Theorizing or Conceptualizing the Research

"Man, because he is endowed with reason by which he is able to perceive relationships, sees the causes of things, understands the reciprocal nature of cause and effect, makes analogies, easily surveys the whole course of his life, and makes the necessary preparations for its conduct."

CICERO

In this chapter, we explore how scholars perform the theoretical or conceptual analysis of economic research. The result is often called the theoretical model of one’s research. As we observed in Chapter 2, in a real sense this is the crux of the research project: where theory is applied to shed light on the problem being studied. Many scholars have noted that developing the conceptual framework is difficult for novice researchers. For one thing, it is the most abstract aspect of the research process, requiring both analysis of the research issue or problem (in the sense of taking it apart to understand it) and synthesis of an appropriate conceptual framework to explain it. It also requires that scholars have sufficient knowledge of the appropriate economic theory on which to build. Let’s see if we can explain it.
The underlying theme of this chapter is what it means to “apply” theory to a research topic. We will begin by discussing what theorizing means in general terms. We then explain the range of ways in which researchers theorize, from narrative reasoning to mathematical reasoning. We also provide examples to make this difficult topic as concrete as possible. Next, we present a shortcut that scholars commonly use: modifying an existing theoretical model rather than creating one from scratch. Finally, we identify the characteristics of a good research hypothesis, which is the product of the theorizing process.

**What Does It Mean to Apply Theory to a Research Topic?**

An economic research project is one in which economic theory is applied to an issue so as to derive insights about it. What exactly does it mean to “apply” economic theory to an issue? Recall that the major theories are learned in your principles of economics classes. On the micro side, the major theories include supply and demand, production and cost, the theory of the firm, and consumer behavior. On the macro side, the major theories are aggregate demand and supply, consumption expenditure, investment demand, and money demand. When you apply a theory to an issue, you ask yourself, “Can this question be expressed in terms of one of these theories?” In other words, you ask whether your topic is related to demand, supply, production, and so on.

Let’s start with a straightforward example. Suppose your research question involves retail diamond jewelry sales. Can you articulate this as an example of the theory of demand? The theory of demand says that the quantity demanded of some item is influenced by the price of the product, by the consumer’s income, tastes, and preferences; and by the prices of related goods. If we treat diamond jewelry sales as reflecting the demand for diamond jewelry, what would be the analogous explanatory variable? These might include diamond prices, income, wedding engagement rates, as an indicator of tastes, and prices of other types of jewelry. We can conclude that the theory of demand can likely be used to analyze retail diamond jewelry sales. Note that whether the theory actually works in practice will be determined by empirical testing.

**What Is Theorizing?**

If after you’ve given it some thought it is not obvious what economic theory should be applied to your research, you may need to do some theorizing about your topic. Theorizing is the process of brainstorming about an issue so as to identify the logical connections that explain the issue. The result of the process is a theory that analyzes the research question, and in particular provides an answer to the question in the form of the research hypothesis.

When you theorize, you ask three questions:

1. What are the essential concepts involved in the problem being researched?
2. How are the essential concepts related?
3. What implications or predictions can be drawn from these relationships?

Theorizing involves constructing a conceptual or theoretical argument. As we noted in Chapter 4, this involves deductive reasoning. As you construct this argument, you will need to think both deeply and broadly about the concepts. Let’s work through a simple example, and then we’ll look in more detail at the process.

Suppose we are investigating the extent to which the U.S. macroeconomic slowdown was caused by the decline in the stock market. How do we “conceptualize” this research question? What are the major concepts involved? The initial two concepts are the economic slowdown and the decline in the stock market. What does economic theory suggest might cause a slowdown in the economy? One answer would be a decrease in aggregate demand. What could cause such a decrease? Since aggregate demand is the sum of consumption expenditure, investment expenditure, government expenditure, and net export expenditure, a decrease in any of these components would cause a decrease in aggregate demand. Let’s consider how each of these might be related to the other major concept—a decline in the stock market. Theory tells us that though consumer spending is primarily dependent on disposable income, it also depends on household wealth. If a decline in the stock market makes individuals feel less wealthy,
it may well cause a decrease in consumer spending. A decline in the stock market could have both a direct and indirect effect on investment spending. To the extent that businesses obtain investment financing by issuing shares of stock, a decline in the market makes that more difficult. That is the direct effect. The indirect effect may be even stronger. If the stock market decline reduces consumer spending, it also reduces the demand for business output and therefore business investment.

Let's restate what we have just described.

First, we asked, given the major concepts in the problem, what economic theory or theories can shed light on them? In this case, it was theories of consumer spending and investment demand. Then, we asked, how could one apply those theories to the current research problem? Can we determine a logical connection between the stock market decline and the macroeconomic slowdown? Yes.

What are the implications of that hypothetical story? In other words, what does this theory predict? If the logic is correct, then a decline in the stock market should cause an economic slowdown as a result of reduced investment and consumer spending. This implication can be tested.

Notice the distinction between existing economic theory and the resulting theory that is developed for a specific research project. In the current example, the existing theory is the theory of consumer spending; in the earlier example, it is the theory of demand. In the current example, the resulting theory is the effects of the stock market on consumer spending; in the earlier example, it is the demand for diamond jewelry. In each case, the specific theory is an application of the existing, more general theory. For example, any introductory economics student knows that the general theory of demand postulates a negative relation between price and quantity demanded. For the specific research project described earlier, the relevant question could be, how sensitive is the demand for diamond jewelry to changes in the price?

**Narrative Reasoning**

You can carry out a theoretical analysis in a variety of ways, from the least abstract to the more abstract. At one end of the spectrum is the use of narrative reasoning process. At the other end of the spectrum is the use of formal mathematical methods. Let's examine these different approaches.

Remenyi et al. (1998, 199) argue that "when one attempts to develop models of the world, these start as narrative descriptions within which the imagination is allowed to range freely and widely over many possibilities. The way to begin this process is by creating what they call a "primary narrative," that is, a document that gives a detailed description of the research topic, based on everything the researcher has been able to find out on the subject. The next stage is "concept creation," in which you review the primary narrative so as to identify the essential concepts. The third stage is to write a "higher order narrative," a revised version of the primary narrative that focuses on the concepts identified in the previous steps and ignores secondary details. The next stage is to examine the rewritten narrative to identify possible relationships between the concepts. The final step is to postulate hypotheses from the theoretical relationships. Though brainstorming is the strength of the narrative approach, Remenyi et al. observe that "The narratives are of course constrained by currently accepted knowledge and theories."

Though it isn't necessary to follow this exact procedure, it does give you some useful ideas about how to proceed. Other scholars have suggested some additional questions to consider as you conceptualize your research. For example, Williams (1984) proposes that scholars think about the issue of problem behind the research question, about what is known about the sources of the problem, and about what variables are relevant to the analysis of the problem. Ethridge (1995) reminds us to think about how other researchers have conceptualized problems similar to yours.

**Mathematical Reasoning**

Theoretical economists have traditionally used mathematical reasoning to conceptualize their research, and specifically to formulate hypotheses. Indeed, the main behavioral relationships familiar to students, including demand curves, supply curves, and production and cost functions, were all derived mathematically. Though we differentiate between mathematical and narrative theorizing, one can make a case that all research begins at a narrative level. Highly abstract theories tend to start life as "stories" prior to being formally fleshed out in terms of mathematics.

Chapter 4 defined deductive reasoning as reasoning that starts from one or more assumptions and derives a specific conclusion from them. This suggests a two-step process, as follows. First, identify the relevant economic assumptions for the problem at hand. This is analogous to the first three stages in the narrative approach discussed earlier. Second, use mathematics to manipulate the assumptions so as to derive a conclusion or hypothesis. This is comparable to the last two stages in the narrative approach. Let's illustrate this process with a series of examples.

**Example 1: Optimizing Models**

Economists employ two types of approaches to mathematical theorizing. The first approach is called optimizing models, and the second is called
**Example 2: Ad Hoc Models**

Ad hoc models are models that are not derived from optimizing principles. Rather, the hypothesized relationships come from common sense or experience. The following is an example of a hypothesis that is derived by manipulating an ad hoc model.

Suppose the Bush Administration has proposed an economic stimulus package of $100 billion worth of spending increases. Our research question asks: What effect will the stimulus package have on GDP? Will it be sufficient to correct the slowdown? Let’s assume that the U.S. economy can be modeled by a simple Keynesian model consisting of three equations:

- An identity to define aggregate demand: \( AD = C + I + G \)
- A behavioral equation to define consumption expenditure: \( C = a + bQ \)
- An equilibrium condition: \( AD = Q \)

The consumption function is what makes this an ad hoc model. We did not obtain this equation as a result of trying to maximize or minimize some function. Rather, we skipped the optimizing and, based on experience, simply proposed that consumption expenditure should be positively related to income or GDP. We further assume that investment expenditure is given and that the parameters of the consumption function \( a \) and \( b \) are known.

Thus, we have five assumptions:

1. The assumption that the U.S. economy can be adequately modeled by three equations;
2. The definition of aggregate demand as the sum of \( C, I, \) and \( G \);
3. The assumption that consumer spending can be modeled by the behavioral equation given above, where the parameters are known;
4. The assumption that investment expenditure is given; and
5. The equilibrium condition.

Using algebra, we can solve the model for \( Q \):

\[
Q = \left[ \frac{1}{(1 - b)} \right] (a + I + G)
\]

Setting this equal to zero and solving for the desired \( Q \) yields:

\[
0 = P - 8Q \quad \text{or} \quad Q = 0.125 \times P
\]

Thus, our mathematical operations on the problem lead us to the conclusion that Acme’s supply curve should be an upward-sloping function of the price of Acme’s product. This conclusion is based on the positive and efficient \(+0.125\) on \( P \). This is a testable hypothesis, derived by manipulating the assumptions of the model.
given, \(1/(1 - b)\) equals 4. Thus, a $100 billion increase in government spending should, assuming this theory is correct, cause a $400 billion increase in GDP. This is a testable hypothesis that was deduced from the mathematics.

**A Commonly Used Shortcut: Modifying an Existing Model**

Though it is always useful to go through the theorizing process just described, rarely do economists create an entirely original model from scratch. We mentioned in the beginning of the chapter that sometimes researchers can readily apply a common economic theory to a research problem. These theories include demand and supply functions, production and cost functions, aggregate production functions, and consumption, investment, and money demand functions.

Often researchers take an existing model, which has already been applied to the topic they are interested in, and modify it in some way that seems an improvement over the original. Recall from Chapter 3 that the purpose of the literature survey is to avoid having to reinvent the wheel and instead build on the work of scholars who came before. The literature survey often shows what has been a helpful way to approach a research problem, as well as what hasn’t worked. So, starting with an existing model that was at least partially successful and then modifying that model to improve it is a time-honored approach.

This can be done either by going through the formal optimization process or by adopting a more ad hoc approach. The ad hoc way is appropriate if you know what the outcome is going to be. For example, if you apply a very well-known theory, say, the theory of demand, it makes little sense to work through the mathematics of utility maximization so as to derive a demand curve, since all economists know that the result will be that quantity demanded should be negatively related to the price. Let’s illustrate this with two examples.

**Example 3: Intertemporal Utility Maximization with Money**

Economists going back at least to Irving Fisher have known that economic agents’ decisions about consumption versus saving can be analyzed as an application of intertemporal utility maximization. Indeed, this is the idea behind Modigliani’s Life-Cycle Hypothesis for Consumer Expenditure. In that model, income in each period is allocated between two items: consumption, which provides immediate satisfaction, and saving, which earns interest and future satisfaction.

The **Existing Theory: Consumption Today versus Consumption Tomorrow** We can first look at utility as the choice between consumption today and consumption tomorrow.

\[ U = f(C_0, C_1) \]

We can then maximize this, using the Lagrangian technique, subject to the following budget constraint:

\[ \lambda (C_0 - Y_0 - (Y_1 - C_1)(1 + r)) \]

The following set of equations shows the maximization subject to consumption today, consumption tomorrow, and \(\lambda\).

\[ \frac{\partial U}{\partial C_0} = \lambda \]
\[ \frac{\partial U}{\partial C_1} = \lambda(1 + r) \]
\[ \frac{\partial U}{\partial \lambda} = C_0 - Y_0 - (Y_1 - C_1)(1 + r) \]

We can look at the marginal rate of substitution here by the following equation:

\[ \frac{(\partial U/\partial C_0) / (\partial U/\partial C_1)}{\lambda / (1 + r)} = 1 + r \]

Therefore, the choice between consumption today versus consumption tomorrow depends on the interest rate.

For a specific functional form, we use a log linear function, as follows:

\[ \ln C_0 + \ln C_1 - \lambda (C_0 - Y_0 - (Y_1 - C_1)(1 + r)) \]

Maximizing this function, we get the following set of equations:

\[ \frac{\partial U}{\partial C_0} = 1/C_0 - \lambda \]
\[ \frac{\partial U}{\partial C_1} = 1/C_1 - \lambda(1 + r) \]
\[ \frac{\partial U}{\partial \lambda} = C_0 - Y_0 - (Y_1 - C_1)/(1 + r) \]

Solving the first-order conditions for \(C_0\) implies that consumption is proportional to wealth.\(^4\)

\[ C_0 = \alpha W_0 \]

**Modification of the Existing Theory: The Addition of Money** Suppose we wanted to add another item to the basic model, namely, money. We would sketch out the basic model in the traditional way, but then add real money to the utility function.\(^5\)

\[ U = f(C_0, C_1, M_0, M_1) \]

According to our income equation the budget constraint will be:

\[ \lambda (C_0 - Y_0 - \Delta M_0 - (Y_1 - C_1 - \Delta M_1)/(1 + r)) \]
Maximizing this function yields the following set of equations:
\[
\begin{align*}
\frac{\partial U}{\partial c_0} &= \lambda \\
\frac{\partial U}{\partial c_1} &= \lambda (1 + r) \\
\frac{\partial U}{\partial \Delta m_0} &= -\lambda \\
\frac{\partial U}{\partial \Delta m_1} &= \lambda (1 + r) \\
\frac{\partial U}{\partial \Delta \lambda} &= (C_0 - Y_0 - \Delta M_0 - (Y_1 - C_1 - \Delta M_1))/(1 + r)
\end{align*}
\]

In addition to the marginal rates of substitution found in Example 3, we also find the following:
\[
\begin{align*}
\frac{\partial U}{\partial c_0} / \frac{\partial U}{\partial \Delta m_0} &= -1 \\
\frac{\partial U}{\partial c_1} / \frac{\partial U}{\partial \Delta m_0} &= 1 \\
\frac{\partial U}{\partial \Delta m_0} / \frac{\partial U}{\partial \Delta m_1} &= -1/(1 + r)
\end{align*}
\]

We can see from this that the marginal rate of substitution between money today versus money tomorrow is based on the interest rate.

As a result of this utility maximization function, we can see the following:
\[
\begin{align*}
C_0 &= aW_0 \\
M_d &= bW_0
\end{align*}
\]

In other words, money demand in any period should be proportionate to total wealth, just as consumption is.

**Example 4: Ad Hoc Example**

The economics literature on the effects of parental work hours on children's cognitive development typically applies the notion of an educational production function. The idea is that just as a firm's output is produced by combining capital, labor, and other inputs, one can treat cognitive development as being "produced" by combining inputs of parental time and quality, family income, and so on. To date, the literature has shown a consensus about whether maternal employment adversely affects children's cognitive development. Suppose you hypothesize that the reason for the mixed results is the failure to control for the quality of child care parents use. It would be straightforward to add child-care quality as an additional input to the educational production function, treating it analytically as any other input.

**What Makes a Good Research Hypothesis?**

The product of the theorizing process should be a research hypothesis. In Chapter 4, we noted that an argument could be considered both the principal assertion and also the entire package of assertion and supporting evidence. In the same way, one can think of the hypothesis and the theoretical explanation as the answer to the research question. The hypothesis is the crux of the conceptual or theoretical analysis. To assess a theoretical argument, we test the hypothesis. One of the most important factors leading to a successful research project is a good research hypothesis. Ethington (1995) suggests that a good research hypothesis must have the following characteristics:

1. It should be stated clearly and specifically in a way that can't be misinterpreted.
2. It must be able to discriminate clearly from alternative hypotheses.
3. It must be capable of being proved false.
4. It should be empirically testable (and nontrivial); that is, there must be reasonable statistical means and reasonable data available for testing it.
5. It must be derived from the theoretical analysis; otherwise, any statistical results will lack validity, demonstrating at best correlation rather than the causation that we seek. Note that either an optimizing or an ad hoc approach can be used here, as long as the hypothesis is linked to the underlying theory.
Let's illustrate with the diamond jewelry example. The hypothesis can be stated clearly that the demand for jewelry depends negatively on the price (Characteristic 1). The alternative hypothesis would be that the demand does not depend negatively on the price. This is a clear distinction (Characteristic 2). Either the hypothesis is true or false (Characteristic 3). The hypothesis can be tested using regression analysis and data obtained from the industry and public sources (Characteristic 4). Finally, as we showed earlier, the hypothesis is derived from the theory of demand (Characteristic 5).

SUMMARY

- When you apply economic theory to a research question, you ask, "Can this question be expressed or interpreted in terms of a basic economic theory such as supply, demand, production, cost, and so on?"
- Theorizing is the process of brainstorming about an issue to identify the essential concepts involved and the logical connections between those concepts.
- The result of theorizing should be a hypothesis that provides a tentative answer to the research question.
- Economic researchers theorize using some combination of narrative and mathematical reasoning.
- Theorizing is an exercise in deductive reasoning—for example, when economic assumptions are manipulated mathematically to derive a prediction or conclusion.
- It is common practice for researchers to modify an existing model in the literature rather than creating an entirely original model from scratch.

NOTES

1. Wyrick (1994) notes that the validity of these proposed relationships is strengthened if they draw on the findings of other researchers.
2. In applying the general theory, one might also ask if there are any institutions or other real-world constraints that are assumed away in the theory but whose presence in the real world has a bearing on our analysis? If so, what are the effects likely to be (e.g., rent controls)?
3. This result was obtained using the power rule: for \( Y = aX^n \), \( \frac{dY}{dX} = naX^{n-1} \).


5. This modification is from an undergraduate research paper, Fallen (2000).

SUGGESTIONS FOR FURTHER READING

- Epstein and Kornberger (2005), Chapters 4 and 5—Excellent introduction of the logic behind economic theories and models. Thoughtful examples fit right in with the discussion in this chapter.
- Thode (1995), Chapter 8—Provides a nontechnical explanation of the theorizing process.
- Komuni et al. (1998)—Offers a detailed explanation of the narrative reasoning process.
- Wyrick (1994), Chapter 10—Provides another perspective on theorizing, addressed to undergraduate researchers.

EXERCISES

4. What economic theory can be applied to the following topics?
   - The effects of foreign direct investment on economic growth in developing countries.
   - Are automobile sales more sensitive to changes in price or financing?
   - The effects of free agency on salaries in baseball.
   - Housing prices in the [fill in a city] area.

Choose three studies from your literature survey that you found to be relevant to your research topic. Identify the economic theory that each study applies to its research question.

When you decide to apply an economic theory like supply or demand to your research as we described in the beginning of the chapter, are you choosing an optimizing model or an ad hoc model?

Example of using an optimizing model to theorize: Determine the demand for advertising by adding advertising as an input in the production function and then minimize cost, subject to an output constraint.

Example of using an ad hoc model to theorize: The macro economy has been modeled frequently using the Cobb-Douglas production function: \( Q = A L^aK^b \), where \( Q = \) GDP, \( L = \) labor input, \( K = \) capital input, and \( A \) is technical change. This production function has great appeal, since the
coefficients on labor and capital \((a \text{ and } b)\) are interpreted as the marginal products of labor and capital. Suppose one wishes to analyze the effects on \(A\) of explicitly treating energy as a factor of production. Explain how to do that.

6. Determine an appropriate theory to apply to your research question. Use either a common economic theory or modify an existing theory from the literature on your topic. Explain why the theory is appropriate for your research question.

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**Locating (and Collecting) Economic Data**

"It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts."

SIR ARTHUR CONAN DOYLE

This is the first of two chapters on locating and collecting economic data. In this chapter, we focus on how data are constructed and where they may be found, both in primary and secondary sources.

In the next chapter, we explain how to compile a data set for your own research project.

A key part of any empirical research project is collecting and manipulating data. It is never too early to begin looking for potential data sources. After all, a research project can be hamstrung by inadequate data just as easily as by a lack of a clearly conceived, testable hypothesis. In fact, it is uncommon for novice researchers to invest a great deal of time and effort developing a research project only to discover that data aren’t available to adequately test the hypothesis. Don’t let this happen to you.

Even though this book describes the research process sequentially, in practice, many steps can be performed in parallel or at least in overlapping ways. Once you have settled on a research question, it is wise to begin looking for usable data. To begin, you should look for data in the general area of your research (e.g., macro data, international trade, financial data, etc.). As you review the literature on your topic, pay attention to the data sources previous studies have used. Think about their strengths and weaknesses. Would they work for your research?