

EDHEC PhD Finance 2022 - Econometrics Homework

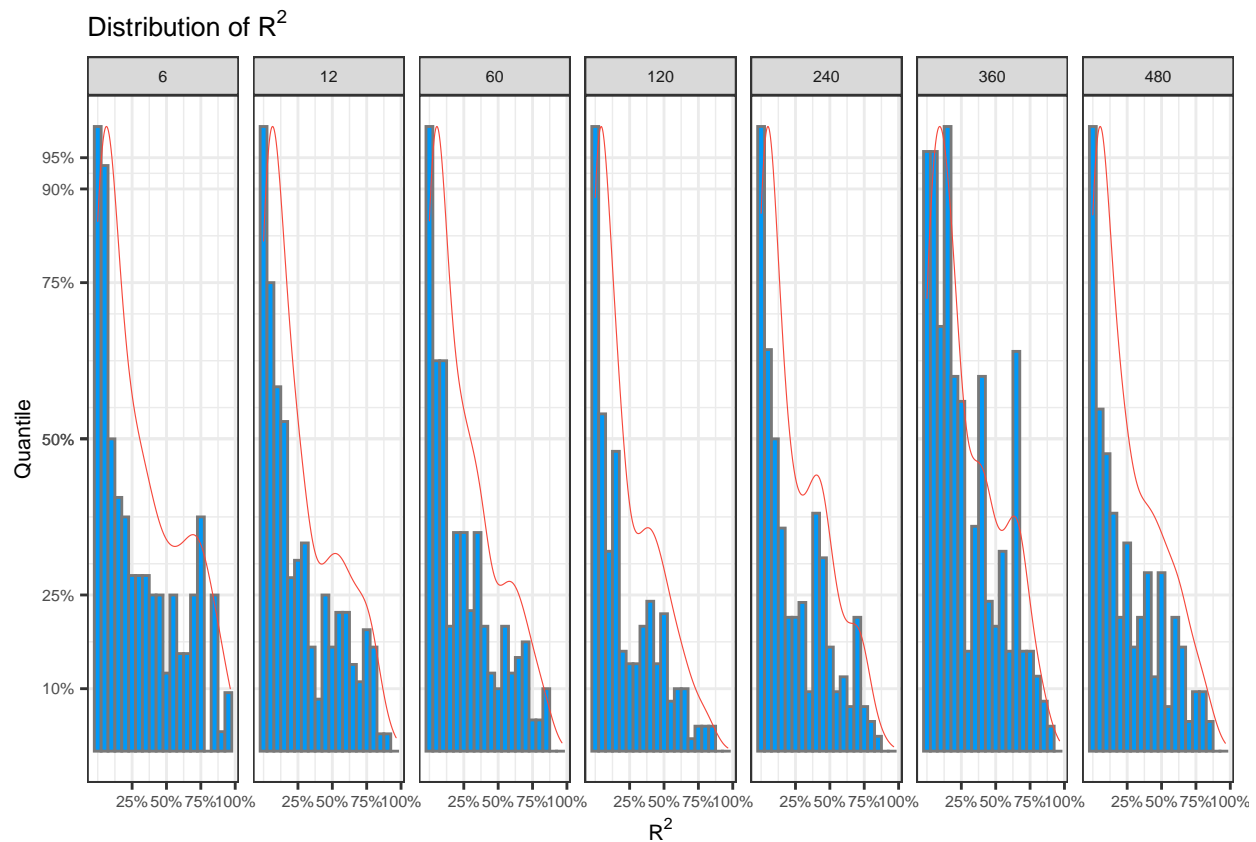
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Question 1: Spurious Regressions (2 points)

1.a. [1 Point] Replicate the analysis leading to Figure 14.1 in Davidson MacKinnon (2005, book)

1.a.i

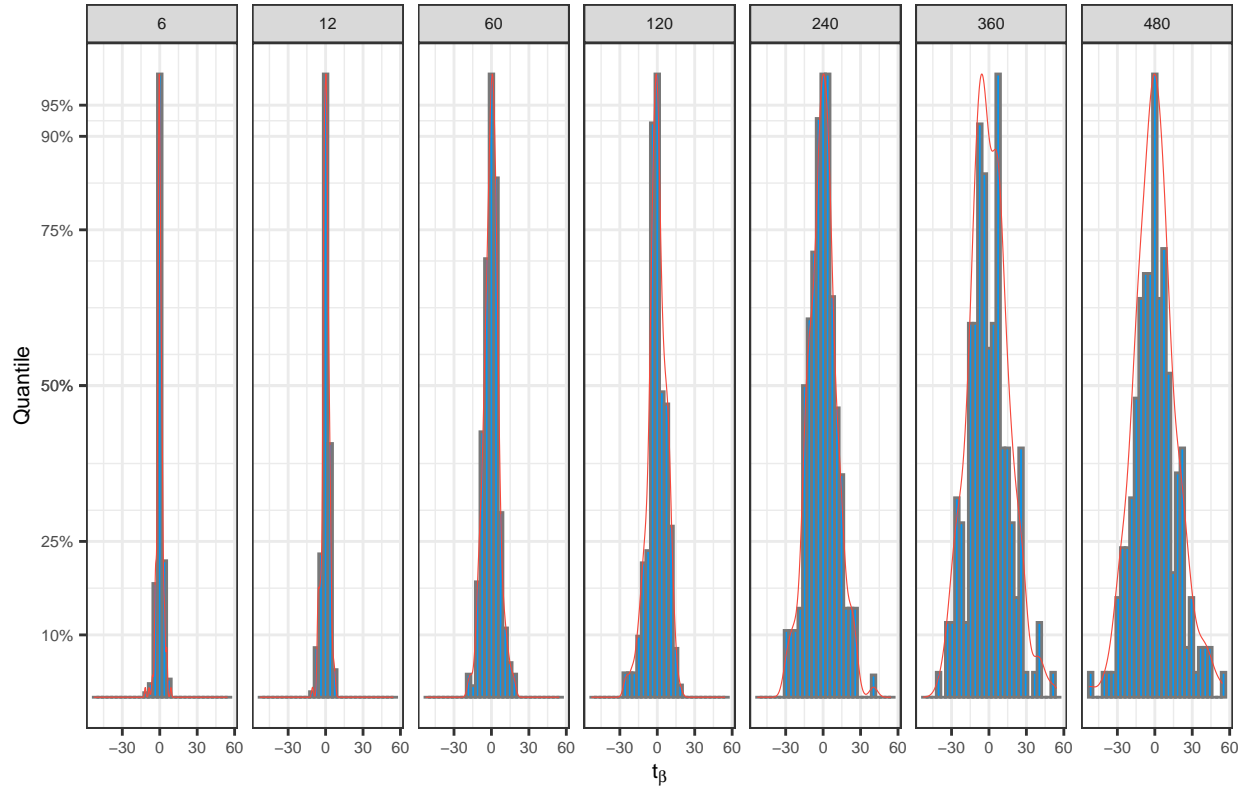
Compute also for each sample size T the distribution of the R^2 of the MC simulations with either 7 separate histograms, or one unique figure where you report on the y-axis the 5%, 10%, 25%, 50%, 75%, 90% and 95% quantiles of the distributions of the simulated R^2 , and on the x-axis you have $T = 6, 12, 60, 120, 240, 360, 480$.



1.a.ii

Similarly (either with histograms, or with one plot of the quantiles) report the distributions of the estimates t-statistics for the test of the null $H_0 : \beta_2 = 0$

Distribution of t_β

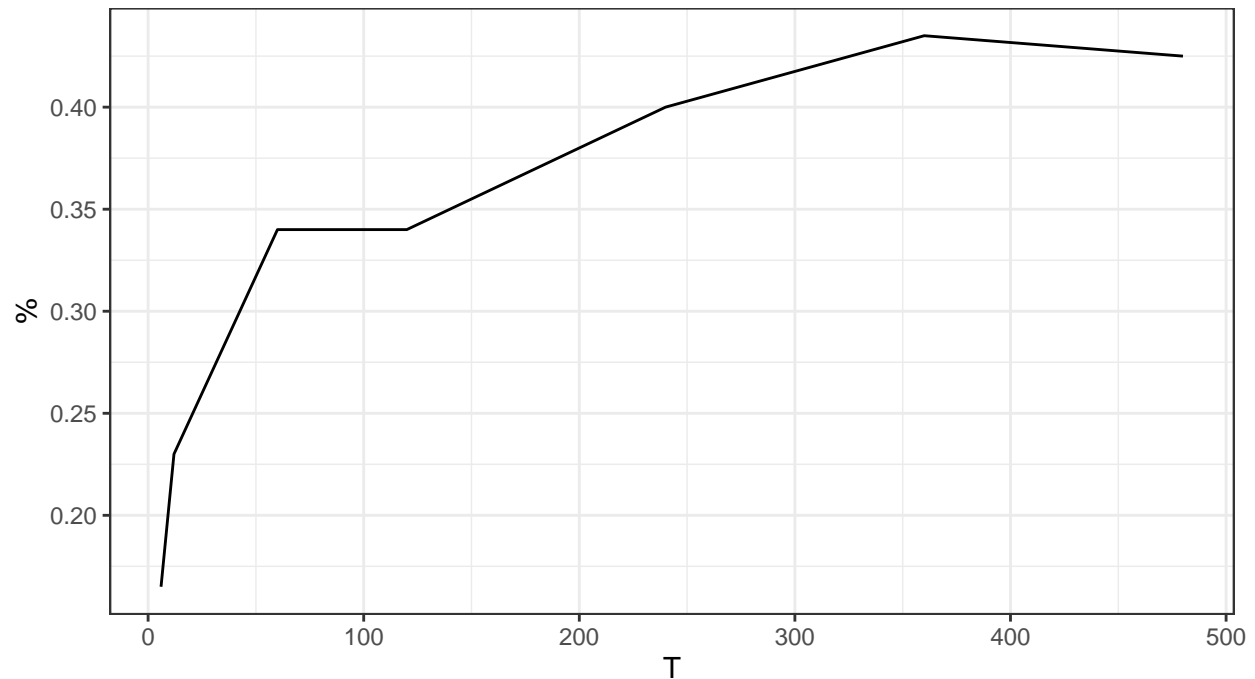


1.a.iii

their empirical rejection frequencies (that is the empirical size of the tests), which is exactly the figure 14.1 in Davidson MacKinnon (2005, book).

% of regressions which reject $H_0: \beta = 0$

$$\text{with } t = \frac{\beta - 0}{\sigma_\beta} > 1.96$$



1. "Spurious regression, random walk" (14.12) $y_t = \beta_1 + \beta_2 x_t + v_t$
 - why does the RR top out at 40-50
2. "Valid regression, random walk" (14.13) $y_t = \beta_1 + \beta_2 x_t + \beta_3 y_{t-1} + v_t$,
3. "Spurious regression, AR(1) process" (14.12), whereby x_t and y_t are generated by AR(1) with $\phi = 0.8$.
4. "Valid regression, AR(1) process" (14.13), whereby x_t and y_t are generated by AR(1) with $\phi = 0.8$.

1.b [1 Point] Based on the results obtained by answering to point (a) summarize the problems of spurious regressions in econometrics.