Chapter 2
Cooperation between the German Labour Union and the French Labour Union

1. The Model

1) Introduction. As a starting point, take the output model. It can be represented by a system of three equations:

$$Y_1 = A_1 - \lambda W_1 - \mu W_2 \tag{1}$$

$$Y_2 = A_2 - \lambda W_2 - \mu W_1 \tag{2}$$

$$Y_3 = A_3 + \nu W_1 + \nu W_2 \tag{3}$$

Here Y_1 denotes German output, Y_2 is French output, Y_3 is American output, W_1 is German nominal wages, and W_2 is French nominal wages. The endogenous variables are German output, French output, and American output. At the beginning there is unemployment in Germany and France. More precisely, unemployment in Germany is high, and unemployment in France is low. By contrast there is full employment in America. The targets of wage cooperation are full employment in Germany and full employment in France. The instruments of wage cooperation are German nominal wages and French nominal wages. So there are two targets and two instruments.

2) The policy model. On this basis, the policy model can be characterized by a system of two equations:

$$\bar{Y}_1 = A_1 - \lambda W_1 - \mu W_2 \tag{4}$$

$$\bar{Y}_2 = A_2 - \lambda W_2 - \mu W_1 \tag{5}$$

Here $\bar{Y}_1$ denotes full-employment output in Germany, and $\bar{Y}_2$ denotes full-employment output in France. The endogenous variables are German nominal wages and French nominal wages.

To simplify notation, we introduce $B_1 = A_1 - \bar{Y}_1$ and $B_2 = A_2 - \bar{Y}_2$. Then we solve the model for the endogenous variables:

$$W_1 = \frac{\lambda B_1 - \mu B_2}{\lambda^2 - \mu^2} \tag{6}$$

$$W_2 = \frac{\lambda B_2 - \mu B_1}{\lambda^2 - \mu^2} \tag{7}$$

Equation (6) shows the required level of German nominal wages, and equation (7) shows the required level of French nominal wages. There is a solution if and only if $\lambda \neq \mu$. Due to the assumption $\lambda > \mu$, this condition is met. The solution is positive if $\mu/\lambda < B_1/B_2 < \lambda/\mu$. As a result, cooperation between the German labour union and the French labour union can achieve full employment in Germany and France. However, as an adverse side effect, it causes unemployment in America. It is worth pointing out here that the solution to wage cooperation is identical to the steady state of wage competition.

3) Another version of the policy model. As an alternative, the policy model can be stated in terms of the initial output gap and the required change in nominal wages. Taking differences in equations (1) and (2), the policy model can be written as follows:

$$\Delta Y_1 = -\lambda \Delta W_1 - \mu \Delta W_2 \tag{8}$$

$$\Delta Y_2 = -\lambda \Delta W_2 - \mu \Delta W_1 \tag{9}$$

Here ΔY_1 denotes the initial output gap in Germany, ΔY_2 is the initial output gap in France, ΔW_1 is the required change in German nominal wages, and ΔW_2 is the required change in French nominal wages. The endogenous variables are ΔW_1 and ΔW_2. The solution to the system (8) and (9) is as follows:

$$\Delta W_1 = -\frac{\lambda \Delta Y_1 - \mu \Delta Y_2}{\lambda^2 - \mu^2} \tag{10}$$