
ECONOMIC MODELLING AND ANALYSIS OF SHIPPING MARKETS GROUP ASSIGNMENT 2019

You will be split in groups of **5 students** and are required to work on the following project: Each group should select a research topic to investigate, related to the maritime/transportation/logistics markets. Following the first class, students must submit their working groups, including the group members and the selected project topic. A “*first-come first-served*” approach will be followed – each group should select a unique topic.

Please find below a proposed list of interesting projects on topics of current research interest. This list is not exhaustive and the working groups are welcome to recommend a different topic.

You should submit a research proposal presenting the idea. The proposal should demonstrate that you spent some time and effort gathering information and understanding the topic.

The research proposal should include the following:

1. A statement of the research questions your project aims to answer
2. A brief outline of the proposed sections in the project
3. A short reference list including major sources (i.e. published articles, reports, books, etc.) that you plan to use.

Working groups are expected to collect their empirical data sets early, either from databases or from other internet sources. For example, for the **Clarkson’s Shipping Intelligence Network** database, students have access, via the ICMA Centre.

PROPOSED PROJECTS

- An econometric model explaining the movements of the Baltic Dry Index or any other shipping-related index
- The examination of the stock performance of publically listed shipping companies
- The economic relationship between a shipping related variable (of your choice) and other shipping (explanatory) variables. Examples:
 - a. Vessel prices
 - b. Vessel operating/voyage costs
 - c. Bunker prices
 - d. Sale & Purchase prices
 - e. Scrap prices
 - f. Freight rates
 - g. Shipping finance variables
 - h. Other...

YOU ARE WELCOME TO PROPOSE YOUR OWN RESEARCH PROJECT

RESEARCH PROJECT METHODOLOGY

Here is a **list of empirical steps** that should be implemented prior to testing your hypotheses:

1. Collect the data using one or more of available databases
 - Test whether each variable is stationary (unit root test)
 - If yes, then proceed to the second step
 - If not, then cointegration analysis (using the Engle-Granger test) can be performed
 - If cointegration analysis cannot be performed then the variables must be transformed to stationary ones. Often in economics, logarithmic first-difference returns are found to be stationary and logarithmic price levels (raw data) are found not to be stationary
2. Generate a graph of the stationary variables (scatter graphs show the relationships between the variables)
3. Estimate the descriptive statistics for each variable (mean, variance, standard deviation, mode, kurtosis coefficient, asymmetry coefficient, Jarque-Bera normality test)
4. Produce a correlation matrix (table) of the variables:
 - The independent variables (X) may/should be correlated with the Y dependent variable
 - There may be a problem (multicollinearity) if the correlation between any independent variables (X) is high
 - In this case, you should only include explanatory variables that do not exhibit high correlation in the regression.
5. Estimate the regression model ($Y = \alpha + \sum \beta X + \varepsilon$) using stationary independent and uncorrelated variables (X)
6. Test the residuals (error-terms):
 - If the residuals are serially correlated, following the Breusch-Godfrey or the Ljung-Box test, then the regression model must be re-estimated, using lags of either Y or X in the right-hand-side of the model
 - Re-estimate the model with the above lags and re-test for serial correlation. Repeat the same procedure until there is no (significant) serial correlation left in the residuals
 - If the residuals are heteroskedastic, following the White test, then the regression model must be re-estimated using the White correction (if there is only heteroskedasticity in the residuals) or the Newey-West correction (if there is both heteroskedasticity and serial correlation in the residuals)
 - If the residuals do not follow the normal distribution, using the Jarque-Bera normality test, then the regression model must be re-estimated using another probability distribution. However, if the sample size is reasonably large, then there is no serious statistical problem, following Central Limit Theorem
7. Check if the adjusted-coefficient of determination (R^2) of your regression model is reasonably high (e.g. more than 80%). If it is very low (e.g. 5%), then your regression model has low explanatory power and possibly more X variables should be added.
8. Employ *t*- and *F*-tests to verify the statistical significance (at the 5% significance level) of your X variables. Any insignificant variable(s) should be eliminated from the model
9. Following the steps above you can now use the model to test your hypotheses

Further information on the assignment will not be provided. Groups should undertake their own research and make decisions on the sources used to collect data for the chosen variables (dependent and independent), the approach to present and discuss the information required and the assumptions used. The module material (lecture and seminar) can provide a good basis to build upon, but additional marks will be awarded for analysis that goes beyond this material. The use (and reference) of additional sources (in the selection/discussion of assumptions used as well as the general analysis) will also be rewarded with additional marks.