



## Equilibrium Versus the Invisible Hand

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**Abstract.** Twentieth century equilibrium modeling depicts an end state toward which an economy tends, whereas the invisible hand, as Adam Smith depicted it, suggests an economy continually progressing as an increased division of labor is produced by growing markets. Thus, there is an inherent tension between the concepts of an equilibrium outcome versus the invisible hand process. The paper discusses different concepts of equilibrium, and relates entrepreneurship to the invisible hand. The paper concludes that the invisible hand concept provides a more fruitful framework for economic analysis than the twentieth century equilibrium framework.

### 1. Introduction

Two concepts that play a central role in economics are those of equilibrium and the invisible hand. Equilibrium is that state toward which an economy is pulled by economic forces, and the invisible hand refers to those forces that pull the individuals in an economy. Seen this way, the two concepts are consistent with each other, and even jointly necessary to have a complete understanding of the way an economy works. How could an economy tend toward equilibrium without forces that pull it there? Looked at the other way, if the invisible hand, as described by Adam Smith, is leading the economy in a systematic direction, the path along which the invisible hand leads the economy ends at an economic equilibrium. The desirable outcome that Smith argued is produced when individuals are led by an invisible hand is, in the framework of twentieth century economics, a competitive equilibrium. Each concept points toward the other.

While the two concepts are complementary, there is an inherent tension between them, because equilibrium suggests the result of an economic process, while the invisible hand suggests the process itself. One does not necessarily exclude the other, but the developments of mainstream economics in the twentieth century have focused almost entirely on deriving a more precise and rigorous description of the conditions of equilibrium, leaving the study of the invisible hand process in comparative neglect. Models that study these equilibrium conditions typically assume complete information on the part of all market participants and a condition of zero economic profit, which eliminates two important factors that drive the invisible hand process. Thus, the assumptions of equilibrium models not only neglect to examine the market process, but rule out important aspects of it by assumption. This neglect of the market process has obvious implications for the study of the market forces that constitute what Adam Smith referred to as the invisible hand, but if the two concepts are

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as interconnected as suggested above, it also means that the economist's comprehension of concept of equilibrium has suffered as well.

Does this tension between these two concepts really exist? In part, it depends upon how one defines the concepts of equilibrium and the invisible hand. As the paper explains, both concepts can be defined differently, and viewed in different ways. This paper makes no attempt to find the best definition for either concept, or attach any kind of definitive meaning to the terms. Rather, after examining different ways in which the concepts can be understood, the paper argues that the way that they actually are understood by most economists at the end of the twentieth century places them in an almost adversarial position. Economic theory at the end of the twentieth century has accepted the tenets of equilibrium over the invisible hand, and this development of economic theory has significant implications for economic policy. Definitional matters will be discussed below in order to clarify what is meant by the two concepts, but they are of secondary importance. The key argument of the paper is that the theoretical emphasis on equilibrium over the invisible hand has important policy implications.

## **2. Twentieth century equilibrium economics**

The development of twentieth century equilibrium economics began late in the nineteenth century with the discovery of the concept of marginal utility in independent works by Menger, Jevons, and especially Walras, and quickly became the centerpiece of economic theory with the publication of the first edition of Alfred Marshall's *Principles of Economics* in 1890. Economic theorists, trying to make economics more scientific, adopted the mathematical techniques of physics, resulting in an emphasis on equilibrium, partly because it conformed with the available mathematical tools, and partly because the equilibrium framework provided an elegant description of the condition toward which the economy tended. Economic theory made great strides early in the twentieth century, armed with new tools of analysis produced within this equilibrium framework.

The development of this equilibrium framework was well along in the 1930s when a more practical reason for emphasizing equilibrium arose. With the world economy in recession, economists were grasping for explanations for the prolonged economic downturn and the apparent failure of the invisible hand, when Keynes (1936) explained how an economy could remain at an under-employment equilibrium, and offered suggestions for reequilibrating the economy at full employment. Thus, from a practical policy standpoint, the main issue in economics became how an economy apparently at a stable equilibrium near full employment could become destabilized and eventually arrive at an underemployment equilibrium, and what policy tools could be utilized to stabilize the economy again at a full employment equilibrium.

By the 1960s the most important policy issues in economics were analyzed entirely within a static equilibrium framework. Macroeconomics was dominated by the issue of how to maintain an equilibrium with both low inflation and low unemployment, while microeconomic policy was based on the foundation of neoclassical welfare economics that emphasized the static optimality conditions of competitive equilibrium, and attempted to design policies to move the economy toward that unique Pareto optimum. Bator (1957) and

Graaff (1957) give good expositions of the welfare economics framework upon which a theory of market failure was developed, and optimal public policy within this framework meant correcting market failures so that the economy could move toward the welfare-maximizing Pareto optimum. Despite the wide gulf that separated macroeconomics from microeconomics, both had the common methodology of identifying an optimal static equilibrium, and both sought to identify policies that would create that equilibrium. Even when the economy was not at the optimal equilibrium, its condition was described in equilibrium terms, as a Keynesian under-employment equilibrium in macroeconomics, or as a Pareto-inefficient allocation in microeconomics, because of monopoly, externality, or other causes.

Economic theory has advanced significantly since the 1960s, but retains its equilibrium emphasis. Modern growth theory, begun by Solow (1956), uses the same equilibrium framework to describe a growing economy, and the new growth theory, discussed further below, retains this equilibrium framework. Even the Austrian school of economics, which more than other schools of thought emphasizes the market process that leads to equilibrium rather than the state of equilibrium itself, still relies on the notion of equilibrium to describe where the process leads. In the most complete and systematic treatments written on Austrian economics, Mises (1966) and Rothbard (1962) both describe an “evenly rotating economy” exhibiting the properties of equilibrium.<sup>1</sup> Thus, despite the existence of many different schools of economic thought, by the end of the twentieth century the concept of equilibrium had become the foundation upon which most of economic theory was supported. This focus on equilibrium has, in turn, clouded the economist’s understanding of the invisible hand process described by Adam Smith.<sup>2</sup>

### 3. The concept of equilibrium

In the competitive model of neoclassical economics, equilibrium exists when all prices are set such that they just clear the market, so for all markets the quantity supplied equals the quantity demanded.<sup>3</sup> This neoclassical competitive model makes a number of unrealistic assumptions in its depiction of equilibrium, including that there are a large number of small firms in all industries, that each producer in an industry produces a homogeneous product, that all resources are freely mobile, and perhaps most important for present purposes, perfect knowledge on the part of all market participants.<sup>4</sup> These assumptions assure that the economy will always remain in equilibrium, for if it were out of equilibrium, that would produce a profit opportunity, and perfect knowledge would mean that it would be instantly observed, and seized and acted upon immediately.<sup>5</sup> Thus, if the extreme assumptions of the neoclassical model of pure competition are met, equilibrium is the only possible state of affairs.

Part of the elusiveness of the concept of equilibrium is that even those who are firmly convinced of the merits of equilibrium modeling recognize that the economy itself is not always in equilibrium, even if their models are. Rather, the economy tends toward equilibrium, and the proponents of equilibrium modeling argue that the forces pulling it there keep it close enough that the state of the economy can be understood by understanding the properties of the equilibrium toward which it tends. This is far from self-evident, because it may be that by ignoring the forces that push an economy toward equilibrium and

focusing on the properties of equilibrium instead, one leaves out key components of the equilibrating process. Nevertheless, the properties of equilibrium still remain important, and casual observation suggests that the economy does remain close to equilibrium following the neoclassical definition, because most markets come close to clearing most of the time. Conditions of excess supply or excess demand are so rare (except when caused by government intervention) that they can be considered anomalies. This equilibrium outcome tends to be produced despite the fact that it is obvious that the neoclassical assumptions regarding competitive equilibrium are not met.<sup>6</sup>

The assumption of perfect information is especially relevant to understanding the market process. Under what conditions would a model economy in which economic actors had less than perfect information actually be in equilibrium? That depends upon how one defines equilibrium. Hayek (1949), Hahn (1984), and Lewin (1997) define economic equilibrium as a condition in which the plans of all individuals in the economy are mutually compatible.<sup>7</sup> Stiglitz (1987:28) defines equilibrium differently, as a condition "...where no economic agents have an incentive to change their behavior." Under many conditions, including the neoclassical model of pure competition, there will be no practical difference between these two concepts of equilibrium, in the sense that a situation that satisfies one definition will also satisfy the other. However, there are conditions under which the economy could be in equilibrium following one definition but not the other, and a discussion of these conditions lends some insight into the invisible hand process.

Kirzner, who emphasizes the equilibrating role of entrepreneurship, takes a view like Stiglitz on equilibrium, although he begins with the Hayekian idea. Kirzner (1979:110) says, "Equilibrium simply means a state in which each decision correctly anticipates all other decisions." Left there, Kirzner and Hayek are completely consistent. In the next sentence, Kirzner continues, "In such a situation, decision making involves nothing more than the calculation of the optimum course available to the chooser, within the constraints imposed by the correctly anticipated decisions of others. No room exists for the entrepreneurial element." This must mean that there are no unexploited profit opportunities, because otherwise there would be room for entrepreneurship, so Kirzner's vision of equilibrium is consistent with the Stiglitz definition. Regardless of whether individual plans are mutually consistent, the existence of an unexploited entrepreneurial opportunity rules out calling this situation an equilibrium, according to Kirzner.

Because unexploited profit opportunities always provide an incentive for people to change their behavior in order to capture the profit, the existence of unnoticed profit opportunities would be inconsistent with equilibrium as Kirzner or Stiglitz defines it, even if everybody's plans were mutually consistent. An economy could be in Hayekian equilibrium, in the sense that all individual plans are coordinated and everyone correctly anticipates the actions of others, and yet not be in equilibrium as Stiglitz and Kirzner envision the concept, if there are unnoticed profit opportunities that provide an incentive for people to change their behavior. In an economy with perfect information, the two definitions of equilibrium would be the same. However, both Kirzner and Stiglitz have emphasized information or knowledge problems as important aspects of the economy,<sup>8</sup> so it seems implausible that either would want to assume, in general, that all economic agents were perfectly informed. Harper (1996) eloquently explains why there will always be some unexploited profit opportunities in an

economy, and based on similar reasoning, Kirzner has explicitly stated that an economy never can actually arrive at equilibrium.<sup>9</sup>

Hayek (1945) too has emphasized the role of the market in effectively utilizing information that is not generally known, so these two different concepts of equilibrium do not seem to stem from the different assumptions that economists (these economists, anyway) want to make about whether all information is generally available to all economic actors. Rather, all would acknowledge that an economy may be in a situation where the plans of all economic actors are consistent with each other, yet there remain undiscovered profit opportunities. Hayek, Hahn, and Lewin would call this an equilibrium, but Stiglitz and Kirzner would not. Thus, unexploited profit opportunities are consistent with an economy in equilibrium, if Hayek's definition of equilibrium is accepted, but not if equilibrium is defined following Kirzner.<sup>10</sup> The distinction is worth making because the paper argues below that unexploited profit opportunities, and the responses of entrepreneurs to those opportunities, are a key element in the invisible hand process. Using Kirzner's definition of equilibrium resolves much of the tension between equilibrium and the invisible hand, but Kirzner's view is probably different from the concept of equilibrium that most economists envision. The previous sentence hedges because if perfect information is assumed, the neoclassical, Hayekian, and Kirznerian views amount to the same thing, and because of this, many economists may not have thought about the implications of imperfect information on equilibrium in any detail. But it is probably a safe conjecture that if imperfect information about entrepreneurial opportunities were introduced into the neoclassical framework, most economists would then envision equilibrium as closer to Hayek's description than Kirzner's.

Another reason to use Hayek's definition of equilibrium rather than Kirzner's is because it more closely approximates the actual state of the economy. It is reasonable to view a healthy economy, in which markets clear without excess supply or demand, as approximately in equilibrium, in the Hayekian sense that people's plans are consistent with one another. Furthermore, Hayek's definition fits better with the neoclassical depiction of equilibrium. All of these definitions identify the same thing when an economy is characterized as having perfect information. However, as Harper (1996) notes, there are always unexploited profit opportunities waiting to be discovered, and the discovery of some leads to the creation of others, Holcombe (1998) argues. Thus, the way that Kirzner and Stiglitz define equilibrium implies that the economy will never be close to equilibrium, and may even be drifting farther away if new profit opportunities are arising faster than they are being acted upon, even if everyone's plans are mutually consistent. Twentieth century economics has focused on the characteristics of economic equilibrium, and when imperfect information is introduced, the essence of equilibrium models of all types is better captured by Hayek's notion of equilibrium.

#### **4. Entrepreneurship and the invisible hand**

As the previous section suggests, there are subtle differences in the way in which economists understand the concept of equilibrium. This is even more true of the concept of the invisible hand. Whereas the concept of equilibrium has been extensively and rigorously analyzed in the twentieth century, the invisible hand has not. At its most basic level, the invisible

hand refers to those forces that guide the economic behavior of those in an economy. In equilibrium, many of those forces have been assumed away, leaving the invisible hand outside the domain of much of economic analysis. In an equilibrium setting, the invisible hand might be thought of as those forces that keep people from straying from equilibrium, but as is argued below, this meaning is much too restrictive, and is not in the spirit of what Adam Smith had in mind when he popularized the phrase centuries ago.

The invisible hand concept arises from the incentives that are provided in a market economy for efficiency-enhancing actions, but those actions can be divided into two different categories. In one category are the maximizing actions that are a part of neoclassical economics. The other category consists of entrepreneurial actions. In the neoclassical framework, individuals maximize utility by allocating their endowments (which in a production economy includes their labor and human capital) over a given opportunity set. Firms maximize profits by choosing the optimal quantity and mix of inputs that will be combined in a production function to generate output. Profit maximization for firms must be a shorthand description, because firms do not act as independent entities. Rather, people act. In a neoclassical setting, profit maximization means that the firm's decision-makers choose the optimal quantities of inputs and then produce the maximum possible amount of output given the inputs employed.

In this neoclassical setting, people who run firms must be good managers, but there is no room for entrepreneurial activity. Good management means choosing the right combination of inputs, and adjusting when changes in relative prices dictate changes in the input mix. Good management also means eliminating waste so that workers do not shirk and so that other inputs are not underutilized. Good management is not a trivial task, but the optimal course of action for the firm is always dictated by market conditions and by the firm's production function. Market prices reveal supply and demand conditions for the firm's inputs and output, and the production function reveals the most efficient way of combining inputs to produce output. Incentives facing both firms and individuals pull them toward equilibrium, and in equilibrium firms, behaving optimally, are just able to make normal profits. There is no room for bad management, because firms that do not maximize profits suffer losses and are driven out of business by those that do. The role of the invisible hand in equilibrium is to keep economic actors from straying away from equilibrium. Even in a dynamic equilibrium model, the invisible hand merely keeps economic actors from straying away from the equilibrium path as the economy grows. Much like a sheep dog watching over a herd of sheep, in equilibrium models the invisible hand keeps people from straying away from the general equilibrium, but does not lead anyone anywhere.<sup>11</sup>

If Adam Smith really meant that people were being led by an invisible hand, rather than being held in place by it, there is an inherent tension between the concept of equilibrium and Adam Smith's concept of the invisible hand. Smith's *Wealth of Nations* makes it clear that he had in mind the invisible hand leading people toward new activities, and not just pushing them back toward an equilibrium allocation of resources. Smith began his monumental treatise with a discussion of how an increasing division of labor increases the productivity of the economy and enhances the wealth of nations. If Adam Smith is the father of economics, and his *Wealth of Nations* is the first real treatise on economics, then the first lesson of economics is that the division of labor is limited by the extent of the

market. Smith uses the example of a pin factory to show how much more productive people can be when they specialize in narrow tasks, and he argues that as markets grow, increased specialization becomes possible, leading to ever-increasing productivity. But this increasing specialization amounts to more than just making sure inputs are being used efficiently, or that the right combination and quantity of inputs are being employed. An increase in the division of labor requires the entrepreneurial insight to envision how a job done by one person can be subdivided into different tasks, changing the nature of the production function as the division of labor is increased. This may require new capital goods and new production processes. It does not mean doing the same things better, it means doing different things that create more value than the previous way of doing things. It requires entrepreneurship.

As people who run firms look for ways to enhance their profits, Smith emphasizes not the management aspects of profit maximization but the entrepreneurial aspects. Rather than looking for the most efficient way of combining a given set of inputs using a given production function to produce a given output, as a good manager would do, those who run firms engage in the entrepreneurial actions of looking for better inputs, different methods of production, and new and improved outputs. They look for ways to increase the division of labor, and this requires entrepreneurial insight beyond that required for management. Of course, profit maximization is enhanced by good management, but without entrepreneurship, firms in a growing economy will stagnate and die as they are surpassed by more entrepreneurial firms.

In the neoclassical model, the essence of what those who run firms do is management, but in Smith's vision, the essence of what those who run firms do is entrepreneurship. In the neoclassical model, the essence of what the economy does is sustain (or fail to sustain) an equilibrium. In the Smithian model, the essence of what the economy does is grow. The invisible hand leads people, pursuing their own interests, to do what is best for the entire economy, but in Smith's vision, the invisible hand does not pull people toward equilibrium, but rather leads them toward activities that enhance the wealth of nations. To do this requires entrepreneurship.

Within the neoclassical framework, one might picture the invisible hand as holding economic agents close to equilibrium, but this is not in the spirit of Adam Smith's depiction of the economy as an engine of wealth generation. Smith talked about a growing economy characterized by an ever-increasing division of labor, and an economy in which the invisible hand led to new ways of doing things. Entrepreneurship and economic progress are key components of Smith's vision of the economy, and the invisible hand concept is, in this sense, completely at odds with the neoclassical equilibrium framework. The concept of the invisible hand could mean different things to different economists, and with the preoccupation with equilibrium in twentieth century economics, economists may think of the invisible hand as the equilibrating force in the economy. But this section argues that the invisible hand is much more than this, and mainly consists of those forces that push individuals to seize entrepreneurial opportunities, and that foster economic progress. In this sense the invisible hand may play a disequilibrating role, as argued by Schumpeter (1934), as entrepreneurial discoveries upset the previous plans of those in the economy, but open up new opportunities for further entrepreneurship and further progress. Whether the invisible hand is equilibrating or disequilibrating is considered in the next section, but the primary

point that this section makes is that Adam Smith was describing an invisible hand that led people to engage in entrepreneurship and to promote economic progress, not an invisible hand that holds people close to equilibrium.

## 5. Entrepreneurship and equilibrium

Whether the invisible hand, thus envisioned, is at odds with the concept of equilibrium depends in part on how one views the concept of equilibrium. Following Kirzner's idea that equilibrium exists only when there are no unexploited profit opportunities, entrepreneurship will be equilibrating because it moves the economy toward that condition where no profit opportunities remain.<sup>12</sup>

Following the Hayekian definition of equilibrium, if entrepreneurial acts are unanticipated, entrepreneurship will upset the coordination of plans of those in the economy, and at least initially, will be disequilibrating. Whether one views entrepreneurship as equilibrating or disequilibrating thus depends at least in part on which definition of equilibrium one uses.

There is some ambiguity in the way Kirzner describes disequilibrium. After discussing equilibrium, Kirzner goes on to note, "In contrast, a disequilibrium market means a state of affairs in which decisions do not correctly anticipate all the other decisions being made. Clearly, scope exists here for exercise of the entrepreneurial alertness to opportunities for more advantageous decisions than those currently embraced." Kirzner describes the situation where people's plans are not coordinated, as in Hayek's concept of equilibrium, but following his own concept of equilibrium, he should also include the case in which everyone correctly anticipates everyone else's decisions and yet there are still unnoticed and unexploited entrepreneurial opportunities. The first sentence of Kirzner's definition of disequilibrium corresponds with Hayek's definition, but the second qualifying sentence corresponds with Stiglitz's. Which definition of equilibrium one accepts becomes relevant when considering the conditions under which entrepreneurial activity can be disequilibrating.<sup>13</sup>

While this might appear to be a technicality or a definitional matter, differentiating these two definitions of equilibrium helps illustrate the relationship between the invisible hand concept and the concept of economic equilibrium. Using Hayek's definition, equilibrium is that destination toward which the invisible hand is always pulling an economy, given what economic actors know at the time. But with Kirzner's definition, entrepreneurial opportunities might remain unnoticed, so everyone's plans are compatible and the economy, in Hayekian equilibrium, is not being pulled toward Kirznerian equilibrium. An entrepreneurial discovery could then produce incompatibilities as the entrepreneur acts on it, which would be disequilibrating under Hayek's definition of equilibrium but equilibrating under Kirzner's. If one makes the neoclassical assumption of perfect information on the part of all market participants, whenever any unexploited profit opportunities appear, everyone knows about them, and the market rapidly equilibrates using both Hayek's and Kirzner's definitions. Of course, perfect information also means everyone knows the plans of everyone else, enabling them to perfectly take them into account with regard to their own actions, making equilibrium a tautological concept.<sup>14</sup>

Using Kirzner's definition of equilibrium, entrepreneurial opportunities cannot exist in equilibrium, but using Hayek's definition, unnoticed profit opportunities can exist in an



equilibrium condition when everyone's plans are mutually consistent. When information is costly to obtain, or when there is ignorance so that people do not even realize they are uninformed, equilibrium can coexist with unexploited profit opportunities. Under the often-used assumption that all economic agents have full information, the distinction between these two concepts of equilibrium disappears, but key elements of the invisible hand process are assumed away with the full information assumption. Thus, identifying the relationship between the concepts of equilibrium and the invisible hand requires a clearer notion of the concept of equilibrium than would be needed in the neoclassical full information setting. But subtle distinctions are unnecessary to identify the fundamental tensions between the concepts of equilibrium and the invisible hand. Equilibrium modeling, as it is done at the end of the twentieth century, rules out the entrepreneurial actions that are the essential part of the invisible hand.

## 6. Equilibrium versus progress

The emphasis on equilibrium in twentieth century economics has tilted the interests of the economics profession toward the study of the outcomes of economic processes rather than the processes themselves, and this has led to the neglect of the study of the causes of economic progress. Surely the title of Adam Smith's book, *The Wealth of Nations*, indicates his emphasis on the causes of progress, and one of the most-discussed economics books in the late 1800s, just before the economics profession was transformed by the marginal revolution, was Henry George's *Progress and Poverty*. But the development of equilibrium economics changed the focus of the economics profession away from the causes of progress, and toward the causes of stability.

The foundation for modern growth theory is a seminal paper by Solow (1956), which employs the equilibrium framework of neoclassical economics. In that framework, output,  $Q$ , is a function of capital,  $K$ , and labor,  $L$ , following the general form  $Q = f(K, L)$ . Within this framework, economic growth means an increase in  $Q$ , and  $Q$  can be increased either by increasing inputs  $K$  and  $L$ , or by improving productivity which changes the functional form  $f$  of the production function. This framework naturally suggests that to produce economic growth, the quantity of inputs should be increased, leading economic policy advisors to recommend capital investment and investments in human capital to enhance  $K$  and  $L$ , to produce more  $Q$ . In addition, technological progress could result in a change in  $f$ , meaning that more output could be produced with a given amount of inputs. As Krueger (1993) has noted, policy advisors, schooled in neoclassical growth theory, suggested that rather than leave development policy to the uncertainties of the market, LDCs should employ central planning to ensure that resources were directed toward capital and labor investment, and the employment of appropriate technology, with terrible results. The problem is that real economic growth has very little to do with increasing inputs and outputs within a particular production function, but is at its foundation entrepreneurial. Real economic growth takes place through an increasing division of labor, which results in new types of inputs and new types of output.

While in a logical sense neoclassical growth theory is correct, it has the two faults of, first, leaving out innovation and entrepreneurship as the real engine of growth, and second,

of describing growth as a very different process from actual economic growth. Growth does not result from more capital, but from different kinds of capital. Economic growth does not result in an increased amount of some homogeneous  $Q$  being produced, but rather results in different types of  $Q$ . While national income accounting is useful for measuring some things, usually in the short run, it is misleading to think of economic growth as being characterized by an increase in GDP. The change in the nature of output is much more significant than the change in the quantity of output.

Consider some simple examples. Workers can excavate with shovels, but once each worker has a shovel, there will be little change in labor productivity due to increasing the number of shovels. But if the shovels are replaced (or supplemented) by a backhoe, labor productivity will increase. This change in the nature of capital requires someone to have the insight that backhoes can be profitably produced, and even if backhoes are readily available on the market, requires the insight that a particular job could be better done with a backhoe. Output can be increased some by increasing  $K$  and  $L$ , but most of the increase in output comes from a change in the nature of  $K$ , not an increase in its quantity. Henry Ford's introduction of the assembly line into automobile manufacturing is another example of a change in the nature of  $K$ , as is the substitution of solid state components for vacuum tubes in electronic devices.

One can see similar changes in the nature of  $Q$ . Automobiles are very different now than they were only a few decades ago, and computers have changed even more than automobiles. The quantity of both items has also increased, but changes in the characteristics of output contribute at least as much to economic progress as changes in the quantity of output. This is even more clear over longer periods of time. Compare the roads, the aircraft, and the telephone system of 1950 to those half a century later. Even the characteristics of food, and in particular, food packaging, have changed substantially. Perhaps the most dramatic improvements in output have come in health care, where conditions that were life-threatening a century, or even half a century, ago are now remedied by routine treatments. Increases in health care output have come not from building more hospitals and training more doctors, but from qualitative improvements in the nature of health care. By trying to analyze economic growth within a production function framework where growth is represented by an increase in  $Q$ , the essential characteristics of growth are lost. In the production function framework, growth looks like an increase in the quantity of output, but the essence of growth is a change in the qualitative nature of inputs and outputs more than just a change in their quantities.

Economic growth occurs because the invisible hand is pulling individuals in an economy to engage in entrepreneurial insights that change the nature of inputs and outputs. The result is called growth by economists, but it might be better to refer to the process as economic progress. The economy may grow, in the sense that national income accounts measure increasing income, but the changes that occur because of the changing nature of production and the increased division of labor result in economic progress, not just growth. Individuals, led by an invisible hand to engage in entrepreneurial acts, produce this progress. When looking at the theory of economic growth, the inherent tension between equilibrium and the invisible hand becomes clear.

## 7. National income accounting and economic policy

National income accounting was developed in the 1920s to help make economic analysis more scientific, and to help economic science to produce better economic policy.<sup>15</sup> The reasoning behind the development of national income accounting was straightforward. In order for economics to go beyond merely describing the economy, better measurement of economic activity was required in order to develop testable hypotheses, as in other sciences. In addition, if economic policy is to be used to improve the performance of the economy, that performance must be measured so that performance indicators can, first, show in what areas economic performance can be improved, and second, show whether economic policies have had the anticipated effects on performance. The performance of the economy can be measured in many different ways, but the key indicator of economic growth has been Gross National Product, and more recently, Gross Domestic Product. Both share the characteristic of measuring the dollar value of the economy's total output of goods and services.

National income accounting may be partly to blame for the economist's orientation of looking at economic growth as an increase in total output. By measuring output in the form of aggregate money values, such as with GDP, it leads economists toward thinking that growth consists of producing more of what is already being produced, rather than consisting primarily of qualitative changes in goods and services. GDP offers a single metric for output in a manner similar to the production function view of growth. Similarly, representing economic activity in a production function format, where  $Q = f(K, L)$ , suggests that growth means producing more  $Q$  by increasing inputs  $K$  and  $L$ . Technological advances might also modify  $f$ , allowing more  $Q$  to be produced with the same amount of  $K$  and  $L$ . While  $Q$  is not the same as GDP,<sup>16</sup> both have the common feature that economic growth is measured by an increase in a homogeneous measure of output, with no account taken of possible changes in the composition of output. In fact, new and changing goods are seen as obstacles to accurate measurement when trying to compute changes in real GDP, rather than as fundamental components of what is being measured.

There are a number of stories about distortions in the types of goods produced in the former Soviet Union as a result of their measuring output in physical terms rather than in terms of value. When the output of factories that produced roofing tin was measured in terms of square feet of output, the sheets of metal were so thin that they would be damaged by rain. Seeing the problem, the authorities changed the metric to measure output in terms of tons of roofing metal produced, but then the sheets were so thick and heavy that they created structural problems for the buildings on which they were used. Similar stories tell about lots of large nails, but no small ones being produced when nail output was measured in tons. When the metric was changed to numbers of nails, there were lots of small nails, but no large ones. These examples show how economic activity can be affected by the way in which economic output is measured.

The use of GDP as an indicator has many well-known problems in this regard. A better measure would be total consumer surplus produced by the economy, but this would be difficult to compute. Because GDP measures market value, it ignores the inframarginal value of goods and services. Thus, if a good has an inelastic demand, for example, an increase in the quantity of output will result in a decline in the market value of the output,

causing measured GDP to decline despite the increase in output. This problem is well-known, but another more subtle problem is that by representing output as a homogeneous single-dimensioned variable, such as value of output (GDP) or quantity of output ( $Q$ ), this leads those designing policies to foster economic growth toward thinking that the essence of economic growth is producing more of what is already being produced. This in turn focuses on the managerial problems of increasing inputs and technology to enhance growth, rather than on the entrepreneurial problems of finding new markets, new goods, and new production processes. The way economic performance is measured has an effect on economic policy, and national income accounting may have further accentuated the twentieth century bias toward the concept of equilibrium, and may have contributed to the comparative neglect given the invisible hand.

## 8. Policy implications

The distinction between viewing the economy as in an equilibrium state rather than focusing on the invisible hand process is in one sense artificial, because the economy both equilibrates and stabilizes as it leads the plans of economic agents to be mutually consistent, and it promotes economic progress by providing the incentives and institutional structure for entrepreneurship and innovation. The two concepts are in this sense complementary. Yet the development of economic models in the twentieth century has focused on the equilibrium properties of the economy, almost to the exclusion of the entrepreneurial aspects of economic activity. This is more than just a theoretical point. Because economic theory has focused on the concept of equilibrium, economic policy has focused on factors that help generate Pareto optimal resource allocation rather than factors that encourage entrepreneurship and economic progress.

This is most evident in the area of macroeconomics. Keynesian macroeconomic policy focused on trying to manipulate aggregate demand in order to arrive at full employment with low inflation.<sup>17</sup> The emphasis was on arriving at a full-employment equilibrium as an end-state, rather than examining the forces that lead the economy to progress. Recent developments in macroeconomics have focused more on growth issues, but the equilibrium framework is explicitly retained, so the issue remains how to increase inputs in order to get more output. The literature, typified by Romer (1986, 1990) and Lucas (1988), recognizes the importance of human capital, including education and on-the-job training, and that technological advances are a key element. But within the production function framework, technological advances are the product of investment in research and development rather than of entrepreneurial insights. Romer (1990) explicitly allows for the possibility of new goods being developed, yet all within a production function framework that leaves out the role for entrepreneurial activity.

To the extent that this literature offers policy recommendations, it is to increase human and physical capital, and to produce technological advances through encouragement of research and development. While it is generally true that more inputs and better technology can produce more output, economic progress in the real world is mostly due to innovations and the application of entrepreneurial insights, not additions to physical and human capital. New growth models improve upon the old, but remain similar in their major shortcomings. They depict growth, but not the essential elements of economic progress.

If these policy recommendations are taken literally as a blueprint for generating economic growth, they are likely to generate poor policies that will inhibit economic progress. The former Soviet Union emphasized investment in human and physical capital, and the adoption of advanced technology, yet its poor economic performance led to the dissolution of the nation. A similar story can be told about centrally planned economies around the world. Clearly, providing the inputs of human and physical capital along with the promotion of technological advance was not enough in those cases. What was missing was the institutions that fostered entrepreneurship, which is the key to economic progress. Yet even the most contemporary economic growth models suggest that the types of policies followed by centrally-planned economies should lead to growth. As Krueger (1993) notes, these same types of recommendations were offered to less developed economies as a blueprint for economic growth, yet economies that chose to centrally direct resources to those areas that economic models suggested would be most productive ultimately languished. The bad advice those economies received came directly from theoretical models of economic growth that were firmly grounded in twentieth century equilibrium economics.

In contrast there is a more recent body of research on economic growth that leaves the equilibrium framework behind and looks instead at the institutional framework that promotes growth.<sup>18</sup> This literature finds that an institutional environment conducive to entrepreneurial activity leads to more economic growth, and conversely, that even when the inputs for economic growth are present in an economy, without the market institutions that promote entrepreneurial activity, an economy will not grow.

The distinction between equilibrium and the invisible hand is made as clearly in microeconomics as it is in macroeconomics. Much actual microeconomic policy is based on the framework of theoretical welfare economics that emphasizes the efficiency of a competitive equilibrium, and views deviations from competitive equilibrium as market failures. Thus, market concentration is viewed as undesirable, rather than as a sign that some firms have found better ways to satisfy the demands of many of the market's customers, and product differentiation is seen as a source of inefficiency rather than as evidence of economic progress.<sup>19</sup> In the competitive equilibrium framework that is the basis for policy recommendations, all economic profits have been competed away, and without the possibility of profits, there is no incentive for entrepreneurship. If a thought experiment is undertaken where the economy is placed in disequilibrium, equilibrating forces bring it back to the unique equilibrium depicted in the model. Depicting the economy as having a unique equilibrium rules out the possibility of allowing the invisible hand to lead people to engage in any innovative entrepreneurial activity. Arbitrage is possible within the general equilibrium framework, but not innovation.

In the late 1960s the Department of Justice brought suit against IBM for monopolizing the computer industry, and indeed IBM did have an overwhelming share of the market when the suit was initiated. The suit dragged on until it was dropped in the early 1980s, because IBM's market share had also dropped. By the early 1990s IBM had suffered such a loss of market share that some computer industry analysts were predicting that the company would go out of business. If the vantage point of equilibrium is replaced by the vantage point of the invisible hand, IBM's market share in the 1960s arose because of its innovation that allowed it to satisfy its customers, but the company's offerings stagnated when compared

to new computer manufacturers, again as the result of entrepreneurship that led to better products. In the late 1990s the scenario is being repeated again, as the Justice Department is pursuing Microsoft for monopolizing the same industry. These examples show that the policy implications one draws differ substantially depending upon whether one views the economy from the vantage point of equilibrium or from the vantage point of the invisible hand.

In the neoclassical equilibrium framework, competition requires homogeneous products, and product differentiation leads to inefficient resource allocation and excess capacity in firms.<sup>20</sup> Yet from the vantage point of entrepreneurship and the invisible hand, producers are always looking for ways to better satisfy their customers in order to increase their profits, and improving the characteristics of their products is a common method of competing for customers. From the vantage point of equilibrium, product differentiation should be discouraged as inefficient, and where it exists markets are not (perfectly) competitive, whereas from the vantage point of the invisible hand, product differentiation is one of the characteristics of market competition and the introduction of new products is one of the hallmarks of economic progress.

Neoclassical welfare economics identifies a unique, stable, Pareto optimal general equilibrium that provides the benchmark for economic efficiency. Public policy then tries to guide the economy toward this outcome. From the vantage point of the invisible hand, efficiency is not an outcome, but rather a process that encourages entrepreneurship and economic progress. It does not try to push the economy toward a unique point, because as Harper (1996) notes, new knowledge is always being generated by market participants, and one can never anticipate where that knowledge will lead the economy. Optimal policy is that which encourages the development of knowledge and the application of entrepreneurial insight to generate economic progress. A framework that offers a unique optimum, like the equilibrium framework, leaves out the possibility of economic progress.

This section on policy implications is intended to show that the differences between the equilibrium versus the invisible hand approaches to economics are more than just semantic, and that the models generate very different policy implications. With regard to monopoly, product differentiation, and even the underlying factors behind economic progress, these two vantage points on economic activity have quite different implications. The distinction is of more than just academic interest. It begins with the academic choice of how economists model the economy, but generally accepted economic models form the foundation for economic policy, which in turn determines how well the economy ultimately performs. Examining some policy issues shows that there is good reason to take seriously the competing visions of equilibrium versus the invisible hand.

## 9. Conclusion

The concepts of equilibrium and the invisible hand are consistent with each other, and indeed it is not possible to fully understand one concept without understanding the other. However, the concepts depict different aspects of economic activity, and the perspective one gets on the economy is affected by the concepts one uses for analysis. The focus of twentieth century economics has been on the conditions for economic equilibrium, and

twentieth century public policy reflects this focus. Some equilibria make better use of economic resources than others, and economic analysis has focused on removing sources of market failure such as externalities, public goods, and monopoly, and on arriving at a stable full employment equilibrium. The nature of equilibrium analysis naturally directs the analyst's attention toward arriving at a desirable end-state.

The invisible hand concept, in contrast, focuses on the ongoing and continuously evolving activities of the market. This focus on the market process naturally leads one to consider development and economic progress as key elements for economic policy. Ideally, the invisible hand will continue to lead an economy to ever-increasing economic well-being. The focus is on continual improvement rather than arriving at the best possible end-state. Adam Smith optimistically titled his book *The Wealth of Nations*, and in it argues that with appropriate policy, ever-increasing economic well-being is possible. The division of labor is limited by the extent of the market, Smith noted. Growing wealth and expanding markets have the effect of extending markets beyond their current bounds, leading to an increased division of labor and continued economic progress. Contrast this with the twentieth century Keynesian notion of underemployment equilibrium. The goal there is not growth or progress, but arriving at a full-employment end-state equilibrium.

While the concepts of equilibrium and the invisible hand are not inconsistent with one another, one gets a different view of the world, and different policy implications, by focusing on one or the other. The twentieth century preoccupation with equilibrium in economic models has led economic policies toward correcting inefficiencies rather than toward creating an environment for economic progress. In the end, one can see that this preoccupation with the concept of equilibrium has stood in the way of the operation of the invisible hand.

## Notes

1. Mises (1998:13) says, "...the state of equilibrium is a hypothetical concept only, although a concept indispensable for every economic analysis."
2. See Kaldor (1972) for a critique of equilibrium economics along similar lines. Kaldor develops his argument from Young (1928), who in turn finds his inspiration in Smith (1776).
3. Ferguson (1969:226–227). Ferguson's book is a good presentation of neoclassical microeconomics, and the neoclassical model as described in this paper conforms with Ferguson (1969).
4. "Consumers, producers, and resource owners must possess perfect knowledge if a market is to be perfectly competitive." Ferguson (1969:224).
5. Of course, this means that immediate action must be possible, which is where the assumption of perfect mobility of resources comes into play. "A third precondition for perfect competition is that *all* resources are perfectly mobile" Ferguson (1969:224).
6. Following Friedman (1953), however, one might argue that the assumptions of a model should be tested by the model's predictions, not by casual observation. Pursuing that argument would lead the current paper off track, but the argument is critiqued in Holcombe (1989), chap. 5.
7. Hayek (1949:41) says equilibrium is the condition where "...the different plans which ... individuals ... have made for action in time are mutually compatible." Hahn (1984:44) says equilibrium exists when "...the intended actions of rational economic agents are mutually consistent and can, therefore, be implemented." Lewin (1997:245) says "equilibrium is understood to be the consistency of actions and the plans on which they are based."
8. Stiglitz (1994) notes that in his previous work he has emphasized information problems that interfere with efficient allocation, suggesting that he would want to retain the possibility of imperfect information when discussing market equilibrium.

9. Prior to his work on entrepreneurship, Kirzner observed (1963:258n), "From this point of view a market system might be described as always in a state of disequilibrium, with respect to the infinity of knowledge that is beyond human reach." If one considers unobserved profit opportunities to be beyond human reach (until they are observed), this further reinforces the idea that a steady-state evenly rotating economy (to use Mises' phrase) would not be in equilibrium as Kirzner defines it when there are unnoticed profit opportunities.
10. An earlier note addresses Stiglitz's views, and Lewin (1997) argues that this is what Hayek means by equilibrium, and gives an insightful analysis of the concept. In addition to Kirzner's published work (see the previous note, for example), personal correspondence with the author confirms that this is Kirzner's vision of equilibrium.
11. Coase (1937) and Alchian and Demsetz (1972) provide examples of this type of management in economic models.
12. A caveat must be added. If entrepreneurial acts themselves generate more profit opportunities, it could be that the act of eliminating one profit opportunity creates many more, as discussed in Holcombe (1998). Even here, however, one might reply that all the later profit opportunities were always lying in wait, contingent upon someone acting upon the first opportunity.
13. Kirzner (1973) contrasts his vision of entrepreneurship as equilibrating with Schumpeter's (1934) depiction of entrepreneurship as disequilibrating. As the discussion above shows, an entrepreneurial act could be disequilibrating according to Hayek's definition of equilibrium, yet equilibrating according to Stiglitz's definition. Thus, at least a part of the difference between Schumpeter's and Kirzner's views might be semantic, based on different understandings of the meaning of the word equilibrium.
14. This is recognized in the new classical macroeconomics in which model economies always remain in general equilibrium by assumption.
15. Alchon (1985) provides an excellent discussion of the origins of the national income accounts within the context of the development of American economic planning.
16. While  $Q$  and GDP are different, they are viewed as close enough substitutes that in introductory economics course,  $Q$  and GDP are often substituted for  $T$  in Fisher's equation of exchange. While Fisher originally wrote it as  $MV = PT$ , it is not uncommon to see it presented as  $MV = PQ$  or  $MV = P * GDP$ , suggesting the relative interchangeability of  $Q$  and GDP in the minds of economists.
17. Samuelson and Solow (1960) is a clear statement of this Keynesian approach by two Nobel laureates in economics.
18. See, for examples, Scully (1988), Barro (1996), and Gwartney and Lawson (1997).
19. Armentano (1972, 1982) has offered insightful criticism and policy analysis on these issues.
20. See Ferguson (1969:chap. 10) for an explanation.

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