

FEER computation: A model based approach

PISCITELLI Laura, WESTAWAY Peter

There is still a huge controversy about the concept of “equilibrium exchange rate”. A number of possible definitions exist and a substantial amount of research has been produced in the past 20 years. Given the timing of monetary policy pass-through, the most relevant definition for policy discussions is perhaps the exchange rate which would prevail if the economy were at its medium term equilibrium. As first introduced by Williamson (1983-1985) and recalled in Driver et al. (1998), a medium run equilibrium is essentially a flow equilibrium. As consumption and investment decisions tend to be implemented over long periods of time, asset dynamics tend to be much longer lived than price dynamics. Therefore while nominal rigidities can be ruled out in the medium run, asset accumulation cannot. The long run equilibrium is thus a stock-flow equilibrium and the medium run equilibrium can be pictured as evolving towards it.

An analogous way of describing the medium run equilibrium exchange rate is the exchange rate consistent with the economy being at both internal and external balance. Prices and wages flexibility ensures that the requirement of internal balance (demand equal supply) is fulfilled. External balance is usually identified with the current account balance being at a “sustainable” level given by the medium term equilibrium level of foreign asset accumulation. In a world where consumers’ assets consist of equities, government bonds and foreign assets, while equities are pinned down by capital accumulation and bonds by the government budget constraint, external balance is required to control foreign asset accumulation.

Given the above definition, any approach to the computation of the medium term equilibrium exchange rate will essentially reduce to a formalisation of the internal and external balance conditions. As this methodology eventually relates the exchange rate to the fundamentals of the economy, the FEER denomination (Fundamental Equilibrium Exchange Rate) follows.

Various approaches to the FEER computation have already been designed. One of the most extensively used, which is usually denominated as partial equilibrium approach, consists of first estimating an econometric trade model. Then, “off models” estimates of potential output and medium term current account are computed. These estimates are finally inserted into the trade equations, which are then inverted to provide the real exchange rate consistent with external balance, ie the FEER. The major advantage of this methodology is its simplicity and clarity, as it provides a direct relationship between the FEER and the fundamentals of the economy. Thus, the causes behind the exchange rate over or undervaluation can be rather easily identified. Also, if the analysis is conducted in a multicountry framework, the estimated FEERs computed for the set of countries in consideration can be used to derive bilateral “equilibrium” exchange rates via the standard arbitrage condition. However, there are a number of major drawbacks to this approach: first, the values used for medium term potential output and current account balance are unrelated and can potentially produce some inconsistency in the results; second, this approach

computes the FEER as an output of the model in use, therefore not taking into account any feedback of the FEER to the economy, especially to the medium term output and current account (which are indeed exogenous variables in the model).

The approach outlined in this paper involves the use of a complete macroeconomic/macroeconometric model to compute the FEER. The model can be either a single country model, with exogenous world variables, or a multicountry one. As it has to describe the economy in the medium run, it has to be specified in medium terms. Wren-Lewis et al. (1991), Church (1992), Bayoumi et al. (1994) are few examples of studies using macroeconomic models to compute FEERs. However, the approach is relatively new in the context of macroeconometric models: see for example Driver & Wren-Lewis (1998, op. cit) for an application to the COMPACT model of the UK economy and Detken et al. (2002) for an application to the AWM model. The strategy followed in these studies involves solving the macroeconometric model for a long enough number of periods in the future until it settles down to its medium run equilibrium. The value at which the real exchange rate settles is the FEER.

While the previous approach allows computing only future values of the FEER, the methodology outlined in this paper also allows an analysis of the FEER from an historical perspective. The macroeconometric model we use is the NIESR's NIGEM model. It is a quarterly estimated model of the World economy consisting of individual blocs describing each of the OECD economies, while the rest of the world is divided in a number of regions. For our analysis, we concentrate on the UK, the US, Japan and the German blocs, while the rest of the world is taken as exogenous. The model is characterised by a neoclassical steady state with superimposed Keynesian and expectational dynamics. It consists of accounting identities and behavioural equations specified in the form of ECM type of equations. The first step in our methodology involves the derivation of a medium term analogue of the dynamic model. As the definition of medium run we adopt is one of a flexi-price equilibrium, the underlying assumption we make is that inflation is at its expected level over the medium term horizon and output is at its potential level. Consequently, monetary policy is neutral and both nominal and real interest rates are exogenous. Additionally, all the cyclical elements have to be eliminated from the dynamic model. This is done by approximating the quarter on quarter growth rates in the behavioural equations with their historical average over the entire period. Under the assumption that the original dynamic equations fit exactly the data, residuals on the so specified medium run equations are generated. Additionally, the cyclical fluctuations in the exogenous variables have to be controlled for. The FEER is computed when the medium term analogue model is solved setting the residuals to zero and when the cyclical elements are eliminated from the exogenous variables.

The main advantage of using a fully specified model of the economy to compute FEERs is that the number of the required exogenous independent assumptions is reduced. Specifically, no exogenous evaluations of potential output and medium term current account is required as they are endogenous variables in the model and therefore computed in a fully consistent way with the model and with each other. Equally important, the interaction between the FEER and the rest of the economy is fully accounted for as the FEER is simultaneously computed alongside the other endogenous variables when solving the model. Additionally, model consistent estimates of medium term bilateral exchange rates are also computed.

The drawbacks of this approach are that it relies on the adoption of a specific model of the economy. Thus, the computed FEER is indeed the equilibrium

exchange rate conditional to the model assumptions. Also, given the scale of the models in use and the usually high degree of recursivity which characterises them, it can be difficult to understand the causes of any observed misalignment. On the other hand, this approach is particularly suited for conducting simulation exercises to help detecting the determinants of the observed appreciation or depreciation over specific periods.
