ECON 200A
Spring 2008

Empirical Project

This assignment is designed to get you familiar with how economist would use theoretical and empirical analysis to answer a research question. The assignment requires that you apply theoretical concepts to data and to use empirical observations to determine the validity of a macroeconomic theory. The project will also involve reading at least two research articles related to your topic.

You will be expected to revise your empirical project and present your findings to the class. The empirical project will be graded out of 100 points:

- (15 points) Critical review of paper, due Monday, April 7

- (20 points) Draft of Section II & III (including revisions to critical review) due Monday, April 21, 5:30p.m.

- (35 points) Draft Sections I & IV (must include proposed regression and completed preliminary steps), plus revised Sections II-III due Monday, May 5, 5:30p.m

- (30 points) Final draft of completed paper, due due Friday, May 16, 5:30p.m

Your empirical project should consist of four sections, with 6-8 double-spaced pages (excluding space used for tables and graphs). I've provided some rules of thumb below to give you a sense of the weight (length) each section should receive, but these will vary by who is writing the project and how concise your are in your analysis. The descriptions below are brief, please see the supplements I've posted online for more details.

You should include a bibliography for the relevant research paper, or papers, that your project is based on. This usually follows the conclusion, it doesn't need to be a separate page in this case because you will have few references. Please follow the APA style for your citations, this is the style you will use for your thesis.

I have proposed four possible projects for you to complete (these are posted on the web site). You are free to propose your own topic, but make sure that you have a research paper to base your project on, a clear macroeconomics research question formulated, and data sources for your analysis. Your proposed topic must be approved by me in advance, before submitting it for a grade. I encourage that you propose your own topic, especially if you have a macro topic in mind for your thesis further down the road.

For each of the projects, I've provided you with some preliminary steps to complete in Section IV, but it is up to you to develop a regression equation/empirical test of the research question. You can use the regression approach used by previous researchers, but make sure that you justify your choice and tie this back to the underlying economic theory. A complete list of references appears on the last page.

Introduction (I)

The introduction should include a brief summary of the theory you are examining, the data you are using, and a preview of your results. This should not exceed two to three paragraphs. This is often the most difficult section to write because it forces you be concise while "pitching" your research to the reader. Your introduction will be to motivate your topic: Why is it interesting? Why is it important? You should also clearly state your research question and briefly summarize your findings. This should about 1 page.

Critical Reviews/Literature Review (II)

This section both summarizes and evaluates the research paper you have chosen. You will be expected to find a similar, recent related empirical research paper that cites the paper you choose (published since 1997). This paper should be closely related to the analysis you conduct in your project. You can find such a paper by searching on either ECONLit or by using the Social Sciences Citation Index. In general, the literature review serves two functions: (i) motivate why this is an important question that other researchers have studied, and (ii) give the reader an overview of what other researchers have found. Here, the focus will be narrowed because of time constraints, but it is important to realize the purpose of a literature review. Since you will be reviewing two papers - one in detail, this section should be about 1-1.5 pages.

Theoretical Model (III)

This section should contain an overview of the relevant economic theory and a discussion of any extensions to this model applicable to your project. This should be one to two pages. In economics research papers, you will see that it is common to integrate this section into the introduction, but keep the two as distinct sections in your empirical project. Ideally, the model will be identical for both papers you reviewed in Section II, but it is possible that there would be slight variations in the underlying theory. This section should be about 1-1.5 pages of text (not including graphs and tables).

Empirical Analysis (IV)

This section will be made up of three parts. First, a description of the data you are using. This includes the primary source of the data and any relevant information (seasonally-adjusted, quarterly, etc.) Second, you will present your empirical findings in the form of tables and/or graphs and analyze this information in the context of the theoretical model(s) you discussed in the previous section. Finally, you should compare your results to those in article related to your topic. You should compare your results to those in the two papers you reviewed in Section II, and in light of the model discussed in Section III. This section should be 2-2.5 pages of text (not including graphs and tables).

Conclusion (V)

This section restates your topic and summarizes your results (generally more compactly that in your introduction). This section also includes possible extensions to the analysis. The conclusion should not exceed two to three paragraphs. Traditionally the first paragraph (or first two paragraphs) summarizes your findings and relates these findings to earlier work. The last paragraph typically includes some policy implications of your findings, and possible extensions for further analysis. This should be about 1-1.5 pages.

Convergence Across the U.S.

The project analyzes convergence across U.S. states. This empirical project is based on Barro and Sala-i-Martin (1991). You will conduct a similar analysis using recent data.

The goal of this project is to investigate convergence in the U.S. and the sources of convergence/divergence that you find in the data. This will require that you retrieve output data from the Bureau of Economic Analysis (BEA). You have the option of doing quarterly analysis (1969-present) or annual (1929-present).

The research questions you are interested in answering are the following:

1. Do states/regions in the U.S. converge?

2. Are there regional patterns in convergence across the U.S.?

3. Why do states/regions converege, or fail to converege?

Preliminary steps:

- Explain the theory or set of theories explains why states across the U.S. should converege.

- Explain how, if states/regions do not converege, the theory or set of theories explains why.

- You will need to update some of the analysis from the Barro and Sala-i-Martin (1991) paper. This will require that you retrieve personal income data from the Bureau of Economic Analysis (1969-2004). In order to analyze this data, you will need to construct some graphs/tables (much as we've done in the homework). Several of this graphs are similar to the ones you will see in the Barro and Sala-i-Martin (1991) paper. At a minimum, you should include the following graphs in your project:

  - Scatterplot of log(Personal Income in 1969) and Annual Growth Rate in Personal Income 1969-present by state. [Figure 1 in the Barro and Sala-i-Martin (1991)]
  - Scatterplot of log(Personal Income in 1969) and Annual Growth Rate in Personal Income 1969-present by region. The BEA has changed is definition of regions, so you will need to use slightly different regions than those used in Figure 2 of Barro and Sala-i-Martin (1991).
  - Scatterplot of *relative* log(Personal Income in 1969) and *relative* Annual Growth Rate in Personal Income 1969-present by region.

  Before you construct these graphs, take some time to understand what each graph tells you, carefully reading through these sections in Barro and Sala-i-Martin (1991). In the empirical section of your paper, you should explain each of the graphs above and what each tells you about convergence across the 50 states and across regions. You should also compare and contrast your results to those from Barro and Sala-i-Martin (1991) in answering the reseach questions above.

Inflation and Output Volatility

For this project, you are going to conduct analysis similar to Lucas (1973) using a larger sample of countries and more recent data. The data used in this study comes from the International Financial Statistics (IFS) provided by the IMF. I have provided the raw output and price index data you will need to do your analysis, since these data are not publicly available.

The research questions you are interested in answering are the following:

1. What is the relationship between inflation and output volatility across countries?

2. How do the results of Lucas (1973) compares/contrasts with later work?

Preliminary steps:

- Explain the theory or set of theories explains the relationship between inflation and output volatility.

- Explain how theory tells us about how the results of Lucas (1973) compares/contrasts with later work.

- Investigate the relationship between inflation and output volatility across countries to shed address the research question empirically. In order to conduct your analysis, you will need to compute the variance in inflation and variance in output for the countries provided in the sample. You will need to compute the inflation rate for each country (in each period). Then compute the variance in output and the variance in inflation for each country. Finally, you will need to construct some graphs/tables (much as we've done in the homework).At a minimum, you should include the following in your project:

    - A scatterplot showing the relationship between the average inflation rate and variance in inflation for the countries in your sample.
    - A time series plot of inflation over time in the U.S. and two other countries of your choice. Your choice of country depends on what you want to show the reader, so think about your results ahead of time (before making this graph).
    - A scatterplot showing the relationship between inflation and output volatility using the same sample period used by Lucas (1973).
    - A scatterplot showing the relationship between inflation and output volatility using the entire sample.

    Before you construct these graphs, take some time to understand what each graph tells you, carefully reading through Lucas (1973) and Katsimbris (1990). In the empirical section of your paper, you should explain each of the graphs above and what each tells you about the relationship between inflation and output volatility.

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Budget Deficits and Crowding Out

The project analyzes the relationship between budget deficits and interest rates. Recall that crowding out works through the effect that government spending and taxes have on the real interest rate. This empirical project is based on Evans (1987). You will be conducting a similar analysis, using more recent data. This study is more on the technical side, but you can sift through the results to get a sense of how Evans interprets his empirical findings.

The goal of this project is to investigate the link between real interest rates and the budget deficit in more detail. This will require that you retrieve federal budget data (government expenditures and tax revenues) and GDP data from the Bureau of Economic Analysis (BEA) You will use unemployment and price data from the Bureau of Labor Statistics (BLS) and interest rate data from the Board of Governors.

The research questions you are interested in answering are the following:

1. What is the relationship between real interest rates and budget deficits?

2. How, if at all, does this relationship depend on the business cycle?

Preliminary steps:

- Explain the theory or set of theories explains the relationship between budget deficits and real interest rates.

- Explain why this link is important in terms of crowding out.

- Investigate the relationship between budget deficits and real interest rates over time in the U.S., to shed address the research question empirically. In order to conduct your analysis,you need to compute the inflation rate for the U.S. 1960-present. Then, you need to do is construct the (ex post) real interest rate using the Fisher equation. Finally, it will be convenient to define the budget deficit as a share of GDP. Now, in order to analyze this data, you will need to construct some graphs that will allow you to evaluate the relationship between the real interest rate, the budget deficit, and the business cycle. You should construct the following:

  - Scatterplot of the federal deficit share and the real interest rate for the entire sample (1960-present).
  - Plot of the federal budget deficit share and the unemployment rate (on the same graph) for the entire sample..
  - Scatterplot of the federal deficit share and the real interest rate for the subsample 1980-1991.
  - Scatterplot of the federal deficit share and the real interest rate for the subsample 1992-present.

Comment on the relationship between the federal budget and real interest rate over your entire sample. Compare these findings to those from Evans (1987). How is the deficit linked to the business cycle/changes in unemployment? How has the relationship between the deficit and the real interest rate changed in the post-1980 period?

Unanticipated Changes in Money

The project analyzes how changes in money growth affect the economy, following work by Barro (1978). This research is among the first that came in response to the famous Lucas (1976) critique. By studying the effects of *unanticipated* changes in money growth, we are able to avoid the problems pointed out in the Lucas critique (a statement about how expected changes in policy lead to a fundamental change in how people/businesses/government make decisions).

The goal of this project is to investigate the link between unanticipated changes in money growth and output.

The research question you are interested in answering is the following: How do unanticipated changes in money growth affect output and unemployment?
Preliminary steps:

- Explain the theory or set of theories explains the relationship between money growth and output.

- Explain why it is important to empirically investigate unanticipated changes, instead of anticipated changes in money growth.

- Investigate the relationship between money growth and output over time in the U.S. This amounts to estimating regression equations from Barro (1978) paper using more recent data, then interpreting these results. In order to compare your results and insure that you are estimating the equations correctly (there is a particular sequence needed to identify the effects of unanticipated money growth shocks), you should try to replicate what Barro does (e.g., use the same sample) and see if you can generate similar results. These results will not be identical because of data revision. Then, go through the same steps using the entire sample that is available.

References

[1] Barro, R. (1978). Unanticipated Money, Output, and the Price Level in the United States. *Journal of Political Economy, 86*(4), 549-580.

[2] Barro, R. & Sala-i-Martin, X. (1991). Convergence Across States and Regions. *Brookings Papers on Economic Activity, 1991*(1), 107-182.

[3] Evans, P. (1987). Interest Rates and Expected Future Budget Deficits in the United States. *Journal of Political Economy, 95*(1), 34-58.

[4] Lucas, R. (1973). Some International Evidence on the Output-Inflation Tradeoff. *American Economic Review, 63*(3), 326-334.

[5] Lucas, R. (1976). Econometric Policy Evaluation: A Critique. *Carnegie-Rochester Conference Series on Public Policy, 1*, 19-46.