Income, inflation tax and money demand

Estimate a money demand function to measure how responsive is money demand to income:

m = f(p,y)

p= inflation
y=income

Estimation strategy

- Two alternatives: General-to-Particular, Engle-Granger approach

- General-to-particular: estimate a short-run model (ADL-error correction model) -> infer a long run relationship. Problem: not enough data (loss of precision, multicollinearity, asymptotic methods are not reliable)

- Engle-Granger: start from a long-run relationship (cointegration) and then estimate a short run model (error correction). Uses less degrees of freedom

Engle-Granger approach:

- Long run: Cointegration:
  1) All series must be I(1) (unit root in every series)
  2) Estimate a long-run relationship
  3) Test for stationary residuals (cointegration)

- Short run: error-correction model

Long run model

$$m_t = \alpha_0 + \alpha_1 p_1 + \alpha_2 y_t + \eta_t \qquad (1)$$

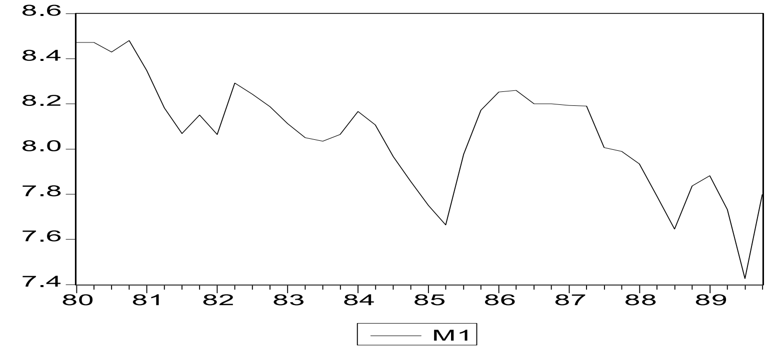
Short run

$$\Delta m_t = \beta_1 \Delta p_t + \beta_2 \Delta y_t + \beta_3 z_{t-1} + \delta W_t + u_t,$$

With Z_{t-1} = residuals from (1) ("errors") => β_3 Z_{t-1} (error correction term)

α_2 = long run income elasticity.
β_2 = short run income elasticity.

Results


8.6
8.4
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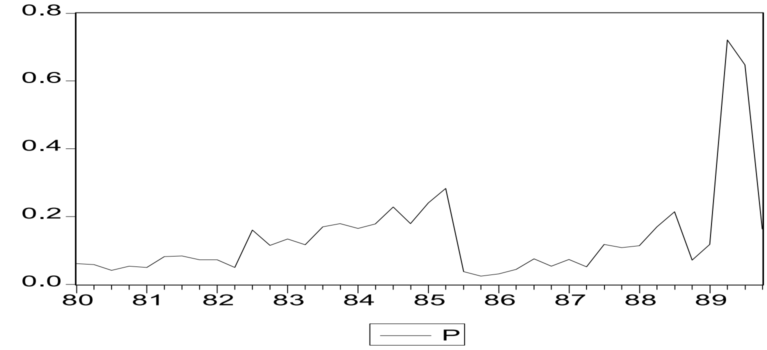
M1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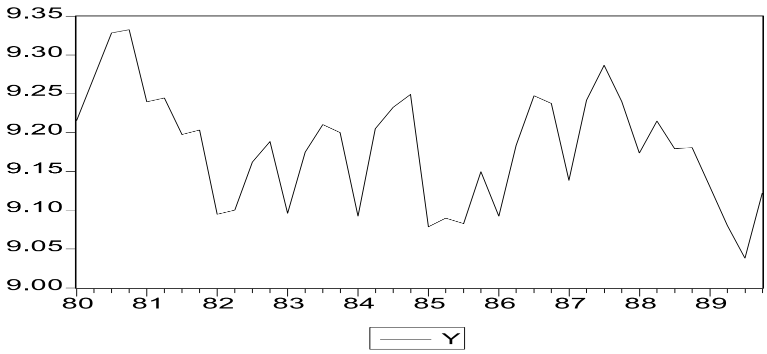
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Y

Long-run relationship

a) Test for unit-roots in every series

	DF Statistic
M1	-2.577362
Inflation	-2.395383
GDP	-3.053772

Critical value (5%): -3.5426

- We do not reject the null in all cases (all series seem to be I(1)

b) Estimation of the long-run relationship

$$m(t)= 1.8404 - 2.0883\ p(t) + 0.7068\ \ y(t)$$

R^2= 0.54; std error:0.51; sample:1980.1-1988.4

Observations: 36

Short-run relationship
(error-correction)

$$\Delta m(t) = -0.0138 - 1.2719\,\Delta p(t) + 0.2275\,\Delta y(t)$$
$$-0.2296\,ERRC(t-1) + \delta\,W(t)$$

R^2=0.51; std error: 0.084; sample:1980.2-1989.1

observations:36

The short run income elasticity is 0.2275
The long run income elasticity is 0.7068