Germany and the European Business Cycle – An Analysis of Causal Relations in an International Real Business Cycle Model

A Comment

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Fichtner considers the hypothesis of a European business cycle, which finds some support in empirical studies. His aim is an examination of the causes of the purported synchronization. He distinguishes two alternative explanatory patterns: Either the European economies may be exposed more or less simultaneously to similar supply shocks or the country-specific shocks may be transmitted through international trade. The second interpretation would imply that business cycle developments of countries which are not directly affected by a shock were in an essential way demand-determined.

The question boils down to the issue of whether business cycle fluctuations in European countries have almost exclusively exogenous causes, or if there are mechanisms of endogenous shock propagation which transmit business cycle phenomena of certain countries to the macroeconomic environment of other countries. Fichtner’s choice of the analytical framework - an international RBC model – may predetermine his findings here since RBC models typically have very weak endogenous shock propagation mechanisms.

Fichtner sets off by estimating a VAR-Model of the HP-filtered GDP series. The impulse-responses of the model point to a certain synchronization among the fluctuations in Germany, France, Italy and Austria. In the analysis of subsamples, Fichtner rightly remarks that this synchronization does not seem to be constant over time: The impulse-responses for the 80s are qualitatively considerably different from those of the 70s and 90s. This is actually a disturbing finding for the economic model that Fichtner uses in the subsequent analysis since his model assumes that the investigated economies are relatively close to their steady-state positions and that all the structural parameters are constant.

To justify his usage of RBC modeling, Fichtner correctly points out that mere data analysis with descriptive statistics cannot say anything about the causal relationships of the business cycles. A causal economic interpretation requires model-based theoretical underpinnings. To this end, Fichtner decides to use the international RBC model due to Zimmermann (1997).

But would identification and interpretation of the shocks not also have been possible in a more general model? VAR analysis would suggest using structural VAR models (SVAR), in which certain identifying restrictions could be imposed to allow variance-decompositions. These decompositions would show the importance of different shocks along the time dimension and in the cross-section. In general, the identifying assumptions are less restrictive a priori than those employed in the specification of an RBC model. Thus the analysis would be less exposed to the critique that the choice of the model might already predetermine its results. However, for a SVAR-analysis it is advisable to use the
original series instead of the HP-filtered ones so that the restrictions about the long-run relationships can be exploited.

Fichtner’s handling of the three-country RBC model is thoughtful and competent. The model formalizes international trade integration using an Armington-approach and thus allows for temporary international borrowing and lending. However, deviating from many other open RBC models no adjustment costs are specified in the capital accumulation equations. Hence the marginal products of capital are identical for all countries. This assumption is certainly debatable, but one would not expect the results of the investigation to differ much with moderate adjustment costs.

Fichtner’s solution method (approximation of the model dynamics around the steady-state) is indispensable in the RBC literature. For the sake of consistency it is also necessary to impose the assumption of zero steady state trade balances. It should be noted, however, that Germany seems to be far off the steady-state using this measure: Neither in the short-run nor in the long-run would we find Germany’s trade balance to be at least approximately zero. By looking at a single country it is difficult to understand why a country that grows with a constant rate cannot have net foreign assets also grow at a constant rate.

The calibration of structural parameters follows the usual standards in the literature. Presumably the order of magnitude of the calibrated parameters is less important than the empirical determination of the technology shocks which result from the growth decomposition that is based on an aggregate Cobb-Douglas production function. Although this is also a standard procedure, it should be noted that the production elasticities which are used for growth decompositions (especially for labor) can in general not be confirmed econometrically.

Fichtner uses the constructed Solow residuals to describe technology shock dynamics of the model as VAR(1) processes. Clearly, estimation results for the VAR(1) models are especially important for the interpretation of Fichtner’s results. First of all, the covariance Matrix $V$ leads to apparently minor contemporary correlations (approximately between 0.1 and 0.4). This implies that the supposed technology shocks are rather country-specific, which is not precisely what one would expect for technology. The hypothesis of joint shocks examined by Fichtner should display high contemporaneous correlations or at least positive off-diagonal-elements in the coefficient-matrix $A$. But Fichtner rightly emphasizes that the latter is not the case. Some of the off-diagonal-elements are even negative.

So what then is the correct interpretation of the supply shocks? A technological interpretation is not convincing and Fichtner does not hesitate to point out that the Solow-residuals are just a measure of our ignorance. However, it is well known that Solow-residuals are often highly correlated with trend deviations of GDP and thus correlated with the business cycle. Fichtner briefly mentions the possibility that the Solow-residual contains remaining endogenous components, e. g. because of variable capacity utilization.
The standard critique of RBC models asserts that the Solow-residual (whatever it really measures) feeds just the business cycle as supposedly exogenous shocks into the model. Due to the weak endogenous propagation mechanisms, these shocks undergo little changes and basically constitute the model results. The remarkable message of Fichtner’s study is that his model seems to be comparatively well equipped against this criticism. This is so because the exogenous impulse (in the form of a VAR(1) process with a dominant diagonal in the $A$ matrix) would make us expect monotonically decreasing impulse-response functions. Instead, Fichtner convincingly shows that the impulse-responses generated by the model are clearly not monotonous. In many cases the predominantly positive effect at short horizons reverses into a negative effect in the medium-term. For production dependencies this is valid also across borders, whereas for consumption dependencies this is confined to the country suffering the shock. Thus, international trade integration seems to generate considerable shock propagation in a way not typically encountered in the RBC literature.

There is hence no reason to suspect that the choice of the model unjustly influences the model outcome. While it is still possible that true propagation mechanisms are stronger than specified in the model, model propagation mechanisms are too strong to be judged negligible. This is why Fichtner’s analysis provides interesting and informative insights: On the one hand, the model offers an explanation of synchronized business cycle fluctuations through common shocks, on the other hand it suggests that shock propagation across borders is almost totally due to supply side effects.

Further research should try to robustify these results. It could especially pay off to embed intermediate consumption in the model. In the current version of the model traded investment goods are the sole channel for cross-borders shock propagation. But in reality intermediate inputs are exported and imported in large amounts. Thus the consideration of intermediate input trade would have the potential of intensifying the effects of international trade integration.

Fichtner’s work constitutes an interesting, carefully handled and competently interpreted study of the European business cycle. While sometimes perhaps too much emphasis may have been put on the “engine-function” of the German economy, Fichtner’s paper enhances our understanding of European business cycle phenomena. Direct economic policy implications, however, cannot be derived from this work. For instance, implications for the ECB (e. g. accommodating monetary policy) cannot be derived from a purely real model. However, the integration of a monetary sector into the model could be a promising subsequent research project.