Chapter 2
Monetary and Fiscal Interaction: Case B

1. The Model

1) The static model. The world economy consists of two monetary regions, say Europe and America. The monetary regions are the same size and have the same behavioural functions. This chapter is based on target system B. The targets of the European central bank are zero inflation and zero unemployment in Europe. The targets of the American central bank are zero inflation and zero unemployment in America. The target of the European government is zero unemployment in Europe. And the target of the American government is zero unemployment in America.

The model of unemployment and inflation can be characterized by a system of four equations:

\[
\begin{align*}
    u_1 &= A_1 - M_1 + 0.5M_2 - G_1 - 0.5G_2 \\
    u_2 &= A_2 - M_2 + 0.5M_1 - G_2 - 0.5G_1 \\
    \pi_1 &= B_1 + M_1 - 0.5M_2 + G_1 + 0.5G_2 \\
    \pi_2 &= B_2 + M_2 - 0.5M_1 + G_2 + 0.5G_1
\end{align*}
\]

An increase in European money supply lowers European unemployment. On the other hand, it raises European inflation. Correspondingly, an increase in American money supply lowers American unemployment. On the other hand, it raises American inflation. An essential point is that monetary policy in Europe has spillover effects on America and vice versa. An increase in European money supply raises American unemployment and lowers American inflation. Similarly, an increase in American money supply raises European unemployment and lowers European inflation.
An increase in European government purchases lowers European unemployment. On the other hand, it raises European inflation. Correspondingly, an increase in American government purchases lowers American unemployment. On the other hand, it raises American inflation. An essential point is that fiscal policy in Europe has spillover effects on America and vice versa. An increase in European government purchases lowers American unemployment and raises American inflation. Similarly, an increase in American government purchases lowers European unemployment and raises European inflation.

The targets of the European central bank are zero inflation and zero unemployment in Europe. The instrument of the European central bank is European money supply. There are two targets but only one instrument, so what is needed is a loss function. We assume that the European central bank has a quadratic loss function:

$$LM_1 = \pi_1^2 + u_1^2$$  \hspace{1cm} (5)

$LM_1$ is the loss to the European central bank caused by inflation and unemployment in Europe. We assume equal weights in the loss function. The specific target of the European central bank is to minimize its loss, given the inflation function and the unemployment function. Taking account of equations (1) and (3), the loss function of the European central bank can be written as follows:

$$LM_1 = (B_1 + M_1 - 0.5M_2 + G_1 + 0.5G_2)^2 \\
+ (A_1 - M_1 + 0.5M_2 - G_1 - 0.5G_2)^2$$  \hspace{1cm} (6)

Then the first-order condition for a minimum loss gives the reaction function of the European central bank:

$$A_1 - B_1 - 2M_1 + M_2 - 2G_1 - G_2 = 0$$  \hspace{1cm} (7)

An increase in $A_1$ requires an increase in European money supply. An increase in $B_1$ requires a cut in European money supply. An increase in American money supply requires an increase in European money supply. An increase in European