

# Learning as an emergent, creative process

## A review essay on Joseph E. Stiglitz and Bruce C. Greenwald's *Creating a Learning Society*

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**Abstract** In *Creating a Learning Society*, Joseph Stiglitz and Bruce Greenwald examine the role of knowledge in economic growth. They view economic growth as an impersonal and automatic phenomenon. The history of economic growth, however, suggests that it is a creative and personal process. We argue that the analytical framework deployed by Stiglitz and Greenwald is unsuited to study the creation of new products, new ways of doing things, and the discovery of new markets. While the questions Stiglitz and Greenwald ask are of fundamental importance, their analysis is neutered by the inability of their conceptual toolbox to grapple with creativity and novelty.

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## 1 Introduction

The central thesis of Joseph Stiglitz and Bruce Greenwald's *Creating a Learning Society* is “that most of the increases in standards of living are, as Solow suggested, a result of increases in productivity—learning how to do things better” (2014: 5). Creating a learning society is especially important, they argue, with the movement toward the “knowledge economy” in the 21st century. Two key questions underpin their analysis. The first question is whether laissez-faire markets produce an efficient level and pattern of learning and innovation. They argue that markets fail in this regard

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because the creation of knowledge involves a wide variety of externalities and information asymmetries. The second question is what kinds of government interventions can fix these market failures. They propose a whole host of measures (Part 3 of the book) including: government investment in public universities, the protection of infant industries, and exchange rate controls intended to protect the domestic economy.

Stiglitz and Greenwald present a variety of reasons why laissez-faire markets do not produce a Pareto efficient amount of innovation, including the prevalence of externalities. Innovation builds on past innovations. Individual innovators cannot reap all the benefits their innovations create for other economic agents, some of whom may not be born yet. This means that there will be under-investment in innovation. A monopoly does not help solve the problem. Although a monopoly *may* internalize more externalities than competitive firms, monopoly power brings dead-weight loss and creates market distortions of other kinds.

Externalities, according to Stiglitz and Greenwald, are not the only reason why markets fail to produce optimal innovation and learning; there are three other reasons. First, capital markets fail to optimally fund innovation because ‘knowledge capital’ cannot be easily collateralized as compared to physical capital. Second, successful innovation requires coordination between different economic actors. But the secrecy that is necessary to secure the profits from innovation does not lend itself to large-scale cooperation. Individual economic actors often do not have the incentive to share their prospective innovation with each other, leading them to (individually) make plans that cannot be completed. Finally, laissez-faire economies tend to be highly volatile and unstable. This reduces learning by making capital more costly and less accessible.

In this essay, we argue that while Stiglitz and Greenwald ask important questions, their analysis is neutered by the limitations of what Wagner (2010) refers to as the Neo-Walrasian approach in explaining changing relations between human actors. This approach seeks to establish logical relations between the attributes of individual economic actors and social outcomes. For instance, general equilibrium theory studies the relationship between endowments, preferences, and production possibilities on the one hand, and prices on the other. These logical relations exist outside of historical time. The dependence between the plans of different economic actors is simple and equilibrium prices are sufficient statistics to coordinate these plans (see Thompson 1992).

We discuss an alternative paradigm, the Neo-Mengerian approach, for understanding and analyzing the process of economic growth. In contrast to the Neo-Walrasian approach, the Neo-Mengerian approach views social phenomenon as emergent outcomes of the interactions between different economic actors (Wagner 2010). The relations between the plans of different micro-entities form an ecology, which evolves in historical time (see O’Driscoll and Rizzo 2014). The dependence between the plans of different economic actors is complex rather than simple. Although prices serve as useful statistics, they are never sufficient statistics to create social harmony (see Thompson 1992). Each economic entity makes decisions with limited knowledge of the plans of other entities (see Lewin 1999). While information asymmetry is a source of trouble in the Neo-Walrasian perspective, distributed knowledge is an ordinary working feature of the system in the Neo-Mengerian perspective. Competition is a rivalrous process (see Hayek 1948; Kirzner 1992; Wagner 2001). It is a verb. Micro-entities often take actions that cause the plans of other entities to fail (Lewin 1999).

Prices are not the only force through which economic actors affect each other; externalities too are an ordinary working feature of the system.

The Neo-Walrasian and the Neo-Mengerian approaches are not competing schemes of thought; rather they are non-commensurable (Wagner 2010). Reality presents us with both structure and process. The two approaches are useful for understanding different economic problems. For instance the Neo-Walrasian approach is a useful means to answer questions such as: “what would happen to the price of apples if the preference for apples changes?” and “what would happen to the interest rate if the temporal distribution of endowments changes?” However, the Neo-Walrasian approach is less useful to study processes that involve the creation of new relations between economic actors.

The Neo-Walrasian approach takes the relations between economic actors as given and asks how resources are allocated within this nexus of relations. It views markets as systems to process information about preferences, endowments, and production possibilities. However, in reality the process of economic growth involves the creation of new products, new ways of doing things, and new markets. It involves the creation of new economic relations and the destruction of old economic relations. It is our contention that such processes are better studied through a Neo-Mengerian window.

We proceed as follows. The next section describes the fundamental principles of the Neo-Walrasian approach. We distinguish between the market-failure and the market-discovery literature within this paradigm. The third section presents the Neo-Mengerian approach. We make the parallel distinction between invention and innovation on the one hand and between scientific knowledge and relational-knowledge on the other. The fourth section discusses the relation between economic growth and knowledge. We argue that economic growth is a process of innovation and the development of relational-knowledge. The fifth section concludes the paper.

## 2 The Neo-Walrasian approach

Social phenomena like prices emerge from the interaction between individual economic agents. Naturally then, social phenomena are related to the attributes of individuals. The Neo-Walrasian approach seeks to establish logical relations between the attributes of individuals on the one hand, and social phenomenon on the other hand. General equilibrium theory, for instance, relates the preferences, endowments, and production possibilities of individuals to a set of prices such that all markets clear. Arrow and Debreu (1954) and McKenzie (1959) proved that under certain conditions there exists a set of prices such that all markets clear when consumers maximize utility and firms maximize profits. Comparative statics allow us to compute the direction of change in prices that logically follow from changes in agent attributes. For example, general equilibrium theory allows us to compute the direction of change in interest due to a change in time preference. One of the strengths of this approach is that it makes clear the inter-relations between the attributes of different economic actors and the hard constraints imposed by scarcity. It puts parameters on the dreams of social philosophers.

The Walrasian approach is amenable to developing statements about whether a given social arrangement is the ‘best’ that could have been achieved given the attributes

of individual economic actors. One such statement is that of Pareto efficiency, which is a state of affairs in which no individual can be made better-off without making at least one individual worse-off. Arrow (1951) and Debreu (1959) formalized this idea through the two fundamental welfare theorems. The first welfare theorem states that the general competitive equilibrium is Pareto efficient. The second welfare theorem states that any Pareto efficient allocation can be achieved as a competitive equilibrium by altering the initial distribution of endowments.

One of the features of the proof of the existence of general equilibrium and proofs of the welfare theorems is that the mathematical assumptions necessary to prove them are strict: the statements fail under mild deviations from these assumptions. Since the 1960s, this observation generated two branches of scholarship. One branch explored the consequences of deviations from assumptions under a classical problem setting. This is the market failure literature. The other branch searched for non-classical assumptions from which to recover more robust variants of the classical results about the existence of competitive equilibrium and its welfare properties. This is the market discovery literature.

*Creating a Learning Society* applies some seminal results from the market failure literature to the creation and dissemination of knowledge. The argument that capital markets fail to optimally fund the production of knowledge is built on the idea that markets fail in the presence of asymmetric information (Akerlof 1970). The argument that the price system fails to coordinate large innovations is built on the idea that market prices are not sufficient statistics because individuals do not have an incentive to reveal all information (Grossman and Stiglitz 1976, 1980). The argument that government intervention can improve market failures that arise due to externalities is based on the Greenwald and Stiglitz Theorem (Greenwald and Stiglitz 1986). This theorem has two parts. The first part says that in a competitive economy with asymmetric information pecuniary externalities look a lot like non-pecuniary externalities.<sup>1</sup> The second part of the theorem states that in an economy with asymmetric information, a government can improve outcomes without access to more information than that which is possessed by private agents.<sup>2</sup>

The literature on market discovery, however, challenges the results that Stiglitz and Greenwald apply in *Creating a Learning Society*. For example, Alchain (1950) argues

<sup>1</sup> Pecuniary externalities occur when the actions of some agents change the prices faced by other agents. For example, when Firm A hires an additional worker, it increases the wage rate and reduces the profits of all other firms. Non-pecuniary externalities occur when the actions of some agents affect the utility or profits of other agents through a non-price channel. For example, when Firm A pollutes a river, it reduces the consumer welfare, without directly affecting the prices faced by consumers. When prices reflect opportunity costs, pecuniary externalities do not have negative welfare consequences. Non-pecuniary externalities always have negative welfare consequences. Stiglitz and Greenwald (1986) argue that in markets with asymmetric information pecuniary-externalities look a lot like non-pecuniary externalities. This is because with asymmetric information competitive prices do not reflect opportunity costs.

<sup>2</sup> In other words, a competitive equilibrium is in general not even constrained Pareto Efficient. Bernanke and Gertler (1990) provide an application of the Stiglitz-Greenwald Theorem. They study an economy in which lenders tell the quality of a borrower by observing their collateral. A subset of individuals does not make profitable investments because they do not have enough collateral, though they have good projects. An information-constrained government cannot use Lindhal Prices to allocate loans. However, a government can redistribute income, thereby reducing the number of individuals who are wealth-constrained, and increasing the number of loans. The redistribution of income does not require the government to have more information than market participants regarding which individuals have good projects.

that profit and utility maximization are meaningless since uncertainty and probabilistic outcomes make it impossible for entrepreneurs to know, let alone maximize, an objective function. The success of firms, Alchian notes, is often due to luck and chance as compared to keen entrepreneurial insight motivated by profit maximization. Irrespective of the specific knowledge and goals of entrepreneurs, market institutions serve as a filtering device such that those that adopt strategies yielding a profit will remain and those that do not will be forced to exit. The result is that at any point in time it will appear as if firms are acting as profit maximizers. Becker (1962) shows that agent-level rationality is not necessary for demand curves to slope downwards. Smith (1962) shows how trade between agents in a laboratory drives the system towards equilibrium, though presumably the agents do not possess quasi-concave preferences. Demsetz (1967, 2002) argues that property titles can be bundled and re-bundled to internalize externalities; the very existence of externalities presents a profit opportunity to do so. Kirzner (1973) indicates that when a few agents arbitrage profit opportunities, the system as a whole moves towards a competitive equilibrium. Gode and Sunder (1993) demonstrate that trade between artificial zero-intelligence traders can exhaust gains from trade in a double-auction market. Axtell (2005) shows that trade between agents with limited rationality leads to the neighborhood of equilibrium within reasonable time, however the welfare theorems no longer hold. Veetil (2015) studies a simple trading process that allocates heterogeneous capital goods with irreversible and lumpy investments. Stiglitz and Greenwald make no mention of the market-discovery literature in *Creating a Learning Society*. This is despite—or perhaps because of—the fact that the literature has come to challenge many of the fundamental theorems that guide the analysis in the book.

Though there are a great many differences between the market failure and the market discovery literature, there is a fundamental similarity that binds the two together—both are branches of the Neo-Walrasian tree. Both strands of literature begin with immutable attributes of individual economic actors and relate these attributes to social phenomena that can be deduced logically—i.e. without the passing of historical time. The complete set of possible social phenomenon can be computed given the attributes of individual economic actors.

### 3 The Neo-Mengarian approach

While the primitives of a Neo-Walrasian approach are preferences, endowments, and production possibilities, the primitives of a Neo-Mengarian approach are the plans of economic actors. The relations between different plans form an ecology of social configurations which emerge from the interactions between different economic actors. Emergent social phenomena, in turn, influence the plans of economic actor. There is thus a bi-directional relation between mind and society, intermediated by the structure of relations between different plans (Wagner 2010).

Individuals form plans within the Neo-Walrasian approach too. For instance, Barro (1974) studies how the consumption plans of individuals change in response to government debt. But the plans have a functional relation to preferences, endowments, and production possibilities. The function may be deterministic (Arrow and Debreu 1954) or stochastic (Stokey and Lucas 1989; Ljungqvist and Sargent 2004). In the Neo-

Mengerian approach, no such functional relation is postulated or sought. Rather, it begins with the postulate that economic actors form plans to pursue their goals. The plans of different economic actors can be related in a variety of combinatorial ways.

Some relations are competitive in the sense that the success of one plan necessitates the failure of another. Other plans are cooperative in the sense that the success of one plan depends on the success of another. For instance, the production of a newspaper requires the collection of news, editing, and printing. Reporters form plans about what news to collect and how. Some reporters work together to collect news; one person may make the first contact, while another may follow-up on the lead. Other reporters compete with each other on the margin of who will be the first to report a news item. Plan failures and substitutions are possible. For instance, the editor may fail to come to work due to illness leading one of her subordinates to undertake editorial tasks for the day. Someone else in turn takes up the subordinates work. In so far as different subordinates could have filled the editor's role, there are a variety of different possible combinations of inputs to produce a newspaper.

Within the Neo-Mengerian perspective, social configurations are never in absolute harmony. There is always some degree of discord between the plans of different economic actors (see Lewin 1999). Discord arises for two reasons. First, economic actors make plans with limited knowledge about the plans of others. Often they know something about the plans of those who buy their products or supply their inputs, but they do not know much about the plans of those far away from their immediate ecology. In so far as the success and failure of different plans are connected through a web of relations, to make perfectly harmonious plans each agent would need to know the plans of all other agents. Such knowledge is simply not available to real-world economic actors. This is not a problem within the Neo-Walrasian perspective because prices (when 'right') are sufficient statistics. The plans of economic actors are functionally related to preferences, endowments, and production possibilities. Prices reflect these priors and therefore prices are all that economic actors need to know to form mutually consistent plans. In contrast, within the Neo-Mengerian perspective prices are useful statistics, not sufficient statistics (see Thompson 1992). They never carry all the information that agents need to make plans that are fully consistent with all the other plans within the ecology.

The second reason for discord between the plans of different economic actors is the human motivation to compete in order to be better than others. To rephrase Wagner (2010:36–38) we all want to play in a concert, but everyone wants to be the first violin. Sometimes economic actors make plans precisely to defeat the plans of others. Supplying everyone with all information will not eliminate the rivalry between plans. Some economists refer to this as “keeping up with the Joneses,” but perhaps a better way to phrase it would be “getting ahead of the Joneses.” Some argue that these dynamics produce an externality which is yet another reason why competitive markets are not Pareto efficient (see Ljungqvist and Uhlig 2000; Dupor and Liu 2003). In addition, some believe that the desire to get ahead is a cause of unnecessary misery (see Layard 2005; Frank 2007).<sup>3</sup> There is, however, no reason to view the desire to be the

<sup>3</sup> Many economists treat the desire of individuals to get ahead as if it is a recent phenomenon. It is not. The human desire to outcompete others can be observed throughout human history. Further, the broader psychology literature finds that envy occurs in all societies and economic arrangements, independent of the size or quantity of the object being envied (see Schoeck 1987: 77).

first violin with more contempt than the motive to play in a concert. After all, concerts do not spring up spontaneously, but instead are organized by individuals acting purposefully. Similarly, economic organizations like firms and markets are set up by individuals—or groups of individuals—who hope to be leaders of such places. Tech-entrepreneurs in the Silicon Valley hope to outdo each other. Billionaires like to be ranked above one another. It is often those who wish to be the first violin that write the songs that others play.

Harmony and discord between the plans of economic actors are the yin and yang of an economic system. Discord is resolved by the failure of some plans and the success of others. This is in sharp contrast to the Neo-Walrasian perspective in which plan failures arise only as a consequence of exogenous shocks. The scope of these failures is limited by the extent to which economic actors are aware of the distributions from which external shocks arrive. Stiglitz and Greenwald (2014) view the instability of market economies as an aberrant feature, something that should, and can, be eliminated. From the Neo-Mengerian perspective, instability is as much an ordinary working feature of the system as is stability. And to the extent that this instability is a result of distributed knowledge and the desire to outdo each other, it is not possible to eliminate it.

This highlights the very different meanings of the word “competition” in the Neo-Walrasian and Neo-Mengerian perspectives. Within the Neo-Walrasian perspective, competition expresses a relation between prices on the one hand, and preferences, endowments, and production possibilities on the other hand. In contrast, within the Neo-Mengerian perspective competition expresses a relation between the plans of different economic actors. In the Neo-Walrasian perspective, a perfectly competitive economy is one in which all of the gains from trade are exhausted. In a dynamic setting, such an economy travels along a steady state path and exhibits prices which equal marginal costs at every time step along the way. Today looks like yesterday which looks like tomorrow. In the Neo-Mengerian perspective, a competitive economy is one in which economic actors form rivalrous plans, some of which must necessarily fail. There is no way to know which ones will succeed, or how they will succeed, without the passing of time (see Lewin 1999; O’Driscoll and Rizzo 2014). Some plans will involve the creation of new products, new ways of doing things, and the discovery of new markets. Today looks different from yesterday, and tomorrow looks different from today. Prices are not necessarily equal to marginal cost and successful economic entities make profits while failed entities incur losses.

Within the Neo-Walrasian perspective, product differentiation reduces competition by segmenting markets. Within the Neo-Mengerian perspective, product differentiation is a central part of the competitive process because it has the potential to altogether eliminate old products and markets (see Holcombe 2009). Competition between economic entities for the right to cooperate with customers (see Rubin 2014) is far from amiable. Competing entities do everything they can within legal rules and sometimes outside those rules.

Consider the history of Uber, a company that developed an application to allow any individual to provide taxi services with their private cars. Its entry was opposed by incumbent taxi companies, many of whom lobbied local governments to impose a ban on Uber. Madrid Taxi Association in Spain and Taxi Deutschland in Germany obtained injunction orders from local courts on the grounds that Uber posed unfair competition. Governments in several parts of the United States issued cease and desist orders. Uber,

in response, worked with local municipalities to create a market for its service. Several other companies entered the same line of business after Uber incurred the fixed costs associated with fighting regulators. Uber in turn fought these companies in a variety of ways. This included ordering fake rides from its competitors, which would be cancelled when the cars arrived. This was meant to waste the time of the competitors' drivers and increase their costs of operation. As this story illustrates, a great deal of economic competition is non-price competition.

The traditional focus on price competition is at best limiting and at worst altogether misleading. Competitors affect each other through many forces, prices being only one of them. All economic actions involve externalities, i.e. non-price effects. Within the Neo-Walrasian perspective, the impact that one economic actor has on another through a change in price is thought to be reasonable. Non-price effects are not. However, in the actual world, the actions of individuals have not only price effects, but also non-price effects which are beneficial. Innovation and the creation of new products does not merely change the prices at which other products can be sold, but also the very opportunities available to other economic agents (see Holcombe 2003, 2007). Ford Motors clearly had a price-effect on the stagecoach industry. But it also had a non-price effect by fundamentally changing the very nature of the transportation industry by creating an array of opportunities that did not exist prior.<sup>4</sup> Competition strikes not merely at the profit margins of firms, but at their very foundation.

Pareto efficiency is the central organizing concept in the analysis of Neo-Walrasian competition. The welfare theorems show that a competitive system is Pareto efficient and vice-versa. In the Neo-Mengerian perspective competition cannot, by definition, be Pareto efficient. Rivalry between plans means that some plans succeed and others fail. Competition necessarily makes some people worse-off and others better-off. In fact, within the Neo-Mengerian approach monopoly and oligopoly are not less competitive than perfect competition; they are merely different forms of competitive social arrangements.<sup>5</sup>

It makes little sense to speak of a system as being less or more competitive than another. In so far as the discords between the plans of different actors arise both because of distributed knowledge and the desire to be better than others, competition is a perennial feature of all social arrangements. However, the form that competition takes varies in different institutional settings. For instance, in the former Soviet Union there was a great deal of competition to be a highly ranked member of the Party, while in ancient China young men studied for years with the hope of becoming a bureaucrat (see Baumol 1990). During the colonial years private companies competed to secure monopolies granted by the British Crown (the East India Company was a beneficiary of one such monopoly). So while legislation will influence the particular way that competition unfolds, rivalrous competition itself, like gravity, cannot be legislated away.

<sup>4</sup> And these non-price effects can extend into other areas and industries. For example, Ford employed wood scraps from building the Model-T to establish the Ford Charcoal Company which today is known as Kingsford's Products Company (see Smith 2015).

<sup>5</sup> Nor is it sensible to make claims about the 'inefficiency' of monopoly by comparing its pricing behavior to that of a perfectly competitive market by assuming that both have the same cost curve. Costs of production are not technologically given; they are the consequence of human action. Cost curves reflect the relations between economic actors and are therefore endogenous to "market structure" (see Schumpeter 1942).



## 4 Economic growth and knowledge

Neo-Walrasian growth theory holds constant a set of fortuitous relations between economic agents, and studies how the system would mechanically work towards prosperity if left undisturbed by outside forces. It views economic growth as an impersonal and automatic process as captured by Schumpeter (1947a: 7):

...the economy grows like a tree. This process is no doubt exposed to disturbances by external factors that are not economic or not strictly so. But in itself it proceeds steadily and continuously, each situation grows out of the preceding one in a uniquely determined way, and the individuals, whose acts combine to produce each situation, count individually for no more than do individual cells of the tree. This passivity of response to given stimuli extend in particular to accumulation of 'capital': in a mechanical way, households and firms save and invest what they have saved in given investment opportunities.

In reality, however, the historical process of economic growth is disruptive and personal. It has not been one in which more capital has meant more of the same goods and services. The average US household in circa 2000 did not own ten times as many stagecoaches as their great-grand parents. Rather they had a variety of products that were simply not available to past generations. The accumulation of physical capital and knowledge has historically taken the form of new goods, new ways of doing things, and new markets. This is because the availability of new resources presents new opportunities (see Holcombe 1998, 2003, 2007). And economic actors respond creatively to these opportunities through entrepreneurship (see Schumpeter 1947a, b). There is a certain degree of indeterminateness associated with creative responses, i.e. the future cannot be predicted from the past. As Mises (1957: 5) notes:

A stone is a thing that reacts in a definite way. Men react to the same stimuli in different ways, and the same man at different instants of time may react in ways different from his previous or later conduct. It is impossible to group men into classes whose members always react in the same way.

Schumpeter (1934, 1939) distinguished between invention and innovation. Invention is the creation of new scientific knowledge. Innovation is the application of this scientific knowledge in the creation of new products coupled with the whole host of activities that are necessary to bring these products into economic use. Entrepreneurs must find investors willing to take the risk of developing new products. They must find management methods to scale up prototypes at reasonable costs. Henry Ford did not invent the automobile, nor did he invent the assembly line. Both these ideas had been around for decades before the first Model-T rolled off the assembly line. Ford's genius was creating an economic organization capable of scaling up a prototype by applying existing knowledge about assembly line production.

The development of economic organization, however, does not ensure success. Entrepreneurs must meet—and often combat—regulatory hurdles. Potential competitors must be kept at bay. They must develop new tastes and desires in consumers

through advertising, an aspect of capitalist economic growth that is assumed away in analyses that employ immutable utility functions. As Schumpeter (1939: 73) noted:

Railroads have not emerged because any consumers took the initiative in displaying an effective demand for their service in preference to the service of mail coaches. Nor did the consumers display any initiative wish to have electric lamps or rayon stockings, or to travel by motorcar or airplane, or to listen to radios, or to chew gum. There is obviously no lack of realism in the proposition that the great majority of changes in commodities consumed have been forced by producers on consumers who, more often than not, have resisted the change and have had to be educated up by elaborate psychotechnics of advertising.

Hayek (1952) postulated that knowledge in the human mind is stored in the relations between neurons, a conjecture that has been developed by cognitive scientists and information theorists (MacLennan 1993; Ellis 1998). In a similar vein, economic knowledge exists in the relation between different economic actors (Lavoie 1986). No individual knows how to produce a pencil (Read 1958). Different individuals know how to make parts of the pencil, however the knowledge of how to put it all together resides in the relations between individuals. No individual knows how to make a MacBook Pro. Different members of Apple know how to make, or secure from suppliers, different components of a MacBook Pro, but it is ultimately the structure of relations between these individuals that brings it all together. If members of Apple were to forget their relations to each other but retain their technical knowledge, they would find it difficult—if not impossible—to produce laptops.

Economic innovation involves the creation of new relations between individuals and therefore the creation of new knowledge in the form of connections and networks. This is not something that can be planned, designed, or implemented by policymakers or development “experts.” While the Neo-Walrasian perspective is concerned with how an economy allocates resources within a set of relational knowledge, the Neo-Mengerian perspective is concerned with how relational knowledge gets created and destroyed. Both approaches are useful, but to answer different questions.

It is true that an economy processes dispersed information and allocates resources given a certain configuration of relational knowledge (see Lavoie 1986). However it is also true that human action continuously reconfigures relational knowledge (Potts 2001). When the Ford Model-T was introduced in October 1908, it destroyed the relations between different individuals who cooperated and competed to produce stagecoaches. At the same time, the Ford Motor Company created new relations between workers, suppliers of raw materials, and final consumers. Economic growth is largely a process of producing new relational knowledge and destroying old relational knowledge. As Wagner (2010: 18) notes, “While repetition and reproduction are discernable features of social life, so too are creation, novelty, and turbulence. The neo-Mengerian program is particularly apt for social theorizing in a setting of continual and turbulent development.”

Neo-Walrasian growth theory does not treat knowledge (Romer 1986) very differently from physical capital (Solow 1956; Swan 1956) and human capital (Ben-Porath 1967; Grossman 2000). Knowledge is viewed as an object that can be produced with the application of labor and capital. This is, to some extent, true of knowledge that

resides within the minds of individual human beings. Individuals can become better physicians, magicians, and athletes by applying greater effort and resources towards these goals. However, society is not an individual spoken in a loud voice. The creation of relational knowledge is an experimental and disruptive process. It involves rivalrous competition, experimentation, and discovery through success and failure. This is the realm of creativity and novelty, not of functional relations between inputs and outputs (see Buchanan and Vanberg 1991). It is also the realm of personalities. Who would deny the role of Andrew Carnegie, Henry Ford, and J.P. Morgan in the American economic experience (Hughes 1965)? In the Neo-Walrasian vision each individual is as significant as any another, like drops of water in an ocean. In the Neo-Mengerian vision, there are entrepreneurs with differing characteristics on a wide array of margins. These differences across individuals matter in the historical process of economic growth.

## 5 Concluding remarks

*Creating a Learning Society* argues that markets, left to their own devices, will fail to generate the learning necessary for economic growth. Stiglitz and Greenwald emphasize the array of failures that plague markets and offer a detailed plan of how well-intentioned and well-motivated governments can go about creating this other, superior world by targeting certain sectors with certain government policies. We have offered an alternative view. What Stiglitz and Greenwald see as market failures can alternatively be seen as opportunities for human discovery and creativity. Today's failures are tomorrow's profit opportunities. Learning is an emergent phenomenon that evolves as imperfect human beings attempt to find their way in the world. It is not something that is "created" by experts attempting to micro-manage the international economy. It is not a simple functional relation between inputs and outputs, but rather an unpredictable process of experimentation which looks chaotic at any snapshot in time.

We have focused on the underlying framework adopted by Stiglitz and Greenwald (the Neo-Walrasian framework) with particular emphasis on the limitations of this mode of thinking for understanding learning and economic growth. Beyond this, there are also a variety of practical issues with their policy proposals which deserve brief mention. Stiglitz and Greenwald argue for an active industrial policy on the part of government to create a learning society (see the chapters which constitute Part 3 of their book). This includes, among other things, adopting policies that provide positive incentives to sectors with significant learning and spillover effects. But how are governments to know what sectors have the highest rates of learning and the most significant spillover effects? Surely this varies from context to context depending on the current state of the sector, the networks required for learning, etc. And even if this question could be answered at a point in time, how would one deal with the fact that the answer to this question is constantly changing over time?

Further, economic activity is not neutral with respect to policy innovations (Baumol 2002: 44–45). Most economic models assume (often implicitly) that the set of goods within the economy never changes, even in the face of government interventions. However, once one allows for the possibility of the introduction of new goods, the welfare loss associated with trade protections increases significantly (see Romer 1994).

Stiglitz and Greenwald never discuss how it is possible for governments to access the relevant knowledge to weigh the gains from their proposed policies versus the resulting welfare losses. From the Neo-Mengerian perspective this knowledge is not obtainable since it does not exist absent the ongoing process of discovery and learning that takes place in markets (see Buchanan 1982).

Another, related, issue comes from the traditional public choice critique of government policymaking. Even if policymakers did know how to advance the general welfare, a heroic assumption in itself, what incentive do those in positions of government power have to implement the appropriate policies? A central insight from public choice is that policies are not designed and implemented in a vacuum. It is true that markets might fail, but so too might government. For instance, what mechanism is there to identify and correct for the externalities created by the government interventions that the authors propose?

Stiglitz and Greenwald dedicate approximately one page to addressing these practical matters (p. 396–397) but quickly dismiss them as being based on “political analysis and not economic analysis” (p. 396). This dismissal is problematic, and not merely because it fails to appreciate the applicability of economics to the study of political institutions and processes. The policies proposed by Stiglitz and Greenwald grant significant power to governments to influence the lives of citizens around the world. While it is possible for governments to do good with these powers, it is also quite possible that they can do significant harm by undertaking bad policies in the name of creating a learning society. The failure of post-colonial development planning is a testimony to the difference between the intentions and the outcomes of government interventions (see Lal 1983; Boettke 1994; Bauer 2000; Easterly 2002, 2006; Williamson 2009; Coyne 2013).

The strength of *Creating a Learning Society* is that it emphasizes the importance of learning for economic progress. That said, the conceptual treatment of this issue is ultimately lacking because it treats learning as a basic functional relationship between inputs and outputs which can be created and controlled by well-intentioned and enlightened policymakers. At the same time the proposed policies suffer from an array of practical issues that threaten the process of learning and hence economic progress itself.

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