Economic Methodology: Empiricism and Reductionism

Most economics textbooks argue that economics, like other sciences, uses the scientific method, a systematic way of testing theories (a.k.a. “models”) to determine whether they are valid or invalid.

For example, Irwin Tucker (2004, p. 7) argues that there are 3 steps in the “model-building process”:

1. Identify the problem
2. Develop a model based on simplified assumptions
3. Collect data and test the model

If a theory / model fits the facts, it is provisionally accepted until facts (evidence) emerges which contradict the theory, at which time a new theory must be introduced and tested, which will then replace the old one. In this way, false theories are discarded, and true theories are kept.

Tucker continues on page 8:

“The purpose of an economic model is to forecast or predict the results of various changes in variables. An economic theory can be expressed in the form, “If A, then B, other things held constant.” An economic model is useful only if it yields accurate predictions.”

This method of determining whether or not a theory / model is valid (i.e. true) is widespread in economics, as well as other disciplines such as physics, medicine, and biology. Despite it being widely accepted, it has a number of well-known conceptual problems. The problems with this view are not new; they have been known to scientists and philosophers for thousands of years. Most texts prefer to ignore these problems, producing a simple-minded and erroneous view of both science and economics. This view is called empiricism, a form of reductionism. You deserve better.

**Empiricism**: the belief that truth can be determined by testing theories (models) against data, based on the theory that all knowledge originates in experience.

**Reductionism**: a theory that reduces complex phenomena to simple terms; the belief that a simple cause and effect relationship exists and can explain complex systems.
Problem #1: Which Data to Use?

There is, practically speaking, an infinite amount of data in the universe. Data means observations about reality. Data include observations made by people, such as sights, sounds, tastes, tactile sensations, smells, and so on. Data include measurements made with the aid of tools, such as a ruler, a scale, a watch, or other instruments designed to extend the power and precision of human senses.

Since there is so much possible data available, it becomes impossible to test a theory against all the data. This means the theorist has to make choices about which data to use, and which data not to use. If one person uses data set #1 to test the theory, while another person uses data set #214 to test the same theory, they may get two entirely different answers. It is impossible to say which one is true in an absolute sense.

The following diagram illustrates problem #1. Notice that there are now 4 steps to the model-building process. Step 3 is now the subjective choice of the theorist to use one set of data over another.

Problem #2: Observation of Reality is Affected by Your Understanding of Reality

Empiricists believe that reality is something which is independent of how you understand the world. In fact, your understanding of the world, or your point of view, which is shaped by the theory or theories you accept, deeply affects how you observe the world, how you measure things, what you see, feel, smell, and taste. Usually people are unaware of their own point of view, since much of it is formed by social and cultural constructs, as well as by a person’s own response to all they have experienced.
From Point of view #1, reality looks a certain way: triangular. A theorist then identifies a problem, creates a model, and tests it against the data or observations that have been collected from that point of view. The theory is either rejected or not, but the testing process has been done from within a certain viewpoint; the results of the testing is inevitably biased.

From a different point of view, say #2, reality looks different, more square, which then affects the way the problem is identified, the model that is created, and the way it is tested. From point of view #2, the model may be false, while the model is accepted in point of view #1. Thus the empiricist’s scientific method, which is supposed to give us the truth, fails to deliver.

**Problem #2**

1. Point of view #1
2. Reality
3. Create model
4. Test model

1. Point of view #2
2. Reality
3. Create a model
4. Test model

1. Point of view #3
2. Reality
3. Create model
4. Test model

**Problem #3: What Variables Should be Used in the Model? (Simplifying Assumptions)**

Recall that Tucker argues: An economic theory can be expressed in the form, “If A, then B, other things held constant.” In other words, A is the cause of B. This is a good description of reductionism, and can be illustrated as follows:
Reductionism: \[ A \leftrightarrow B \]

In order to say that A is the cause of B, we had to make a few simplifying assumptions. We had to assume that all the other stuff in the entire universe is irrelevant; that nothing else affects B beside A. That’s a pretty big assumption, because there’s a lot of other stuff in the universe, and since everything is connected to everything else, we must assume that these connections, these relationships are not as important as the relationship between A and B. Furthermore, we must assume that A is the cause and B is the effect.

If we assume that A and B both cause each other to exist, (we’ll give the arrow two points to indicate this), and assume that other variables, such as C, X, Q, etc. also shape A, B, and each other, then the picture becomes a lot more complex. In fact, it’s a real mess.

**Problem #3**

How do we decide which of these factors to focus on? All are related to B, as well as to each of the other variables (and many more) in many ways. This also relates to Problem #2 -- we have a certain point of view on the reality of this complex mess; if we believe that A is the cause of B, then it causes us to look at the world a certain way, which affects how we then test whether or not A is the cause of B. It’s a vicious circle. The consequence is that following the empiricist idea of the scientific method does not give us absolute truth.
Problem #4: Things Change

Empiricists recognized Problem #3, but said in response to it that if all the other factors in the universe could be held constant, then we could determine whether or not A is the true cause of B. Thus the Latin phrase *ceteris paribus* was invoked, which means “holding all else constant”.

Unfortunately, we cannot hold all things constant. We simply cannot control most things in the universe; we cannot stop the planets from orbiting while we conduct experiments; we cannot stop asteroids from entering the earth’s atmosphere; we cannot stop all human activity; we cannot suspend the laws of space and time. So we assume that all else is held constant. We assume that the universe does not change, or that if it does, it changes in ways that are not relevant to our process of creating a model and testing it.

This assumption is obviously completely wrong. It goes against one of the most fundamental aspects of reality, which is that things change. It is for this reason that the ancient Greek philosopher Heraclitus remarked: “You cannot step in the same river twice.”

The following diagram illustrates the problem caused by the changing nature of A, the changing nature of B, and the changing relationship between A and B over time. This causes a problem, for example, if the model is created in time period #1, and tested in time period #2 or #3.

Again, we cannot be sure if the results are true (objective) or simply dependent on our own limited point of view.
Problem #5: It is Not Possible to Observe Causation, Only Association

It is argued in most economics texts that a common error is becoming confused between *association* and *causation*. Association is when variables simply happen to occur at around the same time. Causation is a cause and effect relationship between two or more variables.

Textbooks warn you not to make the error of confusing causation with association. Unfortunately, there is no way to avoid making this error, nor is there any way to know if or when you have made it, because we have no way of knowing what is the true cause of something, and what simply occurs at the same time.

Tucker’s example on page 10 is between a witch doctor performing a voodoo dance and stock market prices.

<table>
<thead>
<tr>
<th>Time period #1</th>
<th>Time period #2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Association:</strong></td>
<td></td>
</tr>
<tr>
<td>voodoo dance</td>
<td>stock market prices rise</td>
</tr>
<tr>
<td><strong>2. Causation:</strong></td>
<td></td>
</tr>
<tr>
<td>voodoo dance</td>
<td>stock market prices rise</td>
</tr>
</tbody>
</table>

Now, everyone knows that voodoo dances don’t cause stock market prices to rise!

The problem with this is that falling back on what everyone already knows is not the scientific method, and will certainly not result in either an advance in knowledge or the truth. Problem #5 here is related to Problem #3, how we decide to choose the variable or variables on which to focus.

Why Economists Disagree

Economists have different points of view, and this affects how they perceive the economy, how they create models, and how they test these models. Economists argue and debate amongst themselves and with others over what is the true relationship between economic and social variables. Since societies and the individuals within them are very complex, questions of what ultimately cause economic phenomena are very hard to settle.
Over time, some economists have advanced arguments which have taken hold and become influential in the thinking of other economists, politicians, historians, teachers, etc. As a result, schools of thought form in economics, just as they do in other fields, such as politics, literature, art, medicine, religion, and so on. These different schools of thought disagree on fundamental issues, and often clash with each other and compete to gain followers. In this course we will discuss three important schools of thought in economics: 1. neoclassical, 2. Keynesian, and 3. Marxian economics. Just as economists differ on what are the nature of and relationships between economic and social variables, they also tend to differ on the subject of empiricism and reductionism. Some choose to overlook, deny, or ignore the many problems with empiricism and reductionism noted above, while others have sought to understand more deeply these problems and find a new way of producing knowledge about the economy.

**Consequences of Reductionist Thinking**

Some of the great theorists of the last 40 years or so were deeply influenced by the mounting criticisms of empiricism and reductionism, and struck by some of the awful events of the 20th century, such as the Holocaust and other acts of genocide, racism, oppression of women, Homophobia, terrorism, and many other kinds of fear and hatred of those who are different than what is deemed to be ‘normal’ by the majority or whoever wields power. These thinkers pondered the connection between the belief in simple underlying causes and all the violence, strife and oppression that humanity endures in the modern era.

Some of these thinkers, such as Benjamin, Gramsci, Adorno, Foucault, and Althusser, argued forcefully that the consequence of reductionist thinking becoming widespread in society was ultimately violence and suppression of different points of view. Since the focus of reductionism is the search for a single theory or explanation, a simple set of variables or causes that explains something complex, the logical extension is that those who cling to theories that have been ‘proven’ false are simply wrong. They are either crazy or malicious -- they must be isolated from the rest of society or destroyed. Many of these thinkers argued that a society that embraces this kind of thinking is well on its way to a ‘final solution’ like that of Nazi Germany or an oppressive religious or secular fundamentalism.

Reductionist thinking has many problems indeed. But what could take its place?

**Overdetermination**

These theorists turned to an old idea, and made it into something new, calling it *overdetermination*. This view is based on three central ideas about reality at a fundamental level: complexity, contradiction, and change. From this view, all things are seen as complex, for everything that exists is in a multifaceted relationship with everything else in the universe. Everything contains internal contradictions -- everything is pushed and pulled in many different directions at once from within and without. This leads to change. Everything that exists is changing, developing, coming into being, and passing out of existence.
From this view, A does not cause B. Rather, B is *overdetermined* by everything that exists. We cannot ever prove that A is a more important cause than C, Q, X, Z, alpha, or some Japanese character, though we may *believe* that one of these causes is more important.

This is a perspective that celebrates difference, for we expect that everyone who observes the world sees it differently. Overdetermination leads one to celebrate and try to learn from these differences, rather than looking for the correct view and then seeking to destroy all other views.

**Concepts of Entry Point, Object, and Logic**

Every theory has three parts. A theory’s *entry point* is where it begins, what variables the theorist has chosen to make the focus of the theory. When one argues that A causes B, this means that A is the entry point. A theory may have several entry points, but they are generally limited to a few.

The *object* of a theory is what it seeks to explain, what it is about. In the example above, A causes B, the object of the theory is B. A theory can have many objects.

The *logic* of the theory is the way that the relationships between the entry point(s) and the object of the theory are understood within the theory. One form of logic is reductionism, in which the entry point is understood as the sole relevant causes of the object; all other variables are ignored, and theories which hold other variables as their entry point are dismissed.

Another form of logic is overdetermination, in which the entry point(s) are understood as a few variables out of many, which have been singled out based on the subjective judgment of the theorist. There is a recognition that other theorists, choosing different entry point(s) will come up with a different theory, a different way of understanding, say the cause(s) of B. While the theorist may favor one theory over another, there is no final way of proving that one is true and the others are false.

It has been argued that this manner of thinking is the cornerstone of a society based on justice and tolerance.

Further reading:


Engels, Frederick. *Dialectics of Nature*.


Resnick and Wolff. *Economics: Marxian versus Neoclassical*

Resnick and Wolff. *Knowledge and Class*. 