

Assignment 4 Solution

ECON M524 (FALL, 2022)

October 27, 2022

1. Use the same data as in the last homework.

"The dataset `data1945_2015.xlsx` gives the *real* price and dividend series of US stock market index over years 1945-2015. Using this dataset, compute two variables: continuously compounded returns (including dividends) r_t , and log dividend-price ratios dp_t ."

Run the horizon- h predictive regression of r_t on dp_{t-1} :

$$\sum_{j=0}^{h-1} r_{t+j} = \mu(h) + \theta(h)dp_{t-1} + u_t(h).$$

Report the standard t-statistic \mathcal{T}_A , and the following t-statistic \mathcal{T}_B (a Hodrick-type t-statistic), for $h = 3$ and $h = 7$,

$$\mathcal{T}_B = \frac{T^{1/2}\hat{\theta}(h)}{\sqrt{\Omega_{22}}},$$

where $\hat{\theta}(h)$ is the direct horizon- h regression slope, and Ω_{22} is the (2,2)-element of the 2×2 matrix Ω

$$\begin{aligned}\Omega &= (T^{-1} \sum_{t=h+1}^T X_{t-1}X'_{t-1})^{-1} V (T^{-1} \sum_{t=h+1}^T X_{t-1}X'_{t-1})^{-1}, \\ V &= T^{-1} \sum_{t=h+1}^T \left[\left(\sum_{j=0}^{h-1} X_{t-1-j} \right) \left(\sum_{j=0}^{h-1} X'_{t-1-j} \right) \hat{u}_t^2 \right], \\ X_{t-1} &= \begin{pmatrix} 1 \\ dp_{t-1} \end{pmatrix},\end{aligned}$$

with \hat{u}_t being the horizon-one residual.

Solution: $\mathcal{T}_B = 1.88$ when $h = 3$.

$\mathcal{T}_B = 1.90$ when $h = 7$.

The Hodrick statistic calculated as such is *identical* to the method we did in the class (using demeaned dp_{t-1}).