What are the Questions We Should Be Asking in Micro Economics?

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Resumen

Con respeto a la dificultad global causada por esta crisis financiera, ahora es un tiempo propicio para hacer una autoevaluación honesta de las fuerzas y las debilidades de la economía ¿está suficientemente dotada la microeconomía para ayudar a solucionar los problemas de nuestra generación, o necesita un replanteamiento? Como un primer paso, en el espíritu de Joan Robinson (1980) debemos plantear si la microeconomía realiza las preguntas adecuadas. Las planteadas en este ensayo golpean en el centro de la microeconomía. Las preguntas que hacen son fáciles; su contestación es lo difícil. Esperamos que este ensayo comience un diálogo fructífero sobre la eficacia de la microeconomía.

Palabras clave
- Enseñanza de la Economía
- Metodología Económica
- Estudios de política económica

Abstract

With due respect to the global hardship caused by this financial crisis, now is a propitious time to conduct an honest self-evaluation of the strengths and weaknesses of economics. Is micro economics sufficiently well-equipped to help solve the problems of our generation, or does it need a tune-up? As a first step, in the spirit of Joan Robinson (1980) we must ask if micro economics is asking the right questions. The questions posed in this essay strike at the heart of micro economics. Asking questions is easy; answering them is more difficult. It is hoped that this essay will begin a fruitful dialogue about the efficacy of the discipline of micro economics.

Key words
- Micro economics
- Economics
- Quantum physics
- Pedagogy

Jel Classifications: A22, B41, E65

Alfred Marshall, in the eighth edition of his *Principles of Economics*, wrote that "economic conditions are constantly changing, and each generation looks at its own problems in its own way" (Marshall, 1946 [1920], p. v). Our generation is beset with major problems including labor market insecurity, global warming and a major financial crisis. Solutions to these problems require thoughtful analysis from policy makers, especially economists. With due respect to the global hardship caused by this financial crisis, now is a propitious time to conduct an honest self-evaluation of the strengths and weaknesses of economics. This self-evaluation must honestly ask if we understand how 'economic conditions are changing' and if we are 'looking at our problems' in the most effective way.

Every discipline within economics should undertake such an evaluation. This paper will conduct one for micro economics. Is micro economics sufficiently well-equipped to help solve the problems of our generation, or does it need a tune-up?

As a first step, in the spirit of Joan Robinson (1980) we must ask if microeconomics is asking the right questions. If not, our insights will be wrong, our policies inefficacious,

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and our pedagogy misleading. It is arrogant to assume one individual is cognizant of all the right questions to ask -never mind providing the answers- but it is equally folly to assume every discipline is perfectly fine. The intention of this paper is to initiate an honest and thoughtful evaluation of the efficacy of micro economics. In the spirit of pluralism this paper is directed at both mainstream economics and the different schools within heterodox economics. Is there a way to unify the micro contributions of the different schools of heterodoxy? Is doing so in our best interest?

Question: What is Economics?

How a discipline defines itself determines its outlook, the questions asked, research agenda, perceived relationship with other disciplines and its pedagogy. Too narrow a definition risks losing sight of the broader, interconnected picture, while too broad a definition uproots a discipline from a specific intellectual tradition, perhaps rendering it impotent to suggest efficacious policy solutions. Is the definition of micro economics sufficient to conceptualize our current problems?

The definition of economics follows closely from that offered by Lionel Robbins, "economics is the science which studies human behavior as a relationship between ends and scarce means which have alternative uses." Is this definition too constrictive? Does fastidious observance of this definition blind us to 'changing economic conditions?' After all, human activity is comprised of a lot more than individuals finding the best means for using scarce resources, as Goethe's Werther exclaims, "things in this world seldom come down to an either-or decision, and possible courses of action, and feelings, are as infinitely various as kinds of noses on the gamut from hooked to snub" (1989, p. 58).

Other definitions of economics are competing for attention. One in particular gaining currency is that "economics is provisioning, or how societies organize themselves to sustain life and enhance its quality" (Nelson, 2009, p. 61). Since such a definition, "does not focus on individual rational choice, [it] can encompass social and economic institutions, real human psychology, and the actual unfolding of historical events" (Nelson, 2009, p. 61).

Adopting a broader definition of economics will enable us to cast our net wide in economics, in order to investigate and understand myriad types of behavior. A broader definition will also return us to Alfred Marshall's definition, "Political Economy or Economics is a study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of wellbeing" (Marshall, 1946 [1920], p. 1).

It is time to reconsider the definition of economics. Will a broader definition of economics enable us to better understand our changing conditions? Will a broader definition help us to ask the right the questions? Is there a definition of microeconomics common to all schools within heterodoxy? As Joan Robinson wrote, micoeconomics should be separate from macroeconomics,

> In current teaching, a sharp distinction is usually made between microeconomic and macroeconomic problems . . . but a general theory cannot be split into these two parts. Micro questions—concerning the relative prices of commodities and the behavior of individuals, firms and households- cannot be discussed in the air without any reference to the structure of the economy in which they exists, and to the processes of cyclical and secular change (1980, 4-5).

What are the strengths and weaknesses of microeconomics within each school of economics? Is it possible to build on this to create a united front?

Question: Why the reliance on Newtonian Physics?

Isaac Newton constructed a unified world view consistent with the ideals of the enlightenment. According to Newton, the world and the universe behave according to well-defined laws, which can be understood and ascertained by human reason. Newton's three laws of motion (Newton, 1995, 19) have been used as the basis for predicting the movement of planets and for launching rockets,

I. Every body perseveres in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it.
II. The alteration of motion is ever proportional to the motive force impressed; and is made in the direction of the right line in which that force is impressed.
III. To every action there is always opposed an equal reaction.

Gravity is the great equalizer and the "invisible hand at work" in both heaven and earth for Newton, since every object both exerts a gravitational force and is exerted upon (Greene, 2000, 54).

A persistent criticism of economics is that it has "become more and more . . . a branch of applied mathematics, where the aim is not to explain real processes and outcomes in the economic world, but to explore problems of mathematical technique for their own sake" (Hodgson, 2001, p. 6). While many have expanded on

this, here I point out one: model choice, "one's choice of characterization determines the kind of theory that will result" (Diesing, 1971, p. 49).

Question: Why Not Quantum Mechanics?

Quantum mechanics revolutionized 20th century physics and underlies most of modern science. It has been called the "most important scientific development of the 20th century" [Hart, 1992, 293; Al-Khalili, 2003, 7] and its discovery constitutes a real "revolution in our understanding of physical process" (Polkinghorne 2002, xi). Quantum mechanics provides a conceptual framework for understanding the microscopic world, particularly how atoms and subatomic particles –nature's building blocks– interact. An understanding of quantum mechanics has helped develop the laser, compact disc, semi-conductors, microwaves, DVDs, television sets, computers, traffic lights, 3 way light bulbs, MRI scanning, radioactive decay, nuclear power and much more. Quantum mechanics has reached beyond science and technology into the realm of "thought and culture where it has led to a deep revision in our conception of the universe and of our relation to it" (Capra, 1984, 3). Quantum mechanics is characterized by a probabilistic description rather than mechanistic causation. The notion of casualty is crucial in Newtonian physics, "but the term path is inappropriate in quantum mechanics because the very notion of continuity has been relinquished" (Mirowski, 1989, 85). Second, quantum mechanics is characterized by a probabilistic description rather than mechanistic causation. The notion of casualty is crucial in Newtonian physics, "but the term path is inappropriate in quantum mechanics because the very notion of continuity has been relinquished" (Mirowski, 1989, 85).

Unlike Newtonian physics which asserts that particles are at rest until acted upon, quantum mechanics assumes constant motion. The collision of two particles does not necessarily result in equilibrium, but in changed energy. The collision can also release latent ideas. How frequency and threshold levels can be transmuted into useful economic concepts will be fun to ponder.

One reason why mainstream microeconomics of course adhere to Newtonian physics is that it comports very nicely with equilibrium,

> [Unfortunately] the academic economics profession remains . . . stubbornly wedded to the traditional equilibrium picture. This seems decidedly peculiar given that every other branch of science from physics to molecular biology has embraced computational modeling as an invaluable tool for gaining insight into complex systems of many interacting parts, where the links between causes and effect can be tortuously convoluted (Buchanan, 2008).

Question: The Shortcomings of Supply and Demand

Supply and demand analysis, familiar to every economics student is based for the most part on Newton's three laws of motion. But while Newton's Laws were subsequently shown by quantum mechanics to be applicable only to large bodies and not to the atomic world, neoclassical economics never made the distinction and continues to assume that Newton's laws apply to societies as well as individual firms and workers. The neoclassical emphasis on equilibrium at both the macro and micro level "is a serious barrier to the understanding of market economies" (Clark, 1989, 604). Indeed, reliance on outdated 19th century physics continues to be a flaw in mainstream economics (Ganley, 1995, 396).

Question: Can Economics Utilize the Uncertainty Principle?

According to the uncertainty principle, discovered by Walter Heisenberg during the 1920s, one can either ascertain the position of an electron, or its velocity but not both; in fact, the more we know of one, the less we know of the other. This is so, because in order to see the electron we have to shed light on it, and because light emits photons, it alters the velocity. The position and the velocity is inherently random without definite values before measurement.

The uncertainty principle profoundly affects how physicists and other scientists conduct research. It injected an element of indeterminancy and uncertainty, due not "to faults of the theory or our lack of knowledge, but because nature herself operates in a very unpindownable way" (Al-Kahali, 2003, 59). The uncertainty principle also injected a healthy dose of humility and a reverence for the unpredictability of nature. It enables physics to be amenable to alternative explanations, since there is "no universal epistemology, no single sovereign way in which we may hope to gain all knowledge (Polkinghorne, 2002, 87) . The uncertainty principle is a clarion call for modesty and to carefully delineate what can and cannot be measured. The uncertainty principle "cleanly broke with 19th century physics and undercut any attempt to cling to the past" (Greene, 2000, 118).

At a fundamental level, the uncertainty principle impugns "the Cartesian partition between the I and the world, between the observer and the observed" (Capra, 1984, 57). It also endows the observer with a vital role in the nature of physical reality and offers "human beings a unique ability to influence the structure of the physical universe in a way that was undreamt of in Newton's day. . . and highlights the unique role of the human mind in determining reality"(Davies, 1983, 135, 141).

The Schrodinger equation, developed by the Austrian physicist Erwin Schrodinger is fascinating, once I figure out what it means. Unlike Newtonian physics which

assumes that we can predict a body's position based on the current forces acting on it, the Schrodinger equation incorporates a particle's mass, speed, size and electric charge into one wave function. Each electron cannot be thought of as a localized particle orbiting the nucleus, but is described as a wave function which carries certain labels called quantum numbers that define the electron's energy and the way it evolves around the nucleus. Thus the wave function occupies the whole volume of the atom and provides us a probability distribution of where the electron is most likely to be found if we were to look for it. The Schrodinger equation explains the probabilistic nature and the built-in randomness of quantum mechanics, making it one of the most important equations in physics (Al-Khalili, 2003, 64).

Question: How Do We Understand, Measure and Conceptualize Reality?

Einstein wrote that there "can be no science without the belief that it is possible to grasp the reality with our theoretical construction" (Einstein and Leopold, 1938, 296). Theory construction can never be ideologically neutral, for "even if there are phenomena that exist as value-free 'facts' they could not be either known or described in a value-free manner since knowing is dependent on perception and by a consciousness that is value-imbued" (Stevenson, 2002, 265). As Davies asks, "Is this freedom to construct reality any more powerful than the already existing freedom to influence the external world by moving objects around, say by touch? (1983, 141).

Metaphor is useful as an "unavoidable means of constituting and ordering our thoughts" (Hodgson, 2000, 67). Adam Smith, an admirer of Newton, wanted to do for economics what Newton did for the universe; that is, develop laws ascertainable through human reason, that explained the workings of the economy. Smith, like Newton, felt that the underlying, natural order was ordained by God.[1]

The leading 19th century neoclassical theorists were familiar with physics; Walras, for example, modeled his general equilibrium theory after the Newtonian model of celestial bodies (Ganley, 1995, 399). Neoclassical economics, in its "its desire to become scientific" (Clark, 1989, 603) eagerly borrowed the notion of equilibrium since it enabled economic agents to optimize as if they were mere particles obeying mechanical laws" (Hodgson, 2000, 74).

The notion of equilibrium remains at "the center of almost all economic theory [and] shapes and determines not only what economists think about, but more importantly, how they think" (Clark, 1989, 597). And pedagogically, "equilibrium provides the framework that [students] use to look at the world" (Colander, 2004, 96).

[1] Smith in his later years was more reluctant to look to the invisible hand to guide society and instead called upon the visible hand of moral leadership from all individuals, especially the statesmen to create those conditions and thereby that society" (Evensky, 1998, 12).

Neoclassical economics, however, has ignored quantum mechanics, while stubbornly clinging to the mechanistic metaphor of 19th century physics. Instititutionalist economics, on the other hand, while rejecting Newtonian mechanics, was "modeled after the evolutionary models of biology with an emphasis on economic processes" (Ganley, 1995, 403). While biological metaphors can help us understand the evolution of societies, quantum mechanics can offer an apt metaphor for better understanding micro behavior. Rather than heterodox economists choosing only one metaphor, why can't multiple metaphors co-exist?

Question: Why the Emphasis on Perfect Competition?

In my experience teaching economics, no topic turns students off more than perfect competition. Not only is it far removed and alien from everyday experience, but the astute student questions its ideological function. Its ostensible purpose is to provide a benchmark to understand and compare other industry structures in a static equilibrium setting, but nevertheless sends a clear ideological message, while underscoring the irrelevance of mainstream economics in understanding today's economy.

Rather than extol the properties of any one static industry structure, micro economics should emphasize how industries evolve and how the evolution affects micro. Introducing a non-equilibrium perspective would demonstrate that perfect competition is inherently unstable; so even if it existed, it wouldn't last.

Question: Why Not System Dynamics?

System Dynamics (SD) is a methodology for studying and managing complex feedback systems, such as one finds in business and other social systems. SD developed during the last fifty years largely due to the inadequacies of mainstream economics in explaining evolutionary behavior. SD "is used to address problems being experienced by any system that changes over time, be it a physical system, biological system, or socioeconomic system (Radzicki, 2003: 151). The overall objective of SD is to improve the position of a firm, agent or society as it evolves over time. Thus it is necessary to understand the actual economy rather than the workings of an overly abstract and unrealistic model. Individual action affects other individuals, firms and institutions, which in turn affect the potential for institutional development. The modeling process is non-teleological, with the preponderant focus not on a "particular model but from the modeling process itself [thus] a model is never complete but simply in its latest stage of development" (Radzicki, 1988: 655).

Question: What about Pedagogy? How Should We Teach Micro Economics?

Joan Robinson, wrote, "a great part of current teaching is conducted in terms of models that are evidently not intended to be taken seriously as hypothesis about reality but are used to inculcate an orthodox ideology" (Robinson, 1980, p. 4). Is the situation much different today? Is our pedagogical objective to teach students about economic theory, how economists think, applying economic issues to markets, or understanding how the economy works? Has our pedagogical focus shifted too much in favor of teaching our students how to think like economists, rather than investigating how 'economic conditions are changing'?

While many of us are working hard on revitalizing and reforming the economics curriculum, it is imperative that as the first step in reform, no student should take any economics courses until after the first year of university study. Instead, at the minimum they should take the following four courses: World Literature, History of Capitalist Systems, History of Intellectual Thought, and Quantum Physics.

First, there is no better primer on the diversity of the human condition than fiction. Properly taught, fiction can explain the myriad forms of behavior and predicaments as good, or even better, than any individual academic discipline. Second, it is essential for educated citizens to understand how the present system of capitalism has evolved, and how people respond to contemporary problems by constructing appropriate institutions. Third, a course in the history of intellectual thought will elucidate how ideas developed in response to certain problems, and students will understand how and why economic theory was developed. And fourth, not only are many of the accouterments of capitalism, such as the CD, laser, computer, MRIs, traffic lights, etc., the result of the intellectual achievements of quantum physics, but no better example exists of the scientific spirit- the willingness to test and experiment and the openness to reform theory if necessary.

Rachman (2010) claims that economists 'ape' physics but unfortunately, it is the physics of Isaac Newton- the physics of force, motion and equilibrium. Economists should ape quantum physics- the physics of change, unpredictability and non-equilibrium. Doing so would reduce the swagger of economists, restore much needed humility to the discipline and more importantly make economics once again useful in solving our economic problems. Perhaps it is naive, but student exposure to quantum mechanics would increase the willingness to question cavalier assumptions of neoclassical economics.

Quantum physics has advanced by questioning unexplained puzzles and once supported by evidence, has moved forward. Richard Feyman notes that "quantum mechanics describes nature as absurd from the point of common sense [but] it fully

agrees with experiment" (Greene, 2000, 111). This is not to say that physicists do not wear ideological blinders, but "the rise of quantum theory is …an outstanding example of the revisionism imposed by physical reality upon the thinking of the scientist" (Polkinghorne, 2002, 85). Whereas neoclassical economics suffers from "an irrational tenacity to hold on to its core beliefs in the face of contrary factual evidence (Keen, 2003, 158); quantum mechanics explains the physical processes of the world and is a tremendous tale of success, "perhaps the greatest in the history of physical science" (Polkinghorne, 2002, 40). Today's economics is woefully disconnected from modern physics, despite its well- known physics envy (Mirowski, 1989). Planck and Einstein proposed their theories after examining experimental evidence that conflicted with theoretical predictions. Theoretical advances confirmed by experimental data was (and is) a hallmark of quantum mechanics; as such, "predictive power of quantum mechanics is a sign of a successful scientific theory" (Al Kahilili, 2003, 132).

Although some might argue that this proposal would constrict the course offerings for the economics major, so be it. Economics is too important, its policies affecting too many people, for economics education to be left solely to economists. At the same time, these suggested courses are fundamental to a university education and will produce better educated (rather than trained) economists, able to converse intelligently with all social scientists.

Question: How can we move forward?

While neoclassical economics briefly flirted with quantum theory is the 1930s, it remains committed to the Newtonian metaphor. It insists on the positive normative dichotomy and that individuals are guided by universal laws that work toward an equilibrium. But rather than offer profound insights into the working of actual market economies, or a willingness to incorporate advances from other fields, neoclassical economics has exhibited locked-in behavior advancing on its own momentum and self-reinforcing standards (Hodgson, 2000, 70). And Hodgson urges "the Walrasian and mechanistic assumptions at the hub of orthodox economics has to be replaced. . . but, it is not enough to criticize, alternatives must be offered" (2000, 44). Is the quantum metaphor useful for heterodox economics. If so, in what specific ways can it be implemented?

Conclusion

Alfred Marshall, a great economist of the 19th century, wrote "economic conditions are constantly changing, and each generation looks at its own problems in its own way." A most pressing problem of our generation is our failed economists fueled

by a failed, myopic and arrogant economics education. To move forward we need educated and open-minded economists who are willing to learn from and cooperate with all social scientists. To do so we must reform economics education.

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