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PRESS RELEASE

The production function approach to the Belgian output gap, Estimation of a Multivariate Structural Time Series Model

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For policymakers, output gaps are a useful measure for assessing the amount of slack in the economy. Cyclically adjusted budget balances - where budget balances are corrected for the impact of cyclical fluctuations as measured by the output gap - still figure prominently in the stability and convergence programmes updated annually by EU Member States. Not only in the European Union but in many international organizations and countries alike, the production function approach has emerged as the preferred method for estimating the output gap. In this approach, the output gap is decomposed between factor inputs, which can be further split into several components. This decomposition is very useful to monitor the complement to the output gap, i.e. potential output, or its developments, i.e. the growth potential. With respect to the output gap, the combination of information coming from the different factor inputs allows to derive better estimates when commonalities exist between their cycles.

In the paper, Multivariate Structural Time Series (MSTS) models are applied to the (sub)factor inputs of a production function to provide an estimate of the Belgian output gap. The starting point of MSTS models is the breakdown of time series into unobserved components: an irregular component, a trend and a cycle, quite appropriate for the purpose at hand. Two types of trend components are considered in the paper: integrated random walks and a damped slope specification. The latter better matches the data, with the notable exception of the unemployment rate. Changes in the unemployment rate are particularly long-lasting.

The cycles on hours worked, the unemployment rate, the participation rate and total factor productivity (TFP) share some common parameters, mainly a common cycle periodicity. But the periodicity is estimated, rather than being constrained a priori. This restriction does not imply that the variables share a common cycle. The approach allows to determine the number of independent cycles hiding behind the cycles of all the variables. If there is only one, the variables share a common cycle. Capacity utilization is added to the system in order to provide extra information, but it is merely one variable among others. It is not assumed to give the reference cycle, as often seen in the literature, and it may also have a trend, as suggested by the data. The existence of a single common cycle is however put to the test. A final issue is the question of leading or lagging cycles, often dealt with in an ad hoc way. In the models estimated in the paper, leads (or lags) are estimated simultaneously with the other parameters, without imposing a given timing between cycles. Moreover, additivity (transitivity) of leads and lags does not necessarily hold.

Over the 1983-2004 period, short cycles of about 3.5 years are found in hours worked, TFP and capacity utilization. They are closely correlated. The output gap implied by these short cycles has much in common with the NBB business survey indicator. The inclusion of the participation and unemployment rates seems unnecessary as far as short cycles are concerned. Their cycles are negligible. The long waves present in unemployment are attributed to the trend component, which suggests that they are of a permanent nature. The three cycles cannot be subsumed in a single measure such as capacity utilization. Capacity utilization delivers useful information, but two independent cycles are at the root of the different cycles and a common cycle restriction is rejected. If the cycle in capacity utilization is wrongly imposed as the common cycle, an idiosyncratic cycle emerges in TFP, explaining 34 p.c. of the TFP cycle variance. Leads and lags are also present. Hours lead capacity utilization by 2.8 quarters. TFP and hours are contemporaneous but TFP leads capacity utilization by 1.1 quarters only. Additivity of leads and lags does not hold, which would be impossible in the presence of a single common cycle.