



# Monetary policy problems for currency unions: asymmetry and the problem of aggregation in the euro area

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## Abstract

This paper highlights implications for a single monetary policy when key economic relationships are non-linear or asymmetric at a disaggregate level. Using a four equation model with data for the EU countries we find considerable non-linearities and asymmetries in the Phillips and Okun curves. High unemployment has relatively limited effect in pulling inflation down while low unemployment can be much more effective in driving it up. Economic downturns are both more rapid and sustained in driving unemployment up than recoveries are in bringing it down. There is considerable variety in these relationships and IS curves across countries, sectors and regions. Monetary policy reacts more vigorously outside a central corridor.

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## 1. Introduction

All economies face problems of aggregation in running macroeconomic policy. If economic behaviour can be approximated reasonably by a linear representation then, however, diverse the economic structure, regional and industry performance, aggregation remains a second order issue. The consequences for each region or industry of single economy-wide policy, such as monetary policy, will, however, be drastically different if the economy is very diverse. This will pose problems for redistribution of income and

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wealth, migration, regional, industrial and other policies aimed at addressing the consequences for those differentially affected. If behaviour is both non-linear and asymmetric, it becomes much more difficult to determine the appropriate single policy.

In most mature economies this potential problem is relatively little studied, in part perhaps because policymakers readily allow for it and partly because the offsetting redistributive measures are extensive and automatic. The problem is thus less visible *ex post*. In the euro area, on the other hand, there was little experience of running a single monetary policy before 1999, yet there was a great deal of information and experience at the member state level. The nature of the aggregation process has thus been much more obvious as has the diversity among the component economies.<sup>1</sup> Furthermore, since there is little redistribution across national borders the divergent consequences are also more obvious. However, while the extent of the variation in behaviour is well known,<sup>2</sup> euro area policy simulations have typically been conducted with models that use euro level aggregated data or which handle the euro countries separately (with appropriate cross-country constraints) and aggregate the results.<sup>3</sup> Such aggregations are usually either unweighted or based on GDP or similar weights.

In this paper we show that there are strong grounds for believing that there are considerable asymmetries and non-linearities in inflationary behaviour and monetary transmission. Ignoring these could have substantial adverse effects on particular sectors, regions and member states within the euro area. In Section 3 we develop a small conventional model of the monetary transmission mechanism in the euro area and show in Section 4, using a dataset that covers all of the EU countries except Greece and Luxembourg,<sup>4</sup> that there are good empirical grounds for asymmetry and/or non-linearity in each of the relationships. In Section 5 we show how these results pose problems for aggregation. Section 6 concludes but before going further, we explain how we use the term asymmetry and motivate the rest of the discussion in Section 2.

## 2. The nature of asymmetry

Before we go any further we need to sort out what is meant by asymmetry, as there is no commonly accepted definition. Sorting out non-linearity is a simpler task as we take it here to refer to relationships that are curvilinear or have different parameter values over different ranges, rather than exhibiting discontinuities or chaotic behaviour.

<sup>1</sup> As an illustration of the variation across the member states of the euro area, inflation varied between 2.5 and 0.6% in 1999, GDP growth between 8.3 and 1.4% and the share of exports between 0.84 and 0.24.

<sup>2</sup> Dornbusch et al. (1998), Eichengreen and Wyplosz (1998) and Obstfeld and Peri (1998) for example.

<sup>3</sup> The Bank of Finland's EDGE model (Kortelainen, 2000) and ECB's AWM (Fagan et al., 2001) follow the first approach and the NIESR NiGEM, the European Commission's QUEST II, and De Nederlandsche Bank's EUROMON the second, for example.

<sup>4</sup> We thus cover not merely the current euro area but also the main countries that might join it over the coming few years. Data for Ireland are more limited and Greece and Luxembourg only excluded because data were not available.

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