

**REFLEXIVITY IN SOCIAL SYSTEMS:
THE THEORIES OF GEORGE SOROS**

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REFLEXIVITY IN SOCIAL SYSTEMS: THE THEORIES OF GEORGE SOROS

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Abstract

George Soros's reflexivity theory is quite compatible with second order cybernetics. Indeed his work shows how to apply ideas in second order cybernetics to economics, finance, and political science. This paper briefly reviews three theories of reflexivity in cybernetics. It provides an introduction to Soros's version of reflexivity theory and reviews applications in economics and finance. Soros's approach to economics is based on different assumptions about information and about human behavior. His approach to finance is more holistic than most current work in finance. He does not emphasize mathematical models but rather sees finance as a human player game with himself as a participant. The paper concludes that Soros's work is a very important contribution to and expansion of contemporary social science.

Key words: equilibrium theory, reflexivity theory, causal influence diagrams

Definitions of Reflexivity

Reflexivity occurs in social systems when an actor observes and thinks about his or her actions and their consequences and then modifies his or her behavior. More generally "reflexion" is defined as the return of light or sound waves from a surface, the action of bending or folding back, or an idea or opinion made as a result of meditation. (Stein, 1968) "Reflexive" is defined as something turned back on itself, a relation that exists between an entity and itself. "Self-reference" in mathematics indicates a statement that refers to itself, for example, a set that contains itself. Such statements lead to paradox, a form of inconsistency. In the informal fallacies self-referential statements are considered poor form. However, a social scientist who formulates a theory of a society in which he or she is a member is making self-referential statements. An investor who makes trades that alter price is engaged in a reflexive process.

Given the self-referential nature of social systems and financial activities, how is it possible to create a non-paradoxical, logically consistent theory? Stated differently, should traditions concerning the FORM of arguments limit the SCOPE of science? Or, should the subject matter of science be guided by curiosity and the desire to construct explanations of phenomena? Cyberneticians have historically chosen subject matter over form of argument.

In recent years at least three theories of reflexive processes have been created.

- Heinz von Foerster, beginning in 1974, advocated including the observer in the domain of science. He called this line of inquiry “second order cybernetics.” (von Foerster, 1974)
- Vladimir Lefebvre proposed the existence of two systems of ethical cognition and called the activity of selecting the appropriate ethical system for the occasion “reflexive control.” (Lefebvre, 1982)
- George Soros described both economic and political systems as being composed of individuals who are actors as well as observers. (Soros, 1987)

Drawing upon the idealist philosophical tradition von Foerster noted that our knowledge of the world is mediated by our senses, and hence the “reality” that we describe is the result of interpretations of sensory experience. Indeed, he said that people are responsible not only for their actions but for the interpretations of the world they have constructed. He claimed that a theory of biology should be able to explain the existence of a theory of biology. (von Foerster, 2002)

Lefebvre created a mathematical theory of cognition and, depending on the operator one chose (+ or *), he noted that there are two systems of ethical cognition. In the first ethical system a good end does not justify a bad means. In the second ethical system it does. Lefebvre claims that people are “imprinted” with one of the two ethical systems at an early age. Throughout life one’s first response is to act in accord with the imprinted ethical system. However, one can learn the other ethical system and act in accord with it, when one realizes that the imprinted system is not working.

Soros’s theory of reflexivity is not well-known in the systems and cybernetics community. Nor is Soros’s theory widely used by economists or finance professors, despite his success as a financial manager. He uses a participatory, not a purely descriptive, theory of social systems. Soros studied with Karl Popper at the London School of Economics. He has worked to implement Popper’s idea of “open societies” in many countries around the world. Soros uses Popper’s idea of conjectures and refutations” to guide his investments and social interventions. However, he rejects Popper’s conception of the unity of method, the idea that all disciplines should use the same methods of inquiry as the natural sciences. Soros claims that in social systems there are two processes – observation and participation. The natural sciences require only observation.

Ways to Describe Systems

In order to understand how Soros’s ideas are different from theories in economics and finance, it is helpful to refer to a theory of how systems change and evolve. Austrian sociologist Karl Mueller (1998) has proposed an epigenetic theory of the interaction between genotype and phenotype. See Figure 1. Genotype refers to genes in the case of

a biological organism or culture or a constitution in the case of social systems. Phenotype refers to organisms or organizations. Variation occurs in the genotype, which leads to different organisms or organizations, which compete for survival. Selection occurs in the phenotype. Those organisms or organizations which survive enable their genes, corporate cultures or constitutions to survive.

Furthermore, it is useful to note that different disciplines describe systems in different ways. (Umpleby, 1997) Social systems can be described using different basic elements.

- Variables are used by disciplines such as physics and economics. Physicists measure mass, length, time, velocity, acceleration, pressure, temperature, etc. Economists measure variables such as price, savings, income, growth rates, and return on investment.
- Ideas, including beliefs, values, and assumptions, are the subject matter of philosophers, psychologists, and cultural anthropologists.
- Groups are the focus of attention of sociologists and political scientists.
- Events are the chief concerns of fields such as computer science and history. Computer scientists describe sequences of operations – multiplication, addition, subtraction, division, storage, retrieval, etc. Historians describe systems in terms of key events, for example, 1066, 1492, 7 December 1941, and 9/11/2001.

Classical scientific theories operate in the realm of variables and ideas. That is, variables are defined and measured and relationships among them are proposed and tested. Although most work in economics describes social systems in terms of variables, Soros uses all four methods – variables, ideas, groups, and events. See Figure 2. Hence, Soros's analyses of social systems are more comprehensive than purely economic analyses. Reflexivity is the process of shifting back and forth between description and action.

For Soros it is important to understand the “bias” or perception or preconception of the various actors in a social system. He feels that bias is the main driving force in historical processes. He assumes that ways of thinking influence events. For Soros cognition means that perception is a function of the situation. Action means that the situation is a function of perception. Combining perception and action yields reflexivity. See Figure 3.

Figures 3 through 10 are “causal influence diagrams.” These diagrams are the first step in creating a system dynamics model, but they are often used by themselves as a way of describing positive and negative feedback processes. Each arrow is either positive or negative. A positive arrow indicates a direct relationship: if variable A increases, variable B increases; or if variable A decreases, variable B decreases. A negative arrow indicates an inverse relationship: if variable A increases, variable B decreases; or if variable A decreases, variable B increases. The sign on a loop is determined by multiplying the arrows together as if they were plus and minus ones. Hence, an even number of negative signs on the arrows yields a positive feedback loop. An odd number of negative signs on the arrows yields a negative feedback loop. Positive feedback is

typical of growth or decay; a difference between an initial and a recent state is added. Negative feedback yields stability; a difference between an initial and a recent state is subtracted.

An example of how Soros's views differ from those of economists is the efficient market hypothesis – the idea that markets are efficient and that information is very quickly reflected in market prices. Soros in contrast says that markets are always biased in one direction or another. He notes that if the efficient market hypothesis were correct, share prices would follow a long-term trend with little fluctuation. In fact share prices fluctuate considerably. Equilibrium theory in economics says that an increase in demand will lead to higher prices, which will decrease demand. Similarly, a drop in supply will lead to a higher price, which will increase supply. These are both negative feedback processes. Negative feedback produces stability. However, for “momentum investors” rising price is a sign to buy, hence further increasing price. A falling price will lead many investors to sell, thus further reducing price. These are positive feedback processes, at least in the short term. Positive feedback describes growth or decline. See Figure 4.

To illustrate reflexivity theory Soros (1987) in *The Alchemy of Finance* provides several examples – the currency market (Figures 5 and 6) the conglomerate boom (Figure 7 and Tables 1, 2, and 3), Real Estate Investment Trusts (Figure 8), the venture capital boom and collapse (Figure 9), and the credit cycle (Figure 10). Consider the conglomerate boom. Soros describes a high tech company with a high price to earnings (P/E) ratio that begins to diversify. It buys consumer goods companies with high dividends but low P/E ratios. As earnings of the conglomerate improve, the price of the company rises. The higher stock price means greater ability to borrow. The conglomerate borrows to buy more consumer goods companies. Earnings per share continue to grow. Investors eagerly buy more stock. Eventually people realize that the character of the company has changed and a high P/E ratio is not justified. Price then falls to more closely match the character of the company. Figure 7 and Tables 1, 2, and 3 show how the conglomerate boom can be described using variables, ideas, groups, and events.

Implications for Finance

Most academic work in the field of finance currently involves building mathematical models. Although behavioral finance is a growing part of the field, this subfield tends to emphasize limits on rational behavior. Soros in contrast regards finance as a multi-person game involving human players, including himself. Whereas behavioral finance focuses on decision-making by individuals, Soros is concerned with the behavior of large social systems.

Dahlem and Trauffner (2005) have compared the ideas of Soros to present thinking in finance, emphasizing the work of Markowitz. They point to three steps in selecting a portfolio.

- Observation and experience.

- Beliefs about future performances. (Soros focuses here.)
- Choice of portfolios. (Markowitz focuses here.)

The work of Markowitz (1952) is widely used by financial managers. It is based on mathematics and statistics. It assumes a tendency to market equilibrium. The focus is on historical data. Reflexivity theory, on the other hand, is not commonly used by financial managers. It is based not only on economics but also psychology and national policies. It assumes market disequilibrium. The focus is on the future decisions of investors and policy makers.

Markowitz's approach emphasizes balanced returns. He defines an investor's risk-return preference and evaluates risk-return relations. The principal activity is to analyze data and the goal is to avoid volatility. Soros on the other hand emphasizes high absolute returns. He defines an investor's time frame and evaluates price levels relative to perception. The principal activity is to analyze behavior and the goal is to avoid losses.

Markowitz's objective is to make successful investments. To achieve this objective he diversifies investments and optimizes portfolio selection. Information management is required. Soros is willing to take some strategic chances. He focuses on investments and optimizing market timing. Knowledge management is required.

Soros uses the same theoretical point of view when analyzing political systems as he uses in economics. He looks for gaps between perception and reality. A large gap means the system is unstable. When people realize that description and reality are far apart, legitimacy collapses. An example in politics was glasnost or the policy of openness regarding information, which destroyed the legitimacy of the USSR Communist Party.

Although most of Soros's investments are in conventional investment instruments, he also looks for short term positive feedback situations, which will yield rapid growth, for example the conglomerate boom, a credit cycle, or a high tech bubble. He also looks for instability preceding collapse caused by a gap between perception and reality.

Implications for Economics

Economic theory is based on several assumptions about information and about human behavior. For example, information is immediately distributed to everyone. Each person seeks to maximize personal profit. Human beings behave rationally. When asked whether they really believe such assumptions, economists reply, "These assumptions allow us to solve problems. If you don't make these assumptions, then you can't do anything." (Waldrop, 1992, 142) Although behavioral economics is making inroads, the situation in economics might be called a "far from reality condition."

Soros's theory is based on his experience as a financial manager. As a result of his work, he was quite aware of inefficiencies in markets. He saw human beings not as efficient information processors or rational actors but rather as acting based upon bias and

incomplete information. He found that biases could exist in the market as a whole not just for minutes or hours but for weeks, months, or even years. Indeed in the case of political or social systems gaps between perception and reality can last for decades. (Soros, 1991) Soros credits his theory with enabling him to become perhaps the most successful investor of recent times. Furthermore, his theory helped him to anticipate and to influence the collapse of the Soviet empire.

One would think this new theory would attract great attention. It is more general than the previous theory because it can be applied to political and social systems as well as to economics and finance. It is more detailed than the previous theory because it explains how markets do or do not go to equilibrium. And it enables better predictions, as illustrated by the superior record in financial management.

However, people often say that the propositions in reflexivity theory are widely known and understood. Apparently, what is happening is that people are using common sense as the reference frame to evaluate the new theory. This is not the way science advances. Common sense is an unreliable reference frame for three reasons:

1. Different people have different views on what common sense is.
2. Common sense changes over time.
3. Common sense is not clearly stated or documented.

Instead, the appropriate reference frame for evaluating a new theory is to compare it with the old or accepted or well-tested theory.

What would economics look like if beliefs in perfect information, rationality, and equilibrium were replaced with bias, interaction between cognition and participation, gaps between perception and reality, disequilibrium, and boom and bust cycles? See Table 4.

Conclusion

Soros's theories expand finance and economics to include the perceptual bias of participants. He also suggests a way to anticipate major political changes. Reflexivity theory provides links between cybernetics and economics, finance, and political science. Reflexivity, which can be thought of as positive feedback between cognition and participation, can be found in other social science fields as well.

References

Dahlem, Stephan and Christof Trauffer. "Soros versus Markowitz: How Asset Management Differs." A paper prepared for a doctoral seminar at the University of St. Gallen, St. Gallen, Switzerland, January 2005.

Lefebvre, Vladimir. *Algebra of Conscience: A Comparative Analysis of Western and Soviet Ethical Systems*. Boston: Reidel, 1982.

Markowitz, Harry M. "Portfolio Selection," *Journal of Finance*, Vol. 7, No. 1, 1952, pp. 77-91, 1952.

Mueller, Karl. *The Epigenetic Research Program: A Transdisciplinary Approach to the Dynamics of Knowledge, Society and Beyond*. Vienna, Austria: Institute for Advanced Studies, Sociological Series No. 24, 1998.

Soros, George: *The Alchemy of Finance: Reading the Mind of the Market*, Chichester: Wiley, 1987.

Soros, George. *Underwriting Democracy*. New York: Free Press, 1991.

Stein, Jess. (ed.). *The Random House Dictionary of the English Language*. New York: Random House, 1968.

Umpleby, Stuart A. "Cybernetics of Conceptual Systems." *Cybernetics and Systems*, 28/8: 635-652, 1997.

Von Foerster, Heinz. "On Constructing a Reality." Originally published in 1973, reprinted in *Understanding Understanding: Essays on Cybernetics and Cognition*. New York: Springer-Verlag, 2003.

Von Foerster, Heinz and Bernhard Poerksen. *Understanding Systems: Conversations on Epistemology and Ethics*. New York: Kluwer, 2002.

Waldrop, Mitchell. *Complexity: The Emerging Science at the Edge of Order and Chaos*. New York: Touchstone, 1992, p. 142.

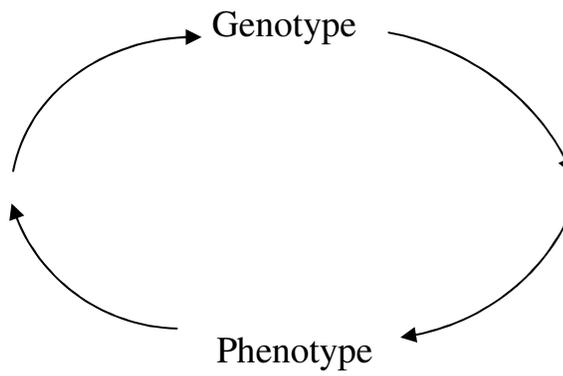


Figure 1. Karl Mueller's epigenetic theory

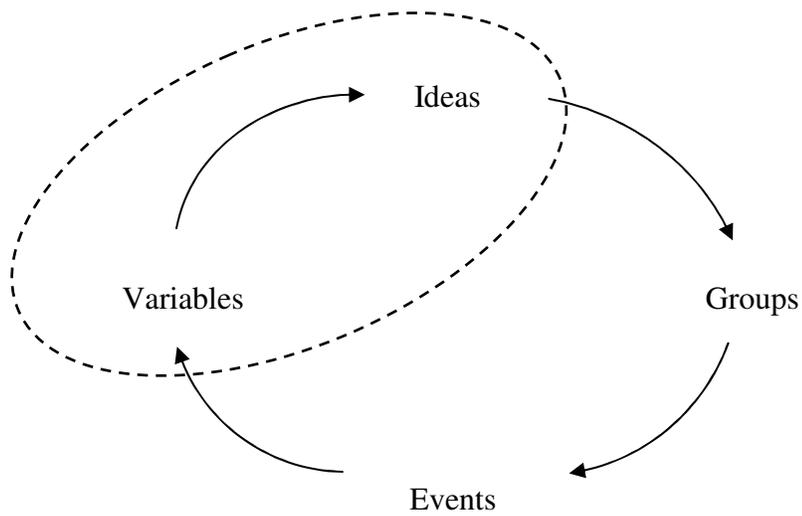


Figure 2. A reflexive theory operates at two levels

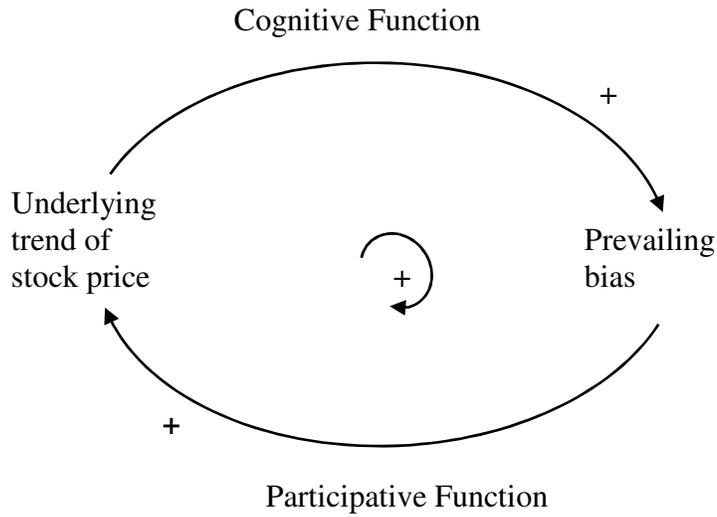
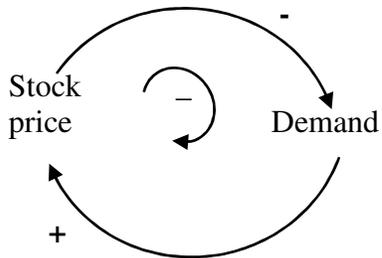


Figure 3. The two functions in reflexivity theory

Equilibrium Theory



Reflexivity Theory

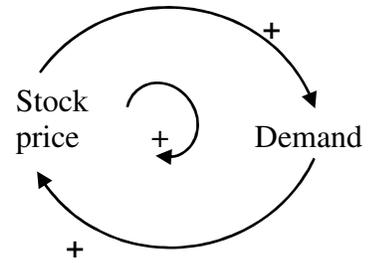


Figure 4. Equilibrium theory assumes negative feedback; reflexivity theory observes positive feedback

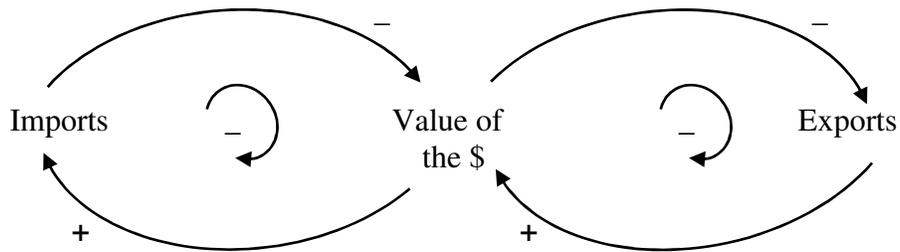


Figure 5. The currency market according to equilibrium theory

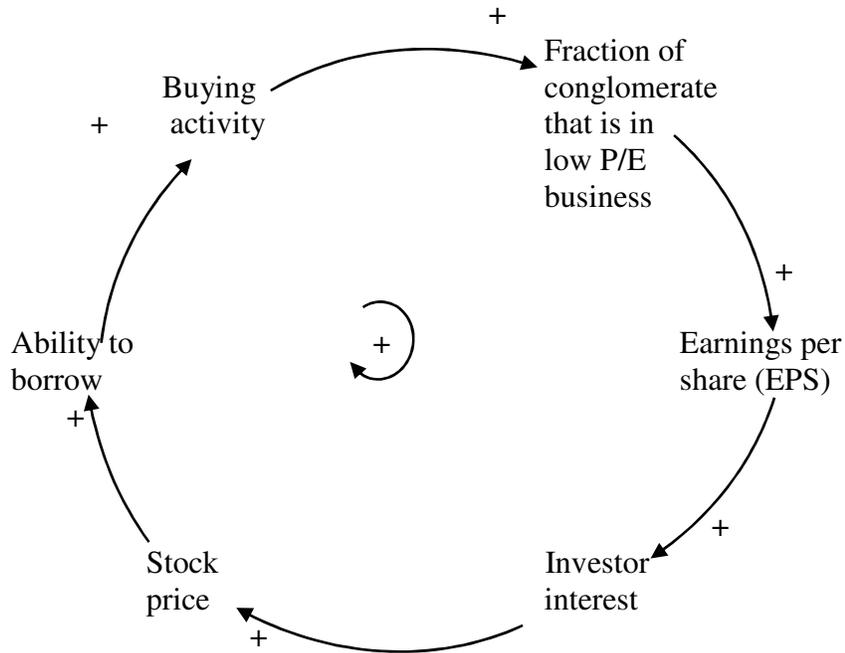


Figure 7. The conglomerate boom, variables

Table 1. The conglomerate boom, ideas

Conventional View

Rising EPS means the company has found the secret of good management

Reflexive View

Rising EPS is an indicator that the character of the company has changed from high tech to consumer goods and a high P/E ratio is no longer justified

Table 2. The conglomerate boom, groups

- Corporate managers who buy other companies
- Investors who believe in something new and foolproof
- Investors who use Reflexivity Theory

Table 3. The conglomerate boom, events

- A high tech company with a high P/E ratio begins to diversify.
- It buys consumer goods companies with low P/E ratios.
- As earnings accelerate, the price of the conglomerate rises.
- A high stock price means greater ability to borrow.
- The conglomerate borrows to buy more consumer goods companies.
- Earnings per share continue to grow.
- Investors eagerly buy more stock.
- Eventually people recognize that the character of the company has changed and a high P/E ratio is not justified.
- The stock price drops dramatically.

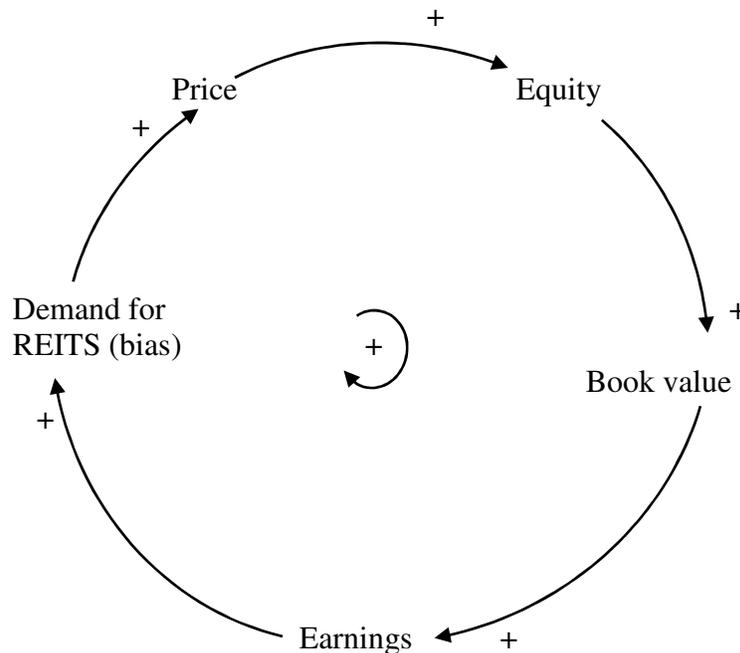


Figure 8. Real Estate Investment Trusts (REITS)

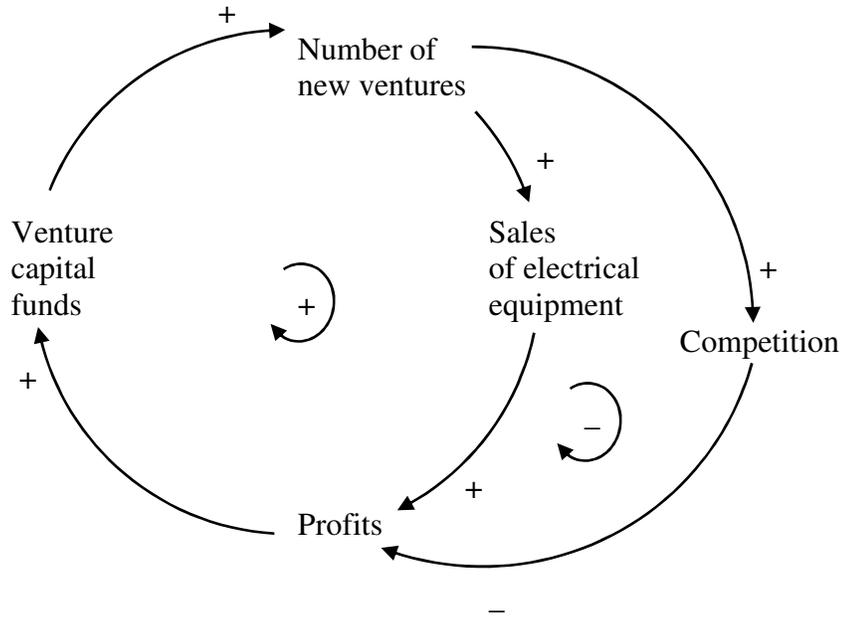


Figure 9. The venture capital boom

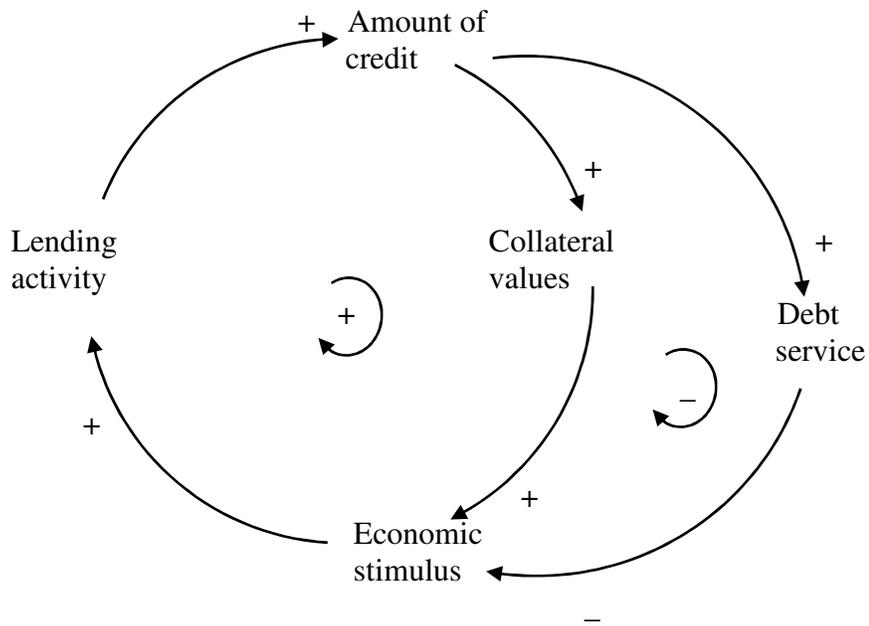


Figure 10. The credit cycle

Table 4. Two Theories of Economics

Equilibrium Theory

Information becomes immediately available to everyone

People are rational actors

Economic systems go quickly to equilibrium

Scientists should build theories using quantifiable variables

A theorist is outside the system observed

Theories do not alter the system described

Reflexivity Theory

People act on incomplete information

People are influenced by their biases

Social systems display boom and bust cycles

Scientists should use a variety of descriptions of systems (e.g., ideas, groups, events, variables)

Observers are part of the system observed

Theories are a means to change the system described