# ECONOMICS'S INTERFERENCES (I) – BIOLOGY

## 1. Two ontological interferences

The *first* ontological interference between Biology and Economics is the necessary[1] presence of the biological individual inside the two „territories". Biology doesn't exist without the biological individual, because the biological phenomenon is created just by this individual. Economics also cannot exist without the economic subject, because the economic phenomenon is created just by the individual's act (or, after the case, his/her abstention).

The *second* ontological interference is the necessary presence of evolution. The biological individual evolves (as species) based on the mechanism *genetical mutation – natural cumulative selection,* while the economic individual (as cultural hypostasis of the biological individual) evolves based on the mechanism *mesetic[2] mutation – social cumulative selection*.

Some consequences of the ontological interferences between Biology and Economics emerge now:

a) the biological evolution influences the economic function of the biological individual;

b) the economic evolution acts as *secondary* integrator (by the social cumulative selection, which is secondary related to the natural cumulative selection) for the genetical replicator

c) the economic evolution acts as a *primary* integrator for the memetic and/or semetic replicators. In other words, the social selection alters the natural one (for example, by cooperation, in the case of generic biological individuals, or by medicine, in the case of cultural biological individuals).

## 2. Eight principled interferences

*(1) the principle of co-evolution*

- the adult individual (the phenotype) evolves (from species perspective) with and through inter-action with its environment (the integrator) in both biology and economics. The biological sanction is equivalent to the economic sanction, i.e. extinction (physically, in the biological field, economically, in the economic field).
- the co-evolution has the same mechanism (based on two interrelated phenomena) in both biology and economics: the emergence of novelty (genetic mutation in biology, economic or institutional innovation in the economy). In both fields arises an interaction between the novelty and the existing background.

To be noted that the biological fitness, respectively the economic competitive advantage are preferentially directed (non-deliberately in the case of biology, but deliberately in the case of the economy). This interaction modelling is done by the Malthusian fitness model (in biology), and by the production function model (in economy). For example, the punctuated equilibrium (from biology) is analogue with the Schumpeterian business cycle in economy.

*(2) the principle of non-predictability*

In both fields (biology and economy) the phenomena/processes are fundamentally unpredictable. The main cause is, of course, the co-evolution (more precisely: co-evolutionary fitness, including adaptation).

---

[1] The word *necessary* has its logical signification, i.e. mandatory, inevitable, inherent.

[2] Mesetic means memetic + semetic.

Also, in both fields, the co-evolution is an exclusive ex post finding: a) an appropriate co-evolutional fitness is observed/measured in biology after it has been achieved; b) an appropriate co-evolutionary competitive advantage is observed/measured in the economy after its achievement. In addition, both in biology and economy is working the auto-poiesis (self-organization, self-reorganization, self-repair, self-generation, self-regeneration).

*(3) the principle of evolving dynamics*

Both fields exhibit an evolutionary dynamics, i.e. a dynamics which is controlled at the same time randomly and non-randomly. The randomization works when the novelty comes in (genes or memes[3]), while non-randomization works to validate the replication (perpetuation) of the novelty by cumulative (natural or social) processes. The models of evolutionary dynamics in biology and economy are formally analogous. Some examples: a) Lotka-Volterra type replicators; b) the hypercicle (Manfred Eigen); c) auto-catalytic networks; d) generative grammars (including stochastic type of grammar). Maybe, the economic taxonomies should be of an evolving type, not of a numeric one: for example, we should have: developing countries, stagnant countries, involutive countries, etc.

*(4) the principle of morphostatic causality*

Both in the biology and in the economy, any cause has adverse effects. In biology: anaerobic organisms have generated oxygen, which has led to the proliferation of aerobic organisms that have then eliminated anaerobics, while in the economy: avoiding unsafe bank customers (as a result of informational asymmetry) by imposing risk premiums on the active interest rate, cuts out also customers who are safe (the adverse selection effect[4]).

*(5) the principle of functional organization*

Both the biological and the economic fields are organized in such a way that the structure generates the function. By function I understand the potential (i.e. not necessarily current) output of a system, having a persistent, repeatable and co-evolutionary character with the system of the environment. However, some analysts believe that in the social field the Lamarckism is dominant. The discussion on this issue cannot be extended here, but the interested reader could find more about in the synthesis provided by Geoffrey Hodgson[5].

*(6) the principle of topological substantiation*

Both biology and the economy are topologically organized and conditioned: biological species is conditioned by geographic separation (thus, topologically), while the economic specialization (values, behaviours, etc.) is geographically, geopolitically conditioned, and from the perspective of endowment with resources - see HOS theory (i.e. also topologically)[6].

*(7) the principle of sustainability*

Both in biology and in economy, the principle of sustainable development works: in biology – evolution does not optimize (see, for example, the incredibly sub-optimized structure of the human brain) but ensures the sustainability of the body (through cumulative natural selection); in the economy –

[3] It is not admissible that the semes work randomly (they work inside an intellectual project only).

[4] See, here, the notorious works of **Joseph Stiglitz**.

[5] **Geoffrey M. Hodgson**, *The Evolution of Institutional Economics*. *Agency, Structure and Darwinism in American Institutionalism*, Routledge, 2004.

[6] Probably the most appropriate modelling (and formalism as well) of the economic process is the topological modelling, but such a modelling is still awaited.

generalizing the paradigm of optimality in the economy has led to chronic and serious adverse effects (inequality, poverty, global environmental damage, etc.), so it seems that the whole sustainability paradigm would be more adequate.

*(8) the principle of dissipation*

Both in biology and in economy, the principle of evolution goes away from equilibrium, i.e. the principle of dissipation is working: in biology – the individual organism extracts from the environment (including from individuals of other or even the same species) low entropy (neg-entropy) and „discharges" high entropy into environment; in the economy: economic actors (economic individuals or multi-individual economic structures) gain advantages, for example, profit (i.e. low entropy) from the economic environment (including other economic individuals) and eliminate in the economic environment disadvantages, for example, costs[7] (i.e. high entropy) in the fulfillment of the economic goals.

[7] The so called negative externalities which generate, in principle, social costs (see, also, the **Ronald Coase**'s theorem).