

## **Referee report on “Evaluating the New Keynesian Phillips Curve under VAR-based learning” by Luca Fanelli**

The paper by Fanelli examines the NKPC from two related perspectives. First, he considers the standard rational expectations based approach, where the data generating process is described by a cointegrated VAR. Second, he considers the case when agents' expectations are formed through an adaptive learning mechanism. This learning mechanism is described by a cointegrated VAR, where agents learn about the VAR coefficients over the evaluation sample.

Using quarterly euro area data for the period 1980-2006, the author finds that the NKPC is rejected under rational expectations when the cointegrated VAR model has 2 lags, one cointegration relation, and inference is based on the asymptotic distribution of the LR-test. For the adaptive learning case, the investigation period covers 1986-2006 and here the evidence against the NKPC is weaker. Again, the VAR has 2 lags and one cointegration relation, where the long run relation is fixed while all other parameters of the VAR are updated using the new information. The author looks at linear combinations of critical values from the chi-square distribution and the distributions from Inoue and Rossi (2005), where the sequential nature of the tests are taken into account.

I think that the paper is generally well written and well motivated. The empirical analysis is skillfully performed and the description of the results is sufficiently comprehensive. I would, however, like to raise an issue concerning the methodology. I think that the author should test the restrictions directly using the cointegrated VAR in equation (14). The representation and the Campbell and Shiller (1987) type of VAR specification in (16) that author uses are algebraically equivalent, but the latter relies on a fixed estimated value for the cointegration vectors when used in practice. To derive the restrictions implied by the NKPC and the selected expectations hypothesis for the cointegrated VAR in (14) looks straightforward.

Moreover, the cointegrated VAR representation in (14) allows the author to let the agents learn also about the cointegration relation under adaptive learning. As far as I can see, the estimation problem is not much affected by this under the null as long as we are willing to assume that the cointegration rank is known. The relatively weaker evidence against the NKPC hypothesis under adaptive learning may at least in part be due to the assumption of a fixed cointegration relation. Since the cointegration relation in Fanelli's case is a function of the 3 structural parameters it seems implausible that they are not learning about this parameter, while they are learning about other parameters that are in at least 2 cases functions of the same structural parameters when the NKPC under adaptive learning is true. Moreover, the full sample estimate is used, suggesting that they have been learning about this parameter relative to the sample that ends in 1986Q1.

A less important issue concerns the robustness of the results. The author considers the case when the lag order is 3 and finds that the evidence against the NKPC is now weaker under both expectations hypotheses. It would also be interesting to see how the results are affected when the information set is increased. One option could be to include real GDP in the VAR.

Finally, some minor issues.

1. I guess it should be  $\bar{\omega}$  instead of  $\omega$  in equation (2).
2. The reference Franchi and Juselius (2007) on page 7 is listed as Juselius and Franchi (2007) in the list of references.
3. The VAR in (16) was already suggested by Campbell and Shiller (1987) for the bivariate case and shown to hold generally by Mellander, Vredin and Warne (1992, JAE).
4. The wording "...in order to *math* the formulation..." on page 10 could perhaps be improved somewhat.
5. Why are the structural parameters in (28) viewed as constant, while the VAR parameters are viewed as time varying? In practise the author lets two of the structural parameters be time varying as well (since the agents are learning about them as well).
6. It would be nice to see a discussion about the plausibility of the estimated parameters under adaptive learning. For example, the discount factor seems to be very small.
7. Table 3 on page 22 should be moved closer to the page where it is discussed (page 17).