

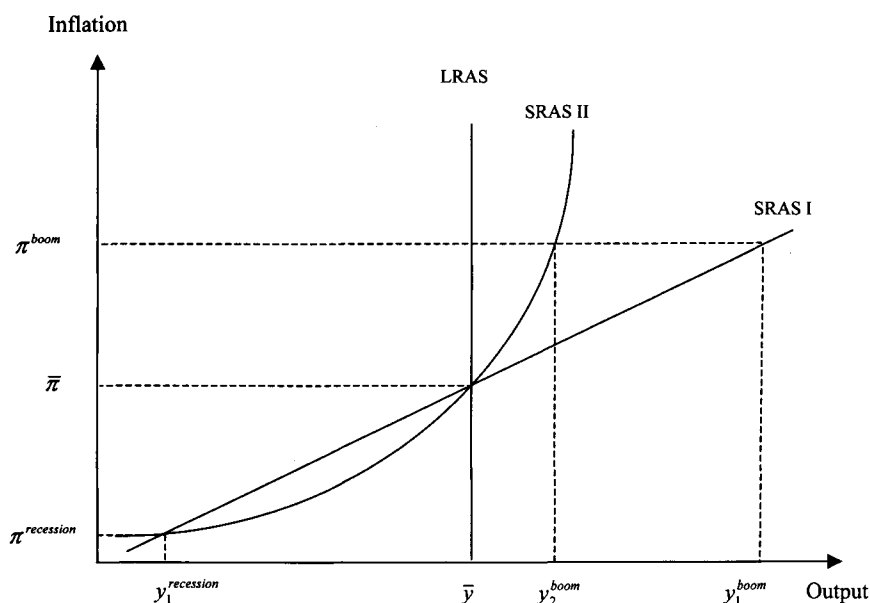
5 Introducing Nonlinearities into the New Keynesian Model

The preceding section has shown that the monetarist policy implications of New Keynesian models are mainly due to its embrace of the natural rate hypothesis. In particular, this hypothesis is a key reason why stabilization policy in New Keynesian models has only second-order effects on output. A contributing factor, however, is that these models are also inherently linear. To assess the importance of the latter assumption, we are now going to introduce some nonlinearities into the New Keynesian model and proceed to reevaluate the benefits of stabilization policy. Since nonlinearities in the model raise the possibility that stabilization policy may have first-order effects on welfare even if the natural rate hypothesis holds, demand management by the central bank becomes potentially more important for the welfare of the economy, which may lead to policy prescription more in line with Keynesian thinking. To explore this possibility, we are first going to consider nonlinearities in the aggregate supply function. Next, we are going to allow for nonlinearities in the welfare function, which provides another avenue for stabilization policy to have potentially large effects. This section will also present empirical evidence on the welfare costs of business cycle fluctuations in Germany. After all, a rationale for an activist demand management policy can arise only if the welfare costs of business cycle fluctuations are sizable.

5.1 Nonlinearities in the Aggregate Supply Curve

To illustrate the effects of introducing a nonlinear aggregate supply curve into the New Keynesian model, we plot in Figure 5.1 a conventional linear short-run aggregate supply curve (SRAS I) together with a convex short-run aggregate supply curve (SRAS II). In the long run, we assume that the natural rate hypothesis holds and therefore the corresponding long-run aggregate supply curve (LRAS) is vertical. Let us consider first a typical business cycle under the assumption that the short-run supply curve is linear: According to Figure 5.1, in equilibrium output and inflation are equal to \bar{y} and $\bar{\pi}$, while booms and recessions are assumed to lead to realizations of output and inflation given by y_1^{boom} , π^{boom} and $y_1^{recession}$, $\pi^{recession}$. To simplify the exposition, we assume that a boom is caused by a nominal demand expansion engineered by the central bank, while a recession is caused by a nominal demand contraction of similar size. With shocks of

Figure 5.1:
A Convex Short-Run Aggregate Supply Curve



similar size but opposite signs, output and inflation fluctuate symmetrically around their equilibrium values.

However, this ceases to be the case if we assume a convex short-run supply curve. The convexity implies that a nominal demand expansion triggers a larger price response, and the corresponding output effects become smaller. Hence, if we assume that the central bank engineers boom and recession phases leading to the same inflation fluctuations as before, the output contraction will be of similar magnitude as in the linear case, but the output expansion will be much smaller, with output increasing only to y_2^{boom} instead of y_1^{boom} . While the fluctuations in inflation continue to be symmetric, the output fluctuations are now asymmetric with a larger weight on the recession phase. This also implies that the average level of output becomes smaller. That is, in equilibrium, output is still at its natural rate of output, but if the economy spends equal amounts of time being in boom and recession phases, the average level of output will be smaller than the natural rate of output. Thus, the introduction of a nonlinear element into the short-run supply curve drives a wedge between the natural rate of output and the average level of output. This raises the prospect that an active stabilization policy, which manages to reduce the fluctuations in output, could increase the average level of output, because the reduction in the depth of recessions will