

Financial Econometrics

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Exercise 1 (4/10) Consider a purchasing power parity (PPP) regression of the type

$$ls = \beta_0 + \beta_1 ld + u$$

where:

- ls is the log of the EUR/USD spot exchange rate and
- ld is the log of the price differential between the European Union and the USA.

and assume, for the purpose of this exercise, that the errors u be homoskedastic and serially uncorrelated.

You are interested in testing the PPP hypothesis in strict form: i.e., that the elasticity of the spot exchange rate to the price differential be one.

You are required to:

- write down the $\hat{\beta}_{OLS}$ estimator and the estimator of its variance $Var(\hat{\beta}_{OLS})$ in matrix form
- describe how the X matrix is formed
- explain how you would estimate the error variance σ^2
- describe the testing procedure you would adopt for assessing the hypothesis of interest.

Exercise 2 (3/10) Consider the sovereign spread y and the sovereign rating z of a country A, and three macroeconomic factors x_1 , x_2 and x_3 (e.g., *growth*, *external balance* and *external debt*). You have observed a sample of quarterly data over 30 years and estimated a model (a) of the spread following Cantor and Packer (1996):

$$y_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + \beta_3 x_{3t} + \varepsilon_t$$

obtaining OLS estimates $\hat{\beta}$ for the unknown parameters, residuals $\hat{\varepsilon}$, standard errors $SE(\hat{\beta})$ etc.. In order to assess the informative power of the sovereign rating, you have also estimated the augmented model (b):

$$y_t = \gamma_0 + \gamma_1 x_{1t} + \gamma_2 x_{2t} + \gamma_3 x_{3t} + \gamma_4 z_t + \eta_t$$

which includes the sovereign rating next to the macroeconomic factors. You have obtained $\hat{\gamma}$, $\hat{\eta}$ and standard errors $SE(\hat{\gamma})$ as above.

- Still following the work of Cantor and Packer, describe how one can assess whether rating agencies hold more accurate information than that embodied in publicly available macroeconomic data alone.

Exercise 3 (3/10) Consider the linear model

$$y = X\beta + \epsilon$$

and a time-series sample of $T = 120$ data points.

- Consider the null hypothesis of incorrelation in ϵ . Formalize possible alternative hypotheses $H_A^{(i)}$ and discuss the available testing procedures.