

Response to referee report (June 30th)

1. Log-linearizing (a set of non-linear equations) requires stationarity on behalf of the variables. In a non-stationary setting, we must define the variables of the linearization in such a way that they are stationary. For example, consider the real output variable Y_t of the NK-model and its corresponding level Y_t^f in the absence of price rigidities. If both of these are non-stationary, theory tells us that the quotient $\tilde{Y}_t = Y_t/Y_t^f$ should be stationary (or equivalently that $\log(\tilde{Y}_t) = y_t - y_t^f$ should be $I(0)$). Clearly, we can linearize around the steady state (which equals zero) of \tilde{Y}_t . Unfortunately Y_t^f does not appear in the non-linear optimality condition for consumption (which leads to the IS curve), and hence re-expressing this condition in terms of \tilde{Y}_t introduces an error term in the forward-looking IS curve. However, the point of the transition from equation (1) and (2) to (3)-(4)/(5)-(6) is that we can use any stationary combination of the non-stationary variables in the linearization, i.e. there is no particular reason (other than theoretical appeal, perhaps) to chose \tilde{Y}_t . As an example, we could equally well use $Z_t = Y_t/Y_{t-1}$ or indeed some more general stationary combination of the variables. With some other choice of stationary combination, y_t^f *does not necessarily enter* the IS-curve but this does not mean that $y_t^f = 0$! If the individual variables that enter the stationary combination do so multiplicatively, we can later express the linearized equations in terms of them. It seems that the referee has been confused on this point. However, as this is the main point that is being discussed on both pages 6 and 7 leading up to equations (3)-(4)/(5)-(6) I think it should be sufficiently clear to any reader with an understanding of log-linearizations.
2. In addition to the previous statements to the effect that the exact rational expectations form of the NK-model is being tested (which appear throughout the paper, including the abstract) I have changed the line “The aim of this paper is to demonstrate how one can test the validity of the restrictions implied by the NK-model when the key variables are difference stationary” on page 3 of the introduction by adding the text “and expectations are exact.¹”. Other methods of testing the NK-

¹Expectations are exact in the sense that they are conditional on the variables of the model and not on information unobservable to the econometrician (see Hansen and Sargent

model and the relevant references are discussed in the beginning of the introduction.

Response to the minor comments:

1. Since the “IS-curve” (the points where Investments and Savings are in equilibrium) is so well established in economics (it has been appearing in every basic macro text for the past 50 years or so) it seems strange write it out explicitly in a professional journal.
2. The constant are not interesting, hence the line “where constants representing equilibrium values are suppressed” which appears directly after equations (1) and (2) in the previous versions of the paper.
3. I fail to understand the question: DPeu is dotted and DPus is solid.
4. Stationarity of a variable is tested as the null hypothesis of a unit-vector in the cointegration space. Long-run exclusion is tested as a zero row in β . These tests are standard and are discussed in Johansen (1995), among others. The results from the stationarity test are reported in Appendix C of my paper.
5. I have changed “roots” to “eigenvalues” on page 24.
6. I have modified the line in question by deleting the word “different” and adding the words “near unity” before “[roots] eigenvalues cluster..”.
7. Its hard to see how this difference has any consequence for the results.
8. The estimates were located on the borders in line with the results from the unconstrained estimates.

References

Hansen, L., Sargent, T., May 1980. Formulating and estimating dynamic linear rational expectations models. *Journal of Economic Dynamics and Control* 2 (2), 7–46.

(1980)).

Johansen, S., 1995. Likelihood-Based Inference in Cointegrated Vector Autoregressive Models. Oxford University Press.