

# Econometria Avançada - 2015-1

## Trabalho 1 - Testes de raízes unitárias

O arquivo `nelsonplosser-data.txt` contém séries macroeconômicas dos Estados Unidos e que aparecem no notório artigo de Nelson and Plosser<sup>1</sup>, cujo *abstract* em repito aqui:

This paper investigates whether macroeconomic time series are better characterized as stationary fluctuations around a deterministic trend or as non-stationary processes that have no tendency to return to a deterministic path. Using long historical time series for the U.S. we are unable to reject the hypothesis that these series are non-stationary stochastic processes with no tendency to return to a trend line. Based on these findings and an unobserved components model for output that decomposes fluctuations into a secular or growth component and a cyclical component we infer that shocks to the former, which we associate with real disturbances, contribute substantially to the variation in observed output. We conclude that macroeconomic models that focus on monetary disturbances as a source of purely transitory fluctuations may never be successful in explaining a large fraction of output variation and that stochastic variation due to real factors is an essential element of any model of macroeconomic fluctuations.

Dois artigos que dão embasamento estatístico para os testes de raiz unitária são:

- David A. Dickey and Wayne A. Fuller (1979) “Distribution of the estimators for autoregressive time series with a unit root”, *Journal of the American Statistical Association*, 74, 427-431.
- David A. Dickey and Wayne A. Fuller (1981) “Likelihood ratio statistics for autoregressive time series with a unit root”, *Econometrica*, 49, 1057-1072.

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<sup>1</sup>Charles R. Nelson and Charles I. Plosser (1982) Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications,” *Journal of Monetary Economics*, 10(2), pp. 139162.

As 14 séries analisadas em Nelson & Plosser são:

1. Consumer price index
2. Industrial production
3. Nominal GNP
4. Velocity
5. Employment
6. Interest rate
7. Nominal wages
8. GNP deflator
9. Money stock
10. Real GNP
11. Stock prices (S&P500)
12. GNP per capita
13. Real wages
14. Unemployment

Faça os testes de raiz unitárias para cada uma dessas séries para modelos com ou sem “drift”. Em seguida, ajuste modelos  $ARIMA(p, d, q)$  para cada uma dessas séries. Lembre-se que os critérios AIC e SIC servem para comparar modelos ARIMA quanto as escolhas de  $p$ ,  $q$  e  $d$ . Entretanto, não se esqueça que é sempre recomendável a implementação dos testes de Box-Pierce e Ljung-Box para os resíduos dos modelos pois os mesmos testam a ausência de correlação serial (algum “sinal”) deixada(o) no ruído.