What is Empirical Economics?

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HUBS

October 4, 2010
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- Partial equilibrium analysis (relates few economic variables on the basis of ceteris paribus)
- General equilibrium analysis (interdependence among variables in the system)

Empirical Analysis relates to estimating, calibrating unknown parameters and computing the model to answer research questions. It involves

- Statistical and econometric analysis
- Policy simulations
- Strategic modelling and experimental research
- Qualitative analysis

Models are used for comparative statics or dynamic analysis.
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Guidelines for Empirical Research

1. Construction of hypotheses: specify one or more equations of a model based on economic theories.

2. Show underlying theory using first and second order conditions of optimisation or by solving a system of equations.

3. It helps to use diagrams to show these relations.

4. Prepare most suitable data for analysis.

5. Estimate parameters and check if signs or magnitudes of estimated parameters or variables are consistent with the theory.

6. Analyse variance by $R^2$, $F$ and $\chi^2$ and significance of coefficient by $t$ tests.

7. Econometric tests: heteroskedasticity, autocorrelation, stationarity, cointegration, mispecification or measurement errors.

8. Write an essay or article based on research experience gained following above steps.
Data sources

- primary survey
- secondary sources like

1. Economic and social data (ESDS) www.esds.ac.uk/international
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3. Eurostat:  
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2. Datastream; http://finance.yahoo.com/
4. BHPS: http://www.esds.ac.uk/government/; http://www.esds.ac.uk/government/surveys/
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  7. http://www.economicsnetwork.ac.uk/links/data_free#uk
Empirical economics: an example

Economic theory of consumer optimisation with a Cobb-Douglas utility function:
Consumers problem: maximise utility subject to budget constraint

$$\max U = C_1^\alpha C_2^{1-\alpha} \quad \text{s.t.} \quad P_1 C_1 + P_2 C_2 = I$$

(1)

Here $P_1$ and $P_2$ are prices of $C_1$ and $C_2$ goods and $I$ is income of the consumer

Demand function for $C_1$:

$$C_1 = \frac{\alpha I}{P_1}$$

(2)

Demand function for $C_2$:

$$C_2 = \frac{(1 - \alpha) I}{P_2}$$

(3)
Empirical analysis requires some manipulation of the original derivation. It is easier to convert this nonlinear demand function to a linear one by taking logs as:

\[
\ln C_1 = \ln \alpha + \ln I - \ln P_1 \tag{4}
\]

There are \(i = 1 \ldots n\) consumers. Define \(\ln C_{1,i} = Y_i; \quad \beta_1 = \ln \alpha + \ln I; \quad \ln P_{1,i} = \beta_2 X_i;\)

\[
Y_i = \beta_1 + \beta_2 X_i + e_i \tag{5}
\]

Expected signs of intercept \(\beta_1 > 0\). This is the demand expected when price is zero; component of demand that does not respond to price level. Slope \(\beta_2 < 0\) for a normal good when prices rise demand will fall.
Preparing data for demand analysis

Let us consider demand for wheat. Data on individual commodities can be obtained from various sources such as http://www.ers.usda.gov/Data/Wheat/YBtable01.asp. When data is constructed the unknown parameters $\beta_1$ and $\beta_2$ can be estimated. See data file wheat.csv.

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>29.44</td>
<td>4.02</td>
<td>7.32</td>
</tr>
<tr>
<td>Wheat price</td>
<td>1.12</td>
<td>0.99</td>
<td>1.12</td>
</tr>
</tbody>
</table>

$R^2 = 0.06$, $F = 1.3$, $N = 23$.

This is not a strong relation, need to do more research. Derivation of OLS estimators and test to follow next week.
Micro theories

Macro theories:

Bandhopadyay and Basu (2005), Basu and Bhattarai (2009)
Trade and exchange rates

Foreign Direct Investment (FDI)

Poverty

http://nobelprize.org/nobel_prizes/economics/laureates/;
http://www.economicsnetwork.ac.uk/
;http://cepa.newschool.edu/het/schools/game.htm;
http://www.hull.ac.uk/php/ecskrb/Confer/research.html;
http://homepage.newschool.edu/het/alphabet.htm