

Research methodology and effective writing

Lecture II - Research question and hypotheses

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Suggested reading:

- Dudenhefer, P. (2009). A guide to writing in Economics. EcoTeach Center and Department of Economics, Duke University.
- Neugeboren, R. H., & Jacobson, M. (2005). Writing Economics. Harvard University.
- Johnson, J. B., Reynolds, H. T., & Mycoff, J. D. (2015). Political science research methods. Cq Press.
- Friedman, S., Friedman, D., & Sunder, S. (1994). Experimental methods: A primer for economists. Cambridge University Press.

Research paper in economics

- basic structure

- Abstract: A brief summary of the whole paper
- Introduction: Pose an interesting question or problem and explain your motivation
- Literature Review: Survey the literature on your topic
- Methods/Data/Design: Formulate your hypothesis and describe your data
- Hypotheses / Theoretical predictions
- Results: Present and interpret your results with the help of graphs and charts
- Discussion: Critique your method and/or discuss any policy implications
- Conclusions: Summarize what you have done; pose questions for further research
- List of references

Finding a research question

- Economists view the world through the lens of efficiency, starting from the assumption that individuals behave rationally and focusing on the problem of allocating scarce resources. From this common analytical perspective, economists study a wide range of topics, involving the behavior of individuals, organizations and nations. The economic approach can be applied so broadly that choosing a topic to write on can be difficult. Indeed, once you start looking at the world through the eyes of an economist, almost anything can be analyzed in terms of choice under constraint.
- Course materials, textbooks, handouts, and so on are obvious and convenient places to look, especially since your topic will most likely have to pertain to the course subject. But reading the newspaper and keeping an eye on current events can be even more helpful. Once you have a general idea, you should go to the literature and see how economists have tried thinking about it.
- Pick out the relevant articles and scour them for content as well as for additional sources. Try to narrow down your topic. Have the authors pointed out any future research areas? Are there any issues that you think have not been fully addressed?
- Get started on your research even if you don't have a precise topic; it will evolve along the way. The question you begin with may become less interesting, and something new may draw your attention. You may be persuaded by an argument you encounter or find data that pose a problem you hadn't considered. You may find no data on one topic and a goldmine on another. Shaping your topic in this way is perfectly fine, but don't get trapped in an endless maze of new, or just slightly revised, topics. You want your search to converge on a manageable topic in a reasonable amount of time. Find a question you can answer and begin your work.

Final thesis - topic selection (note: especially important for PhD candidates)

1. Choose a topic that you already understand (and enjoy!!!), to have more time to go deeper, instead of having to learn all from scratch
2. In case you don't understand anything, choose a topic that your advisor understands (while choosing an advisor that is willing to consult with you a lot)
3. In case even your advisor does not understand anything, choose a topic for which a book/extensive literature review paper was published recently
4. In case you still don't have a topic, choose a topic for which you are willing to put together and extensive literature review by yourself

Research question

- A good term paper will ask an interesting question and offer a plausible answer. It should be plausible in that it is (probably) true, but also not obviously or patently true; and it should be supportable in that it is subject to factual observation or logical demonstration.
- Though there is no one way to find a topic, thinking of the issues that interest you is a great place to begin. While the range of possible topics is large, there are some well-defined fields in economics, and your own interests are likely to fit into one of these.
- In addition to finding something that interests you, you will also need a project that can be done within the parameters of the assignment (for example, length, due date, access to research materials). If the topic doesn't interest you, you probably won't put in the effort needed to do a good job or ask the right questions along the way. On the other hand, a profoundly interesting topic may not be manageable given the time and other constraints that you face.
- You should focus on a single, manageable question. In any case, it has to be:
 - Relevant - has to deal with some real (economic) issue
 - Important - the issue (e.g. inefficiency) it is dealing with has to be significant
 - Interesting - has to have an audience - there has to be somebody who should be interested in / benefitting from your findings
 - Testable - there has to be a way to answer your question
 - Novel - there has to be some novelty involved, so that you are contributing to the advances in the field
- As a rule of thumb, I think the question is potentially good if it is a "Yes/No + Why" question. That is, you can answer your research question with either "Yes" or "No", and you can also show the mechanism of the answer - why is it a Yes OR why is it a No.

Imagine that you want to know more about why students in your class are late for lectures...

1. “The relationship between student life and class attendance.”
 - Not a great RQ... I mean... it is not even a question :)
2. “What factors influence the student class attendance?”
 - Also not great... even if you find a couple of factors, how can you be sure that these are all? Maybe there are thousands of more important ones you have not identified...
3. “Does the way of how students manage their time influence their class attendance?”
 - Better. You can answer with yes/no. But.. what is “time management”? Your variable is too vague, very unspecific.
4. “Do reminders have an effect on class attendance?”
 - Good one - for empirical research. You can say yes/no, and also have a mechanism - reminders as a counterstrategy for forgetting/procrastination etc.
 - However, if you want to also show causality, then your problem will be that the main variable of interest (setting reminders) is out of your control.
5. “Do teacher e-mail reminders have an effect on class attendance?”
 - If you want to do experiments, here is your research question. For example, you can send reminders to half of the class and do not send reminders for the rest and then count what percentage of each group shows up.

Research question sources

- Look for...
 - **Curiosity** - maybe you have read/heard about something and you are wondering -> *How does that work?*
 - **Ineffectiveness** - sometimes you may find yourself pissed about something that does not work very well.. -> *Why are they doing it that way? Is there a better way?*
 - **Searching for truth** - sometimes you may feel that somebody is just wrong... -> *I don't believe what they are saying! Is it really how they say it is?*
 - **Competing conclusions** - sometimes there are two ideas/theories that contradict each other... -> *Who/what is lying and who/what is telling the truth?*
 - **New theories** - sometimes you find an attractive theory making clear predictions, but nobody tested the theory yet... -> *Is that a good theory?*
 - **New applications of theories/insights...** -> *Does it also work in my environment? Does it also apply here?*
 - **Papers that really need replication study** - maybe because of small sample sizes or obsolete methodology -> *Your hypotheses, my design/data - will your results still hold?*

Presentation of your research question

- When presenting your research question, you should give the answers to at least 3 questions to your audience:
 - What? - what is your topic/question?
 - So what? - why is it important? Why should we care?
 - Now what? - how do you plan to do your research and find the answer to your question?

Literature review

- Once you have well-defined research question, it is time for a literature review - a short “essay” about previous research that is relevant to your research question - what has already been done? What has already been found? How does my research question connect to & expand the literature?
- Literature review will also help you by stopping you from doing things that are not worth your time (if it has already been done a million times and everybody knows what the results will be) and on the other hand, will help you find gaps that are worth digging into. Really good papers actually include ideas for future research/expansion in the discussion section.
- Finally, literature review will provide you good guidance on the methodology/design and analysis of data . If everybody in your field uses same methodology and statistical analysis techniques, there is a good chance that you should use what they use - because there is probably a reason why they use what they use.
- Please use as good sources as possible. That means, you should strive for citing quality peer-reviewed journals only. No wikipedia or “internet” sources.
- Things to try: EconLit/Google Scholar for paper search, Mendeley for citations and bibliography

So you have your research question...

- What do you do after figuring out your research topic (motivation), doing your literature review and narrowing down your research questions?
 - Propose a suitable explanation for the phenomena you are interested in (the “why” of your research question)
 - Formulate testable hypotheses
 - Define the concepts identified in the hypotheses (what exactly it is that you will measure and analyse)

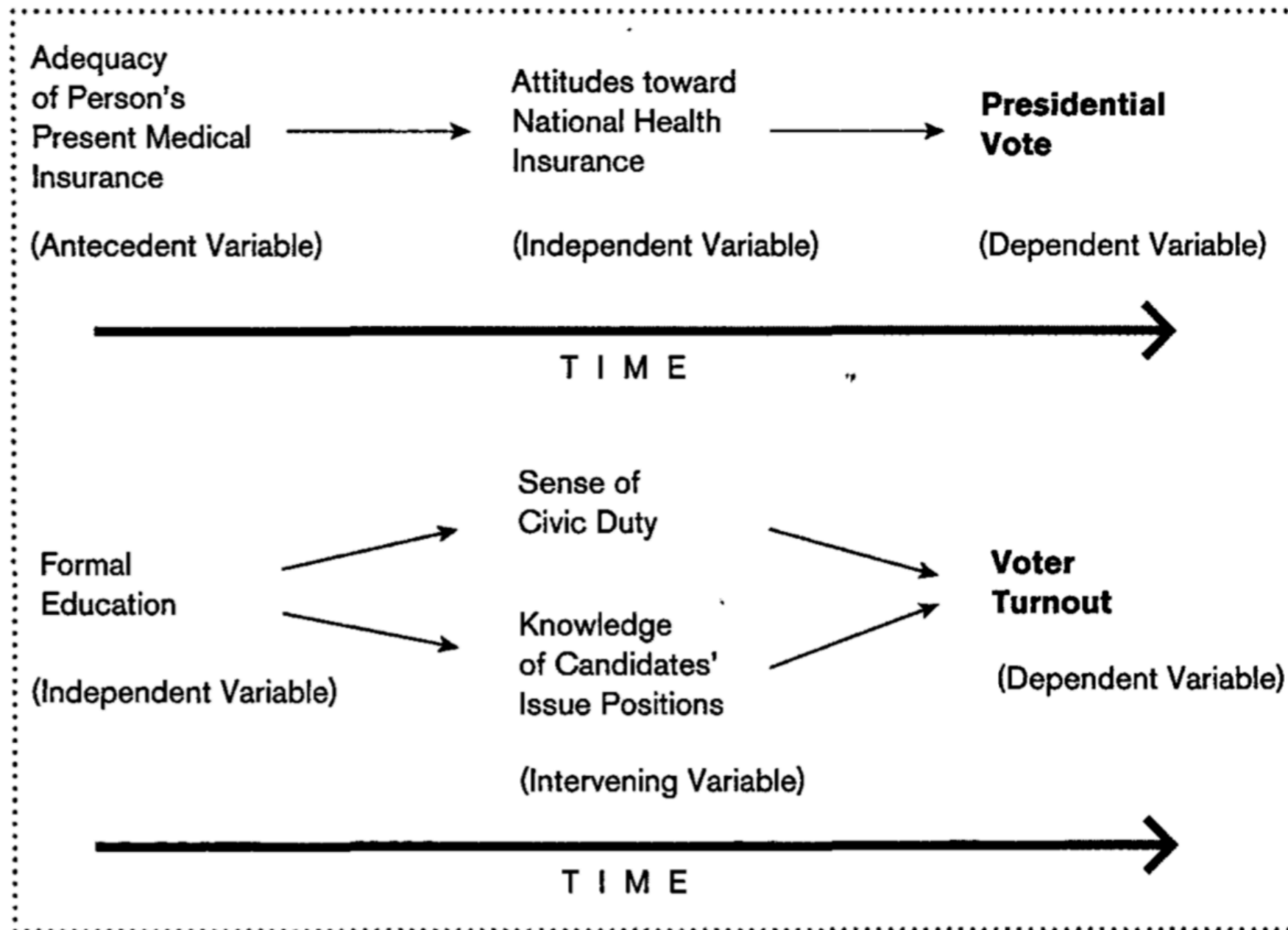
Proposing explanations

- Once your research question is developed, you need to propose an explanation (e.g. identify a phenomena/concept) that may provide you with the answer. Often you will need to identify more phenomena and specify how they are related.
- To help clarify relationships between phenomena, scientists refer to phenomena as variables and identify several types of variables.
- A phenomenon that we think will help us explain our observations or behavior is called an **independent variable**. Independent variables are thought to influence, affect, or cause some other phenomenon.
- A **dependent variable** is thought to be caused, to depend upon, or to be a function of an independent variable.
- Thus, if a researcher has hypothesized that acquiring more formal education will lead to increased income later on (in other words, that income may be explained by education), then years of formal education would be the independent variable, and income would be the dependent variable.
- As the word variable connotes, we expect the value of the concepts we identify as variables to vary or change. A concept that does not change in value is called a constant and cannot be used to investigate a relationship.

Variables

- Sometimes, in addition to proposing that independent variables are related to the dependent variable, researchers propose relationships between the independent variables.
- In particular, we might want to determine which independent variables occur before other independent variables and indicate which ones have a more direct, as opposed to indirect effect on the phenomenon we are trying to explain (the dependent variable).
- A variable that occurs prior to all other variables and that may affect other independent variables is called an **antecedent** variable. A variable that occurs closer in time to the dependent variable and is itself affected by other independent variables is called an **intervening** variable.

FIGURE 4-1 Arrow Diagram of Adequacy of Medical Insurance and Voter Turnout Examples



Arrow diagram

- Explanatory schemes that involve numerous independent, alternative, antecedent, and intervening variables can become quite complex. An arrow diagram is a handy device for presenting and keeping track of such complicated explanations.
- The arrow diagram specifies the phenomena of interest; indicates which variables are independent, alternative, antecedent, intervening, and dependent; and shows which variables are thought to affect which other ones.
- Arrows indicate that one variable is thought to explain or be related to another; the direction of the arrow indicates which variable is independent and which is dependent in that proposed relationship.
- Arrow diagrams show hypothesized causal relationships. A one-headed arrow connecting two variables is a shorthand way of expressing the proposition "X directly causes Y". If arrows do not directly link two variables, the variables may be associated or correlated, but the relationship is indirect, not causal.
- Note that when we assert X causes Y, we are in effect making three claims. One is that X and Y covary - a change in one variable is associated with a change in the other. Also, we are claiming that a change in the independent variable (X) precedes the change in the dependent variable (Y). Finally, we are stating that the covariation between X and Y is not simply a coincidence or spurious - that is, due to change in some other variable, but is direct.

Formulating Hypotheses

- A hypothesis is an explicit statement that indicates how a researcher thinks phenomena of interest (variables) are related. It proposes a relationship that subsequently will be tested with empirical observations of the variables.
- A hypothesis is a guess (but of an educated nature) that indicates how an independent variable is thought to affect, influence, or alter a dependent variable.
- Since hypotheses are proposed relationships, they may turn out to be incorrect and not supported by the empirical evidence.
- For a hypothesis to be tested adequately and persuasively, it must be stated properly. It is important to start a research project with a clearly stated hypothesis because it provides the foundation for subsequent decisions and steps in the research process. A poorly formulated hypothesis often indicates confusion about the relationship to be tested or can lead to mistakes that will limit the value or the meaning of any findings.
- A good hypothesis has six characteristics: (1) it is an empirical statement, (2) it is stated as a generality, (3) it is plausible, (4) it is specific, (5) it is stated in a manner that corresponds to the way in which the researcher intends to test it, and (6) it is testable.

Good hypothesis is...

1. Empirical statement - open question, proposing a relationship that can be empirically observed. Not a normative statement (opinions, preferences).
2. General - it should propose a relationship pertaining to many occurrences of a phenomenon rather than just to one occurrence.
3. Plausible - there should be some logical reason for thinking that it might be confirmed.
4. Specific - it should not simply state that variables are associated; rather, it should indicate the direction of the expected relationship (positive - if X increases then Y increases, or negative - if X increases then Y decreases) between two or more variables. Also, it must be clear what variables X and Y mean (it must be easy to say how to measure variables).
5. Testable - it must be possible and feasible to obtain data that will allow one to test the hypothesis.

Conclusion

- A research project must provide - to both the producer and the consumer of social scientific knowledge - the answers to these important questions:
 - What phenomenon is the researcher trying to understand and explain?
 - What explanation has the researcher proposed for the behavior or attributes in question?
 - What are the meanings of the concepts used in this explanation?
 - What specific hypothesis relating two or more variables will be tested?
 - What is the unit of analysis for the observations?