Macroeconomic Models of the Euro area at the European Central Bank

## ☒Macroeconomic Models of the Euro area at the European Central Bank

☒ Monday, 9 March 2009 | ☒ John A Morrison

point of order : August 2012; the '@ the ECB' predicate in the title is more than a little redundant & 'wears' as time goes on but I am stuck with it; the ECB does move with the times, particularly after the Trichet speech in Clare College, Christmas 2009 & one can even begin to see DG ECFIN lumber towards modernity also; the historical lesson below still retains relevance however ..

see intro text box : August 2012 : point of order : August 2012;   " the '@ the ECB' predicate in the title is more than a little redundant & 'wears' as time goes on but I am stuck with it; the ECB does move with the times, particularly after the Trichet speech in Clare College, Christmas 2009 & one can even begin to see DG ECFIN lumber towards modernity also; the historical lesson below still retains relevance however .. "

I noticed an inocuous looking little text box on the enormous European Central Bank (ECB) website, it describes four approaches to macroeconomic modeling going on at the European Central Bank, the first thing that strikes one is just how elderly the methodological underpinning is.
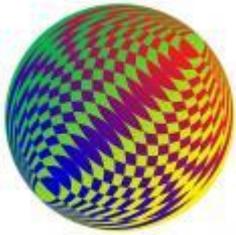
That does not by defintion mean that the approach in this modelling is weak or flawed or anything like that at all but it may entail that when a commercial financial institution is looking for a methodological guide for stress testing or asset valuation, these methodologically elderly models may not be the best blueprint for them. This is particulalry so currently where what could be described as a 'Logical Positivist' approach needs to be adopted in Stress Testing and Asset Valuation problems. By this I mean the 'partial equilibrium' or purely statistical methods deployed simply to quantify risk or economic capital or fair value. In this context I thought it might be useful to look briefly at the 4 macroeconomic models referenced on the ECB site and summarise what these models are doing and what their objective is.

1. The (Euro) Area Wide Model (AWM) [2001]

The AWM, developed by ECB staff, is a relatively standard structural macroeconomic model for the euro area. It is based on a specific dataset, comprising 'synthetic' historical series for the euro area as a whole. The model is regularly used in forecasting and simulation tasks. The model is Keynesian in the short run and classical in the long run. This means output (measured by GDP) is determined by aggregate demand in the short run but by aggregate supply in the long run. The components of aggregate demand are consistent with this equilibrium via a stock-flow adjustment mechanism involving net foreign assets and the real exchange rate. Regarding prices, the long run is determined by the nominal anchor chosen in running the model (e.g. an inflation objective which enters the interest rate setting equation, the money supply or, in the case of a fixed nominal exchange rate, the 'world' price level). The reference paper for this model from 2001 is here;-

http://www.ecb.int/pub/pdf/scpwps/ecbwp042.pdf [1]

2. The Multi Country Model (MCM) [2002]

The MCM comprises country blocks ? one for each country of EMU ? linked together with a trade block. The MCM is a Eurosystem project, coordinated by ECB staff. Country blocks and the trade block are regularly used in forecasting tasks. The MCM blocks have a common theoretical structure: classical in the long run where output is supply-determined, Keynesian in the short run where output is demand-determined. The overall specification is designed to explain the main expenditure categories in each country, as well as employment, prices and some summary financial variables. Note: explicitly this model does not incorprate an elaborated model of the financial sector thus the latency of lending does not impact the real variables considered. The components of aggregate demand are consistent with equilibrium, via a stock-flow adjustment mechanism involving net foreign assets and the real exchange rate. In the short run, however, output is demand-determined; The model is backward-looking; although expectations are explicitly modelled, they are generally based on lagged values of the variables concerned (adaptive expectations). An illustration of a country block is given in

ECB WPS No 149, which is here;-

http://www.ecb.int/pub/pdf/scpwps/ecbwp149.pdf [2]

3. The Coenen-Wieland (2000) Model

The Coenen-Wieland (CW) Model is a small-scale model of aggregate supply and aggregate demand which is designed to capture the broad characteristics of inflation and output dynamics in the euro area. A simple aggregate demand relationship relates the output gap to several lags of itself, the ex ante long-term real interest rate and a transitory demand shock. The long-term real rate is determined jointly by a term-structure relationship and the Fisher equation. As a benchmark for conducting monetary policy experiments, short-term nominal interest rates are set according to a Taylor-type interest rate rule that relates the short-term nominal interest rate to developments in inflation and the output gap. Changes in the short-term nominal interest rate affect aggregate demand through their impact on the ex ante long-term real interest rate. The reference paper for this model describes its theoretical underpinnings as the Taylor rule (1980) and the relative real wage contracting model proposed by Buiter and Jewitt (1981), the paper is here;-

http://www.ecb.int/pub/pdf/scpwps/ecbwp030.pdf [3]

4. The Smets-Wouters (2003) Model

This is an early "Dynamic Stochastic General Equilibrum" (DSGE) model. Both the parameters and the shocks to the structural equations are related to deeper structural parameters describing household preferences and technological and institutional constraints. The Smets-Wouters (2003) Model is an example of such a medium-sized DSGE model, which has been estimated on the basis of quarterly euro area macro data. The model features three types of economic agents: households, firms and the central bank. Households decide how much to consume, how much to invest and how much to work and at what wage. Firms employ workers and capital and decide how much to produce and at what price to sell their products.

In addition to a number of real frictions such as habit formation in consumption and adjustment costs in investment, the model features nominal price and wage rigidities. The model is estimated using seven euro area macroeconomic series (real GDP, consumption, investment, employment, real wages, inflation and the nominal short-term interest rate). Using Bayesian estimation and validation techniques, it is shown that the estimated model is able to compete with more standard, unrestricted time series models, such as vector auto regressions (VARs), in out-of-sample forecasting. The reference paper from 2002 is here;-
http://www.ecb.int/pub/pdf/scpwps/ecbwp171.pdf [4]

CONCLUSION: I hope this brief revue will have provided a context for anyone considering methodological issues in regard to stress testing or fair value assessment of complex products or indeed economic capital setting, I think this review shows in relief the methodological context of the more positivist risk modeling techniques demonstrated in the

central bank and academic papers which we otherwise refernce on this site.

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