2nd set assignments Introductory Econometrics

Task 1

Use the data set dcx_gh.wf1 to estimate the Glosten/Harris (1988) model. An estimable linear equation can be derived in the following way.

The unknown true value of a stock $m_t$ is given by:

$$m_t = \mu + m_{t-1} + \varepsilon_t + z_t Q_t$$

where $\mu$ is a constant, $\varepsilon_t$ is a random disturbance, $Q_t$ is a trade indicator (taking the value 1 for a buy and $-1$ for a sell) and $z_t = z_0 + z_1 V_t$. With $V_t$ we denote the traded volume. The ask price $p^a_t$ (the price to buy a stock) and the bid price $p^b_t$ (the price to sell a stock) are:

$$p^a_t = m_{t-1} + \mu + \varepsilon_t + z_t + c$$

$$p^b_t = m_{t-1} + \mu + \varepsilon_t - z_t - c$$

Thus, the transaction price in period $t$, $p_t$, and the price in period $t - 1$, $p_{t-1}$, can be written as:

$$p_t = \underbrace{m_{t-1} + \mu + \varepsilon_t + z_t Q_t + c Q_t}_{m_t}$$

$$p_{t-1} = m_{t-1} + c Q_{t-1}$$

Subtracting $p_{t-1}$ from $p_t$ and plugging in the above expression for $z_t$ yields:

$$\Delta p_t = \mu + c \Delta Q_t + z_0 Q_t + z_1 Q_t V_t + \varepsilon_t$$

data set description:

- $\Delta p_t \doteq dq$
- $\Delta Q_t \doteq dq$
- $Q_t \doteq q$
- $Q_t V_t \doteq qv$

a) Estimate the OLS regression with EViews.

b) Test if volume $V_t$ has a significant impact on the market makers choice for setting $p^a_t$ and $p^b_t$.

c) Test, if $2c = 0.01$, which would imply that the order processing costs are minimized to the lower bound (1 euro cent) in an electronic order book.
Task 2

Analyze the data set wine.wf1 considering functional form and change of measurement of the variables. Therefore, regress the price and the logarithm of the price, respectively, on the age of the wine. Explain and interpret your results. Further, analyze the effect of using different price measures on your results. Formulate an economic interest rate model in discrete time for wine (take wine as an asset) and interpret the parameters of the linear regression model in this context.

data set description:

- **age**: the age of the wine in years
- **price1**: price for one bottle of wine
- **price12**: price for twelve bottles of wine
- **logprice1**: log-price for one bottle of wine
- **logprice12**: log-price for twelve bottles of wine