Appendix 2. Unit Root Tests

For all variables in levels, except pound and yen, the null hypothesis of a unit root cannot be rejected at the 5% significance level using the ADF[1] test with constant trend (model 1), and for pond and yen, the null hypothesis cannot be rejected using model 2. However, an application of the ADF test on the first differences of the natural logarithms demonstrates that this transformation is consistent with the assumption of stationarity for all variables.

Model 1 $\Delta Y_t = d_0 + d_1 Y_{t-1} + d_2 t + \sum_{j=1}^{p} x_j \Delta Y_{t-j} + V_t$

Model 2 $\Delta Y_t = d_0 + d_1 Y_{t-1} + \sum_{j=1}^{p} x_j Y_{t-j} + V_t$

Result of the Unit Roots (ADF-test)

	Original	First Difference of log variables	MacKinnon[2] critical values at 5% significant level
DM	-3.33(1)	-52.27(0)*	-3.41
£	-1.38(1)	-50.96(0)*	-1.94
¥	-1.73(3)	-16.07(9)*	-2.86
FF	-3.24(1)	-22.40(5)*	-3.41
BF	-2.63(1)	-22.56(5)*	-3.41
IL	-2.78(6)	-30.58(2).*	-3.41

DM: German deutsche mark, £: British pound; –: Japanese yen, FF: French franc; BF: Belgian franc; IL: Italian lira.
The number of lags used to remove serial correlation in the residuals is reported in parentheses.
* indicates the statistics are significant at 5% level.

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[1] Dickey, D.A. and W.A. Fuller (1979) Distribution of the Estimators for Autoregressive Time Series with a Unit Root, Journal of the American Statistical Association, 74, 427-31.

[2] MacKinnon, J.G. (1991) Critical Values for Cointegration Tests, Chapter 13 in Long-run Economic Relationships: Readings in Cointegration, edited by R.F.Engle and C.W.J. Granger, Oxford University Press