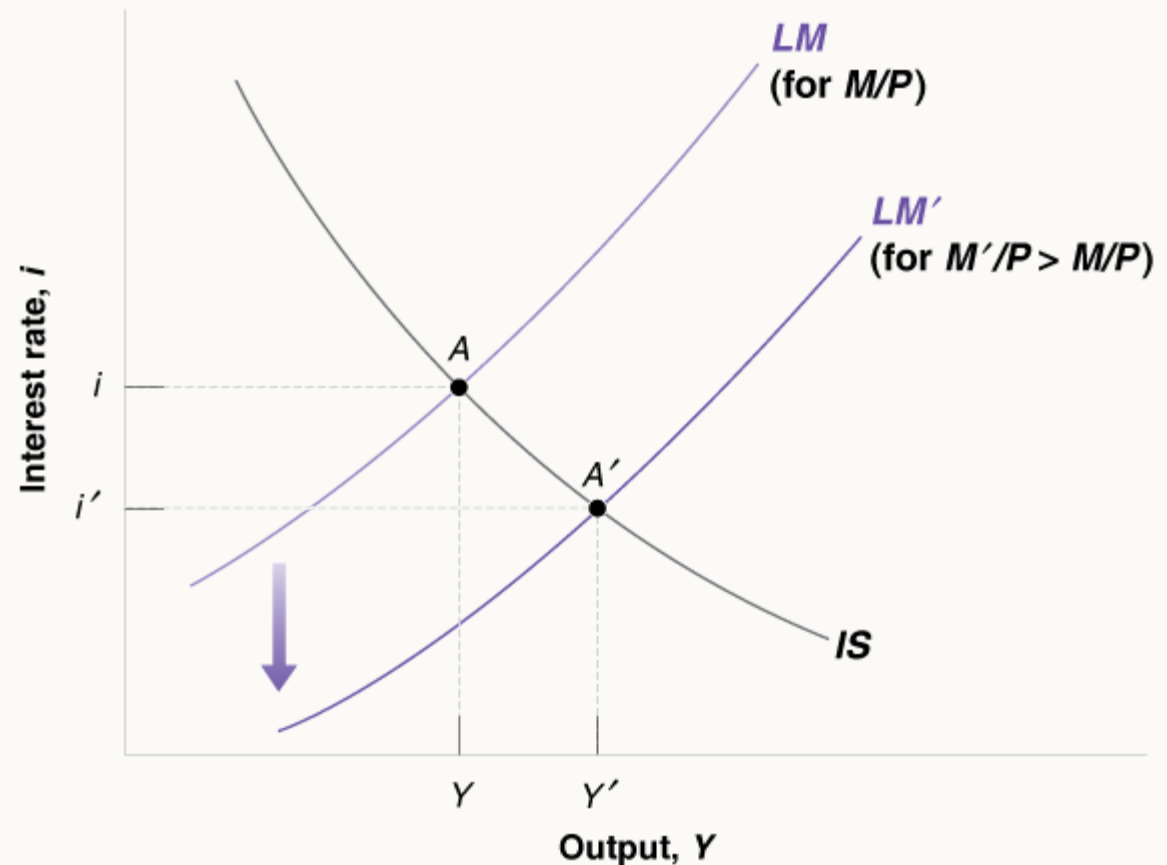
5-3 Putting the *IS* and the *LM* Relations Together

Monetary Policy, Activity, and the Interest Rate

■ Figure 5 - 8

The Effects of a Monetary Expansion

A monetary expansion leads to higher output and a lower interest rate.



5-4 Using a Policy Mix

Table 5-1 The Effects of Fiscal and Monetary Policy

	Shift of <i>IS</i>	Shift of <i>LM</i>	Movement in Output	Movement in Interest Rate
Increase in taxes	Left	None	Down	Down
Decrease in taxes	Right	None	Up	Up
Increase in spending	Right	None	Up	Up
Decrease in spending	Left	None	Down	Down
Increase in money	None	Down	Up	Down
Decrease in money	None	Up	Down	Up

Deficit Reduction: Good or Bad for Investment?



SCU
FOCUS

Investment = Private saving + Public saving

$$I = S + (T - G)$$

A fiscal contraction may decrease investment. Or, looking at the reverse policy, a fiscal expansion—a decrease in taxes or an increase in spending—may actually increase investment.

5-4 Using a Policy Mix

The combination of monetary and fiscal policies is known as the **monetary-fiscal policy mix**, or simply, the **policy mix**.

Sometimes, the right mix is to use fiscal and monetary policy in the same direction.

Sometimes, the right mix is to use the two policies in opposite directions—for example, combining a fiscal contraction with a monetary expansion.

The U.S. Recession of 2001



FOCUS

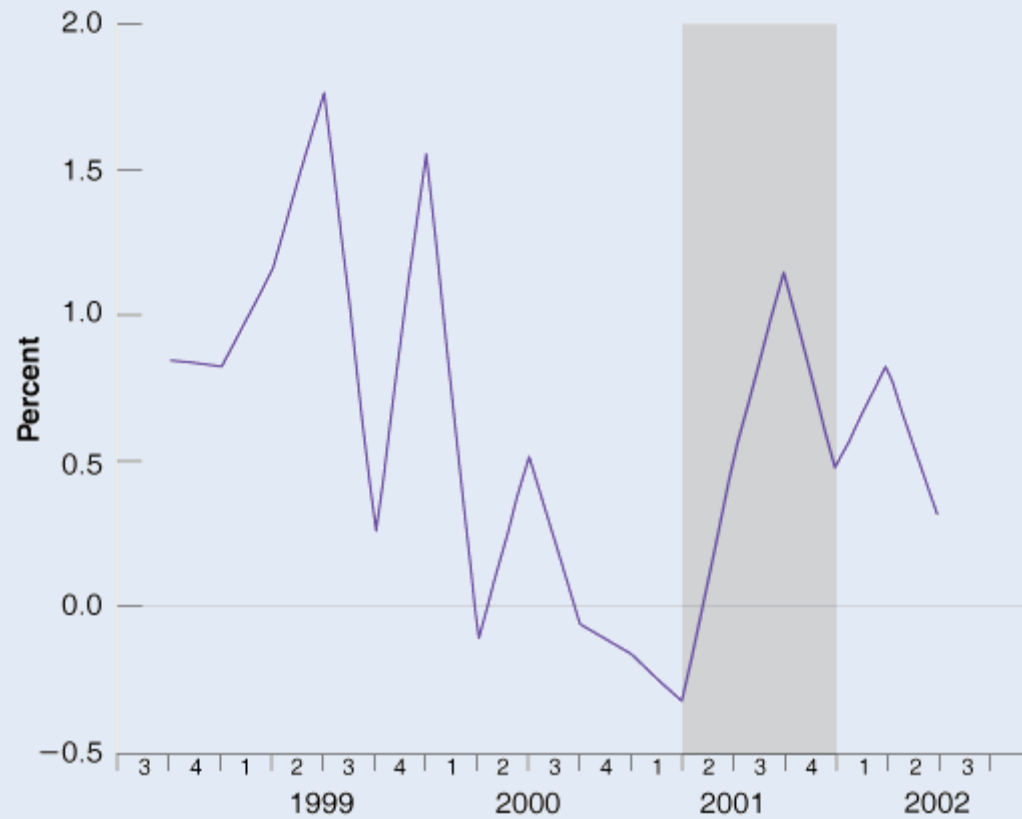


Figure 1 *The U.S. Growth Rate, 1999:1 to 2002:4*

The U.S. Recession of 2001



FOCUS

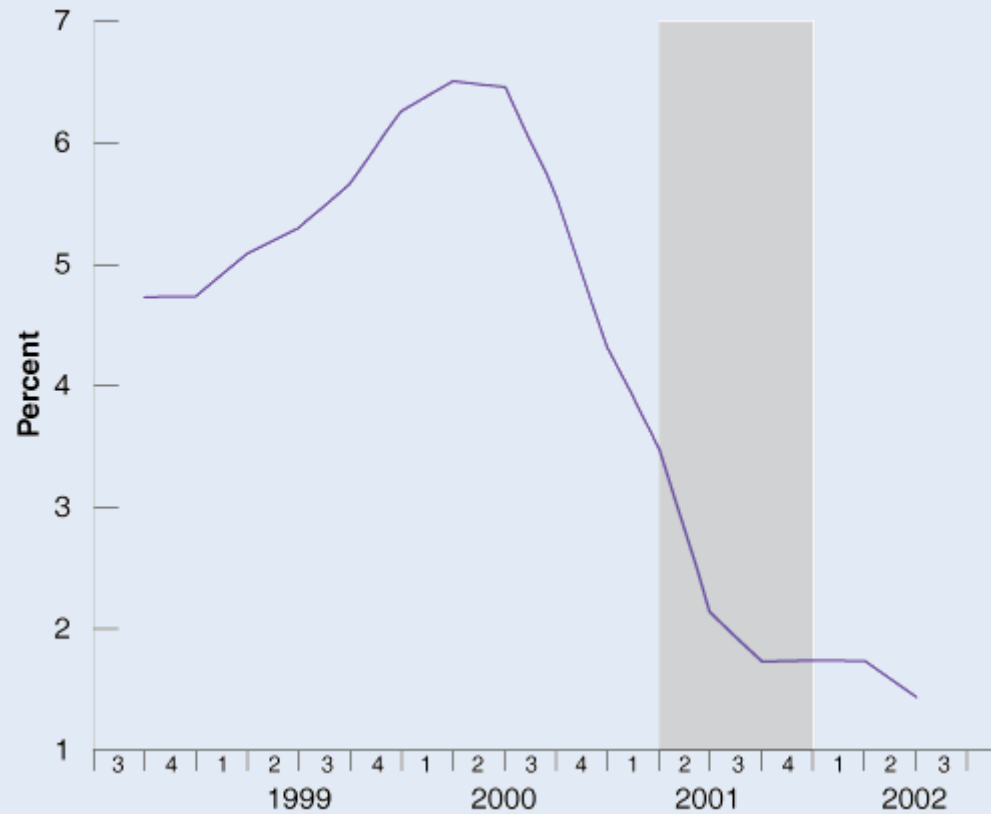


Figure 2 *The Federal Funds Rate, 1999:1 to 2002:4*

The U.S. Recession of 2001



FOCUS

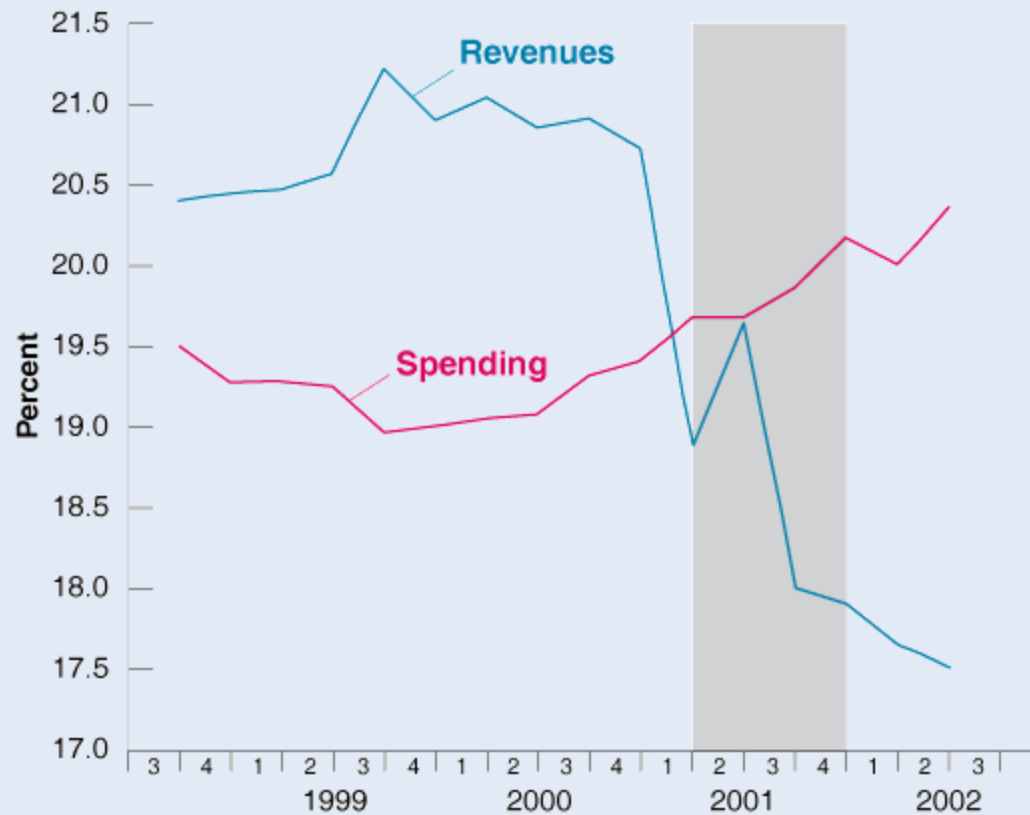


Figure 3 *U.S. Federal Government Revenues and Spending (as Ratios to GDP), 1999:1 to 2002:4*



BIAYA PEMULIHAN EKONOMI NASIONAL (PEN)

(yaitu BIAYA PENANGANAN COVID-19 tanpa memasukkan biaya kesehatan)



Demand Side
Rp205,20 T

Biaya
Pemulihan Ekonomi Nasional
Rp607,65 T*

Supply Side
Rp402,45 T

Rumah Tangga

PKH
Sembako
Bansos Jabodetabek
Bansos Non-Jabodetabek
Pra Kerja
Diskon Listrik
Logistik/Pangan/Sembako
BLT Dana Desa
Insentif Perumahan Bagi MBR

Rp205,2T

Ultra Mikro dan UMKM

Subsidi Bunga, Penempatan Dana untuk Restru UMKM,
Belanja IJP, Penjaminan untuk Modal Kerja (Stop Loss), PPh
Final UMKM DTP, Pembiayaan Investasi melalui LPDB KUMKM

123,46T

Korporasi

Penempatan Dana untuk Restru Padat Karya, PMN dan Surat
Utang ke PPA, PPh 21 DTP, Pembebasan PPh 22 Impor,
Pengurangan Angsuran PPh 25, Pengembalian Pendahuluan
PPN, Penurunan Tarif PPh Badan, Stimulus Perpajakan
Lainnya, Cadangan DAK Fisik, Program Padat Karya K/L,
Insentif Tiket untuk 10 Destinasi Pariwisata, Hibah
Pariwisata, Kompensasi Pajak Hotel/Restoran

169,97T

BUMN**

PMN dan Talangan (Investasi) untuk Modal Kerja

35,15T

Pemerintah Daerah

DID Pemulihan Ekonomi, Pemberian Pinjaman ke Daerah

15,00T

Cadangan Perluasan

58,87

*finalisasi besaran pada revisi perpres 54/2020

**tidak termasuk kompensasi BUMN sebagai sebagai
konsekuensi kewajiban Pemerintah sebelumnya

The U.S. Recession of 2001

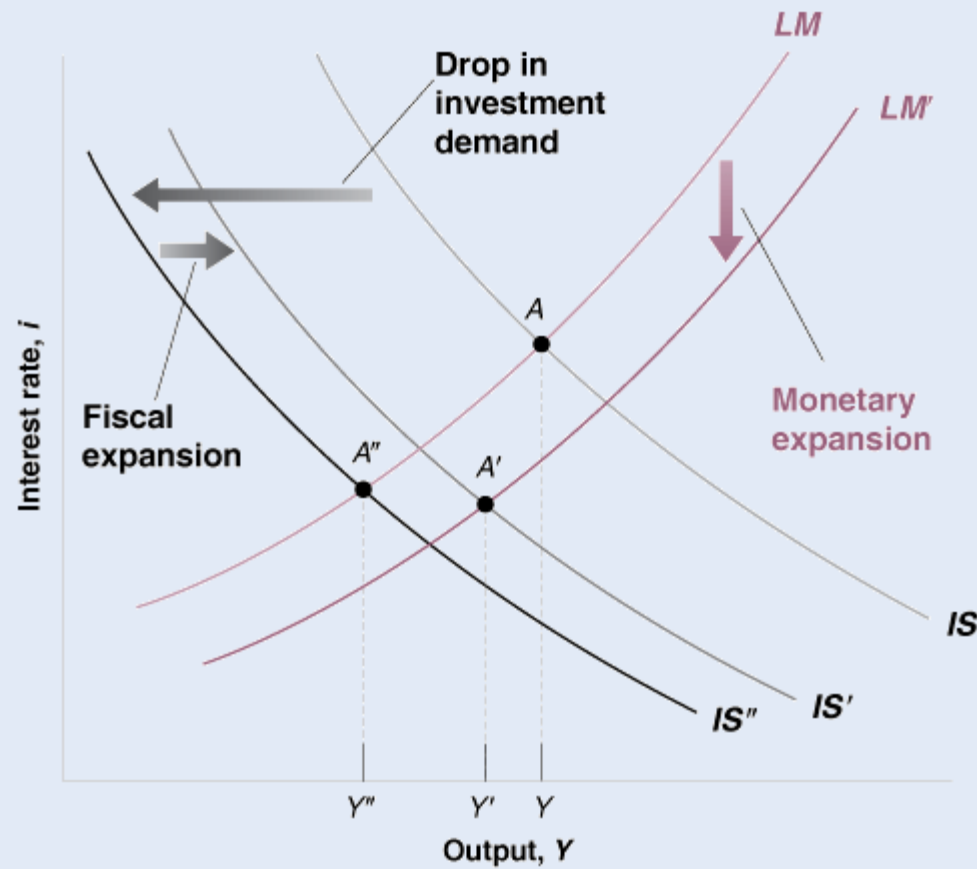


Figure 4 *The U.S. Recession of 2001*

The U.S. Recession of 2001



SCUDS
FOCUS

What happened in 2001 was the following:

- The decrease in investment demand led to a sharp shift of the IS curve to the left, from IS to IS' .
- The increase in the money supply led to a downward shift of the LM curve, from LM to LM' .
- The decrease in tax rates and the increase in spending both led to a shift of the IS curve to the right, from IS'' to IS' .



BIAYA PENANGANAN COVID-19

Untuk menangani kesehatan, perlindungan sosial, dan dukungan UMKM, dunia usaha, dan Pemda



Program Pemulihan Ekonomi Nasional (PEN)

Perlindungan Sosial

Rp203,90 T

- PKH Rp37,40T
- Sembako Rp43,60T
- Bansos Jabodetabek Rp6,80T
- Bansos Non-Jabodetabek Rp32,40T
- Pra Kerja Rp20,00T
- Diskon Listrik Rp6,90T
- Logistik / Pangan / Sembako Rp25,00T
- BLT Dana Desa Rp31,80T

Insentif Usaha

Rp120,61 T

- PPh 21 DTP Rp39,66T
- Pembebasan PPh 22 Impor Rp14,75T
- Pengurangan Angsuran PPh 25 Rp14,40T
- Pengembalian Pendahuluan PPN Rp5,80T
- Penurunan Tarif PPh Badan Rp20,00T
- Stimulus Lainnya Rp26,00T

Pembiayaan Korporasi

Rp53,57 T

- Penempatan dana untuk Restru Padat Karya Rp 3,42T
- PMN Rp20,50T (HK Rp7,5T, BPUI Rp6T, PNM Rp1,5T, ITDC Rp0,5T, PPA Rp5T)
- Pinjaman Rp29,65T (Garuda Rp8,5T, KAI Rp3,5T, PTPN Rp4T, KS Rp3T, Perumnas Rp0,65T, PPA Rp10T)

Sektoral K/L & Pemda

Rp106,11 T

- Program Padat Karya K/L Rp18,44T
- Insentif Perumahan Rp1,30T
- Pariwisata Rp3,80T
- DID Pemulihan Ekonomi Rp5,00T
- Cadangan DAK Fisik Rp8,70
- Fasilitas Pinjaman Daerah Rp10,00T
- Cadangan Perluasan Rp58,87T

UMKM

Rp123,46 T

- Subsidi bunga Rp35,28T
- Penempatan Dana untuk Restru Rp78,78T
- Belanja IJP Rp5,00T
- Penjaminan untuk Modal Kerja (Stop Loss) Rp1,00T;
- PPh Final UMKM DTP Rp2,40T
- Pembiayaan Investasi kepada Koperasi melalui LPDB KUMKM Rp1,00T

Kesehatan

Rp87,55 T

- Belanja Penanganan Covid-19 Rp65,80T
- Insentif Tenaga Medis Rp5,90T
- Santunan Kematian Rp0,30T
- Bantuan Iuran JKN Rp3,00T
- Gugus Tugas Covid-19 Rp3,50T
- Insentif perpajakan di Bidang Kesehatan Rp9,05T

Total Biaya Penganganan COVID-19

Rp695,2 T

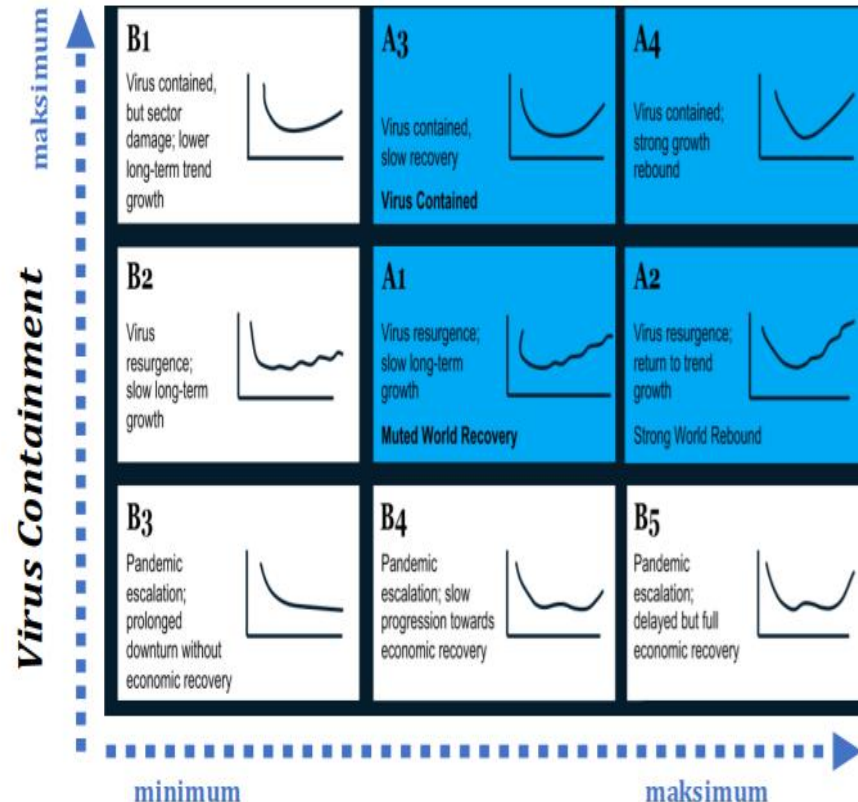
- Perubahan Defisit butuh pembiayaan utang Rp903,46 Trilyun
- Beban bunga ↑ Rp66.5 Trilyun/tahun atau ~2.43% dari total Belanja



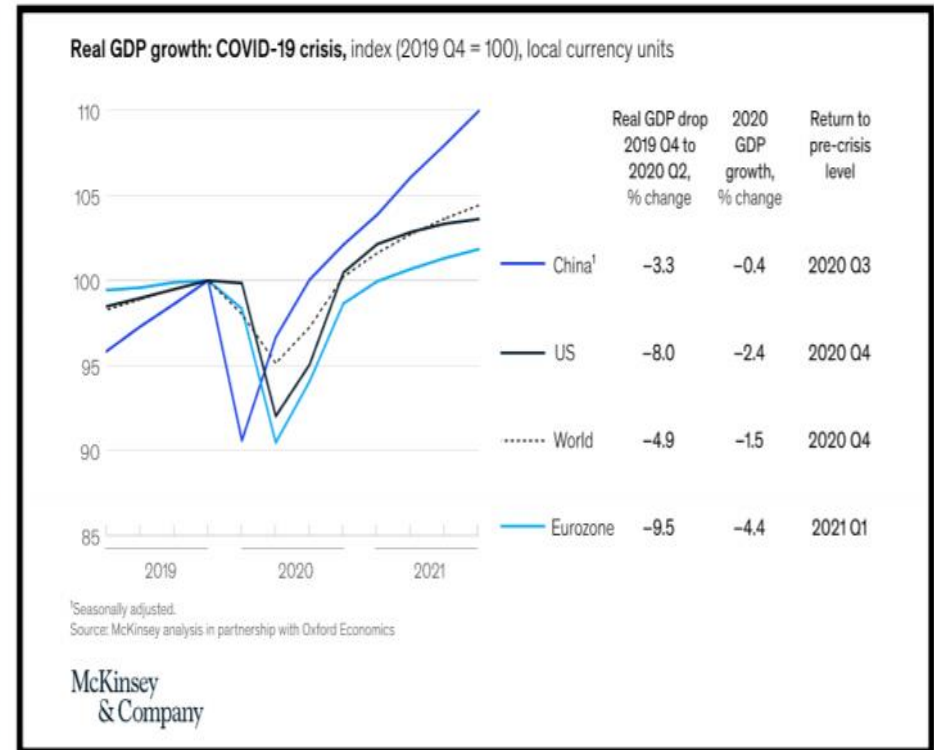
KRISIS COVID-19 MEMERLUKAN *UNPRECEDENTED POLICIES*

Kecepatan pemulihan ekonomi tergantung kepada kombinasi yang pas antara:

- (i) kebijakan pemutusan sebaran virus dan
- (ii) kebijakan ekonomi

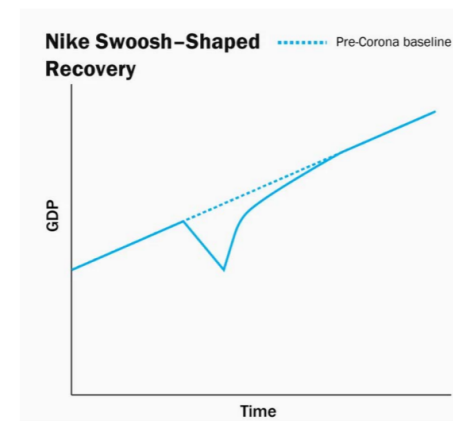
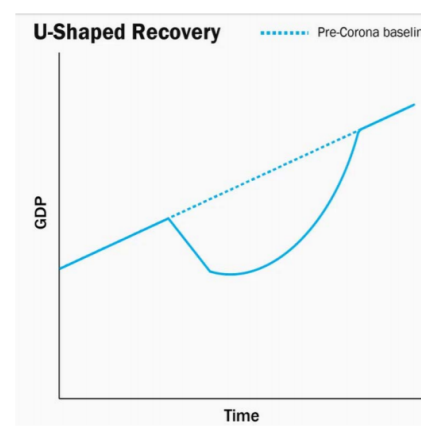
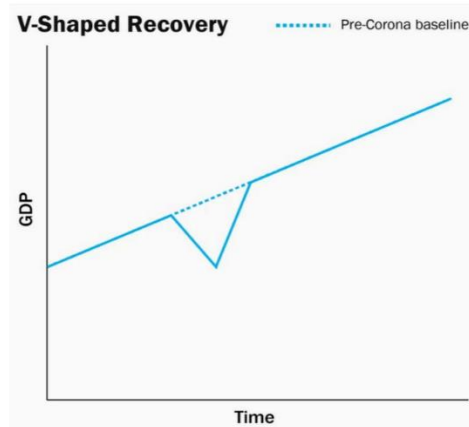
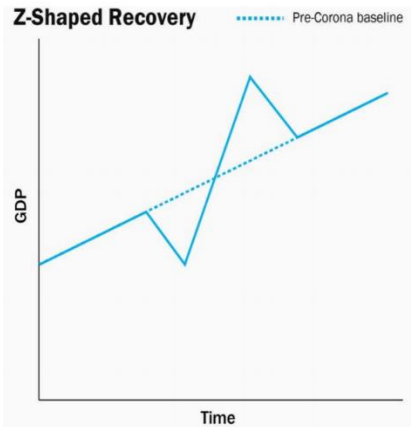


China akan *recovery* lebih cepat di Q3-2020
 Karena telah berhasil melakukan *virus containment*,
 Sementara negara lain akan pulih lebih lambat



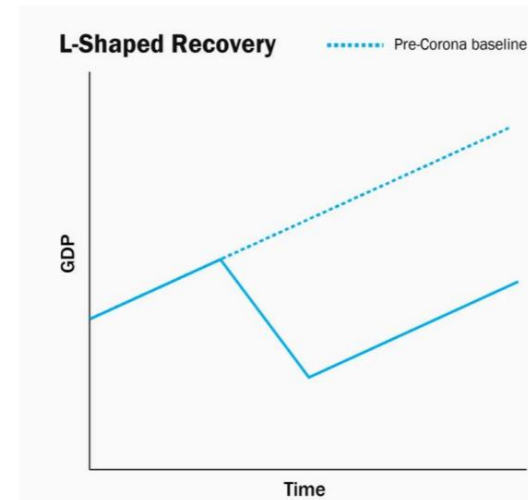
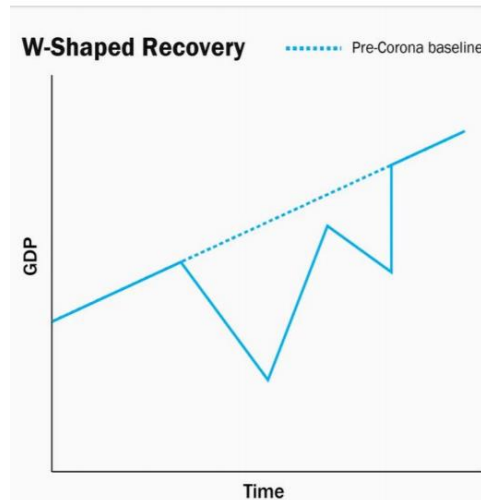
Paling Optimis : The Z and The V

Agak Pesimistik : The U and The “Nike”



Sheiner and Yilla (2020)

Terburuk : The W and The L



Sheiner and Yilla (2020)

5-5 How Does the *IS-LM* Model Fit the Facts?

Introducing dynamics formally would be difficult, but we can describe the basic mechanisms in words.

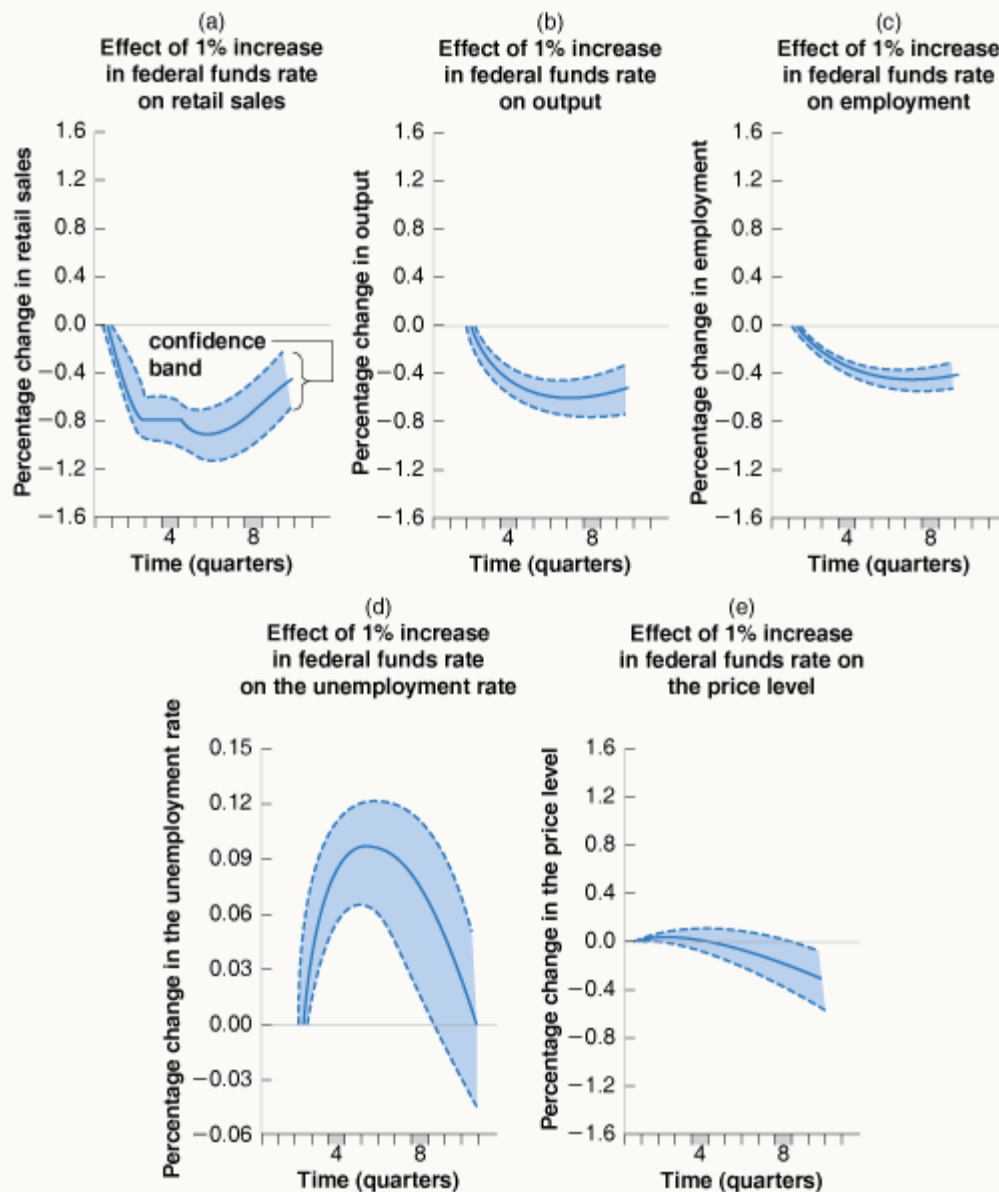
- Consumers are likely to take some time to adjust their consumption following a change in disposable income.
- Firms are likely to take some time to adjust investment spending following a change in their sales.
- Firms are likely to take some time to adjust investment spending following a change in the interest rate.
- Firms are likely to take some time to adjust production following a change in their sales.

5-5 How Does the *IS-LM* Model Fit the Facts?

Figure 5 - 9

The Empirical Effects of an Increase in the Federal Funds Rate

In the short run, an increase in the federal funds rate leads to a decrease in output and to an increase in unemployment, but it has little effect on the price level.



5-5 How Does the *IS-LM* Model Fit the Facts?

The two dashed lines and the tinted space between the dashed lines represents a confidence band, a band within which the true value of the effect lies with 60% probability:

- Figure 5-9(a) shows the effects of an increase in the federal funds rate of 1% on retail sales over time. The percentage change in retail sales is plotted on the vertical axis; time, measured in quarters, is on the horizontal axis.
- Figure 5-9(b) shows how lower sales lead to lower output.
- Figure 5-9(c) shows how lower output leads to lower employment: As firms cut production, they also cut employment.
- The decline in employment is reflected in an increase in the unemployment rate, shown in Figure 5-9(d).
- Figure 5-9(e) looks at the behavior of the price level.

Key Terms

- ***IS* curve**
- ***LM* curve**
- **fiscal contraction, fiscal consolidation**
- **fiscal expansion**
- **monetary expansion**
- **monetary contraction, monetary tightening**
- **monetary–fiscal policy mix, policy mix**
- **confidence band**

Homework (PR)

3. The response of the economy to fiscal policy

- a. Use an IS-LM diagram, show the effects on output of a decrease in government spending. Can you tell what happens to investment? Why?

Now consider the following IS-LM model:

$$C = c_0 + c_1(Y - T)$$

$$I = b_0 + b_1Y - b_2i$$

$$Z = C + I + G$$

$$i = \bar{i}$$

- b. Solve for equilibrium output when the interest rate is \bar{i} . Assume $c_1 + b_1 < 1$. (Hint: You may want to rework through Problem 2 if you are having trouble with this step.)
- c. Solve for equilibrium level of investment.
- d. Let's go behind the scene in the money market. Use the equilibrium in the money market $M/P = d_1Y - d_2i$ to solve for the equilibrium level of the real money supply when $i = \bar{i}$. How does the real money supply vary with government spending?

5. Consider the following numerical example of the IS-LM model:

$$C = 200 + 0.25Y_D$$

$$I = 150 + 0.25Y - 1000i$$

$$G = 250$$

$$T = 200$$

- a. Derive the IS relation. (Hint: You want an equation with Y on the left side and everything else on the right.)
- b. The central bank sets an interest rate of 5%. How is that decision represented in the equations?
- c. What is the level of real money supply when the interest rate is 5%? Use the expression:

$$(M/P) = 2Y - 8000i$$

- d. Solve for the equilibrium values of C and I , and verify the value you obtained for Y by adding C , I , and G .
- e. Now suppose that the central bank cuts the interest rate to 3%. How does this change the LM curve? Solve for Y , I , and C , and describe in words the effects of an expansionary monetary policy. What is the new equilibrium value of M/P supply?
- f. Return to the initial situation in which the interest rate set by the central bank is 5%. Now suppose that government spending increases to $G = 400$. Summarize the effects of an expansionary fiscal policy on Y , I , and C . What is the effect of the expansionary fiscal policy on the real money supply?