Introduction to research methods in economics

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Get familiar with the research tools in economics such to be able to produce report, scientific article, review, referee…..

……and (maybe) a thesis.

Why Do Research?

• Summarizing what is known in a field

• Contributing to knowledge on a topic

• Solving a problem/puzzle

• Weighing in on a debate
What is research?

- Research = creation of knowledge
- How to create knowledge
  - Construct an argument
  - Argument must be a position or point of view on a question
  - Argument must be supported by evidence
  - Scholars develop competing arguments
  - Over time, stronger arguments survive
Six steps in the research process

- Develop an effective research question
- Survey the literature
- Conceptualize the problem
- Test the hypothesis
- Analyze and interpret the results
- Communicate the findings
Developing an effective research question

- Three questions must be answered
  1. What is the research topic
     - General area (unemployment, pollution, poverty)
  2. What is the research question
     - One-sentence question
  3. What is the research hypothesis
     - Proposed answer to your question
Developing an effective research question: How to begin

- Choose a general topic

- Start reading the literature
  - What has been done
  - What questions remain
  - Are there contradictions in the literature

- Select a research question from the gaps in the literature
Developing an effective research question: How to find the gaps in the literature

• Introduction to articles
  – Every article will identify the research question and how it differs from other research in the introduction

• Conclusion of articles
  – Every article should list its weaknesses and areas for further study in the conclusion
General structure of a paper:

- Introduction
- Literature Review
- Theoretical Framework
- Empirical Analysis
- Conclusions
- Appendix (if any)
- References
Organization of your final paper

1. Introduction
   - Define general topic
   - What research has been done on this already
   - What are gaps in literature
   - Define your specific research question
   - How will you answer your question (method)
   - Order of remaining paper
2. Literature review and hypothesis

- What does previous research say about topic
  - Each paragraph represents one study
  - Each paragraph represents one theme
- Summarize gaps in literature
- What is your own hypothesis
Organization of your final paper

3. Theoretical framework

Describe the theoretical foundations underpinning your empirical analysis. Refer to the mainstream contributions and, if possible, try to develop your own framework.
4. Empirical Analysis
   - Descriptive statistics
   - Regression analysis
   - Before and after
   - Case studies
   - Forecasting
Organization of your final paper

5. Conclusions

- Restate the hypothesis or research question
- Summarize your results
- Did you confirm your hypothesis
- Weaknesses of your study
- Areas for further study
- No new citations, tables, or footnotes
Economics Resources: Data

- General statistics:
  - US population:
    - Census [http://www.census.gov](http://www.census.gov)
    - Statistical Abstract of the US
  - US government(s):
  - European Union:
  - SPAIN:
Economics Resources: Data

• Bureau of Economic Analysis (BEA):
  • [http://www.bea.doc.gov](http://www.bea.doc.gov)
  • National Income and Product Accounts (NIPA)

• Bureau of Labor Statistics (BLS):
  • [http://www.bls.gov](http://www.bls.gov)
  • Consumer Price Index (CPI)
  • Consumer Expenditure Survey (CEX)
  • Current Employment Statistics (CES)
  • Productivity
Economics Resources: Data

• National Bureau of Economic Research (NBER):
  • http://www.nber.org
  • US business cycles

• US Federal Reserve Board of Governors:
  • http://www.federalreserve.gov/rnd.htm
  • Financial data (e.g., credit, flows of assets, interest rates, money supply)
Economics Resources: Data

• Organization for Economic Cooperation and Development (OECD):
  • [http://www.sourceoecd.org](http://www.sourceoecd.org) => “Statistics”
  • Development, employment, health, national accounts

• The World Bank:
  • World Development Indicators (WDI)
  • Global Development Finance (GDF)
Economics Resources: Data

• The International Monetary Fund (IMF):
  • GDP growth, inflation, unemployment, debt
  • International Financial Statistics (IFS): exchange rates, trade, government accounts, national accounts

• United Nations Development Program (UNDP):
  • Human Development Index (HDI)
  • Human Poverty Index (HPI)
Economics Resources: Data

• World Institute for Development Economics Research (WIDER):
  • [http://www.wider.unu.edu/](http://www.wider.unu.edu/) => “Database”
  • World Income Inequality Database (WIID)
  • Comprehensive database of measures of income inequality (Gini coefficient) across several countries and through time
Economics Resources: Data

• Integrated Public Use Microdata Series (IPUMS):
  • [http://www.ipums.umn.edu](http://www.ipums.umn.edu)
  • Vast amount of socioeconomic data

  • [http://www.census.gov/cps/](http://www.census.gov/cps/)
  • Vast amount of socioeconomic data
Economics Resources: Data

• National Longitudinal Surveys (NLS):
  • http://www.bls.gov/nls/home.htm
  • Vast amount of data on labor market activities

• Panel Study of Income Dynamics (PSID):
  • http://www.isr.umich.edu/src/psid
  • Vast amount of data on households’ income sources, employment, occupation, poverty status
Economics Resources: Thailand’s Data

• Bank of Thailand (BOT):
  • https://www.bot.or.th/English/Pages/default.aspx
  • Vast amount of data on Economic indicators

• National Statistic Office Thailand (NSO):
  • http://www.nso.go.th/sites/2014en
  • Data on Economic activity, population, housing statistics
How to analyze the data
A Big picture...of the analysis

Central claim/Thesis

Reason

Why the claim is true

Evidence

Facts: Results from other research, statistics, model results

Reason

Why the claim is true

Evidence

Facts: Results from other research, statistics, model results

Reason

Evidence

Macro Structure of an Analytical Essay

- **Example:** Illness and the labor market

- **Thesis:** The impact of chronic illness on workers’ wages is indeterminate…

- **Reason:** …*because* firms have lower demands for chronically ill workers and chronically ill workers supply less labor

- **Evidence:** Demand and supply model, data on chronic illness and productivity, labor demand, and labor supply
• The general structure of essay applies to the most common economics papers:

1. Literature reviews

2. Empirical papers

3. Theory papers
1) Literature reviews:

1. Introduction

2. Subsections of topic/area of research

3. Conclusion

• Purpose of section:

1. Introduce topic, scope and organization of review

2. Outlining what we know about a topic

3. Summing up, identifying open questions, areas for future research
2) Empirical papers:

1. Introduction
2. Literature review
3. Methodology
4. Data
5. Results
6. Discussion
7. Conclusion

- Purpose of section:

1. Introduce topic, motivation, thesis
2. Context for the research
3-4. Model to be estimated, variables in regression, source of information
5-6. Summary statistics, estimated parameters, hypothesis testing, interpretation
7. Return to thesis
3) Theory papers:

1. Introduction
2. Literature review
3. Model setup
4. Model results/analysis
5. Extensions of model
6. Conclusion

• Purpose of section:

1. Introduce topic, motivation, thesis
2. Context for the research
3. Definitions and assumptions
4. Manipulation of the model and interpretation of its implications
5. Relaxing assumptions and deriving new results
6. Return to thesis
Higher Order Concerns

• Incorporating counterarguments:
  – Do other studies find different results using different data or different models?
  – What are the alternative explanations?
  – What are the competing models?
Higher Order Concerns

• Refuting counterarguments:
  
  – Why is your interpretation of “the facts” the most persuasive?
  
  – What support for your claims do you have that competing explanations do not?
  
  – Is there something important about the topic that a competing argument ignores and that you do not?
Higher Order Concerns

• Concession:

  – What are the limitations of your argument?

  – Are your empirical results sensitive to specification, data, or measurement issues?

  – Are any of your assumptions particularly unrealistic?
Presenting Statistical Evidence and Graphical Information in Written Work

….or how to get to the point ….
Info./Results of Your Research

• Why does it matter? It is the most important part of your research!

• You are trying to make an argument: why should your reader believe you?

• Statistical, graphical, and mathematical information provide:
  – Background on your problem
  – Support for your claims
  – Tests of your hypotheses
  – Illustration of your argument
Info./Results of Your Research

• Information supporting your argument:
  – Statistics from data (tabular and/or graphical)
  – Estimates from a regression model
  – Equations derived from a model
  – Figures to illustrate how a model works

• Tell your reader what the information says as well as what it means in the context of your economic theory
Info./Results of Your Research

• General tips:

  – All figures, graphs, and tables need a title

  – Tables: “Table [Number]: [Title of table]”
    Typically at the top of the table

  – Figures/graphs: “Figure [Number]: [Title of figure]”
    Typically at the bottom of the figure

  – Help your reader: Titles should be self-explanatory
    and state the theme of the information
Table 1: Describing data

<table>
<thead>
<tr>
<th>Topic</th>
<th>Topic</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data 1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Data 2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Data 3</td>
<td>3</td>
<td>3¹</td>
</tr>
</tbody>
</table>

¹: footnote is needed.
Figure 1: Graphical data (a) describing data 1 and (b) describing data 2
Info./Results of Your Research

• General tips:

  – Figures and tables with self-explanatory titles are not enough!

  – Reference the figure or table in the body of your text

  – Do not simply refer the reader to your results and then let her do the thinking; draw conclusions!
Info./Results of Your Research

• General tips:
  – Discuss the contents of the figure or table:
    • Interpret the information for your reader
    • What does the figure or table show?
    • Any interesting information you want your reader to know?
    • How is the information related to your argument?
Info./Results of Your Research

• General tips:

  – Keep these two slogans in mind while writing:

    1. I need to write about my results

    2. The interpretation of my results is as important as my results
Statistical information: Summary statistics

– Two forms: 1. Tables, 2. Graphs

– Purpose:
  • Background information
  • Illustrates trends (or differences)
  • What trends are there in the data? Changes over time…across countries, firms, etc.?
Tables: Info. that summarizes your data

What to include:

- Clear, descriptive title of the table and its variables
- Units of measurement for each variable
- Measure of central tendency (e.g., average)
- Measure of variability (e.g., standard deviation)
- Minimum and maximum values
- Correlation with other variables
### Table 4  Descriptive analysis

<table>
<thead>
<tr>
<th></th>
<th>GDP</th>
<th>CAP</th>
<th>LAB</th>
<th>TELINT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1: ASEAN5</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>9.937</td>
<td>8.629</td>
<td>9.016</td>
<td>22.882</td>
</tr>
<tr>
<td>Maximum</td>
<td>15.021</td>
<td>13.592</td>
<td>11.575</td>
<td>30.492</td>
</tr>
<tr>
<td>Minimum</td>
<td>4.742</td>
<td>3.301</td>
<td>3.787</td>
<td>18.821</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>2.531</td>
<td>2.579</td>
<td>1.978</td>
<td>3.005</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.174</td>
<td>-0.260</td>
<td>-0.904</td>
<td>0.870</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.033</td>
<td>1.938</td>
<td>3.314</td>
<td>2.879</td>
</tr>
<tr>
<td>Jarque–Bera</td>
<td>7.046</td>
<td>9.325</td>
<td>22.450</td>
<td>20.282</td>
</tr>
<tr>
<td>Probability</td>
<td>0.030</td>
<td>0.009</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Sum</td>
<td>1,589.906</td>
<td>1,380.587</td>
<td>1,442.590</td>
<td>3,661.139</td>
</tr>
<tr>
<td>Sum square deviation</td>
<td>1,018.351</td>
<td>1,057.725</td>
<td>621.781</td>
<td>1,435.612</td>
</tr>
<tr>
<td>Observations</td>
<td>160</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
– Tips for tables:

• Don’t let the table stand alone

• Explain its contents to your reader

• Think about questions that the data can answer and discuss them in the text of your paper
- Figures/graphs: Visual summaries of your data

- What to include:
  - Clear, descriptive title of the figure
  - If a graph, clear labels for axes and curves
  - If a graph, a clearly labeled key to distinguish curves
  - Units of measurement for each variable
Figure 1: Time series plot of company A and company B
– Tips for figures:

• Don’t let the figure stand alone

• Explain its contents to your reader

• What does the figure show?

• What are the important trends/differences?

• How does it relate to the point you want to make?
Statistical information: Regression analysis

- Tables: Info. that summarizes your estimation results

- What to include:
  - Clear, descriptive title of the table and its variables
  - Units of measurement and source for each variable
  - Signs and values of estimated coefficients
  - Indication of each estimate’s statistical significance
  - Standard error of each estimate (or $t$-statistic)
  - Sample size, measure of goodness-of-fit, and overall statistical significance
Table 2: Estimated results

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>$\beta$ Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defendant–victim race/ethnicity (reference category = Black-on-White)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black-on-Black</td>
<td>-.324***</td>
<td>.333</td>
</tr>
<tr>
<td>Black-on-Latino</td>
<td>-.096**</td>
<td>.446</td>
</tr>
<tr>
<td>White-on-White</td>
<td>-.115***</td>
<td>.449</td>
</tr>
<tr>
<td>White-on-Black</td>
<td>-.085**</td>
<td>.507</td>
</tr>
<tr>
<td>White-on-Latino</td>
<td>-.032</td>
<td>.511</td>
</tr>
<tr>
<td>Latino-on-White</td>
<td>-.083**</td>
<td>.458</td>
</tr>
<tr>
<td>Latino-on-Black</td>
<td>-.115***</td>
<td>.481</td>
</tr>
<tr>
<td>Latino-on-Latino</td>
<td>-.233***</td>
<td>.362</td>
</tr>
<tr>
<td>Defendant and victim gender (reference category = female)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victim’s gender</td>
<td>.022</td>
<td>.165</td>
</tr>
<tr>
<td>Defendant’s gender</td>
<td>-.028</td>
<td>.258</td>
</tr>
<tr>
<td>Defendant and victim age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victim’s age</td>
<td>-.021</td>
<td>.004</td>
</tr>
<tr>
<td>Defendant’s age</td>
<td>-.030</td>
<td>.008</td>
</tr>
<tr>
<td>Defendant–victim relationship (reference category = not a stranger)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stranger</td>
<td>.158***</td>
<td>.147</td>
</tr>
<tr>
<td>Homicide circumstances (reference category = not instrumental)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumental</td>
<td>.247***</td>
<td>.127</td>
</tr>
<tr>
<td>Number of victims in homicide</td>
<td>.459***</td>
<td>.201</td>
</tr>
</tbody>
</table>

Adjusted $R^2 = 36.9$.  

*Significant at $p < .05$, **Significant at $p < .01$, ***Significant at $p < .001$. 

a weighted data.
– Typical format for a table of regression results: What could improve this table?

– Tips for tables:

  • Discuss estimates on important variables; provide interpretation
  • Are the estimates statistically significant? Economically significant?
  • Do the results confirm your theory? Do they reject it?
• **Mathematical information: Equations**

  – Treat equations as part of a sentence:

    • If an equation ends a sentence, a period (.) should follow it
    • If an equation is part of a clause, a comma (,) should follow it
    • Major equations deserve numbers, minor ones do not
    • Explain and interpret parts of any displayed equation
• Mathematical information: Figures/graphs

  – Figures should illustrate and simplify your model, not obscure it

  – Figures need clear, descriptive titles
    • “Figure [Number]: [Title of figure]”
    • Typically at the bottom of the figure

  – Figures need labels for anything that is not obvious to the reader

  – You must reference the figure in the body of your text and then discuss its interpretation and meaning