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Plamen Nikolov
State University of New York (Binghamton, IZA and Harvard Institute for Quantitative Social Science

JANUARY 2022

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Writing Tips for Economics Research Papers – 2021-2022 Edition*

This document summarizes various tips for economics research papers.

JEL Classification: A30, A39

Keywords: writing tips, economics, research papers, research studies

Corresponding author:
Plamen Nikolov
State University of New York (Binghamton)
Department of Economics
4400 Vestal Parkway East
Binghamton
NY 13902
USA

E-mail: pnikolov@post.harvard.edu

* This document has been produced for public service benefit. In the production of this handout, in addition to my thoughts on how to write better economics research papers, I have also relied on other writing-related suggestions or practical tips by John Cochrane, Claudia Goldin, Caroline Hoxby, Lawrence Katz, Greg Mankiw, Robert Neugeboren, and Humberto Barreto. I started this document for the benefit of undergraduate economics concentrators at Harvard College in the Economics 970 sophomore tutorial course, a course I taught between 2009 and 2014. Over the years, the document has expanded and benefited from numerous helpful comments by students at Harvard College, Harvard Kennedy School, and The State University of New York (Binghamton). I thank Matthew Bonci, Sharon Itin, Declan Levine, and William Lombardo for outstanding research support in the update of this document.

I. General Tips about Writing Style

When I read economics research papers, I look for the author's ability to motivate an interesting question using economic logic, critically analyze the past literature, and recognize empirical problems as they arise. Your research paper should also highlight a central novelty related to existing economics research. Your research paper should demonstrate that you are more knowledgeable in your analysis of applied microeconomics issues than a witty editorial writer for The New York Times. To this end, you should present evidence, cite literature, explain economic trade-offs, and approach your central thesis from an analytic perspective. Students are occasionally tempted to write an opinion piece or adopt a tone that resembles journalistic writing. This is not the purpose of economics research papers!

Teaching economics writing is an essential aspect of communicating good economics research well. You will get a lower grade if your writing is:

- ungrammatical
- unclear
- journalistic

If you have trouble writing grammatically, please leave yourself some extra time to go to a writing tutor at the University's Writing Resource Center. Clarity takes priority when writing about economics. Do not worry about sounding sharp if your writing is clear.

Economists have a particular writing style that is useful to learn if you want to be taken seriously by other economists. Below are some of the essential features of the "economics style." The desirable tone and writing style are exemplified in some of the peer-reviewed papers listed on the syllabus. Some of the stylistic features may seem arbitrary, but you should follow them anyway

- Favor the present tense. For instance: "Mullainathan (2000) finds that..." or "In this paper, I attempt to...."
- Use formal in-text citations for books and articles. Do not describe them in your writing
    - Write: "Mullainathan (2000) finds that..."
    - Do not write: "Sendhil Mullainathan, in a 2006 journal article...."
- Use the active voice. Do NOT use the passive voice. The active voice is a more efficient use of language, and it is much easier to read. Make sure the subject of the sentence is the one doing the action of the verb(s) of the sentence and avoid any unnecessary use of the verb "to be." For example:
    - Write: "I collected data…."
    - Do not write: "Data was collected…."
- Direct and simple sentences are the most effective ways to deliver a message.
- Use "I" when you mean "I" and use "we" when you mean "we."
    - Personal pronouns (I, we, she/he, them, etc.) are acceptable in economics papers.
    - For instance, you might use "we" to talk about something that everyone could be expected to appreciate: "We expect that highly selective colleges enroll few students who had low grades in secondary school."
    - Use "I" to talk about what you specifically did: "I use data from...."

- Avoid overly dramatic adjectives or verbs. For instance, writing “these results completely shatter our expectations.” is too much.
- Do not overuse contractions or abbreviations such as: e.g., i.e., etc. Latin and other foreign languages should be italicized: “Feldstein *et al.* (1976)....”
- Phrases about data, calculations, and findings may seem repetitive and boring, but they are necessary. These include: “The results show...," “The tables reports,” “The estimated coefficient on...,” or “is not statistically significantly different from zero.” Statements like these are clear, which is most important.
    - When reading your “Results” section, readers are used to keeping track of numbers and regression tables.
    - As such, they will tolerate a less than scintillating delivery of the main results so long as your delivery and reporting are clear.
- Keep non-economics comments for your first paragraphs and your conclusion unless they are part of the model.
    - For instance, if your results have interesting political implications, you can motivate them in the Introduction section and return to them in the Conclusion section.
    -
- If you are unsure whether or not including some non-economics content will add to your research paper, it is better to leave it out.
    - Students tend to include too much political and social commentary rather than too little.
- Keep sentences short. Short words are better than long words. Monosyllabic words are best.
- Repetition is boring.
    - Once you write your paper, review each section, paragraph, and sentence.
    - Cut, cut, and cut again.
    - Your writing objective is to be as clear as possible with as few words as possible.
    - If it is possible to cut a word (or sentence or a paragraph), cut it out.
- Positive (evidence-based) statements are more persuasive than normative (i.e., what should/ought to happen).
- Use adverbs sparingly.
- Avoid jargon.
    - Any word you do not read regularly in a newspaper is suspect.
    - Only use jargon if it describes unavoidable technical concepts related to your empirical approach.
- Do not make up your acronyms.
- Avoid unnecessary words. For instance, in most cases, change “in order to” to “to," “whether or not” to “whether,” and “is equal to” to “equals.”
- When you start sentences with “This,” make sure you have something following it to explain what “this” refers to.. e.g., This regression, this table.
- Avoid “of course,” “clearly,” and “obviously.”
    - Clearly, if something is obvious, that fact will, of course, be obvious to the reader.
    - The word “very” is very often very unnecessary.
- Keep your writing self-contained.
    - Frequent references to other works or things that have come before or come later can be distracting.

- Place minor or secondary details and/or digressions from the main point in footnotes.
- A graphic metaphor, an interesting fact, a puzzle, or a compelling anecdote can be captivating to everyday people. Do not be afraid to use some of these devices. They are worth a thousand articles in the QJE.
- Keep your writing relevant and relatable to your audience.
    - You can remind readers how economics or your specific question affects their lives.
- Keep it simple.
    - Think of your reader as your college roommate who majored in English literature.
    - Assume he has never taken an economics course, or if he did, he used the wrong textbook.
- Remember two basic rules of usage in economics writing: "Long run" (without a hyphen) is a noun. "Long-run" (with a hyphen) is an adjective. Same with "short(-)run." and "Saving" (without a terminal s) is a flow. "Savings" (with a terminal s) is a stock.
- When it comes to critiquing your writing, be your own worst enemy. If you will not, someone else will.
- Buy a copy of Strunk and White's Elements of Style. Also, William Zinsser's On Writing Well. Read them—again and again, and again.

II. Organization of the paper

(keep much of this section in mind for later when you have actual results from your analysis)

Figure out the most novel contribution of your paper. Write this down in one paragraph. Distilling your paper's one central contribution or several critical contributions will take some conscientious thinking. You will need to think carefully about your work, its merits, and its merits in relation to existing research. It will cause some consternation because you will realize how much you may need to cut out from your paper. However, once you do it, your paper's focus will be more transparent, its storyline better regarding claimed contributions, and it will help readers get it quickly.

As with anything else in your writing, be concrete. Do not write, "I analyzed data on the HIV epidemic and found many interesting results." Explain what the most critical results are. For example, Oster (2012) starts her abstract with: "I estimate behavioral response using a new instrumental variables strategy, instrumenting for HIV prevalence with distance to the origin of the virus. I find a low response on average, consistent with existing literature, but larger responses for those who face lower non-HIV mortality and for those who are richer."

When you write your paper and lay your argument, you should think of your readers as very impatient people who would rather do other things than read your paper. Most readers skim papers so write your paper with the mindset that your readers will skim it. To this end, you should make it easy for readers to get the primary results and the main punchline of your paper. Only a handful of readers who are vested in your work, the topic, or happen to work the particular subfield in which your paper is will dive into the specific details and nuances if your paper differs from existing research.

Your writing tone should not mimic a journalistic tone. However, your framing and unfolding of your main argument (at least in the Introduction section) should mimick the structure of a newspaper article:

It would be best to convey the most important aspects of the story first. In journalism, a popular expression for this idea is "do not bury the lead." Additional and secondary details can be fleshed out, but only after the main idea is presented first. The secondary details appear later only for readers interested in reading further.

In the Introduction section, organize your story and its main punchline in a "triangular" structure. As soon as you present the specific main research question that you will address, present the most important findings of your paper. After you present the primary findings, fill in (if necessary) the rest of the Introduction section with background details.

Do not write research papers like mystery novels. Mystery novels typically have a long windup until they reach the final punchline or denouement. Writing a research paper in a mystery novel style is a recipe for failure. This will most certainly annoy seasoned readers of academic research papers.

Insert the punchline right up front after introducing the main research question. Then, proceed to explain it slowly.

- Readers will not stick around to find the punchline on page 10 or Table 12.
- The punchline belongs prominently and early in the Introduction section. After introducing your specific research question, place it somewhere in the first few paragraphs.

- Many research papers get this point wrong. If the main pitch is buried, readers are lost regarding the paper's main punchline and its critical contribution(s). Alternatively, they do not find out about it until the paper's last page.

III. The Introduction Section

A. Main Elements

The "foot-in-the-door" parts of your written work are the abstract (the summary of the paper, which you will write at the very end once you have actual results and think through the paper's contributions) and the Introduction section. Write these parts extremely clearly, with simple language and concisely!

Writing the first sentence is the hardest step. There are multiple approaches to opening up the play's stage and captivating your audience's attention. So, you will have to exercise some creativity. Your paper must be interesting on its own, not just because lots of other people wasted space on the subject.

One way to set the stage is by introducing a so-called "hook." A hook is a sentence or several sentences intended to arrest people's attention and to get people to want to read your research paper. The essence of the hook is to spark a reader's curiosity. You want the reader to wonder what happens next and keep reading your paper.

There are multiple potential approaches to accomplish this:

- Present an interesting puzzle
- Present a fact that is hard to explain
- A strong controversial statement
- Story hook (perhaps relating to a common activity or an issue that affects many people)

For instance, the introduction could start with an interesting but puzzling stylized fact. Something that will motivate the backdrop of your research topic and set the stage for what you will do in your study. After you do so, point out a potential link to your question as it relates to the fact (or another type of "hook" you may have decided to use) you presented. Be sure to draw the link between the hook and what you plan on doing.

The reader will be much more motivated to read the rest of the paper if you challenge his or her intuition right from the get-go. Your readers are your audience. They have better things to do than read your paper. Make them interested in your thesis and convinced of your argument in the first two paragraphs.

For example, in Nikolov and Adelman (2019), we examine the effect of a new pension program in China among the elderly. To note something interesting about the unintended adverse consequences of a program meant to confer benefits, we note a surprisingly negative effect on the cognitive outcomes among the elderly. Here is an excerpt from the study:

- "Our analysis yields several interesting results. First, the NRPS program has a significantly negative effect on cognition among individuals aged 60 or above. Retirement programs are generally introduced and geared towards ensuring the welfare of aging adults (Cutler and Johnson 2004). Nevertheless, we provide strong evidence for a clear case of how the introduction of a pension program led to unintended and significant adverse consequences for program participants. We note: "Specifically, we find that the provision of pension benefits negatively influences immediate recall, delayed recall, and total word recall. For the total word recall

outcome, and among individuals aged 60 and above, we find a significant decline in cognitive performance when NRPS program benefits kick in."

- Another example is Oster (2012), a study exploring effective ways to target behavior change in the context of the HIV epidemic in Africa.
    - Oster (2012) starts with, "For this reason, sexual behavior change is a major focus of HIV prevention efforts and understanding changes in behavior is important for both predicting the future path of the epidemic and for developing policy. I first present new estimates of behavioral response to HIV, which rely on an instrumental variables strategy. I then consider whether variations in behavioral response across individuals are consistent with utility-maximizing choices in the face of HIV."

Be sure to frame and motivate the importance of your question in the first one or two paragraphs. Then move on to state clearly what specific question you seek to address. You should state clearly your research question in a paragraph or paragraphs very early on in the Introduction section. Make sure readers walk away clearly, knowing what key independent variables and outcome variables will be the focus of your work. The reader should also be perfectly clear about the embedded testable hypothesis in your research question and the question itself.

Then move on to explaining the relationship to previous research. If you are presenting something valuable and exciting, other smart people must have thought about it. What did they miss? Poor data? Poor methodology? Is it an empirical test for a new theoretical model? Explain the novelty and the improvements to overall knowledge due to your paper in relation to previous economics studies.

A critical aspect of the purpose of the Introduction section of a research paper is to highlight the central research contribution of the research study. Explaining how your research improves on the existing body of scholarship is a must. Use clear, simple, and to the point language.

Please do not confuse the point about highlighting your contributions with your results: they are separate but related issues. To highlight your contribution, you need to highlight how your approach, results, and study differs better from existing studies. Part of the novelty of your scholarship could relate to your results, although likely this is not exclusively so. Therefore, do not just simply restate your conclusion: "My results show that the signaling model of education is rejected." Bolster your claims with how your paper supports that claim.

Furthermore, when you discuss your contributions, state that something is a contribution and state how it is a contribution. Is it the better empirical method? Is it the application of an old model to a new context? Better exploration of the underlying mechanisms underpinning an old question? Resolving and reconciling the results from competing theoretical models? State with specificity how your approach specifically contributes to previous economics scholarship.

Two pages is a reasonable upper limit for the introduction. (assuming a paper in the range of 20 pages).

B. Suggestions for Specific Points to Cover in the Introduction Section:

1. The specific question you are trying to address
    - stating the hypothesis to be tested directly is the best way to do this
2. Why should we care about this question?

- Is it an unproven theoretical result?
- An important policy question?
- Why should we care from an economic perspective?
- The motivation is not the place to do a long literature review.
    - If, for example, there has been a debate in the literature about this question, just briefly describe the uncertainty.
    - For example, you may want to point out the range of previous results.

3. An excellent way to get your audience excited is to make it curious.[1]To do this, you can surprise their intuition or challenge their understanding or baseline expectations about what you might find on the proposed research question (much like the purpose of the "Economic Naturalist" assignment).
    - If readers become curious about your finding and the finding is inconsistent with their intuition, they will become curious to read the rest of the paper.
    - If you can invoke the reader's curiosity with a puzzle in your introduction, it will make for much more engaging reading.
4. Be sure to state your specific contribution in that section.
    - How are you answering the question?
    - For example, you may state that the novelty is a more robust identification strategy (i.e., field experiment), testing a new theoretical model, or using a new dataset that allows you to test for specific mechanisms previously overlooked by existing studies.
    - Be sure to state that something is a contribution and <u>how</u> it is a contribution.
5. What are your main results? Preview them.
    - Stick to highlights of the most important results based on your analysis.
        - Caveats, robustness checks, extensions, secondary results are better placed in a different section (not the Introduction section)
    - Explain briefly how your findings differ from previous work and their implications.
    - If your analysis is inconclusive (which is fine!), be upfront and briefly state why.
    - Make sure the analysis of the results is crystal clear even to a lay audience.
6. Provide a brief roadmap of the sections in your paper for the reader. It may seem boilerplate, but it will provide the reader with a better sense of the organization of your paper, what to focus on and what to skip.

[1] The Heath and Heath (2007)'s "Made to Stick" has specific suggestions on how to do. The PDF is also available at http://www.chaosscenario.com/main/files/CHAOSstick.pdf

IV. How to Discuss Previous Literature (or Having a Literature Review Section)

A. Main Elements

In general, papers discuss the relation of the paper's results to findings from previous studies in one of two major ways:

- By having a separate and distinct Literature Review section within the body of the paper;
- Folding the discussion of previous studies into the Introduction section or other sections that may be the most appropriate place to discuss results from previous studies.

If you opt for the first approach, here are some general guidelines to follow:

- Making it a separate section will make it easier for people to skip it if uninterested.
- Do not title your literature review section "literature review"! It is a bit sophomoric.
    - Instead, integrate your discussion of previous literature under the common thread of previous work as it relates to your main thesis.
        - For example, if your paper is "Do Traditional Institutions Constrain Female Entrepreneurship?" you might want to call your literature review "Gender norms in India."
        - In other words, tell your readers what is in the section, e.g., A Model Demonstrating the Finiteness of Space.

If you opt for the second approach, here are some general guidelines to follow:

- It will be challenging for readers to decide if your work is better than existing research until they understand what you do.
- Do not start your introduction with pages of what others have found. Papers sell because of what you do. What you do should take priority over what others have done. Discuss what others have done only in a way to contextualize and juxtapose the potential benefits of your study.
- After explaining your contribution, you can relate it to other studies from the literature review.
- It is a good idea to be generous with citations to other people's work. The Golden Rule applies.
- Be generous also in the sense of how you discuss other studies. You could emphasize some important limitations in existing research. However, be careful in being too critical (especially if you attempt to publish your paper, your referees might not be very happy reading about their work in a negative light).
    - It is unnecessary to cite every paper in the literature. The objective of the literature review should be to distinguish your paper from the several and closest existing papers and give proper credit to people who deserve priority for things that might otherwise seem new in your paper.

If you opt for the second approach, here are some additional guiding points to remember:

- First, all readers are reading your work because they are interested in what you do.
- Unless your readers work closely in the field of your research topic, most of them will not be intimately familiar with the literature. Therefore, it will be challenging to explain your research in simple terms. So, it will be even more challenging explaining other people's findings in simple terms, too.

Depending on your assignment, preparing a literature review might entail an exhaustive library search or referencing a single paper.

- It would help if you have notes: either on index cards or in files on your computer, on the books and articles, you have read.
- Read over your summaries and comments and begin to look for common themes that can organize your review.
- A spreadsheet or some systematic way to keep track of previous studies will be helpful to you.
    - Highlight key dimensions for each study
        - Study name
        - Journal / Year
        - Identification Strategy
        - Main Results
        - Main Caveats/Comments
    - What is the article's main point, and how does it relate to your topic? Do other authors offer a similar position? An opposing one?

As you think through these questions, keep in mind that the literature review has two functions:

- The first is simply to demonstrate your familiarity with scholarly work on your topic. You will need to provide a synthesis of what you have read, trace the development of important themes, and draw out any tensions in prior research.
- The second function is to convey to the readers what your paper brings to the table as contributions.
    - The particular issues you intend to raise, the terms you will employ, the approach you will take, etc.
    - These issues should be defined in relation to previous scholarly works.
    - By drawing on such sources, you can invoke the authority of those who have written on the topic before you.
- In some instances, these two functions will pull in opposite directions: the first toward including as many sources as possible, the second toward selecting only those that are useful for your argument.
    - In any case, more research is better than less. A summary is always selective, as only some things can be included, and others must be left out.
    - The selections you make will necessarily reflect your interests and should lead the reader to become interested in the argument you present.

Let us consider an example from Chakravarty et al. (2019), a study that explores the effect of a vocational training program in Nepal on subsequent labor market outcomes among program beneficiaries.

- The study specifically explores the issue of the labor market returns to vocational training in the context of a low-income country.
- In the text, the authors contextualize the study findings by discussing previous studies examining the effect of vocational training from other countries and income classifications:
    - "Most of the vocational training literature on similar programs in high- or middle-income countries finds low or insignificant effects (Card et al., 2010; Kluve, 2010; Dar and Tzannatos, 1999)."
- Then, the authors proceed to compare the study's findings and research question relative to other very closely related studies on the same research question:
    - "Our paper provides evidence that large program impacts of vocational training programs – particularly in the low-income context – are possible, despite most of the existing evidence from middle-income countries suggesting otherwise. Based on the experience of middle-income countries, only Maitra and Mani (2017), Reis (2015), and Alzua (2016) find positive impacts on the probability of any employment and any earnings in India, Brazil, and Argentina, respectively. On the other hand, Honorati (2015), Card et al. (2010), Attanasio et al. (2011, 2015), Ibarraran (2015), Hirshleifer et al. (2015), Acevedo et al. (2017), Diaz and Rosas (2016), and Galasso et al. (2004) find either mixed, muted, or no impacts at all from vocational programs on various labor market outcomes. That large effects may be particularly pronounced in low-income contexts is confirmed by two studies conducted in Liberia and Uganda: Adoho et al. (2014) randomly assign a similar intervention like the one studied here and detect an increase of 47 percent in non-farm employment and 80 percent in earnings among young Liberian women. Similarly, Bandiera et al. (2017) find positive impacts on income-generating activities of 48 percent (which were almost entirely driven by self-employment), but no positive impacts on wage-employment in Uganda."
- The authors also point out how their study and its findings relate to other closely related studies on one important dimension: program impact differences by gender of the beneficiary:
    - "Our second contribution to the existing literature relates to the pattern of different returns to vocational training between women and men. Although Blattman and Ralston (2015) point to a stylized fact that proposes vocational training has higher returns for women, McKenzie (2017) reviews recent vocational training programs in low-income and middle-income countries and argues that previous studies, which formally test for equality by gender, can either not reject similar impacts for men and women, or have found significantly higher impacts for men. In stark contrast, our study does formally test for equality by gender, and it unambiguously shows robust evidence that vocational training in our context yields higher returns for women."
    - "We highlight that our results are likely driven by the socio-cultural norms in Nepal, which shape gender roles that identify women with more restrictive

characteristics and capabilities in the labor market compared to other country contexts in the training literature (e.g., Latin America). This exemplifies that generalizing heterogeneous impacts of policies such as the one investigated here should (if at all) be done very cautiously, carefully considering the relevant effect channels."

- "Finally, our study underscores that measuring a wider range of employment outcomes, such as self-employment, may be necessary to study the impact of active labor market programs comprehensively. Even though formal employment per se is not affected by the vocational training in our context, we can identify some short-run effects on women's self-employment that less comprehensive labor market surveys of previous studies may have missed."

Let us consider another example from Feldstein (1974)'s "Social Security, Induced Retirement and Aggregate Capital Accumulation."

- The article discusses the development of economists' thinking on lifetime savings patterns.
- He starts with a discussion of a famous early work in public economics:
  - "Ever since Harrod's (1948) discussion of 'hump savings,' economists have recognized the importance of saving during working years for consumption during retirement (p. 906)."
  - "Hump-savings" refers to the idiosyncratic shape of an individual's savings curve over the typical person's life-cycle: savings are low at the beginning of the life-cycle, they increase during middle-age years, and they drop towards the end.
  - This basic model is used throughout the paper and holds all that follows.
- Feldstein cites several researchers to confirm the model, observing this regularity in empirical data on personal savings patterns.
- He goes on to argue that while the "hump-savings" model works well to explain most of the observed data, the effect of specific government policies on individual savings has never been measured empirically.
- Specifically, he poses the question: What is the effect of social security on individuals' lifetime savings?
- He proceeds by citing the work of three other authors and his previous work as examples of this neglect.
- In this way, Feldstein presents his current research (i.e., the 1974 paper) as a necessary development out of a well-established research program. This tactic of setting the stage segues nicely to the next question, which he poses in his paper. This shows a line of work stemming from famous ancestors to contemporary scholarly research.
- Feldstein's paper prepares the reader for the following empirical analysis with his framing. The analysis in the 1974 paper shows that "social security depresses personal savings by 30–50 percent" (Feldstein, 1974).

B. Suggestions for Specific Points to Cover in the Literature Review Section or sub-section:

- Try to stick to about two single-spaced pages (assuming a paper in the range of 20 pages).
- This section should consist of two parts (both of which should be brief).
    - The first section should discuss previous research directly relevant to your paper (not every single paper written on the topic).
        - The review needs to be topical and include research that employs similar methods to the ones you use, analyzes a similar model, uses the same dataset, etc.
        - Keep in mind that your main contribution will be to the economics discipline.
    - The second section should explain your contribution in more detail.
        - You should discuss how your approach is different from what has been done before:
            - Is it new data?
            - A new model?
            - A new identification strategy?
            - Are you answering a question more broadly/specifically?
            - How are you improving on a previous paper?
            - In this section, you should think creatively about external validity issues: Are your findings relevant for a population/institutional environment that is different from previous work, and could this be the reason your findings differ?

- Let me emphasize the previous point again: your main contribution will be judged in relation to previous economics papers and the economics discipline.
    - This statement implies you should be able to relate your work mostly to previous *economics* peer-reviewed papers!
    - If you are working on an interdisciplinary topic (such as health), it is fine to cite several papers from another discipline (e.g., epidemiology) that examine a related question. However, mostly your work will be judged based on its relation to previous economics papers and how it improves our understanding of economic behavior relative to previous economics work.
    - So, be sure that your literature review mostly consists of papers from peer-reviewed economics journals.[2]

[2] A fairly comprehensive list of peer-reviewed economics journals is available at: http://www.aeaweb.org/econlit/journal_list.php

V. Data Section

A. Main Elements

This section should be approximately one single-spaced page (assuming a paper in the range of 20 pages).

The best way to learn how to write a Data section is to read several Data sections in the literature and pay attention to the kinds of information they contain.

In general, the section should cover two aspects:

- The first aspect of this section should describe the name, the source of your data, the period it covers, and variables central to your empirical approach.
    - Describe whether you have a panel, cross-section, or time series.
    - State what the unit of observation is and how many observations you have.
    - Pay attention to what aspects of your data will be most relevant to your project
        - To this end, you might spend more energy and space discussing your dependent variable than a secondary control variable.
    - Discuss limitations of the data such as missing variables, missing observations, survey response, a small number of observations, etc.
        - You may want to highlight the most critical limitations that a careful reader may be concerned and nervous about.
        - You might want to address such significant limitations in a falsification exercise or a robustness check later in the body of the paper.
        - Discuss the minor limitations in a footnote.
        - Discuss other obvious shortcomings (i.e., no income data; no men interviewed, only people attending school interviewed, etc.). Consider the ideal dataset for your hypothesis and compare that to your data.
- The second aspect of this section should report (relevant) descriptive statistics of the data.
    - It would help if you had a couple of tables with means and standard deviations for the variables you will use in the analysis (all outcomes, independent variables, and other essential controls).
        - Do not forget to provide the sources of your data.
        - Help the reader by having a table that offers summary statistics on each variable.
    - You may want to present these descriptive statistics for different subgroups (e.g., treatment vs. control; attriters vs. non-attriters; pre vs. post).
    - The names and significance of the variables should be crystal clear to the reader.
    -
    - If necessary, point out how the empirical measure deviates from its theoretical counterpart.

Let us consider an example of a Data section from Chakravarty et al. (2019).

- The study first discusses the sampling strategy as it relates to the data generation process:
    - "We used two primary sources of data. First, we used data from training application forms and the selection procedure of EF-sponsored training that covered three consecutive cohorts of applicants (from 2010 to 2012). Second, we conducted individual (applicant) and household surveys with two rounds of data collection for each cohort. For the 2010 cohort, a second follow-up was conducted on half of the cohort. Figure 1 shows the survey timeline. Sampling into this study included a combination of stratified, random, and convenience sampling and was done in two consecutive steps. The first step consisted of selecting training events for each cohort, and the second step consisted of selecting individuals according to standardized procedures. The event sampling frame for this study consisted of all training events from the universe of the EF-funded trainings that occurred between January and April of each year. Events were grouped into clusters of close-by districts before sampling for survey administrative reasons. We then randomly sampled up to 15 district clusters in each of the three years, respectively. Furthermore, from the list of training events in these district clusters, we randomly selected 20 percent. Because of the focus on young women in this study, events that were likely to include more young women (identified by training providers) were purposely oversampled in 2011 and 2012. In 2010, because a complete event listing was not available in advance, the events were not chosen randomly but by convenience, based on scheduling and accessibility. Table 1 details the resultant sample of events for the three cohorts."
- It proceeds by discussing the structure of the data:
    - "The 2010 sample comprised 65 events across 12 districts. The 2011 sample comprised 182 events, of which 113 events were dropped from the baseline survey, either because the survey team could not reach the event on the day of applicant selection (usually due to weather conditions) or because the event was not "oversubscribed." The remaining 69 events in 28 districts were included in the 2011 baseline sample. In 2012, 85 out of 112 sampled events covering 26 districts were included in the study sample. Figure 2 depicts the study areas by survey year."
- And then a discussion of the summary characteristics:
    - "Generally, women have lower *paid* employment levels and earnings at baseline. Forty-seven percent of women engage in activities *inside* the house that yield some income (e.g., self-employment activities). In comparison, only 36 percent of the women engage in *paid* activities *outside* the house. In contrast, 59 (69) percent of men engage in *paid* activities *inside* (*outside*) the house. Also, men (69 percent) are more likely than women (56 percent) to carry out *unpaid* work *outside* the house (e.g., helping relatives); however, more women carry out *unpaid* work *inside* the house (e.g., household chores, child care). Almost all women (94 percent) work in the household without pay for at least five hours a week, whereas this is only true for 61 percent of men. Furthermore, 55 percent of the women work more than 20 hours per week inside the house without pay, which is only true for 12 percent of the men in our sample."

B. Suggestions for Specific Points to Cover in the Identification Strategy Section.

- Report interesting stylized facts or patterns from the table with your descriptive statistics. Focus on pointing out patterns that may provide useful background to your audience to understand your analysis better. Provide context, describe the relationship(s) between key variables, and help the reader understand your subsequent results and get a better sense of issues related to generalizability.
- Typical summary statistics that are offered include average and SD values for each variable.
    - Histograms and other figures are acceptable, albeit not standard. Such data presentation could be effective for critical variables that exhibit skewed distributions. This may be a relevant consideration for robustness checks, or lack thereof, of the empirical method or the empirical approach related to the main hypotheses.

VI. Identification Strategy

A. Main Elements

This section should be approximately two to three single-spaced pages (assuming a paper in the range of 20 pages).

The three most essential aspects for applied micro work are Identification, Identification, Identification.

Identification is just another term for the particular empirical method that you will use to estimate arguably causal effects. You should describe your identification strategy as clearly as you can. (Needless to say, make sure you understand it inside out first!). The bottom line of empirical work boils down to a claim that "A causes B," usually documented by some sort of regression. Your identification strategy will explain how your empirical method will uncover the causal effect you think you see in the data.

The identification strategy is about formulating a specific testable hypothesis and choosing a research design to test your testable hypotheses and address your main research question. It would help to underscore this hypothesis and how the research question you initially discussed in the Introduction section relates to your proposed estimation technique. Be sure to describe the approach you adopt to address, solve, or test your central hypothesis(es). Examples of empirical questions one could address are:

- "Does social security depress personal savings?",
- "Do higher social protection benefits crowd out informal interhousehold transfers between family members?",
- "Does the introduction of birth control delay women's age of marriage?"

In presenting your proposed identification strategy for your hypothesis, discuss the data set you use and the type of regression or analyses you plan to test. Most of the data description is better suited for your Data section. However, you should explain how the data relate to your hypothesis if necessary. Be sure to note how potential data limitations (if any) could affect your identification strategy approach. Such limitations include:

- A small set of observations
- Imperfect proxies for crucial variables
- The level of data is different from the ideal level related to your research question.

For example, in "Employment-based Health Insurance and Job Mobility: Is There Evidence of Job-lock?," Brigitte Madrian (1994) writes:

- "To study the phenomenon of job-lock, one would like information on individual and family health status, worker mobility, and the health insurance plans of both the firm for which and individual works and to which one could move."
- However, the study faces some important limitations to address the phenomenon of job-lock analytically:
  - "Unfortunately, information on health status and health insurance is not widely available in labor force surveys, information on worker mobility is not typically available in health surveys, and information on insurance plans of companies for which an individual could have worked is nonexistent."

- To tackle this issue, Madrian offers a clever approach to studying job-lock by examining the outcomes of two workers.
    - The two groups are similar in all respects, except one (arguably): one group has employer-provided health insurance, and the other does not. However, other confounders could influence the relationship between the two key variables.
    - Employers that provide health insurance often provide other benefits that could influence mobility.
    - Furthermore, unobserved characteristics of workers' health status may also independently affect job sorting and mobility. For example, workers with pre-existing conditions may have a considerably more difficult time getting new health insurance.
- Madrian's careful analysis attempts to control as many factors as possible (or so she claims).
- Her paper concludes: "that there is substantial health insurance-related job-lock."

It may not be possible to reach conclusive empirical results in a research paper. It is better to acknowledge these shortcomings than to make overly broad and unsupported statements:

- You may have incomplete data
- Your regression coefficients may be insignificant (widespread phenomenon)
- You may not have controlled for all factors involved.

In this section, you would want to set up a compelling argument about your identification strategy and why it is suited to identify causal effects.

Various identification strategies allow you to estimate causal effects that we have discussed already:

- OLS (with exogenous variation in X)
- instrumental variable estimation
- difference-in-difference estimation
- regression discontinuity designs
- randomized control trials

Be clear about what specific identification strategy you plan to use! Assume your reader knows the basics of each method. Therefore, do not waste time describing why the difference-in-differences method is an appropriate empirical strategy, in general. However, do not assume the reader knows how the method will work with your specific data and study context. Each method has its upsides, downsides, and identifying assumptions. It is your job to describe the suitability of the proposed method to your specific context.

For example:

- If you use an instrumental variable approach, explain why instrumental variable estimation is appropriate here, what your Y is, your key X variable is, what instrumental variable you use.

- If you use a regression discontinuity (RDD), discuss the context of the actual RDD rule how participants are assigned to program or comparison groups solely based on a cutoff score on a pre-program measure.

- Be upfront about what assumptions you are making.
    - Highlight them in the context of your data and setting. Do not list them in a textbook manner. Discuss the assumptions by discussing what they imply for your specific variables and study context.
    - It will be good practice to defend some of these assumptions in your analysis/results section later.

Once you highlight the empirical method, write out the basic econometric specification and explain how each variable is defined/measured. Note the key parameter(s) of interest.

Related to your estimating equation, be sure to discuss most of the following issues:

- Why is this the correct specification for the question you wish to address?
- Was it derived from theory, and has it been used in previous empirical work?
- Why are certain variables included and others not?
- You should be clear about the basis for your identification strategy and what assumptions you need to make to interpret the parameters as you claim to interpret them (e.g., discussing exclusion restrictions if you wish to interpret specific parameters as causal).
- After discussing the basic specification, write out any elaborations or additional tests you will perform and why.

Let us consider another example from Ye et al. (2019) and review the specific approach adopted by the study in describing its identification strategy.

- The study examines the effect of the so-called "gradualism," an idea that individuals' coordination on difficult goals is facilitated by allowing them to first coordinate on easier goals and slowly increase the level. The study explores whether gradualism improves coordination among group members for hard-to-achieve outcomes.
- The authors' identification strategy to examine this hypothesis is based on a lab experiment's random assignment.
- The authors clarify the empirical method:
    - "We conducted the laboratory experiment at the Renmin University of China in Beijing, China, in July 2010 with 256 subjects recruited through the bulletin board system and posters. The majority of the subjects were students from Renmin University and nearby universities. The experiment consisted of 18 sessions, all computerized using the z-Tree software package (Fischbacher, 2007). Both the instructions (see S1 in the Supplemental Material) and the game information shown on the computer screen were in Chinese. In each session, we randomly assigned subjects to groups of four; our sample consisted of 64 groups in total. The experiment included two stages: the first stage comprised twelve periods, while the second was eight. Group members did not change within each stage, but subjects were randomly reshuffled into groups of four after the first stage; this rule was made to be common information. The subjects were not told the exact number of periods in each stage. Instead, the subjects were told that the

experiment would last from 30 minutes to one hour, including the time for sign-up, reading of instructions, taking a quiz designed to ensure that subjects understood the experimental rule, and final payment. Such a design reflects many real-world cases where people do not know the exact number of coordination opportunities."

- Moreover, the experimental treatment arms, as they specifically relate to the "gradualism" hypothesis:
  - "Our experiment comprised three main treatments: (1) Big Bang, (2) Semi-Gradualism, and (3) Gradualism. To isolate the wealth effect on the contribution of participants from the effect of the three main treatments in the second half (Periods 7–12) of the first stage, we introduced a fourth High Show-up Fee treatment, which is identical to the Big Bang treatment except that we give subjects higher show-up fees. All groups in the three main treatments faced the same stake in the second half of the first stage, but stake paths differed for each treatment in the first half (Periods 1–6). The first half of the first stage featured different stake paths for each treatment. We randomly assigned 12 subjects (three groups) into the three main treatments for eight of the 18 sessions. We randomly assigned 16 subjects (four groups) into the four treatments (three main treatments and the High Show-up Fee treatment). In total, we had 18, 18, 18, and 10 groups (or 72, 72, 72, and 40 subjects) in Big Bang, Semi-Gradualism, Gradualism, and High Show-up Fee treatments, respectively. Table S2 in the Supplementary Material shows that the randomization of treatment assignments worked well."

B. Suggestions for Specific Points to Cover in the Identification Strategy Section.

- What biases could arise from the "naïve" OLS estimation (just regressing y on x or using a full sample from any time or place)?
  - Why does endogeneity bias possibly plague the naïve estimate? (depends on your identification strategy).
    - Examples:
      - Pooling different types
      - Ignoring a key regressor
      - Excluding the interaction term you are using to identify the effect
      - Using cross-section instead of changes
      - Looking across rather than within families
      - Looking at the wrong outcome
      - Excluding fixed effects
- Describe key comparison groups.
  - Provide some intuition or justification for this comparison.
- Feel free to use subheadings to lead the reader through the different levels of your analysis.

VII. Results Section

A. Main Elements

This section needs to highlight the main results of your analysis as carefully and clearly as any other part of the paper. In light of these essential aspects, one needs to make several decisions:

- What empirical results to report.
- How many empirical results to report.
- Which results go in the main body of the paper and which belong to an appendix
- How to describe the results in the body of the paper

B. How Many Results Should I Report?

A good rule to follow regarding reporting results is that less is usually better. Novice researchers (or graduate students) tend to over-include or report many secondary parameter estimates from most regression specifications.

Although such a "kitchen sink" approach has some merits (e.g., it shows the audience the extensive analysis performed or that the researcher has examined various aspects regarding the stability of the results), this particular approach has a significant drawback. Pages of parameter estimates usually muddy the main message and story of the paper. It can significantly detract from the comprehensiveness of your central contribution, which is most important in your paper.

- The reader will get either lost, bored, or annoyed.
- Present only results and parameter estimates that directly bolster your main takeaway and story.
- Do not present secondary analyses or relegate such analyses to an Online Appendix if needed.

Let us consider an example. Suppose you are considering the so-called Mincer equation, which labor economists use to estimate the wage returns to education. Your primary regression (based on the Mincer equation) will place an individual's earnings on the left-hand side. Any regressors, such as education, race, gender, work experience, and geographic fixed effects, will be on the right-hand side. Suppose that you believe that the key regressor of interest (i.e., education) is strongly correlated with the error term of the wage equation. For example, this could be because people who exhibit higher than average ability earn higher wages at their jobs. These same people also obtain more schooling. This correlation between the error term and the education variable will most certainly result in a biased estimate of the parameter estimate in front of the education variable (a phenomenon called "ability bias"). The measured effect of education in the regression will reflect the true causal effect of education on wages and some of the effect of ability on wages.

Labor economists have adopted several approaches to circumvent this "ability bias," one of which relies on using a proxy measure for ability (if data on such proxy measures are available). We can assume that the main storyline relates to the presence and the magnitude of the ability bias. Then, your narrative on the main results should focus on the estimates of the education effect and the ability effect in the revised specifications, including the imperfect proxies of ability.

Your regression results will likely look like the results reported in Table 1 below:

Table 1: The Effect of Education on Wages (OLS)

	Dependent Variable: Log of Yearly Earnings			
	(1)	(2)	(3)	(4)
Education	0.091	0.031	0.086	0.027
	(0.001)	(0.003)	(0.002)	(0.005)
Ability dummy		0.251		0.301
		(0.010)		(0.010)
State FE	No	No	Yes	Yes
R^2	0.50	0.55	0.76	0.79
No. of Observations	35,001	35,001	19,505	19,505
No. of Persons	5,505	5,505	4,590	4,590

Notes: Standard errors are in parentheses. The analysis dataset covers the years 1985 to 1995. The shares of doctors and lawyers are taken from the Five Percent Public Use Micro Sample of the 1950 U.S. Census and are defined as the share of each profession among employed persons in the population aged 25–64. A "city" is defined as Standard Metropolitan Statistical Area; constant SMSA definitions are used from 1950 to 1990. Region dummies correspond to the 10 "major regions," as defined by the Census Bureau.

Notice a few aspects of how Table 1 reports the results:

- The table does not report parameter estimates of all independent variables (e.g., marital status, gender), only the principal variable (education).
- The table also has a footnote section marked with the *Notes* heading.
- The *Notes*: this footnote is an important place for clarifications and secondary details, enabling the audience to make sense of your results.
- The Notes to a table should be self-explanatory. However, they should be extensive enough so that an intelligent reader will not have to return to the text to understand the results reported in the table.
- For example, in the Notes, one could state their definition of labor market experience. Additionally, one could explain why the third and fourth regressions have fewer observations than the first and second regressions. Any clarifications about important measurement issues or other caveats that will help the reader understand your results better belong in this section.
- Finally, the notes to the table should indicate whether you are reporting standard errors or t-statistics in the parentheses underneath the coefficients.
    - In general, the preferred approach is to report standard errors. In this way, your readers can more easily choose the statistical method they would like to use in evaluating your numbers. However, since published papers adopt both approaches, you must be clear about which approach you are using.

Your variables and their associated labels must also be clear to the reader.

- Do not use variable abbreviations from your Stata or SAS program (YEDUCT2011 or ABIL8225A) as variable names.
    - Make sure you label your variables in the Tables so that they are easy to interpret and will not cause any confusion for your audience

    - Make sure your variable labels and data in the Tables are consistent with any references in the text.
- Do not worry about repeating yourself in the text and the notes.
    - This kind of repetition will often be necessary so the reader can understand your table without looking back at the text.
    - You should present enough information so that a researcher can replicate your results.
        - For very complex projects, this may require a data appendix.

After presenting the main results, you may include and discuss additional robustness checks performed. Robustness checks refer to additional analyses exploring the stability of the main results.

- The third and fourth columns of Table 1 are robustness checks. They show that the effect of including ability in the regression is the same whether or not we include state-level fixed effects.
- Another robustness check would be to consider the inclusion of the ability variable if we subset only on male household heads or if we restrict the sample to the 1990s. Here, we may check whether the estimate of the education effect is lower.
- Sometimes all that is necessary is to let the reader know in the text that you performed these tests and that the main results were unaffected.
- For a single robustness check, this information can even appear in a footnote keyed to the relevant portion of the text.
- However, if there are many robustness checks, you may want to present these results in another, more parsimonious table.
    - Papers often include a separate section called "Robustness Checks."
    - In the Robustness Checks section, the authors explore several aspects of the stability of the main results

C. Describing Your Results in the Paper

After you decide how to make your tables, graphs, and figures, you should clearly and precisely describe them in the text. Establish the main point of the table in the topic sentence of a paragraph. Consider the following example of a brief description of the main results and takeaways:

> Table 1 shows that including a measure of ability in the wage equation lowers the predicted effect of education on earnings. In Column (1), we do not include the proxy measures of ability; the results reported in the Column indicate that a year of education raises wages by 9.1 percent. In Column (2), we add the proxy measures of ability, and the education effect drops to 3.1 percent. Columns (3) and (4) report the results from the same specifications with the inclusion of state fixed effects; the pattern of the results reported in these columns was that this general pattern is consistent with the results from Columns (1) and (2). The estimates in Table 1 are consistent with the hypothesis that an upward ability bias plagues the naïve OLS estimates.

Note that the first and last sentences in the paragraph describing the results are "big picture" statements. They describe how the overall results fit into the paper's overall story.

Authors frequently do not pay close attention to the narrative regarding their results. Some authors opine that the results are already in the table. However, there is an excellent argument to frame the focus on results central to your thesis and frame your narrative, particularly as it relates to the paper's main punchlines. To this end, you should guide the reader. Steer his or her attention on the most important results from your analysis, and in the right order.

- Remember, no empirical paper ever turns out perfectly.
- Usually, the data do not resoundingly support each hypothesis or proposed idea.
- It is especially critical that you discuss your results as honestly and carefully as possible in such cases.

Let us consider another hypothesis research question. Assume you are studying the effect of the population share of lawyers in a city on the city's subsequent population growth. Some theoretical models posit that cities with lots of lawyers will grow more slowly. However, the same theoretical model posits that this relationship does not hold for cities with many other highly educated professionals, such as doctors. You obtain data on the population percentage of doctors and lawyers in cities in 1950 and the cities' growth rates from 1950 to 1990. Table 2 reports the results of this particular analysis.

Table 2: The Effect of Lawyers on City Growth

	Dependent variable: City's Population Growth Rate, 1950-1990		
	(1)	(2)	(3)
Share of Lawyers in Population, 1950	-0.09	-0.08	-0.07
	(0.01)	(0.03)	(0.05)
Share of Doctors In Population, 1950		0.05	0.05
		(0.03)	(0.05)
Region FE	No	No	Yes
R^2			
No. of Observations	25	25	25

Notes: Standard errors are in parentheses. The shares of doctors and lawyers are taken from the Five Percent Public Use Micro Sample of the 1950 U.S. Census and are defined as the share of each profession among employed persons in the population aged 25–64. A "city" is defined as Standard Metropolitan Statistical Area; constant SMSA definitions are used from 1950 to 1990. Region dummies correspond to the 10 "major regions," as defined by the Census Bureau.

Let us consider two alternative approaches to describe the results in Table 2.

- One approach (not the best approach!) to describe the table's results is as follows:
  - The first column of Table 2 shows the main effect predicted by theory. The second Column shows that doctors do not have the same effect on city growth. Finally, including regional dummy variables do not significantly affect the main point estimates, though statistical precision is lost.
- A second approach (a much better approach!) is as follows:

- Table 2 reports that a higher share of lawyers in a city's population leads to slower city growth. However, when we account for other determinants of city growth, the estimated effect is less precise. Column (1) shows that a ten percentage-point increase in the lawyer share of population decreases the future city growth by about .9 percentage points. In contrast, Column (2) shows that a higher share of doctors in the population improves the city's growth. Specifically, the point estimate associated with the doctor share coefficient is positive, although imprecisely estimated. The estimates in Column (2) are less precise than those in Column (1). This increase in the associated standard errors in Column (2) is likely driven by possible positive multicollinearity, as the doctor and lawyer share variables are strongly (positively) correlated. Turning out attention to results reported in Column (3), the issue of statistical precision becomes even more salient. When the analysis accounts for Census region fixed effects, the associated standard errors of the estimated coefficients go up. Adding additional regressors in the specification increases the standard errors to the point that the effect of more lawyers in the city becomes statistically indistinguishable from zero. One possible interpretation of Column (3) results is that more lawyers in a city might negatively affect city growth. However, the point estimate is robust to including additional control variables; the effect size is imprecisely estimated.

Below, I point out several important considerations in reporting your results.

a. How Many Decimal Places?

Do not report all the decimal places displayed by your software package. Doing this is called *false precision*. Figuring out how many decimal places should be reported is a difficult question.

- Studies rely on rounding numbers primarily to enhance readability.
  - Decisions regarding what to display hinge on creating tables that are pleasing to the eye. For example, every number is reported to the same relatively small number of decimal places.
  - While not necessarily logical, it is the best of many imperfect options.

Enhancing readability leads to a suggestion to avoid coefficients with many leading or trailing zeroes.

- A number such as 0.00123456 could be reported as 1.23456 as long as the units of the variable are appropriately adjusted.

b. Using Standard Errors as a Benchmark

Another approach regarding how many decimal points to report is letting standard errors (SE) be a benchmark (as commonly used in the hard sciences). The idea behind this particular approach is that the standard error measures the precision of an estimated coefficient.

The rule for using SE as a benchmark is: Find the first non-zero digit in the SE. If the digit is greater than one, then this digit determines the decimal place to which coefficients are reported. Round the SE to this decimal place and round the estimated coefficient to the same decimal place. Then report both numbers accordingly.

Here is an example:

- 0.00456789 +/- 0.0089 → 0.005 +/- 0.009.
- The first non-zero digit in the SE is 8. We round the SE to 0.009. We report the coefficient rounded to that decimal place, 0.005.

If the first non-zero digit in the SE is a one, then you apply the same rules to the next decimal place in the SE.

Here is another example:

- 12345.6789 +/- 12.3456789 → 12346 +/- 12.
- The first non-zero digit in the SE is 1, so we go to the next digit, 2, and round the SE to 12.
- Then we use the rounding decimal of our SE as our guide to rounding the coefficient. Note that this rule means that 12345.6789 +/- 1234.56789 should be reported as 12300 +/- 1200.

If the first non-zero digit in the SE is a 1 that rounds up to a 2, keep the next digit, e.g., if the SE is 0.196, report the SE as 0.20.

Here is a small modification to the scientific rule of thumb. Follow the same rule, as noted above, but add one additional decimal place to the results you report beyond what the above rule would give you.

Here is an example:

- 12345.6789 +/- 12.3456789 → 12345.7 +/- 12.3
- 12345.6789 +/- 1234.56789 → 12346 +/- 123.

This modification is useful to tackle a potential disadvantage of the scientific rule: it is challenging to compute accurate t-statistics when only a limited number of decimal places are reported.

It is essential to underscore that no consensus exists on this issue. However, it is also clear that reporting fifteen to twenty decimal places is silly. Do not do this.

c. Discussing Policy Implications and Normative Issues

Many of the topics that economics research explores have real-world policy implications. Your research may also report robust findings of the effects of existing or new policies. Providing normative statements in your papers is a tricky business. It is best to avoid making value judgments and rely on positive analyses, which can speak for themselves. Your analyses will rarely consider all relevant aspects of new policies. Your audience can consider the analysis of additional aspects.

In the discussion of your result, you can and should also point out the limitations of your research

- A relatively small number of observations you have
- The simplicity of the functional form you have tested.
- In general, it is better to show your reader/audience that you understand the limits of your method than make broad claims you do not support.

D. The Bottom Line

When writing up your results, focus on the central message of your results and findings and be as clear as you can. Your audience will appreciate it if you point things out directly and clearly.

Miscellaneous

- You will mightily resist this advice about highlighting only the results critically important to your most important findings. If you cannot follow it, do not put anything before the main result that a reader does not need to understand.
- Explain the economic magnitude of the central numbers, not just their statistical significance.
- Especially in large panel datasets, even the tiniest of effects are "statistically significant."
- Every important number should include a standard error.
- Follow the main result with figures or tables that bolster the message
- Provide results or additional analyses that will address and preempt potential criticisms and robustness checks.
- Most of those robustness analyses will be better suited for an appendix or Online Supplementary Materials.

a. Tables

- Each table should be self-contained.
- The reader must understand the content of your tables without having to go back to the main body of the paper.
- Each table must have a clear, self-explanatory title and a descriptive legend (if relevant).
- Authors must check tables to ensure that the title, column headings, captions are clear without prior context.
- The tables should report self-explanatory names for the main variables, especially the dependent and central independent variables.
- The caption should capture the central idea behind the estimating equation underlying the table's results.
- The primary goal of the table presentation should be to enable a skimming reader to understand the variables, understand what analytical method is being used, be able to interpret the results reported in the table, and understand the central message of the analysis presented.
- An intelligent reader should understand the results reported in the table without reverting to the main text.
-
- You can leave out secondary details regarding variable construction (unless these variables are critical in your analysis or the variable construction in itself is the crux of your contribution).

- Detailed documentation is better suited for the main body of the paper.
- Use a sensible number of significant digits, not whatever the programming package spits out.
    - For instance, 4.56783, with a standard error of 0.6789, should be 4.6 with a standard error of 0.7. I discuss this particular issue in a separate section in this document.
    - Two to three significant digits are plenty for almost all economics and finance research papers.
- Make sure to favor sensible units. Percentages are good.
- Some nice American Economic Association templates (for Word, Scientific Word, or LaTeX) are available at: https://www.aeaweb.org/journals/policies/templates

b. Figures

- Visually engaging figures make a paper come alive.
- They communicate patterns in the data much better than big tables of numbers.
- On the flipside, poorly chosen figures waste much space.
- Provide a self-contained caption for each figure.
- Provide a clear definition of each symbol on the graphs.
- Clear legend is always a must (if necessary for the interpretation of the content).
- Label your axes clearly.
- Use sensible units.
- Do not use dotted line types that are invisible when reproduced.
- Mind coloring your figures: some readers will view/print your figures in a black-and-white mode.

E. Suggestions for Specific Points to Cover in the Results Section

- Try to stick to about 3-5 single-spaced pages (assuming a paper in the range of 20 pages).

- If you are testing a hypothesis, be clear about the null hypothesis.
    - State whether you reject or do not reject the null.
- Interpret coefficients only on key variables presented.
- Interpret your results.
- Explicitly comment on the estimated coefficient of the critical explanatory variable in your analysis—comment on what the estimate implies.
- Note both statistical significance and point estimates. Interpret the magnitude of the estimated effect.
- Are any other coefficients strange/large/unexpected?
- When discussing numbers, provide units, such as estimated coefficients or predicted Y values.
    - Foreign currencies will be better understood if benchmarked against USD.
- Discuss any potential biases/shortcomings/threats to internal validity.
    - Suggest ways to check these.

- Present (or discuss) results from various other result runs.
- Compare your results to previous studies on the same or related topics.
  - Do they support or contradict the relevant economic theory?
- What are the ambiguities of your results?
- What are the different possible interpretations?
- State any possible mechanisms that explain the relationship between the main variables in your analysis.

VIII. Conclusion Section

A. Main Elements

The Conclusion section to research papers should be typically short and sweet. You should resist the urge to paraphrase content already mentioned in previous sections of your paper, with the exception being your results. You can restate (or remind the absent-minded reader) your main findings from the Results section. However, do so in a blitz-style summary: focus on summarizing the most central results and your main takeaways from these results. Your Conclusion section should typically comprise several (5 or 6) tight paragraphs that address some (or most) of these study aspects:

- Summarizes your main results
- Provide an intuitive and engaging explanation underlying these results
- Discuss potential mechanisms driving your main results
- Discuss important limitations of your approach
- Potential policy implications
- Promising directions for future research

Here is an example of how Nikolov and Jimi (2020) write up their concluding remarks in a study that examines the returns to cognitive skills for labor market outcomes in South Africa. Note each of the following:

- Summary of main results:
  - In this study, we examine the importance of cognitive domains for the returns to schooling in the context of sub-Saharan Africa using data from two labor market surveys in South Africa.
- The punchline of the results:
  - Using the HAALSI and CAPS samples, we find that the return for an additional year of schooling ranges from 9 to 14 percent. In the HAALSI sample, the estimate is approximately 9 percent of higher earnings associated with each additional year of schooling. Based on the CAPS sample, the estimated return was approximately 11 percent. We also find that, when accounting for ability measures in the Mincer earnings equation, the implied ability bias in the observational design estimates ranges from one to three percent. Although significant progress has been made in estimating the returns to schooling in high-income countries, for the most part, estimates of the educational returns in developing countries rely on OLS estimations. The choice of using OLS estimations is justified only if realized schooling and unobserved labor market ability are uncorrelated.

Therefore, the validity of very high returns to schooling, especially those found in data for sub-Saharan countries—as reported by Psarachopolous and Patrinos (2004)—casts doubt about the true causal nature of these empirical estimates. Suppose these estimates reflect true high-measured returns to schooling. In that case, it is unclear whether the rising premium for education reflects a higher return to formal schooling or a larger—and unaccounted for—ability bias in the estimated returns to schooling. This distinction and disentangling of the importance of each contributing factor are essential for human capital policy. Suppose the higher education premium reflects the growing importance of unobserved ability factors that are acquired earlier in life. In that case, it may be better to divert resources from formal education to preschool education and childcare. Although we document evidence of positive ability bias using data from South Africa, the magnitude of our estimates is lower than what has previously been found in high-income countries.

- Caveat and Limitations:
  - These findings introduce a caveat to the pervasive view of developing economies in the literature that general cognitive ability, as measured by test scores, is important for explaining personal labor market outcomes. Although cognitive skills certainly explain much of the variance in wages, specific cognitive domains (i.e., executive functioning in rural settings and higher-order cognitive skills in urban settings) play a more prominent role than general cognitive skills.
- Policy implications:
  - This distinction and disentangling of the importance of each contributing factor are essential for human capital policy. Suppose the higher education premium reflects the growing importance of unobserved ability factors that are acquired earlier in life. In that case, it may be better to divert resources from formal education to preschool education and childcare.
  - These results have potential implications for understanding education and labor markets in developing countries. Although our research illuminates the important role of specific cognitive skills for determining a person's earnings, from a policy standpoint, much more must be learned about potential policy interventions—in addition to their cost and timing over one's lifecycle—that could effectively influence these important cognitive domains.

After writing the conclusion, you should then go to the beginning of the paper and write/rewrite the introduction with a brief overview of the results and their implications. It should be a snap.

The last thing you should do is carefully **PROOFREAD** your entire paper. Even after spell-checking the paper with your word processor, you should take the time to read it one last time before turning it in. Fix typographical errors, improve wording, and make sure the numbers make sense.

B. Some Suggestions for Points to Cover in the Conclusion Section

- Try to stick to about one single space page (assuming a paper in the range of 20 pages).
- If your research topic is on an applied microeconomic issue, think about the "Policy brief" that could come out based on your study.
- Insert points to motivate a potential policy brief that addresses each of these issues:

- What were the main findings?
- Remind the reader why the exercise (your study) is important.
- What did you learn about human behavior more generally?
- What did you learn about human behavior that you did not know before reading the paper
- What do your results imply for public policy?

IX. Placing Citations in Your Paper and References

A. Main Elements

When you invoke an existing theory, a fact, or cite evidence from a source, cite the source in the text of your paper. Your in-text citation will contain the name of the author(s) and the year of publication. The way this information is formatted depends on:

- whether you wish to draw attention to the source, and
- whether you have referred to the author(s) previously in your paper.

B. Loud Reference

If you wish to acknowledge the source of an idea explicitly, cite the author's name (s) in the body of your sentence and place the publication date in parentheses. Typically, economics research papers use the author(s) by the last name only: e.g., Crawford (1998)

C. Soft Reference

To evoke a source that substantiates a claim you make, cite the name of the author(s), as well as the date in parentheses. The sky is blue (Crawford and Sobel, 1982; Crawford, 1998)

- The authors are listed in order of publication date.
- Separate sources with a semi-colon.

D. Listing Your References

The full bibliographic records of all sources cited within your papers should appear at the very end of your paper. The section title REFERENCES is capitalized in the frequently used AER Style. In REFERENCES, follow the rules about indentation, capitalization, punctuation, and the ordering of information (including boldface, italics, and spacing count). See https://www.aeaweb.org/journals/aer/submissions/accepted-articles/styleguide

a. Types of Sources and Sample Reference Entries

The information contained in a REFERENCES entry and how this information is formatted depend mainly on the source type. The most frequently used citation style among economists is the *Chicago Manual of Style* Author-Date system for all common publication types. The AEA's "Sample References" provides information for less common citation sources: https://www.aeaweb.org/journals/policies/sample-references.
Below are some reference style examples following this style (17th edition):

Specific Source	Chicago Manual of Style 17th edition (author-date)
No author (Newspaper/Magazine)	*The Economist*. 2000. "Survey of China: Wealth and Power," April 6, 2000.
Journal Article Published in a Journal (One Author)	Nikolov, Plamen. 2018. "Time Delay and Investment Decisions: A Field Experiment in Tanzania." *Economics Bulletin* 38 (2): 1124–37.

Journal Article Published in a Journal (Two Authors)	Nikolov, Plamen, and Nusrat Jimi. 2020. “The Importance of Cognitive Domains and the Returns to Schooling in South Africa: Evidence from Two Labor Surveys.” *Labour Economics* 65 (August): 101849. https://doi.org/10.1016/j.labeco.2020.101849.
Journal Article Published in a Journal (Three Authors):	Angrist, Joshua D., Guido W. Imbens, and Donald B. Rubin. 1996. “Identification of Causal Effects Using Instrumental Variables.” *Journal of the American Statistical Association* 91 (434): 444–55.
Journal Article Published in a Journal (Four Authors):	Jimi, Nusrat Abedin, Nikolov, Plamen, Malek, Mohammad Abdul, and Kumbhakar, Subal. 2019. “The Effects of Access to Credit on Productivity: Separating Technological Changes from Changes in Technical Efficiency.” *Journal of Productivity Analysis* 52 (2019): 37–55. https://doi.org/10.1007/s11123-019-00555-8.
Books	Flora, Peter. 2017. *Development of Welfare States in Europe and America*. 1st ed. Book, Whole. London, The United Kingdom: Routledge.
Unpublished Ph.D. dissertation:	Nikolov, Plamen. 2013. “Essays in Applied Microeconomics of Development.” Doctoral, Cambridge, MA: Harvard University.
Working paper or discussion paper:	Nikolov, Plamen, and Adelman, Alan. 2019. “Do Pension Benefits Accelerate Cognitive Decline? Evidence from Rural China.” IZA Discussion Paper No. 12524. Bonn, Germany: IZA Institute of Labor Economics. https://www.iza.org/publications/dp/12524.
Website:	American Economic Association. 2020. “Sample References.” American Economic Association’s Sample References. June 2020. https://www.aeaweb.org/journals/policies/sample-references.
E-mail Message:	Nikolov, Plamen. 2020. “Sample References,” June 1, 2020.

X. Appendices

A. Main Elements

Including Appendices in your paper is a great way to present additional analysis without necessarily distracting your readers from the main results and your main story. To this end, you can use Appendices to report auxiliary information or report the results of extension analytical exercises. For instance, appendices are the perfect place for that impenetrable theoretical model that you spent months and months writing up. Alternatively, you could use the appendix space for the 100 robustness exercises or consistency checks you performed on Stata for many weeks.

To summarize: appendices are a great way to report secondary analyses related to, but not central to, your storyline. Ensure that any analyses appearing in your Appendix are mentioned with an in-text call within the paper.

XI. Manuscript/Paper Formatting Rules

A. General

- All margins should be one inch.
- Use a standard typeface in 11 or 12 point font.
- Indent your paragraphs.
- Space the text either with 1.5 or 2-line spacing
- Single space footnotes, endnotes, and long quotations.
- Single space within each reference entry and double space between reference entries.
- Your first page should cover your title, name, abstract, and date.

B. Graphs and Charts

- Graphs and charts should have numbers (e.g., Figure 1 or Table 1) and clear captions.
- The data source should be indicated at the bottom of the graph or chart.
- You should include them right after your section called “References.”
- It is easier to read a working paper if the tabular and graphical material is grouped.

C. Proofreading and Revision

Check for typos, spelling errors, missing pages, incorrect table or figure numbers, missing references, and the like. Ensure that all your in-text citations appear in the References section and vice versa. Carefully read your draft to correct awkward and/or repetitive phrases and reorganize your sentences and paragraphs to improve the flow of the paper and eliminate redundancies.

XII. Further Resources and References on Writing For Economics

Several additional resources can be beneficial for economics writing:

Jr, William Strunk. 2018. *The Elements of Style*. New York, NY: OK Publishing.

McCloskey, Deirdre N. 1998. *The Rhetoric of Economics*. Univ of Wisconsin Press.

McCloskey, Deirdre N., and Donald N. McCloskey. 1987. *The Writing of Economics*. Macmillan Publishing Company.

McCloskey, Donald. 1994. *Knowledge and Persuasion in Economics - Google Books*. Cambridge, United Kingdom: Cambridge University Press.

McCloskey, Donald N., and Deirdre N. McCloskey. 1990. *If You're So Smart: The Narrative of Economic Expertise*. University of Chicago Press.

Officer, Lawrence H., Daniel H. Saks, and Judith A. Saks. 1985. *So You Have to Write an Economics Term Paper*. East Lansing: Michigan State University Press.

Thomson, William. 1999. "The Young Person's Guide to Writing Economic Theory." *Journal of Economic Literature* 37 (1): 157–83. https://doi.org/10.1257/jel.37.1.157.

———. 2001. *A Guide for the Young Economist - Google Books*. Cambridge, MA: The MIT Press.

Turabian, Kate L., John Grossman, and Alice Bennett. 1996. *A Manual for Writers of Term Papers, Theses, and Dissertations*. University of Chicago Press.

XIII. References

American Economic Association. 2020. “Journals Indexed in EconLit.” Economics Journals Indexed in EconLit. Pittsburgh, PA: American Economic Association. https://www.aeaweb.org/econlit/journal_list.php.

Chakravarty, S., M. Lundberg, Plamen Nikolov, and J. Zenker. 2019. “Vocational Training Programs and Youth Labor Market Outcomes: Evidence from Nepal.” Journal of Development Economics 136 (January): 71–110. https://doi.org/10.1016/j.jdeveco.2018.09.002.

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Harrod, Roy Forbes. 1948. Towards a Dynamic Economics: Some Recent Developments of Economic Theory and Their Application to Policy. London, The United Kingdom: Macmillan.

Heath, Chip, and Dan Heath. 2007. Made to Stick: Why Some Ideas Survive, and Others Die. 1st ed. New York, NY: Random House.

Madrian, Brigitte. 1994. “Employment-Based Health Insurance and Job Mobility: Is There Evidence of Job-Lock?” The Quarterly Journal of Economics 109 (1): 27–54. https://doi.org/10.2307/2118427.

Nikolov, Plamen, and Alan Adelman. 2019. “Do Pension Benefits Accelerate Cognitive Decline? Evidence from Rural China.” IZA DP No. 12524. Bonn, Germany: IZA Institute of Labor Economics. http://ftp.iza.org/dp12524.pdf.

Nikolov, Plamen, Nusrat Jimi, and Jerray Chang. 2020. “The Importance of Cognitive Domains and the Returns to Schooling in South Africa: Evidence from Two Labor Surveys.” Labour Economics, May, 101849. https://doi.org/10.1016/j.labeco.2020.101849.

Oster, Emily. 2012. “HIV and Sexual Behavior Change: Why Not Africa?” Journal of Health Economics 31 (1): 35–49. https://doi.org/10.1016/j.jhealeco.2011.12.006.

Zinsser, William. 2001. On Writing Well : The Classic Guide to Writing Nonfiction - Harvard University. 1st ed. New York, NY: HarperResource Quill.

Ye, Maoliang, Jie Zheng, Plamen Nikolov, and Sam Asher. 2019. “One Step at a Time: Does Gradualism Build Coordination?” Management Science 66 (1): 113–29. https://doi.org/10.1287/mnsc.2018.3210.