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Research Project Information Packet

A. General Tips for Getting Started

- Start with a broad topic, but work to refine your research question by (1) geographic location, (2) time period, (3) specific event, (4) specific policy change, (5) demographic group, or (6) some combination of these.
- As you begin researching a question, keep track of related questions that arise as you go. Eventually one of these questions will be your final research question, but seldom is it the one you started with.
- Look seriously at journal article sources on a given topic before you have a clear question. Research is an iterative process – a topic, some reading, a question, more reading, other questions, more reading, more questions, etc.
- Browse data sources to see what type of information is available. Sometimes variables or trends in data can spark interesting questions.
- Keep the research project in the back of your mind... news articles, other classes, and casual conversations can spark great research questions.

B. Journal Resources

- [Google Scholar](#)
- [EconLit](#)
- Economic encyclopedias
 - [New Palgrave Dictionary of Economics](#)
 - [International Encyclopedia of the Social and Behavioral Sciences](#)
- [Handbook chapters](#) (e.g., Handbook of Labor Economics)
- Published literature reviews (*especially useful for finding other sources and identifying open questions in the literature*)
 - [Journal of Economic Literature](#)
 - [Journal of Economic Perspectives](#) (*very undergraduate accessible*)

Tips:

- Read the abstract, introduction, conclusion, tables, and then the “meat” of an academic journal article – this saves time and increases comprehension relative to reading “front-to-back” as you would a novel.
- Look at the citations listed in a given article to find related, possibly more relevant articles.
- In Google Scholar, check the “cited by” link to find newer, related articles that cited a given article

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C. Some Publically Available Data Resources (*this is my no means an exhaustive list and students should not feel constrained to the items here.*)

- Macroeconomic Data
 - [FRED](#) (Federal Reserve Bank of St. Louis: Federal Reserve Economic Data)
- International Data
 - [Penn World Tables](#)
 - [National Trade Data Bank](#)
- U.S. Microeconomic Data
 - [CPS](#) (Current Population Survey)
 - [PSID](#) (Panel Survey of Income Dynamics)
 - [SIPP](#) (Survey of Income and Program Participation)
 - [HRS](#) (Health and Retirement Study Panel Survey of Income Dynamics)
- U.S. Government Sources
 - [Census Bureau](#)
 - [Bureau of Economic Analysis](#)
 - [Bureau of Labor Statistics](#)
 - [National Center for Health Statistics](#)

D. Final Paper Guidelines (*See syllabus for directions on early stages such as the proposal!*)

- I. Introduction ($\approx 1/2$ - 1 page)
 - Motivate the question... Why is your paper interesting/worth reading?
 - State the research question(s)... In general, what hypotheses are you testing?
 - Explain, in broad strokes, how you plan to answer the question.
 - Briefly summarize your key findings and relate them to important policy issues and/or the broader literature.
 - Give a “roadmap” for the remainder of the paper
- II. Literature Review (≈ 1 - 1.5 pages)
 - Discuss other studies on this topic, and *relate each article to your analysis*.
 - To the extent possible, focus on methodology, data, and results (not just results)
 - Note whether your study brings up new ideas or expands on old ones.
 - Refer to authors, not paper names (e.g., “Goldin and Katz (2000) argue that...”). The title of the paper does not need to appear anywhere except the works cited.

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III. Model (≈ 1.5 pages)

- Verbally and mathematically describe and explain the theory you're analyzing. Focus on the dependent variable and *key* independent variables.
- Note the general variables in your model (e.g., $Y = f(x_1, x_2, x_3 \dots)$) and briefly why they are needed and whether they affect the outcome positively or negatively.
- For key independent variables, make predictions about the signs of marginal effects (consider second derivatives and cross-partial derivatives as needed). Where appropriate, make any significant predictions about magnitudes (e.g., elastic or inelastic). Justify the predictions based on economic theory.
- Specify and justify the specific econometric model (regression equation). Given the theory above, discuss the appropriate functional form and methodology (linear, log-linear, OLS, fixed-effects, instrumental variables, etc.)
- Express the theory in terms of testable hypotheses from the primary regression equation. Note any other relevant hypotheses (e.g., changes in the magnitude of coefficient estimates for a specific subsample relative to the primary specification).
- Note any restrictions to your analysis (e.g., simplifying assumptions imposed between the theory and the empirical model, or ideas that aren't testable due to data constraints)

IV. Data ($\approx \frac{1}{2}$ - 1 page)

- Name the data source(s) and give salient characteristics and background info.
- Note whether the data are a cross-section, time series, or longitudinal.
- Discuss whether the data are appropriate. (Do data correspond to theoretical variables? Are the sources reliable and unbiased?)
- Describe and justify any selection criteria used to narrow the sample.
- Provide information on variables names, units of measurement, and key summary statistics. Note any anomalies or interesting features of the data.
- Discuss potential problems that could affect the analysis (e.g., multicollinearity)

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V. Empirical Results (≈ 1.5 pages)

- Present and interpret your coefficient estimates. Discuss your results and compare them to your predicted hypotheses. Did results match predictions?
- Address sign, magnitude (economic significance), and statistical significance. Focus primarily on your final regression model, although address any secondary regression models as they relate to hypotheses presented in the model section.
- Evaluate the explanatory power of your final model, including R^2 , adjusted R^2 , AIC, and any necessary considerations based on the error term analysis. (The error term analysis should consider issues such as normality, autocorrelation, heteroskedasticity, and the influence of outliers).
- Discuss whether data limited your conclusions or ability to test hypotheses.

VI. Robustness ($\approx \frac{1}{2}$ page)

- Present additional estimates to convince readers that your findings are “real.”
- To the extent possible, address any concerns regarding omitted variables, alternative theories, biases in the data, sensitivity to outliers, endogeneity, etc.

VII. Conclusion ($\approx \frac{1}{2}$ - 1 page)

- Briefly summarize your method and empirical results. Attempt to reconcile any differences between your predictions and the results.
- Put your findings in perspective relative to the literature. Attempt to reconcile any differences between your results and the literature.
- Highlight the importance of your study. What does it add to existing knowledge? What important implications does it have for policy and/or for the literature?
- Discuss how your research could be extended in the future. What is the next step in studying this theory?

Abstract (≈ 100 words)

- State your specific research question(s), and briefly explain your contribution to existing knowledge on the topic.
- Summarize your method, data, and empirical results.

References

- Use any standard, accepted format for the works cited (e.g., APA).
- Citations should include at least 5 peer reviewed journal articles.

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E. Table Guidelines (Example formatting)**Table 1A: List of Variables**

Dependent Variable:	Wages
Key Independent Variables:	Years of Experience Years of Schooling
Other Control Variables:	Gender Race (Black or White) Ethnicity (Hispanic) Dangerous Industry/Occupation Innate ability

Notes: This is not a typical table to include in a paper, but will help facilitate model development after the initial proposal. A list of a variables might appear in an appendix with variable definitions. This is designed as an example, not necessarily a fully-specified regression.

Table 1: Testable Alternative Hypotheses

<i>Econometric model:</i>	$w = \beta_0 + \beta_1 E + \beta_2 E^2 + \beta_3 S + \beta_4 F + \beta_5 B + \beta_6 BS + \beta_7 H + \beta_8 D + \varepsilon$			
<i>Predictions:</i>		$\frac{\partial y}{\partial x}$	$\frac{\partial^2 y}{\partial x^2}$	$\frac{\partial^2 y}{\partial x \partial z}$
<i>Dependent Variable:</i>	Wages (w)			
<i>Key Independent Variables:</i>	Experience (E)	$\beta_1 + 2\beta_2 E > 0$ $\beta_1 > 0$	$\beta_2 < 0$	n.a.
	Schooling (S)	$\beta_3 > 0$ $\beta_3 + \beta_6 B > 0$	n.a.	$\beta_6 < 0$
<i>Other Control Variables:</i>	Female (F)	$\beta_4 > 0$	n.a.	n.a.
	Black (B)	$\beta_5 < 0$	n.a.	$\beta_6 < 0$
	Hispanic (H)	$\beta_7 < 0$	n.a.	n.a.
	Dangerous job (D)	$\beta_8 > 0$	n.a.	n.a.

Notes: For experience, the second derivative is actually $2\beta_2$ but we can ignore the constant 2 for the sake of predicting signs. In particular, note that “innate ability” appeared in Table 1A because we think it likely affects wages. However, “innate ability” does not appear in Table 1 because there is no appropriate variable to control for innate ability. If the data set included an appropriate proxy variable (e.g., IQ score) then we could include it. Or, if we had panel data, we could use individual fixed effects to control for innate ability. (As you can see here, use table footnotes to clarify any necessary issues. Again, a table of this form is not used in published papers, but will facilitate early stages of research and model development.)

Table 2: Sample Statistics

	Mean	Standard Deviation	Minimum	25 th percentile	Median	75 th percentile	Maximum
Wages (w)							
Experience (E)							
Schooling (S)							
Female (F)							
Black (B)							
Hispanic (H)							
Dangerous job (D)							

Notes: Sample size includes 2,880 observations. (Use as needed for relevant information.)

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Table 3: Empirical Results

Dependent variable: wages	OLS	Fixed Effects
Experience	1.47*** (0.39)	
Experience squared		
Schooling		
Female		
Black		
Black*Schooling		
Hispanic		
Dangerous job		
Constant		
Number of Observations	2,880	
R ²	0.46	
Number of Individuals	1,440	

Notes: Robust standard errors are reported in parentheses below each coefficient estimates. One, two, and three asterisks indicate statistical significance at the 10-, 5-, and 1-percent level, respectively. (*Obviously the table would be appropriately filled in your version. The final regression results might include two, three, or four, main specifications – here I have shown one OLS specification and one Fixed Effects specification, where fixed effects are used to control for innate ability. Depending on the specifications, different information should appear in the bottom rows. For instance, if my specifications included dropping or adding independent variables, I should report R² and adjusted-R². If comparing models, I might consider including the AIC.*)

Table 4: Error Term Analysis

	Initial Model	Final Model
<i>Error Normality</i>		
<i>Autocorrelation</i>		
<i>Heteroskedasticity</i>		
<i>Key outliers or influential observations</i>		

Notes: Details are omitted because this table will differ substantially by student and might only include results from specific statistical tests. Appropriate error term tests will vary depending on the regression and data set. The final model includes all variables and the appropriate functional form. The initial model might be a simpler functional form, have fewer variables, and/or have yet to correct for autocorrelation, etc.

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Table 5: Robustness

Dependent variable: wages	Log-Linear	Alt. Model 2	Alt. Model 3
Experience			
Experience squared			
Schooling			
Female			
Black			
Black*Schooling			
Hispanic			
Dangerous job			
Constant			
Number of Observations			
R ²			

Notes: Robust standard errors are reported in parentheses below each coefficient estimates. One, two, and three asterisks indicate statistical significance at the 10-, 5-, and 1-percent level, respectively. (*Obviously the table would be appropriately filled in your version. Here, report regression results that can be compared to Table 3. For instance, one alternative model might consider log-linear instead of linear regressions in wages to see if results are robust. I might consider adding other explanatory variables or splitting the sample. Formatting should follow that of Table 3, but details will differ substantially by project.*)

F. A Couple of Reference Guides for Writing an Empirical Economics Research Paper

Van Gaasbeck, Kristin A. 2007. *Writing in Economics: Components of a Research Paper*. Department of Economics, California State University, Sacramento, www.csus.edu/indiv/v/vangaasbeckk/resources/writing/comp.htm. (Accessed 1/24/2016).

Dudenhefer, Paul. 2014. *A Guide to Writing in Economics*. Department of Economics, Duke University. https://econ.duke.edu/uploads/media_items/a-guide-to-writing-in-economics.original.pdf. (Accessed 1/24/2016).

- *The PDF for this source is also on Isidore under our reading folder. I strongly suggest reading Part II (all sections), Part III (all sections), and Part IV (sections 18-23).*



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