

**An Epochal Change in the Pattern of Scarcity**

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**Warm greetings to colleagues in Peking, and thank you for this opportunity to share a thought with you at the beginning of this important conference.**

**I just want to share one thought---namely that there has been an enormous change in the basic pattern of scarcity, a change unrecognized by standard neoclassical-Keynesian economics, but emphasized by ecological economics.**

**How has the pattern of scarcity changed? Historically the economy was small relative to its containing biosphere. In that relatively "empty world" there was room for physical growth both of human populations and the stocks of our physical wealth. Natural capital and resources of the biosphere were superabundant, and manmade capital and labor were the limiting factors in production. Little attention was given to the encroachment on, and degradation of the biosphere by growth of the economy. The path of progress was to increase wealth by investing in the limiting factor. But exponential growth led to a "full world" surprisingly quickly. In the full world, the pattern of scarcity is reversed---manmade capital and labor are superabundant, and remaining natural capital has become the limiting factor. How to invest in natural capital? By reducing our off-take and consumption, and allowing it to regrow naturally.**

***This is an epochal change in the fundamental pattern of scarcity---and requires a consequently fundamental change in economic policy.***

**Ecological economics recognizes the change, but mainstream neoclassical economics---which was developed during the empty world epoch--- does not. This huge blind spot exists both in microeconomics and macroeconomics.**

**In microeconomics the neoclassical production function includes only labor and capital, not resources. And if resources are occasionally included they are nowadays treated as *substitutable by*, rather than *complementary***

*with*, capital and labor. Without complementarity there can be no limiting factor, nor any historical shift in limiting factor from manmade capital to natural resources, nor any required change in economic policy resulting from this epochal change in the pattern of scarcity.

In macroeconomics the GDP counts only the value added by labor and capital, with zero value attributed to *that to which value is added*, namely the flow of natural resources. Natural capital depletion is valued at its labor and capital cost of extraction, and counted as current income, not capital depletion.

An economic theory that leaves the limiting factor out of the analysis of both production and of national income accounting is deeply flawed. Especially so, if that limiting factor is the very sap of life and wealth, namely the entropic throughput of matter/energy from nature's sources and back to nature's sinks. Ecological economists are dedicated to correcting this fatal error.

The foundational vision of ecological economics is that the economy is a subsystem of a finite ecosphere that is open to a given throughput of solar energy, but closed to materials. Matter cycles within the ecosphere, but does not enter or exit, except in trivial amounts. Both economy and ecosphere are subject to the laws of thermodynamics---the conservation of matter/energy, and the entropy law. These, and other basic scientific laws are both constraints within which we live, and the foundation for any technological advance. They cannot be evaded by new technologies because any technology must take them as given. They provide clear theoretical boundaries to the continued physical growth of the economy.

Before growth hits absolute *physical* limits, however, it is hitting *economic* limits. Growth is still physically possible, but on average and in the aggregate, growth in many countries now increases environmental and social costs faster than it increases production benefits. Further growth has become *uneconomic* when all costs are counted. Yet we continue to pretend that growth is still economic and strive for more of it.

After WWII, nations entered into the Cold War growth race. Whichever system, Communism or Capitalism, could grow faster would presumably win the adherence of the uncommitted nations. At first Capitalism seemed to win as the Soviet Union and Eastern Europe collapsed. But now China, with its system of Communist-led State Capitalism, has become the world's growth champion. The US and Western Europe are growing slowly, although striving desperately to grow faster because that is the only path of progress that they recognize.

The irony is that, thanks to exponential growth, the previously empty world has become over-full very rapidly, so that growth success, including that of China, now presses strongly against the containing biosphere, imploding inward with increasing costs of congestion, pollution, depletion, and ecological disruption. Efforts by ecological economists to tell the truth about the epochal change in the pattern of scarcity, about the uneconomic nature of further growth, have so far been politically unsuccessful. The dominance of the neoclassical-Keynesian growth synthesis among US economists is strong, and understandably so, given its past success. But that very success in the empty world era has blinded economists and politicians to the epochal change in the pattern of scarcity in the resulting full world era.

Will ecological economists in China have more success than their Western counterparts in arguing for the reality of this change, and in reconciling the demands of the economy with the limits of the ecosphere? One is encouraged by the official commitment of the Chinese government to "build an ecological civilization." I hope this conference will help to achieve that end. *However, an ecological civilization cannot be built on the basis of a growth economy.* Quantitative physical *growth* must give way to qualitative *development*, to technical and distributive improvement, within biophysical and ethical limits. *Better* is still possible, but *more* is not.

Having won the growth race, China is now in a strong position to lead other countries away from the suicidal expansion of the physical economy beyond ecological carrying capacity. But in a competitive world it is surely a hard thing to call for a halt to the game that one is winning!

Yet if the winner says that the benefit of the growth game is no longer worth the cost, and that we should play a less competitive and more cooperative game, then other countries are more likely to listen than if a losing country called for changing the game. So China is in a position to speak with authority and be heard.

We must no longer engage in the left-over growth race of the Cold War, but rather in a common effort to qualitatively develop an ecological economy that is just, sustainable, and peacefully cooperative. The old Cold War race to grow faster in a finite and entropic world leads not only to ruinous *uneconomic* competition among nations, but also to *military* conflict over access to remaining natural resources---the new limiting factor. In a world not only full of manmade capital and people, but also of weapons of mass destruction, ecological economics offers a critical path to peace, as well as to lasting prosperity.

May this conference be an important step toward that goal!