In the previous chapter on the Phillips curve we indicated that some of
the problem came from the focus on aggregate unemployment without
regard to its distribution over the regions of Europe. In this chapter we
tackle that issue directly and whether the dispersion of output growth
or unemployment rates within a country has a direct effect on the
determination of inflation for the country as a whole in the context of
a nonlinear relationship. This discussion is by no means the first in
this area. Nonlinearity of the Phillips curve has been tested in numer-
ous analyses (see Laxton et al. (1995), Laxton et al. (1999) and Linzert
(2005) among others). The whole issue itself is also quite old. Lipsey
(1960) remarks (p. 19) ‘If one wishes to predict the rate of change of
money wage rates, it is necessary to know not only the level of unem-
ployment but also its distribution between the various markets of the
economy.’ (emphasis in original). While Lipsey does not attempt any
estimates, Archibald (1969) offers some for the UK, where the variance
of both regional and industry unemployment are shown to have a pos-
itive effect on wage inflation. Extending this to the US gives more prob-
lematic results with quarterly data.1 However, it is Brechling (1973)
who introduced the nonlinear aggregation hypothesis which basically
formulates the problem and suggests ways of testing the proposition. He
also carried out some empirical tests with the US data. The results of the
tests were somewhat disappointing from the hypothesis’ point of view

1Somewhat later, when quarterly data were available for an adequate period for
the UK, Buxton and Mayes (1986) show that it is unemployment in the tightest
labour markets that plays a key role in determining inflation and that both
slacker labour market regions and the long-term unemployed have much more
limited effect in the Phillips curve.
and, maybe, therefore explain why the aggregation case has not been revisited with any intensity since.\(^2\)

If Phillips curves are nonlinear and different regions/sectors are at different points on them, then aggregation of the regional/sectoral results will give different implications for the application of a macroeconomic policy aimed at affecting inflation than one estimated from aggregate data for the whole country or area. Furthermore a policy aimed at reducing the heterogeneity of labour markets, as is the case with European integration, will reduce the sacrifice ratio (unemployment cost) of lowering inflation. If on the other hand it is the regions or sectors with the tightest labour markets that have a disproportionate impact on inflation for the area as a whole then addressing the shortage of labour in those regions, say, through the encouragement of migration, would be an appropriate complement to policies such as monetary policy that do not discriminate in the same way.\(^3\)

Why then are Phillips or wage curves nonlinear? Luckily or unfortunately, there are several explanations for the regularities observed thus far (Mayes and Virén, 2002b). On the one side the simplest is that unemployment is bounded even if the level of participation in the labour market is itself endogenous. As the bound is approached so inflation is likely to take off. A second common feature in explanations is the key role of labour market institutions. Thus, one may refer to downward rigidities of nominal wages, which themselves can be explained in various ways. One may also refer to asymmetries in employment adjustment – for instance to the apparent asymmetry of hiring (training) and lay-off costs. Given the fact that asymmetries appear to be particularly typical of estimated Okun curves, this explanation may be not completely irrelevant (Silverstone and Harris, 2001).\(^4\)

Asymmetries do not only appear in behavioural equations but may also be present in policy rules. There the issues can be quite complex:

\(^2\)Brechling's (1973) contribution is also noteworthy in that it offers a clear explanation of why it is that the regions/sectors with the tightest labour markets should lead in the determination of wages in the country as a whole.

\(^3\)Monetary policy itself has an impact that varies across sectors (Mayes and Virén, 2002b) but there is no guarantee that this variation would be appropriate for the treatment of the distributed inflationary pressure.

\(^4\)A satisfactory explanation thus requires a more substantial model, including at least an Okun curve, an aggregate supply function and a policy reaction function if the nonlinearities are to be taken into account in the appropriate relationships and not simply captured in the limited specification of single equation (Mayes and Virén, 2005).