Available online at www.sciencedirect.com
SCIENCE DIRECT®

Economic Modelling 23 (2006) 391–426

Economic Modelling

www.elsevier.com/locate/econbase

A small scale macroeconometric model for the Euro-12 area

Claudio Morana

Accepted 16 December 2005

Abstract

In the paper a small scale macroeconometric model for the Euro area is built, relying on cobreaking and fractional cointegration theory. Several linkages relating key macroeconomic variables are found. Firstly, evidence of a common nonlinear deterministic trend driving the long-run evolution of inflation, nominal interest rates and money growth, determined by medium to long term monetary policy management, is found. Both the quantity theory of money and Fisher's theory of nominal interest rate determination are the economic mechanisms explaining how inflation and nominal interest rates are attracted towards their equilibrium values in the long term. Secondly, evidence of two common long memory factors driving the medium-run evolution of the nominal and real variables, related to output and nominal money growth shocks and short term monetary policy management, is also found. The quantity theory of money, the management of the short term rate by the central bank (Taylor rule), term structure linkages and a present value relationship relating output and real stock market prices growth, are the economic mechanisms explaining the evolution of the macroeconomy in the short to medium term. The macroeconometric model has then been employed to assess the monetary policy strategy of the ECB with respect to the achievement of the price stability objective in the medium term, finding full support for its formulation involving two dimensions, i.e. the monetary pillar and economic pillar.

JEL classification: C22; E31; E52

Keywords: Long memory; Structural change; Fractional cointegration; Cobreaking; Time-varying parameter VECM; Core inflation; Monetary policy; Euro area

E-mail address: claudio.morana@eco.unipmn.it.

0264-9993/$ - see front matter © 2005 Elsevier B.V. All rights reserved.
doi:10.1016/j.econmod.2005.12.001

1. Introduction

The paper contributes to the literature on small scale macroeconometric models for Euro-12 area,[1] along two dimensions, since a time-varying parameter fractional vector equilibrium correction model (F-VECM-X) is estimated and a cobreaking/fractional cointegration approach is implemented in a multivariate framework. Moreover, a new decomposition for long memory processes in long-run, medium-run and short-run components is also introduced. The estimation of VECM-X model is an important novelty, since so far the empirically oriented literature has always been concerned with the integer ($I(1)$–$I(0)$) case. In addition, an accurate modelling of the persistence properties of the data, in terms of structural breaks and long memory, allows the uncovering of linkages not otherwise detectable. In fact, accounting for both common deterministic components, i.e. common break processes, and common stochastic components, i.e. common long memory factors, allows structural modelling to be based on key linkages predicted by economic theory, and to accurately discriminate among permanent, persistent and short lived economic features. Evidence of a common deterministic monetary trend (break process), related to long term monetary policy management by the ECB since 1999, and the national central banks before the starting of the common monetary policy, is found. Both the quantity theory of money and Fisher's theory of nominal interest rates determination are the economic mechanisms explaining how the latter monetary trend affects the nominal side of the economy. In the proposed framework such relationships can be interpreted in terms of cobreaking relationships, since they lead to linear combinations of the variables which are free from the break process. Albeit no evidence of structural breaks can be found in both real output growth and real stock market prices growth over the sample analyzed (1980 : 1–2004 : 12), these latter variables, as well as the break-free nominal variables analyzed, show strong persistence. Evidence of two common stationary long memory factors, determined by output and nominal money growth shocks and short term monetary policy management, respectively, is found. The quantity theory of money, the management of the short term rate by the central bank (Taylor rule), term structure linkages and a present value relationship relating output and real stock market prices growth, are the economic mechanisms explaining the medium-run comovement in the variables analyzed. By decomposing the variables analyzed in long-run, medium-run and short-run components, it is found that economic fluctuations in real output growth, the short term nominal interest rate and nominal money growth tend to be persistent, while for real stock market prices growth, the nominal long term interest rate, and inflation, fluctuations tend to be short lived, and mostly determined by disequilibrium dynamics, i.e. by the error correcting behavior of the system. While the term structure disequilibrium is the most important determinant of short lived fluctuations for the long term nominal interest rate, the quantity theory and the Taylor rule unbalances mostly affect inflation, nominal money growth, output growth and the short term nominal interest rate. On the other hand, real stock market prices are mostly affected by the present value disequilibrium. Moreover, the time-varying parameter framework allows an accurate description of current dynamics in the Euro area, also controlling for the fact that the ECB started its operations in 1999, while synthetic data are used since 1980. While no evidence of instability can be found in the fractional cointegration relationships or in their loadings, structural change has affected short-run

[1] See for instance Coenen and Wieland (2005), Cassola and Morana (2004), Bagliano et al. (2003), Bruggeman et al. (2003), Morana (in press-b). See also Dieppe and Henry (2004), Fagan et al. (2005), and Dees et al. (2005) for results concerning large scale models of the Euro area.