The Implications of Punctuated Equilibrium for Economic Theory and Policy

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Professor Khalil's paper on economics and biology is a valuable survey of some major issues in one of the most exciting areas in contemporary economics. The on-going revolution in evolutionary biology is having a profound impact on all fields of science and is even beginning to influence the citadels of economic orthodoxy. In the past decade exciting research in paleontology has been spawned by the recognition that the evolutionary record shows a pattern of punctuated equilibria, relatively long periods of stasis punctuated by relatively short bursts of sudden change. The recognition of this pattern in evolutionary biology has profoundly changed our understanding of the history of the earth. On-going research is showing that the histories of the biosphere, atmosphere, and lithosphere are not only characterized by punctuated equilibria they are also intimately connected (Hartman and Miller 1991). The fact that a pattern of punctuated equilibria can also be seen in economic history has been recognized by many prominent economists (Boulding 1989, Hodgson 1993, Mokyr 1990) but the more far-reaching implications of this pattern have been largely unrecognized. These implications strike at the heart of neoclassical theory and its role as the intellectual underpinning of the status quo.

The discussion that follows is based on what Khalil terms a homologous metaphor. I argue that the broad pattern of sorting processes is similar in the biological and economic worlds. Following Vrba and Gould (1986) “sorting” refers to differential survival rates over time while “selection” is a kind of sorting driven by some particular cause. The cause of selection in economic theory is efficiency driven by profit maximization.

The Neoclassical Theory of Economic Change

The neoclassical theory of the firm is a theory of allocation. Even in its most sophisticated form the theory merely describes the static allocation of a fixed amount of resources. Consumers allocate goods subject to a budget constraint and firms allocate productive inputs subject to a cost constraint. So-called growth theory attempts to make the analysis dynamic by allocating growth rates of inputs, by discounting the future, and by reducing uncertainty to risk.

In the neoclassical model productive inputs and techniques are chosen by the selection mechanism of efficiency. Driven by profit maximization, more efficient ways of producing goods replace less efficient ones. Macroeconomic change is driven, like neo-Darwinian change in biology, by the gradual accumulation of favorable traits (Gowdy 1991, 1992). Some critics of the neoclassical approach have used a punctuated equilibria analogy to argue that neoclassical microfoundations are inadequate for a theory of macroeconomic change. However, the mere existence of punctuations is insufficient to overturn the neoclassical model of economic change. Change may be rapid and appear to be non-marginal, but as long as the selection process (efficiency) is the same, neoclassical theory need only be modified slightly to absorb the new view. If, however, these punctuations are driven by reasons other than efficiency, then the theory is inadequate as a complete explanation of macroeconomic change.

Punctuated Equilibria and Hierarchies of Selection

According to Gould the truly revolutionary aspect of punctuated equilibria is that it implies the existence of hierarchies of sorting processes. If punctuations occur randomly this implies that selection at the margin for reasons of efficiency is not the sole explanation for evolutionary change. In the economic world efficiency may operate as a selection mechanism at one level but there are also other mechanisms at work. The fact that market forces propel firms toward efficiency does not imply that all existing patterns of firms and techniques are there because they are the most efficient.

Observations of the natural world show us that much of what happens is a matter of pure chance. For example, Mount St. Helens erupted at 8:32 am on May 18, 1980. Some animals were up and about at that hour and were wiped out, others were still asleep and so they survived. Dinosaurs lived quite successfully on earth for tens of millions of years.
until they were suddenly exterminated, most likely
by a meteor which struck the planet some 65 million
years ago. In the economic world, some firms that
happened to be financially overextended at the time
of the 1987 stock market crash did not survive
while others that were not (through sheer chance)
did survive. In the economic world there are all
manner of punctuations, a whole array of
overlapping short runs where efficient firms fail
and inefficient firms succeed due to circumstances
outside the purview of neoclassical theory. That is,
the success or failure of economic entities (sorting)
depends on much broader and more varied processes
than mere differences in efficiency (selection). This
observation is not meant to belittle the value of
neoclassical theory as a theory of allocation.
Neoclassical insights into the workings of markets
are sometimes profound and useful for a whole
range of policy questions. But to extend the theory
to become the sole explanation of economic change
is erroneous and restricting.

Almost all of the new “evolutionary” models
of economic change are merely interesting
extensions of the standard model of marginal
change. The ultra-orthodox approach of Hirshleifer
(1978) would extend the notion of constrained
optimization to form the basis of study of all natural
science. The evolutionary models of Nelson
and Winter (1982), although allowing for non-
optimality and Lamarckian goal-seeking, are
fundamentally marginalist. Frank (1988) uses
traditional Darwinian selection mechanisms to add
seemingly “irrational” characteristics to a standard
utility function. All these extensions are interesting
but they are based on pre-1970s notions of
biological evolution and miss the rich and
far-reaching implications of contemporary evolutionary
theory.

The existence of hierarchies of selection also
shows the futility of trying to find analogies of the
gene in economic selection (Penrose 1952). There
is no single unit of selection in biology or in
economics.

Hierarchies of Sorting and Macroeconomic
Policy

The view that survival is based solely on
selection leads naturally to a neo-Darwinian
argument that whatever exists is best and it
tends to reduce the scope of economic policy to
protecting the status quo. The most conservative
macroeconomic schools of thought (monetarism,
rational expectations, and the new classics) are
based on neoclassical microeconomics. For the
adherents to these systems of thought the only cause
of change is the competitive selection at the margin
of more and more efficient techniques. By this view,
if left alone “natural” forces will lead to the best
possible outcome, defined in terms of Pareto
optimality, so any active role the government might
play will almost by definition have an adverse effect
compared to a market generated outcome. Industrial
policies are criticized on the grounds that they
interfere with natural market selection. Murray
Weidenbaum, a major player in the Reagan
administration, wrote in 1983:

The most effective strategy for encouraging
economic growth is no secret. It is to reduce
government barriers and achieve a better
functioning market economy. However,
the approach I am advocating is not
accompanied by any guarantee. In a truly
dynamic, competitive economy, we do not
know in advance where the new product
breakthroughs will occur. And the benefits
will not be evenly distributed. But we do
know that society as a whole will be better
off, since it is likely that most—but not all—
industrial workers and employers will enjoy
higher real incomes and living standards.
(Weidenbaum 1983, p. 25)

Two ideas are apparent in this statement. First
of all is the standard conservative argument that
productivity can best be promoted by avoiding
policies such as government regulation, taxes, and
spending that inhibit the efficient functioning
of private businesses. Implicitly present is the
notion that it serves us right if we can’t compete.
One hears this attitude frequently in the case of
the automobile industry. The relative demise of the
U.S. automobile industry is treated as if it is
natural selection that has devastated Detroit and
not the hands-off policy of the U.S. government
compared to Japan’s policy of actively promoting
innovation and subsidizing “risky” projects.

The belief that firm survival is based only on
private market efficiency (“rationalization”)
precludes other policies designed to compete in
international markets increasingly characterized
by government subsidy of risk, and with success
increasingly dependent on cooperation and
interindustry agreements. The realization that
economic survival, the sorting of individual
economic agents, depends on a variety of
mechanisms other than efficiency should open
the door to more realistic and effective economic
development strategies.

Just as Darwinian natural selection and
catastrophe theories of major extinction episodes
can coexist in evolutionary biology, so should
neoclassical theories of allocation coexist with other theories describing economic survival as a result of historical lock-in, increasing returns to scale, or merely pure chance. The notion of hierarchies of sorting offers a way to extend the scope of economics without getting into a sterile debate about whether neoclassical or alternative theories offer a "better" description of reality.

References