Understanding Social Competition by Evolutionary Concepts

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Abstract

In this paper, we try to understand some social patterns of competition using evolutionary concepts.

1 Socialism

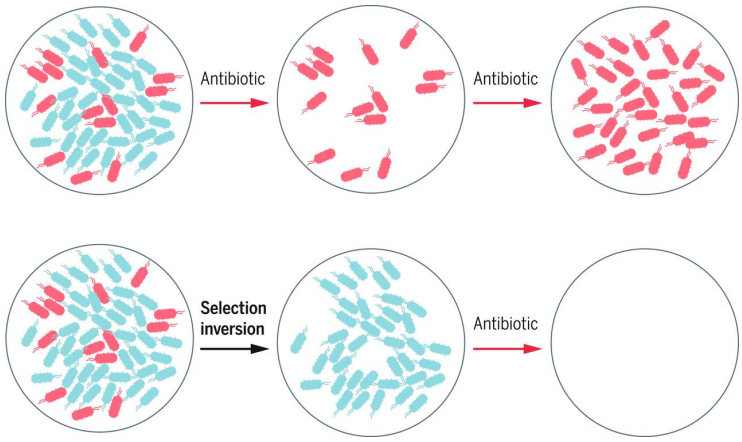
Suppose that we have n athletic clubs in our league.

One way to manage these n clubs is by Socialism, *i.e.*, we pay those teams from our financial property (v) the equal amount of $\frac{v}{n}$, regardless of their achievements and value creation. Besides, a central organization gathers all the incomes. Also, the government can decide to increase or decrease the total income of this organization using tax. In this world, as the athletes' efforts are not correlated with their incomes, they do not grow competitive and extra-hard working. A good example of this ecosystem is Iran's football or volleyball leagues.

In the biological analogy, this Socialism world is like a growth medium without any evolutionary pressure (n is the number of microorganisms, and v is the concentration of nutritions added into the medium per each culturing). In this medium, all organisms (*e.g.,* bacteria) are exposed equally by the nutrients in the medium and consequently grow at the same rate. Without any evolutionary pressure, we impose no meaningful condition for emerging evolutionary advantages. Hence, the current strains have equal growth rates, and each of their shares in the population remains untouched.

2 Capitalism

This time, we begin with the biological phenomena. Consider that we are culturing bacteria in the lab. By imposing (gradual) evolutionary pressure on the bacteria, we provide the situation in which the fitness rate becomes meaningful. If a mutation happens in a specific strain, it can affect that strain's survival fitness and growth rate, resulting in an evolutionary advantage or disadvantage.



All strains are different in this culture, and the phenotypic quality of bacteria increases throughout generations when having a proper evolutionary pressure. Now, we return to our social world. Each entity (sport club), has a distinctive income, $v_M(\vec{p})$, derived from its features, $\vec{p}$. The income function $v_M(.)$ is like the fitness function for microorganisms in the medium M with a special pressure. Unlike the Socialism society, v_M is a function of $\vec{p}$ here and is not set to a fixed amount of $\frac{v}{n}$. This dependency is the cause for improvements, as the following optimization problem is getting solved during evolution:

$$\underset{\vec{p}}{\text{maximize}} \quad v(\vec{p}) \tag{1}$$

The medium evolutionary pressure is an analogy for the financial policies on organizations and can be modeled or even tested via experiments in the lab!

3 Detailed Analogy

We have the following summary for our analogy:

Parameter	Organism's Growth	Social Groups
n	number of organisms	number of entities
v	total nutrients in the medium	total invest
M	evolutionary pressure	dispensing policy
$\vec{p}$	biological features	socioeconomic features
$v_m(\vec{p})$	fitness (growth rate)	income
r	mutation rate	reformation rate

It is worth mentioning that mutations happen between generations, but reformations can happen on a single entity (*e.g.,* a single club). The exact analogy of mutation is in the formation of new companies, but the reformations are enough for our purpose here. A club or organization in the next year could be considered as the new progeny of this year's situation. However, there is another important difference between evolution and social changes. As members of a social organization possess intelligence, they can change their features consciously, not merely randomly. This phenomenon can be modeled with directional mutagenesis during the pressure, but usually, the random mutations fulfill our purpose for simulating and theorizing the Capitalism transitions through time and testing various financial policies.

4 Evolution Failure

It is a well-known phenomenon in the biological systems that a severe and sudden evolutionary pressure could cause a complete death, so it should be imposed gradually. Understandably, a sudden policy change without adequate time for adaptation eliminates the financial income for the club, and consequently, they will go bankrupt. A gradual policy change will keep clubs alive and impose pressure on them to change to have more profits.

5 Common Social Evolutionary Pressures

To understand hidden pressures, we should consider the income function, $v_M(\vec{p})$. Usually, this pressure is the *broadcasting right* that expresses the followers of a club. In other words, for an athletic club, their fitness is highly correlated with the number of people who follow the matches of that club. Another obvious fitness in the competitive circumstances is the power of a team, which is highly correlated with that club's ascending in a kick-out competition and forthcoming trophies and incomes.