***Boom, Bust, Recovery: Forensics of the Latvia Crisis***

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**Online Appendix III – Explaining Latvia’s Export Performance**

This annex uses a simple error correction model for exports to assess how much of the drop in real exports in Latvia between 2008:1 and 2009:1 can be accounted for by the drop in external demand. The model was estimated using data from 1996:1 to 2008:1. The estimates were then used to produce dynamic forecasts from 2008:2 onwards.

The dependent variable is the log of Latvia’s seasonally adjusted real exports (from Haver); the log of an index of foreign demand (produced by the IMF, as an index of real GDP of Latvia’s main trading partners, weighted by Latvia’s exports over 2009-11) and the producer price index (PPI)-based real effective exchange rate (from Haver).

The three series show evidence of being integrated of order 1. For all variables the augmented Dickey-Fuller test of the null hypothesis that the series in levels has a unit root cannot be rejected at conventional levels of significance. And in all cases the test rejects the null hypothesis for the series in first differences. This holds whether allowing for a deterministic trend to appear in the unit root test or not. The trace test shows evidence of one cointegration equation (CE) at the 5% significance level (both with and without an intercept in the CE). The maximum eigenvalue test suggests the existence of one CE at the 5% significance level when the CE does not assume a constant or trend term, and at the 10% significance level when the CE allows for an intercept.

The error correction equation is estimated in two steps. The long-run relationship between exports, foreign demand and the real exchange rate was estimated by dynamic-OLS (Stock and Watson, 1993, which is suitable for handling small-sample bias), including lagged and lead values of the first difference of the I(1) regressors.[[1]](#footnote-2) The estimated equation is:[[2]](#footnote-3)

where denotes the log of real exports; is the log of the index of partner country real GDP; and is the log of the PPI-based real effective exchange rate.

We then use the residuals from this static regression as an error correction term in the following dynamic first-difference regression (where is the first-difference operator):



Figure III.1 shows the actual and predicted (dynamic forecast) growth rate of real exports, and Figure III.2 depicts the corresponding levels of the series (rebased to 2008:1=100). The exercise suggests that the drop in Latvian exports was initially faster than predicted by the change in fundamentals. But the level of exports by 2009:2 was broadly in line with what the model would have predicted given the drop in foreign demand. The recovery of actual exports from its trough was also somewhat faster than what the model would have predicted.



**References**

Stock, James H. and Mark W. Watson, 1993, "A Simple Estimator of Cointegrating Vectors in Higher Order Integrated Systems," *Econometrica*, vol. 61(4), pp. 783-820.

1. We fixed the number of leads and lags at one. When allowing for an automatic selection of lags based on the SIC criterion the results did not change much. [↑](#footnote-ref-2)
2. Newey-West robust standard errors were estimated. \*\*\*, \*\* and \* indicate that the coefficient is significant at the 1, 5 and 10 percent level. [↑](#footnote-ref-3)