

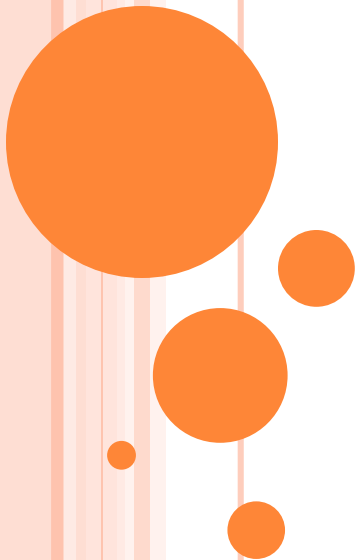
CA



THE INSTITUTE OF
CHARTERED ACCOUNTANTS
OF SRI LANKA

KC5 – CORPORATE STRATEGY AND CONTEMPORARY ISSUES

ASSIGNMENT



Outline

- 1) An introduction to the practical case scenario.
- 2) An introduction to the concept of an Econometric model.
- 3) Main factors (variables) for the analysis.
- 4) Assumptions of major variables.
- 5) Hypothesis testing.
- 6) Interpretation of the results.



An Introduction to the practical case scenario

- A well-known importer of secondhand motor vehicles from Japan.
- Major limiting factor for the growth of the business is the issue of 'financing' faced by the customers
- The corporate mission of the business hence has been expanded to include finance as a part of the company's marketing-mix.

An Introduction to the practical case scenario

Contd...

- Now the Finance Company is in the process of preparing the strategic plan for the acquired business.
- In a strategic plan one of the most important items is to forecast sales (in this instance **Interest Income**) and as the consultant has advised this should be approached methodically. Perhaps market segmentation is an approach where interest income can be projected under the applicable segments of vehicles , namely NEW, REGISTERED LOCAL- and IMPORTED RECONDITIONED because market shares of 'PFC' will depend on the **vehicle** category
- Segment of Interest for the Assignment -Reconditioned Imported

An Introduction to the practical case scenario

Contd...

Please bear in mind:

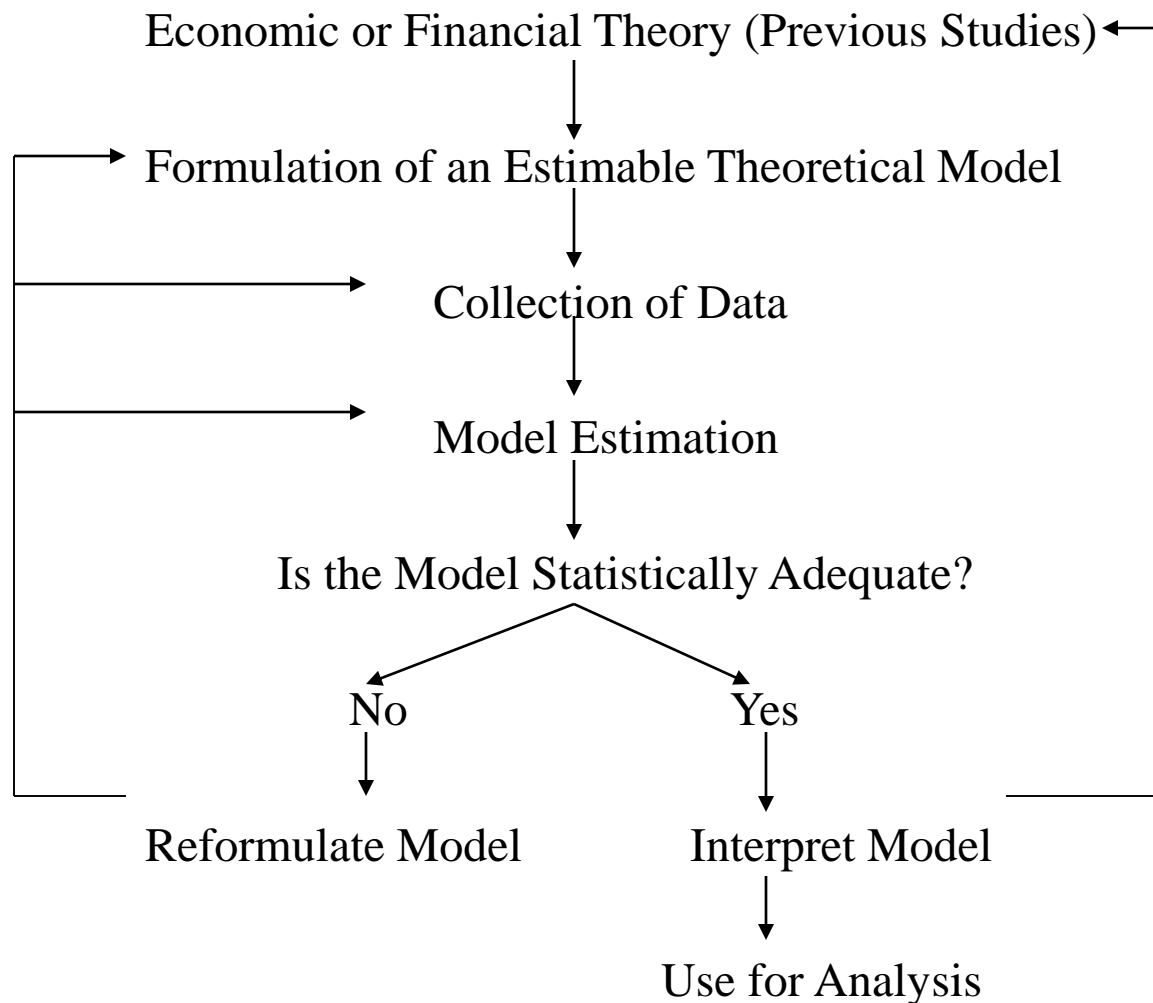
- Projected sales = market share * potential sales of a category
- And market share is a function of relative strengths and opportunities of PFC Vs Competitors, for a particular O & T Scenario
- In the assignment we are trying to forecast potential sales using possible major DRIVERS of demand. A better and a more logical method
- This is the academic SPIRIT of this assignment

An introduction to the concept of an Econometric model

Steps involved in formulating an econometric model

- **Step 1:** general statement of the problem
- **Step 2:** collection of data relevant to the model
- **Step 3:** choice of estimation method relevant to the model proposed in step 1
- **Step 4:** statistical evaluation of the model
- **Step 5:** evaluation of the model from a theoretical perspective
- **Step 6 :** use of model

Steps involved in the formulation of econometric models



Main factors (variables) for the analysis

Demand for vehicles for imported reconditioned is impacted by many variables such as;

- Duty factor,
- Disposable income,
- Exchange rates
- Oil prices
- Interest rates etc.

It should be hypothesized that demand will be affected by such factors.

Assumptions of major variables

- Theoretical perspectives
- Results of previous empirical studies
- How to measure the main variables
- Main assumptions

Hypothesis Testing

- We can use the information in the sample to make inferences about the population.
- We will always have two hypotheses that go together, the null hypothesis (denoted H_0) and the alternative hypothesis (denoted H_1).
- The null hypothesis is the statement or the statistical hypothesis that is actually being tested. The alternative hypothesis represents the remaining outcomes of interest.
- For example, suppose we are interested in the hypothesis that the exchange rate and vehicle registration have significant relationship.

- We would use the notation

H_0 : *there is no relationship between exchange rate and vehicle registration*

H_1 : *there is a relationship between exchange rate and vehicle registration*



Testing Hypotheses

- Assume the regression equation is given by ,

for $t=1,2,\dots,T$

$$y_t = \alpha + \beta x_t + u_t$$

- The population correlation coefficient ρ (rho) measures the strength of the association between the variables.
- The sample correlation coefficient r is an estimate of ρ and is used to measure the strength of the linear relationship in the sample observations



Features of correlation coefficient

- Unit free
- Range between -1 and 1
- The closer to -1, the stronger the negative linear relationship
- The closer to 1, the stronger the positive linear relationship
- The closer to 0, the weaker the linear relationship

Calculating the Correlation Coefficient

Sample correlation coefficient:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{[\sum (x - \bar{x})^2][\sum (y - \bar{y})^2]}}$$

or the algebraic equivalent:

$$r = \frac{n \sum xy - \sum x \sum y}{\sqrt{[n(\sum x^2) - (\sum x)^2][n(\sum y^2) - (\sum y)^2]}}$$

where:

r = Sample correlation coefficient

n = Sample size

x = Value of the independent variable

y = Value of the dependent variable

MAFE-03

Introduction to Regression Analysis

- **Regression analysis is used to:**
 - Predict the value of a dependent variable based on the value of at least one independent variable
 - Explain the impact of changes in an independent variable on the dependent variable

Dependent variable: the variable we wish to explain

Independent variable: the variable used to explain the dependent variable

Estimated Regression Model

The sample regression line provides an **estimate** of the population regression line

Estimated (or predicted) y value

Estimate of the regression intercept

Estimate of the regression slope

Independent variable

$$\hat{y}_i = b_0 + b_1 x$$

The diagram shows the equation $\hat{y}_i = b_0 + b_1 x$ inside a yellow box. Four arrows point from labels to parts of the equation: 'Estimated (or predicted) y value' points to \hat{y}_i , 'Estimate of the regression intercept' points to b_0 , 'Estimate of the regression slope' points to b_1 , and 'Independent variable' points to x .

The individual random error terms e_i have a mean of zero

Relationship between vehicle registration and exchange rate

Hypothesis 1

$H1_1$: There is a significant relationship between exchange rate and vehicle registration

$H1_0$: There is no significant relationship between exchange rate and vehicle registration

$$\text{Vehicle_Reg} = \alpha + \beta_1 \text{Ex_Rate} + \varepsilon$$

Regression Analysis; Example

Hypothesis 1

$H1_1$: There is a significant relationship between
Economic Growth & Financial Development

$H1_0$: There is no significant relationship between
Economic Growth & Financial Development

$$\text{Econ_Growth} = \alpha + \beta_1 \text{FDIndex} + \varepsilon$$

Regression Analysis; Example

Dependent Variable: **EG**

Method: Least Squares

Date: 09/07/16 Time: 11:52

Sample: 1971 2010

Included observations: 40

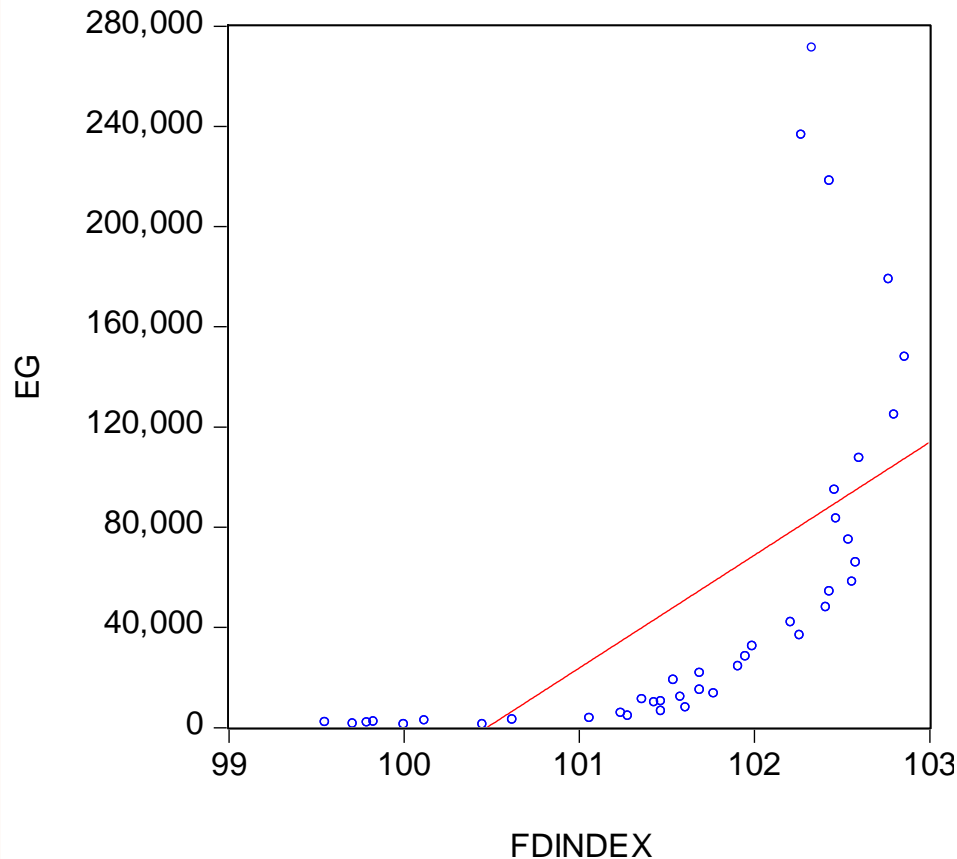
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4527029.	950983.6	-4.760365	0.0000
FDINDEX	45057.81	9357.160	4.815329	0.0000
R-squared	0.378957	Mean dependent var	52072.13	
Adjusted R-squared	0.362614	S.D. dependent var	70061.18	
S.E. of regression	55934.37	Akaike info criterion	24.75045	
Sum squared resid	1.19E+11	Schwarz criterion	24.83490	
Log likelihood	-493.0091	Hannan-Quinn criter.	24.78098	
F-statistic	23.18739	Durbin-Watson stat	0.088748	
Prob(F-statistic)	0.000024			

There is a significant negative relationship between economic growth (EG) and financial development(FD).

Since the value of probability is less than 5% (0.0000), the null hypothesis is rejected and therefore, it can be concluded that there is a significant positive relationship between EG and FD during the period under review.

Regression Analysis :

Interpretation of Results



The above scatter diagram shows that there is a significant positive relationship between EG and FD during the period under review.

Regression Analysis; Example

Hypothesis 2

H_{2_1} : There is a significant relationship between
Economic Growth and Real Interest Rate

H_{2_0} : There is no significant relationship between
Economic Growth and Real Interest Rate

$$\text{Econ_Growth} = \alpha + \beta_2 \text{RIR} + \varepsilon$$

Regression Analysis; Example

Dependent Variable: **EG**

Method: Least Squares

Date: 09/07/16 Time: 12:03

Sample: 1971 2010

Included observations: 40

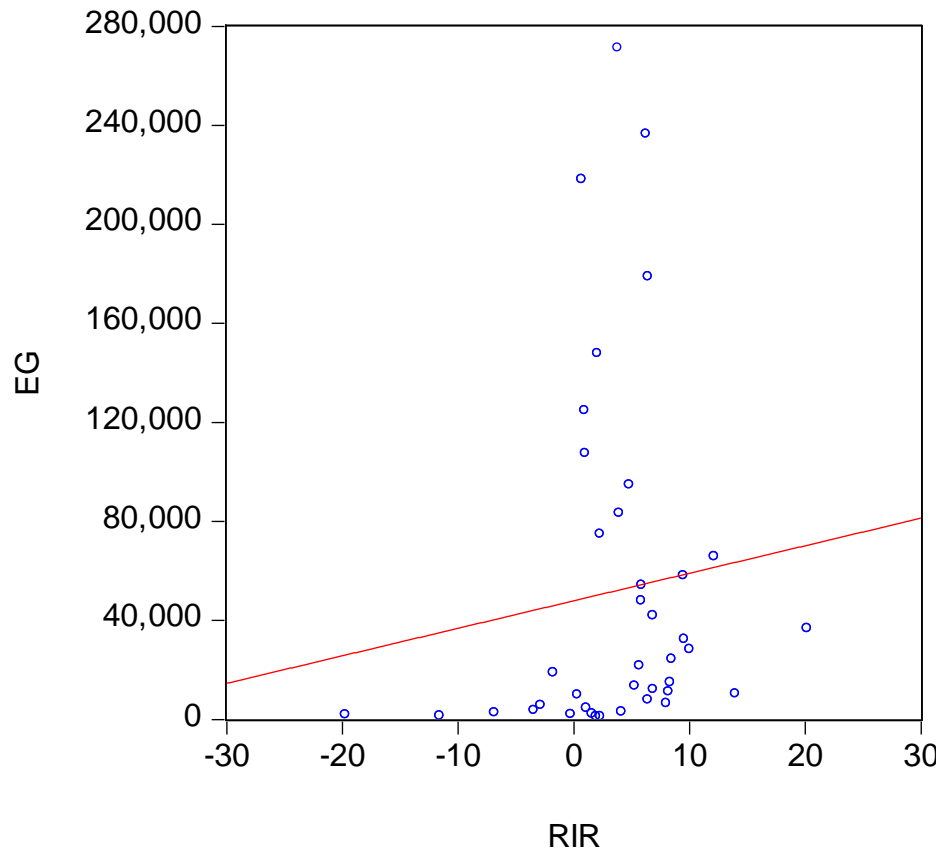
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47946.45	12761.52	3.757112	0.0006
RIR	1111.668	1668.991	0.666072	0.5094
R-squared	0.011540	Mean dependent var		52072.13
Adjusted R-squared	-0.014472	S.D. dependent var		70061.18
S.E. of regression	70566.32	Akaike info criterion		25.21520
Sum squared resid	1.89E+11	Schwarz criterion		25.29964
Log likelihood	-502.3040	Hannan-Quinn criter.		25.24573
F-statistic	0.443652	Durbin-Watson stat		0.044689
Prob(F-statistic)	0.509389			

There is no significant relationship between EG and RIR.

Since the value of probability is more than 5% (0.5094), the null hypothesis cannot be rejected and therefore, it can be concluded that there is no significant relationship between EG and RIR during the period under review.

Regression Analysis :

Interpretation of Results



The above scatter diagram shows that there is no significant relationship between economic growth and financial development during the period under review.

Multiple Regression Analysis

$$EG = \alpha + \beta_1 \text{FDIndex} + \beta_2 \text{RIR} + \beta_3 \text{FRIndex} + \varepsilon$$

- EG : Economic growth (per capita income)
- FDIndex : Financial Development Index
- RIR : Real Interest Rate
- FRIndex : Financial repression index



Multiple Regression Analysis

Dependent Variable: EG

Method: Least Squares

Date: 09/07/16 Time: 12:25

Sample: 1971 2010

Included observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2013295.	2224382.	-0.905103	0.3714
FDINDEX	53040.21	10593.65	5.006791	0.0000
RIR	-1950.122	1630.538	-1.195999	0.2395
FRINDEX	-33133.64	16934.02	-1.956632	0.0582

R-squared	0.507449	Mean dependent var	52072.13
Adjusted R-squared	0.466403	S.D. dependent var	70061.18
S.E. of regression	51178.11	Akaike info criterion	24.61865
Sum squared resid	9.43E+10	Schwarz criterion	24.78754
Log likelihood	-488.3730	Hannan-Quinn criter.	24.67972
F-statistic	12.36294	Durbin-Watson stat	0.214054
Prob(F-statistic)	0.000010		



Multiple Regression Analysis

Interpretation of Results

- When all three independent variables are used together to perform a multiple regression analysis, the results show that financial development and financial repression policies are the most significantly affecting variables for the economic growth for the period under review.
- However, the results indicate that there is no significant impact from real interest rate to the economic growth for the period.

Coefficient of Determination, R^2

- The coefficient of determination is the portion of the total variation in the dependent variable that is explained by variation in the independent variable.
- The coefficient of determination is also called R-squared and is denoted as R^2

Coefficient of Determination, R^2

- The **coefficient of determination** is the portion of the total variation in the dependent variable that is explained by variation in the independent variable
- The coefficient of determination is also called **R-squared** and is denoted as R^2

$$R^2 = \frac{SSR}{SST}$$

where

$$0 \leq R^2 \leq 1$$

Multiple Regression Analysis

Interpretation of Results

- Further, it can be identified from the results of the multiple regression analysis that the impact of financial development is very significant and positive for the economic growth when all the variables are considered together, and authorities should take proper measures to improve the financial markets and institutions.
- Coefficient of determination value indicates that 50.74% of the variation of the economic growth is explained by the three independent variables used for the analysis. Therefore, the independent variables used for this analysis can be considered as the main factors affecting to the economic growth.



THANK YOU

Sanjeewa Guruge (sjkg@cbsl.lk)
B.Sc, M.Sc, FCA, FCMA