Tecnológico de Monterrey

TEC21

Econometric Models FZ2019
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What is Econometrics?

Econometrics

THE USE OF STATISTICAL MODELS AND TOOLS TO ESTIMATE ECONOMIC RELATIONSHIPS AND TEST ECONOMIC THEORIES.

FOR EXAMPLE:

The effect of the price of diesel in the earnings of terrestrial transportation companies

Dependent variable:

Earnings of terrestrial transportation companies — ETT

Independent variable(s):

Price of Diesel — POD

FUNCTION:

$$ETT = F(\underline{POD})$$

LET'S TAKE THIS AS OUR ECONOMIC THEORY

$$ETT = 1.52 - 0.022\ POD$$

But, how do we interpret this equation?

$$ETT = 1.52 - 0.022\ POD$$

key elements:

Units

Especially, their magnitudes.
e.g. hundreds, thousands, tenths, etc.

Functional form

Refers to the algebraic form of the relationship of the variables in a regression

ETT = 1.52 - 0.022 POD

1.52 BILLION DOLLARS WOULD BE THE HYPOTHETICAL EARNINGS OF TERRESTRIAL TRANSPORTATION COMPANIES, IF THE PRICE OF DIESEL WERE $0

LET'S ASSUME THAT ETT'S UNITS

are billions of dollars (thousands of millions)

AND POD'S UNITS

are dollars

THEN, THE INTERPRETATION WOULD BE:

for every dollar that the Price of Diesel increases, the Earnings of Terrestrial Transportation will decrease in 0.022 billion dollars

But WHAT ABOUT THE FUNCTIONAL FORM?

Relationships between variables can be linear or they can be transformed using a logarithm (usually the natural logarithm).

When the relationship is linear, the interpretation is just as in the previous example: for every unit of change in "x", "y" will change $ß_1$ units.

y = 5 + 2 x

"For every unit that x increases, y will increase 2 units."

This is what we colloquially call a log-log model

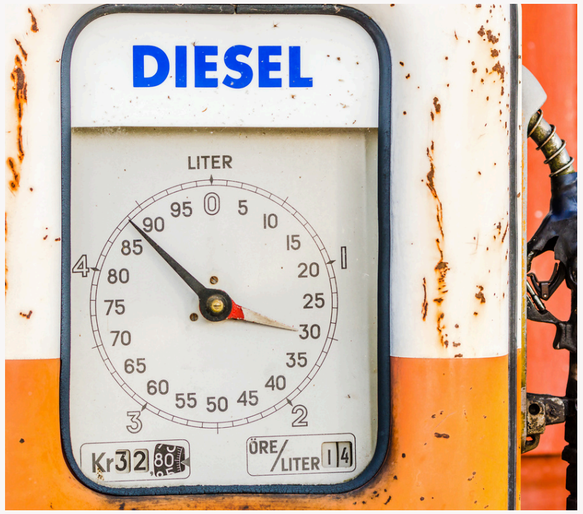
But, when the relationship is logarithmic, the interpretation is given in relative terms.

ln(y) = 5 + 2 ln(x)

"For every 1% that x increases, y will increase 2%."

Mixed models (either lin-log or log-lin) also exist...

SOMETIMES, MORE THAN ONE VARIABLE AFFECTS THE DEPENDENT VARIABLE



The cheaper the jet fuel, the cheaper air transportation will be, so more people will prefer it over terrestrial deliveries.

ETT = F (- POD , + PJF)

Earnings of terrestrial transportation companies

Price of Diesel

Price of jet fuel

ETT=0.958-0.020*POD+0.031*PJF

IF THE PRICES OF BOTH DIESEL AND JET FUEL WERE $0, THE EARNINGS OF TERRESTRIAL TRANSPORTATION COMPANIES WOULD BE $958MUSD

IF THE PRICE OF DIESEL INCREASES ONE DOLLAR, THE EARNINGS WOULD DECREASE IN $20MUSD, IF EVERYTHING ELSE REMAINS CONSTANT

IF THE PRICE OF JET FUEL INCREASES ONE DOLLAR, THE EARNINGS WOULD INCREASE IN $31MUSD, IF EVERYTHING ELSE REMAINS CONSTANT.

ceteris paribus

ETT=0.958-0.020*POD+0.031*PJF

Since the predicted signs and the signs of the regression are the same, THE ECONOMIC THEORY stands.

This is useful, because Terrestrial Transportation companies can plan ahead, knowing what can happen with every change on each of the regressors.

This is one of the main purposes of econometrics.

BIBLIOGRAPHY

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