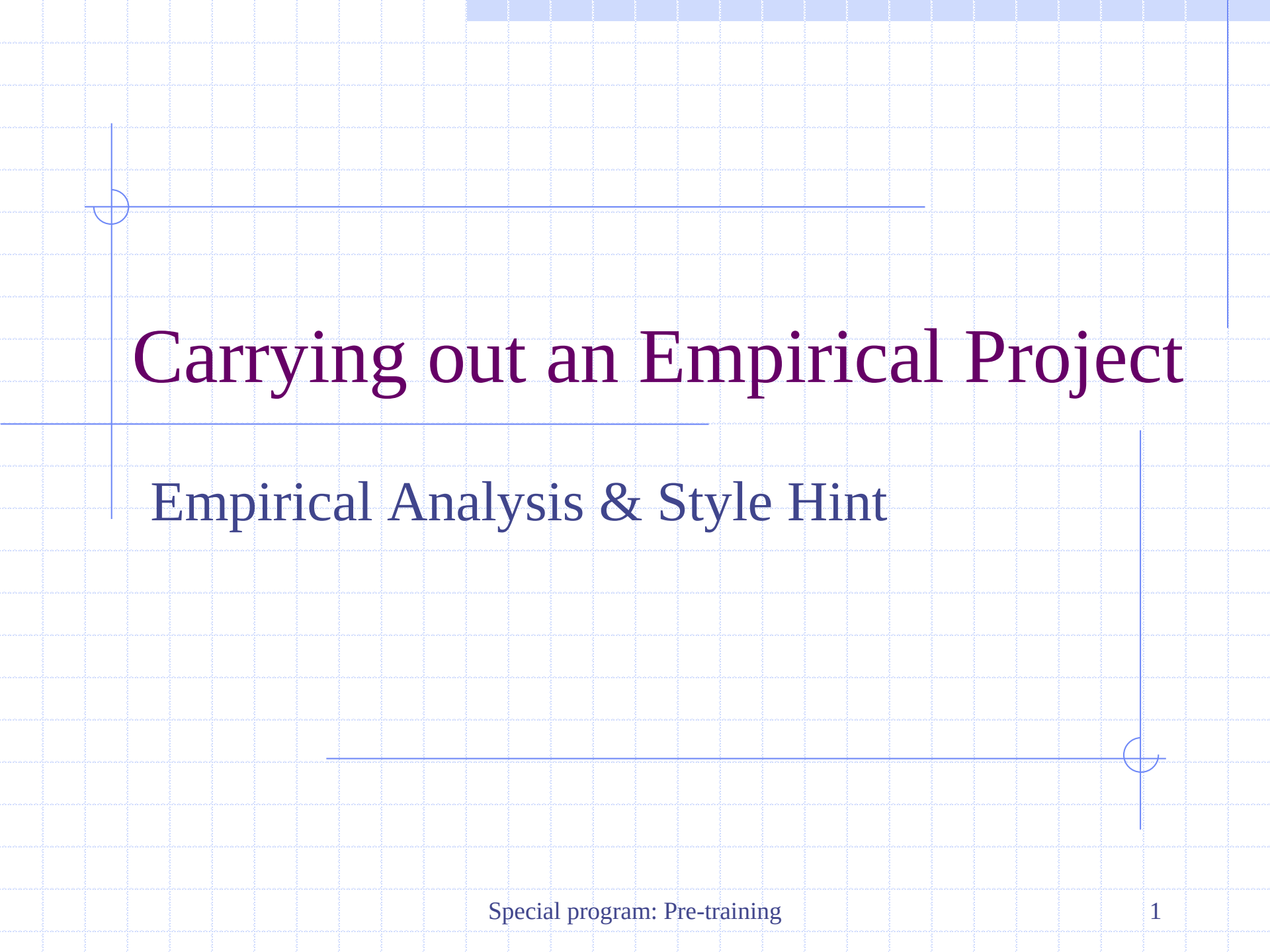




Carrying out an Empirical Project

Empirical Analysis & Style Hint

Carrying out an Empirical Project

1. Posing a Question
2. Literature Review
3. Data Collection
4. Econometric Analysis
5. Writing an Empirical Paper
 - 2 Steps in Empirical Analysis
 - Causality & Ceteris Paribus

1 Posing a Question

- ◆ Start with a general area or set of questions.
- ◆ Make sure you are interested in the topic.
 - Use on-line services such as *Google scholar* to investigate past work on this topic.
- ◆ Narrow down your topic to a *specific* question or issue to be investigated.
 - Work through the theoretical issue.
 - You cannot be too ambitious for your master thesis.

1 Posing a Question *cont.*

◆ Your research should add something new

- Example

- ◆ Use a new data set or study a question for a different country
- ◆ Add a new variable whose influence has not been studied before
- ◆ Try out new/alternative methods to study an old question
- ◆ Study an existing question for more recent data
- ◆ It helps if your research question is policy relevant or of local interest

2 Literature Review

- ◆ All papers, even if they are relatively short, should contain a review of relevant literature.
 - A literature review is important to place your paper into context.
 - On-line services are useful for “lit-review”.
 - ◆ You can read abstracts of papers to see how relevant they are to your own work.
 - Think of related topics that might not show up in a search using a handful of key words.

3 Data Collection

- ◆ Deciding on which kind of data to collect depends on the nature of the analysis.
 - Investigate what type of data sets have been used in the past literature.
 - The most important is *whether there are enough controls to do a reasonable ceteris paribus analysis.*
- ◆ Consider collecting your own data.

Inspecting Data, etc.

- ◆ You must know the nature of the variables in the data set.
 - Measurement units, rates, ...etc.
- ◆ Check the data for missing values, errors, outliers, etc.
 - Drawing graph, finding descriptive stats,...etc.
- ◆ Create variables appropriate for analysis.
 - For example, create dummy variables from categorical variables, create hourly wages, etc.

4 Econometric Analysis

- ◆ After deciding on a topic and collecting an appropriate data, decide on the appropriate econometric methods.
- ◆ If you want to use OLS, OLS assumptions must be satisfied for your model.
 - The error term must be uncorrelated with x .
- ◆ Make functional form decisions.
 - Log, interactions, dummy, etc.

Estimating a Model

- ◆ Start with a model that is clearly based in theory.
 - Test for significance of other variables that are theoretically less clear.
- ◆ Test for functional form misspecification.
 - Consider reasonable interactions, quadratics, logs, etc.

Cont. Estimating a Model

- ◆ Don't lose sight of theory and the *ceteris paribus* interpretation – you need to be careful about including variables that greatly alter the interpretation.
 - For example, effect of bedrooms conditional on square footage.
- ◆ Be careful about putting functions of y on the right hand side – affects interpretation.

Cont. Estimating a Model

- ◆ Once you have a well-specified model, need to worry about the standard errors.
 - Test for heteroskedasticity.
 - Test for serial correlation if there is a time component.
- ◆ Correct if necessary.

Other Problems

- ◆ Often you have to worry about endogeneity of the key explanatory variable.
- ◆ Endogeneity could arise
 - from omitted variables that are not observed in the data.
 - because the model is really part of a simultaneous equation.
 - due to measurement error.

Cont. Other Problems

- ◆ If you have panel data, you can consider a fixed effects model (or first differences).
 - Problem with FE is that you need good variation over time.
- ◆ You can instead try to find a perfect instrument and perform 2SLS.
 - Problem with IV is finding a good instrument

Interpreting Your Results

- ◆ Keep theory in mind when interpreting results.
- ◆ Be careful to keep *ceteris paribus* in mind.
- ◆ Keep in mind potential problems with your estimates – be cautious drawing conclusions.
- ◆ You can get an idea of the direction of bias due to omitted variables, measurement error or simultaneity.

Further Issues

- ◆ Some problems are just too hard to easily solve with available data.
- ◆ May be able to approach the problem in several ways, but something wrong with each one.
- ◆ Provide enough information for a reader to decide whether they find your results convincing or not.

Cont. Further Issues

- ◆ Don't worry if you don't “prove” your theory.
- ◆ With unexpected results, you have to be careful in thinking through potential biases.
- ◆ But, if you have carefully specified your model and feel confident you have unbiased estimates, then that's just the way things are.

5 Writing an Empirical Paper

1. Introduction
2. Conceptual (or Theoretical) Framework
3. Econometric models & Estimation methods
4. The data
5. Results
6. Conclusion

5 Writing an Empirical Paper

◆ Typical contents of an empirical paper

1. Introduction
2. Conceptual (or Theoretical) Framework
3. Econometric models, Estimation methods & The data
4. Results
5. Conclusion

A1: 2 Steps in Empirical Analysis

◆ An empirical analysis uses data to test a theory or to estimate a relationship

1. Constructing *economic model*

$$wage = f(educ, exper, training) \quad (1.2)$$

2. Specifying *econometric model*

$$wage = \beta_0 + \beta_1 educ + \beta_2 exper + \beta_3 training + u \quad (1.4)$$

- u is error term, and β s are parameters.

A2: Causality & Ceteris Paribus

- ◆ Economist's goal is to infer that one variable has a **causal effect** on another variable, for testing economic theory or for evaluating policy.
 - **Causal effect:** A ceteris paribus change in one variable has an effect on another variable.
 - **Ceteris paribus:** All other relevant factors are held fixed.

Example: Returns to Education

- ◆ A model of human capital investment implies getting more education should lead to higher earnings.
- ◆ In the simplest case, this implies an equation like

$$wage = \beta_0 + \beta_1 educ + \beta_2 exper + \beta_3 age + u .$$

Example *cont.*

- ◆ The error term, u , includes other factors affecting earnings, like gender difference or job training.
- ◆ The estimate of β_1 is the return to education.

$$\beta_1 = \frac{\Delta wage}{\Delta educ} \quad s.t. \Delta exper = \Delta age = \Delta u = 0$$

Causality & Ceteris Paribus *cont.*

- ◆ Simply establishing a relationship between variables is rarely sufficient.
- ◆ If we've truly controlled for enough other variables, then the estimated ceteris paribus effect can often be considered to be causal.
- ◆ ***Econometric methods can simulate a ceteris paribus experiment.***