COMPETITION IN THE DARWIN ECONOMY AND LIVING SYSTEMS

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ABSTRACT

In his recent book *The Darwin Economy* Robert Frank predicted that Charles Darwin would replace Adam Smith as the father of modern economic theory. Darwin observed that natural selection tends to favor traits that make individual organisms successful even if those traits inhibit the success of the species. Darwin also noted that what counts is success relative to one's competitors rather than absolute numbers of progeny. Frank showed that these insights apply equally well to problems of economic competition.

In making this argument, however, Frank ignored the fact that such competition often involves interaction among multiple levels of living systems and that the loyalty of deciders can become quite compromised in these interactions. On the other hand living systems theory has ignored Darwin's insights, perhaps because it is unclear how they apply to upper levels of living systems. This paper attempts to bring together modern economic theory, living systems theory and evolution theory to see how each might contribute to an improved understanding of competition in monetary systems.

Keywords: competition, evolution, living systems, monetary systems, decider subsystem.

INTRODUCTION

Robert Frank begins his analysis of economic competition by noting that Charles Darwin perceived a basic weakness in Adam Smith's "invisible hand" theory and that Darwin offered a correction that has strongly influenced modern economic thinking (Frank, 2011; Darwin, 1872; Smith, 1776). Frank's book *The Darwin Economy* is focused on the problems of relative success of economic competitors and the implications of that competition for the greater society. Frank examines solutions to these problems, including negotiation between competitors in which each receives a share of the savings from agreement not to compete, as well as taxation of competitive activities that are harmful and costly to the competitors or the society in which they live.

Darwin's special insight was that natural selection, operating through the process of procreating organisms, tends to favor traits that make individual organisms successful even if those traits inhibit the success of the species. Thus competition among individuals does not necessarily produce an outcome that is good for the multitude.

To illustrate this situation Frank cited the example of elephant seals. Bull elephant seals must battle each other for the right to mate. The battle favors the larger bull. Bulls with genes that support growth tend to procreate more than smaller bulls. The result has been that modern bull elephant seals are huge, often five times the size of the females. But they are attractive and vulnerable targets for other predators such as sharks and they consume an inordinate amount of the food available to the herd. Thus their size actually adds to the vulnerability of themselves and the herd.

A further insight from Darwin is that success in breeding is relative to what others are doing. It is not simply a question of how many offspring one individual produces. For an individual's genetic mutation to spread amongst the species that individual must produce more offspring than its rivals and its offspring must carry the trait that supplies the advantage. When applied to economic competition the importance of relative success becomes quite significant. Typically the goal of participants in economic transactions is relative success rather than an absolute "win."

Frank shows us that when these insights are applied to examples of economic competition they reveal ways in which more efficient solutions can be found. Unfortunately these solutions often involve viewing the conflict from a higher level and invoking intervention from above. Thus interaction between levels of living systems becomes inextricably bound with modern economic theory.

LIVING SYSTEMS THEORY

James G. Miller presented living systems theory in great detail in his book *Living Systems* (Miller, 1978). Seven levels were originally described: cell, organ, organism, group, organization, society, and supranational system. An eighth level, the community, was later inserted between organizations and societies (Miller & Miller, 1990).

For purposes of this paper the most salient characteristic of these levels is that they evolve upward one step at a time by means of a shred-out process in which each higher level copies features that have been instrumental in the success of the lower level. Theoretically these eight levels apply to all forms of life but the upper levels, particularly societies and supranationals, are found primarily among humans.

One of the great values of living systems theory is that it facilitates investigation of cross-level interactions. When an individual organism has to deal with an organization or community, for instance, it is very useful to consider differences in the methods of decision making and the values each level employs in such interaction. The decision-making of individuals is governed by their inherited DNA as modified by learning whereas higher-level systems operate on the basis of a charter that often codifies a predecessor's "rules for success." Yet living systems at all levels possess a reproducer subsystem that enables the system to procreate. Studying the

evolution of higher-level living systems should yield valuable insights into the processes at play in the development of human civilization.

Natural and Service Systems

Living systems at the lower levels—cells, organs and organisms—are natural systems. Under the natural conditions provided by our solar system these forms of life evolved to populate an otherwise nonliving environment. Cells, organs and organisms may also be service systems. For instance organs by definition serve various needs of organisms. But cells develop naturally for that purpose and thus they are studied primarily in the natural sciences.

At the middle levels of living systems—groups, organizations and communities—these entities display a mixture of natural and service characteristics. Many species naturally form groups because the organisms share preferences for sustenance and living conditions or because groups naturally aid survival of the young. But groups may also be formed intentionally for services such as mutual defense, grooming and hunting. Some species such as bees and ants naturally develop organizations with specialized roles, but organisms or groups may also learn to develop organizations for purposes such as defense, nest or dam building, aquaculture or agriculture.

Certain locations naturally attract communities of organisms. For instance seals like to gather on beaches, penguins on ice packs, bats in caves, various species of aquatic life on corals, and certain kinds of trees in watery groves. These organisms share a preference for natural conditions of soil, water, temperature or weather. Communities also are formed intentionally for social purposes such as trade, mutual defense and storage of food. Thus groups, organizations and communities are studied in the natural sciences and the social sciences. They may be natural systems, service systems, or both.

The top levels of living systems—societies and supranational systems—are primarily service systems. Certain natural conditions such as isolation on an island, in a desert or estuary, or on a mountain range may encourage the formation of societies. Likewise, minor physical differences within a species may lead to separate societies. But societies are usually developed around social conditions such as common language and religious beliefs, an intrinsic trade relationship, or the dominance of one particular community. Their purpose is primarily to serve the people or the ruling elites in such matters as defense or expansion, trade, transportation, education, and regulation of behavior. Supranational systems such as the United Nations have been created specifically as service systems to promote peace and trade and to bridge social divides between societies.

To fully understand living systems they should be studied both as natural and service systems. There are commonalities in the two approaches that should be better recognized and differences that could easily contribute to greater understanding of complex fields of study such as political science and economics.

NATURAL SELECTION IN LIVING SYSTEMS

In *Living Systems* James G. Miller cited Darwin rarely and only once when discussing systems at a level higher than organisms. Miller wrote extensively about evolution but focused on how traits are passed from one level to a higher level through a *shred-out* process. Thus there is no evidence that he was aware of the special insights that serve as the foundation for Frank's book. Yet those insights, I believe, have profound implications for living systems theory.

If natural biological selection favors retention of traits that help individual organisms to procreate, sometimes at the expense of traits that aid survival of the species, this raises at least three important questions for living systems theory:

1. Is this also true at higher levels of living systems? Is the reproducer subsystem of a group directed only at producing groups that mirror faithfully the charter of the parent group? If groups are part of an organization, does the organization shape new groups to its own ends?
2. Since the decider subsystems of higher-level systems are made up of various combinations of organisms and those organisms also retain decider status for themselves and perhaps others, how can higher-level systems assure that their reproductive interests are properly represented?
3. Since money and the monetary economy were invented to facilitate trade between and among human living systems at every level, how can monetary systems theory best deal with the competing interests of all of these levels?

I will address these questions in turn.

Natural Selection at the Group Level and Above

Living systems theory indicates that the decider subsystem of a group, organization, community, society or supranational system makes decisions for the system on the basis of its understanding of the best interests of that system. That is the function of decider subsystems. Thus when a living system above the level of organisms decides to procreate it presumably seeks "offspring" that reflect its values and proffer some advantage to the parent system. Is there reason to suspect that this process might work in the same way that natural selection works for cells, organs and organisms?

The reproductive values of an organism are expressed primarily in its genetic template whereas the central structure and values of a group are recorded in its charter. The template or charter of a living system is "the original information input that is the program for its later structure and process" (Miller, p. 34). It is subject to modification by later inputs of matter-energy and information.

In higher organisms the template of a newborn is a combination and selection of instructions from the templates of two representatives of the species. Thus, even without modification the templates of offspring are not duplicates of either parent's template. For a new characteristic to

survive and grow to dominate the species it must provide a powerful advantage to its holders. Adding other sources of variation only reinforces the need for such an advantage.

Humans are able to modify some reproductive values through social behavior (e.g. abstaining from procreation because of inheritable disease) and medical technology but these modifications have relatively minor effects on genetic transmission of human values. A greater effect on inherited traits may come from factors such as social perceptions of beauty, strength, wealth or tribal affiliation. Such factors help to bring together people who are seen as "good matches" for the reproductive sweepstakes.

We may conclude that, even at the organic level of Darwin's observations, faithful transmission of advantageous traits from one generation to another is a very difficult and chancy process. Proliferation of new traits may be a more likely outcome. And elimination of disadvantageous traits may be much easier and more common than direct establishment of particular advantageous traits.

If we accept these conclusions then the transition from the organic level to the social systems may not be as great a leap as it seems. At the social level we lose the precision of genes as communicators of template information, but that precision is already substantially compromised in human reproduction.

When a group decides to reproduce itself or when a higher-level living system—an organization, for example—decides to replicate some of its component groups, it has much greater facility to modify the charter of its offspring. Such modifications are often the result of conscious choice. A group may wish to make its offspring more effective or attractive, for instance. An organization may decide to reproduce or modify itself through building more efficient groups. Thus the pace of change from one generation to another is likely to be much more rapid than at the level of organisms. The chances of error and misogyny are also likely to increase. One source of error, the loyalty of members of the decider subsystem, becomes a particular concern.

Loyalty of Decider Subsystems at the Group and Higher Levels

A major source of "error" in the transmission of traits from one generation to another resides in the nature of the decider subsystem at the group level and above. The decider subsystem is "the executive subsystem which receives information inputs from all other subsystems and transmits to them information outputs that control the entire system" (Miller, 1972, p. 67). Because conscious choice plays a major role in human activities at all levels the decider is a strong participant in maintaining or modifying the charters of human institutions.

Living systems at all levels must have an independent decider. But at any level above the cell the decider is composed of lower-level systems. That is, the decider of an organ such as the heart (part of the distributor subsystem) consists of cells. The decider of the human organism consists of the brain and nervous system; that is, it is made of cells and organs.

Darwinian Competition

A group's decider consists of one or more members of the group. These members are deciders for themselves as well as for the group. When decisions are made at the group level does the group's decider consider only the survival and procreation of the group or does it also weigh questions of individual survival and procreation? Let us examine this question in some detail. Theoretically Group A's decider subsystem is dedicated to the interests of that system alone. The interests of other systems are considered only with respect to how they may serve Group A. But our experience tells us that in reality this division of interests often breaks down. The values of the group are mixed with individual values when group decisions are made.

Group A may also be—in fact, likely is—part of a suprasystem such as an organization or community. In such cases the charter of the group as well as the call for a decision may have come from above. Thus for practical purposes we must assume that a group's decisions are made under a variety of possibly competing influences (Tracy, 1992). Conceivably outside influences could improve a group's decisions but at the very least such influences are likely to increase the divergence of the group's decisions from the specifications and limits of its own charter.

When a group is making decisions about creating copies of itself it proceeds, in theory, from the provisions of its own charter. The group modifies that charter in accordance with the purposes of the new groups, available resources, orders from above and perhaps personal preferences. Thus new groups, even in theory, are seldom accurate copies of the original.

Additional divergence is likely to occur from the means by which the charters of new groups are communicated. Instructions in the form of words are less detailed and precise than DNA. One method used by groups to counter this problem is to assign members of the original group as leaders of the new groups. The new groups may also train together with the mother group. Such methods will help to reduce divergence in the charters of the new groups but divergence will likely still be greater than at the organic level. Human reproduction is far from precise, as any family member can attest, but reproducing a group is even less exact.

In spite of the difficulties we have identified, decisions made even at upper levels such as the organization or society sometimes lead to a form of procreation. For instance a corporation may decide to create a subsidiary or franchise built upon a charter that is derived from the corporation's own charter. The corporation would naturally build into its subsidiary's charter those features it thinks are helping to make itself successful. Apple Corporation, for example, would expect its offshoots to employ the technology and operating system that have pleased so many of its customers. Thus there is a rough equivalent of natural selection, albeit more intentional, at the corporate level. If the judgment of the corporation's decider is good and is implemented well by the corporation's reproducer subsystem, the result will be to spread those elements of the corporation's charter in the microcosm of similar corporations.

Comparable influences toward preservation of system characteristics exist at higher levels. Communities maintain certain facilities and characteristics in their suburbs in order to retain

and attract families with similar values. As the suburbs grow and become communities in their own right they are likely to retain and replicate many of those characteristics. And nations tend to incorporate certain features of their governmental system into the charters or constitutions of their colonies and new territories.

With respect to the loyalty of the decider subsystems of living systems above the level of the organism we must conclude that it is chancy at best to expect complete adherence to a system's charter in the reproductive process. Indeed such systems often expend considerable energy in trying to assure such loyalty to the charter with the adverse effect that the decider may overemphasize the interests of the parent system at the expense of the needs of other related systems. Yet living systems theory is built upon the unity of control, through the decider, of all other subsystems.

Why are we surprised when our brains tell us to smoke a cigarette or eat too much? Why is a family chagrined when a son or daughter decides to quit school and elope with an "inappropriate" age-mate? And why do we expect our systems to be completely rational in their economic decision making?

The Conjunction of Living Systems Theory and Monetary Systems Theory

Economic behavior is conducted by living systems. Classical economic theory, like living systems theory, is based on the assumption that each system or competitor is acting in its own best interests. As we have seen, the precision of economic theory may not match the realities of such competition.

Economic competitors may be at the same systems level or at different levels. For example a small family grocery store may compete for business with a similar store across the street and also with a megastore that is part of a large corporation. In the simplest case we may look at two same-level participants each choosing their economic behavior on the basis of self interest. Our analysis of the decider subsystems of such participants causes us to be wary of the self-interest assumption but for two individuals it is often a reasonable approximation of the truth. Thus we can construct scenarios in which the participants may behave competitively or cooperatively in economic transactions and we may then examine what would be in their best interest. Such scenarios are the bread and butter of economic analysis.

Frank is aware that economic competitors do not always act in their own best interests. He notes "We can't pretend to understand how markets function unless we begin with a reasonably accurate portrait of the structure of human motivation" (Frank, 2007, p.24). He rejects, for instance, the simplistic notion that people are purely selfish in their motivations. He also rejects the idea that human satisfaction is based on the absolute amount consumed, citing evidence that we also care about our consumption relative to others. Thus he calls for more nuanced models.

Frank argues effectively that negotiation between economic competitors can often reveal potential agreements that would be better for both parties than a winner-take-all outcome. For

example, the cost of the battle may be greater than the benefit to either party. But what if there are participants on one or both sides who will not endure the costs of battle? This might easily occur if the negotiators are “hired guns” or one party has plenty of options while the other doesn't. It could also occur between parties who are not on the same systems level, such as a contest between government representatives and common citizens.

When markets become multi-level such as competition between a small family enterprise and a corporate megastore, the model of economic behavior assumes new dimensions. The megastore might be the family store's only important competitor but the corporation has many competitors. It may also view its market quite differently and may endeavor to maintain a consistent policy toward its competitors. Any attempt at negotiation would be constrained by such a policy. Likewise the community in which these competitors operate might have very different interests in the success of the competitors and might treat them quite differently if it assumes a regulatory role over their competition. An economic model that attempts to deal with these factors will be quite complex.

The assumption made by classical economic theory, and seemingly by living systems theory as well, that the participants will act on self interest may often be close enough for theoretical speculation. Yet we all can cite examples from history and our own experience that indicate this assumption can also be disastrously wrong. Examples abound of parents leading their families into ruin to satisfy personal needs, office holders stuffing their pockets at public expense, business moguls pursuing flights of fancy that harm their enterprises, and despots leading their nations into starvation and revolt. Thus it seems that for practical purposes our economic theories and models should at least consider the possibility that any given decision of a participant may represent a mixture of interests of that system and of its suprasystems or any of the components of its decider subsystem.

It is all very well to define the decider as the subsystem that directs the behavior of a living system, but it rarely does so without some influence from the interests of the decider's living members. My model of the Motivation Complex explicates many of these influences from systems both higher and lower in level than the system of central focus (Tracy, 2006).

For practical purposes we must assume that each competitor's decider subsystem is composed of one or more members of a lower-level system—for example, a Board of Directors making decisions for a corporation. Each member of the Board is likely to have some interests in common with the corporation but is almost certain also to be influenced by personal or social interests. The Board's processes may be designed to minimize such influences and concentrate attention on the needs of the corporation but no such system is perfect. Thus we can reasonably assume that the Board's decisions will not perfectly represent the good of the organization. And that is true of every economic decision made at the level of the group or higher.

For example the Mayor and Council members of a city may meet to debate and vote on proposals for the maintenance of existing assets and expansion of public facilities. We may call this group the decider subsystem of the city. And each of its decisions have economic

consequences that might be subject to negotiation. But each of the members of the decider are also affected by those consequences as are their families. And the brain of each of the members is his/her own decider and likely as well a part of the decider subsystems for their family, their church or other groups. Treating such a process by means of an economic or systems model that assumes each decider acts in her/his/its own best interests is an exercise in futility.

We should also note that the only elements of the decider whose characteristics can be replicated and perhaps multiplied through natural processes are the values of the living organisms involved. The decision processes used by the Mayor and City Council can be codified through legislation and can be improved through amendment, but the effectiveness of these tools is modified by the vagaries of human decision making and by the fact that over time the living members of the decider change. As we have noted, systems such as corporations and governments are not directly subject to natural selection.

MIXING LEVELS OF LIVING SYSTEMS AND MONETARY SYSTEMS

Thus far I have applied living systems thinking to specific economic problems. A broader concern is how living systems theory and monetary systems theory may intertwine. The link between living systems and monetary systems is very strong. Monetary systems are created by living systems at the community and society levels for the purpose of facilitating trade. Trade is the basic process of the distributor subsystem of a community or society. Through distribution trade also involves the ingestor, converter, producer and extruder subsystems.

Money is a code. It is thus deeply involved in the encoder, decoder, associator, memory, and decider subsystems of communities and societies. Their matter-energy storage subsystems become involved through the mechanism of banking. Overall in groups, organizations, communities and societies money performs much the same function as does blood at the organ and organism levels. Thus for social systems to perform well money or credit must flow.

Like blood, money is able to transfer energy from one part of a system to another part. But money also acts like fat cells. It is able to store energy for future use. In social systems the decider subsystem must often step in to control the rate of flow and the balance between storage and flow.

Although modern technology has enabled blood to flow from one organism to another, such cross-system transfers are much more common in monetary systems. More to the point, at least for this paper, is the fact that money flows easily from one level to another. Thus it connects all levels of living systems from organisms to supranationals.

It is in understanding the needs and structures of the different levels that living systems theory can contribute to the development of monetary systems theory. Trade between levels of living systems is fundamentally different from trade between members of the same level. The needs

of the levels are different and their decider subsystems often have divided loyalties. These factors must receive consideration in analyzing the performance of monetary systems.

MAKING DECISIONS FOR HIGHER-LEVEL LIVING SYSTEMS

The need for inclusion of living systems theory in economic theory was brought home to me by Frank's presentation of an economic analysis originally proposed by Robert Coase (Frank, 2011; Coase, 1959). Coase analyzed the problem of a factory owner and a physician in a dispute about noise from the factory that was damaging the doctor's practice at a potential cost to the doctor of $20,000. The analysis of the situation, as presented by Frank, showed that in the absence of regulation the factory and the doctor could negotiate a least-cost solution in which the factory installs sound proofing for $5000 rather than the doctor moving his office at a cost of $10,000. Even if the doctor paid for the sound proofing he would be better off than with any other solution.

On the other hand if the government of the community decided that the factory was liable for noise damage to the doctor's practice the factory would have to curb the noise or pay the doctor $20,000 in damages. The factory's best response would then be to pay $5000 to install the sound proofing.

In the presentation of the problem the economic interests of the factory owner and the doctor were analyzed. The focus was on the conclusion that in the absence of government regulation the best solution for the doctor would be to pay the factory owner to install sound proofing. To me, however, it was a dispute between an organization and an individual. The doctor was acting as decider for himself but the owner represented the whole factory organization. The description of the problem paid no attention to the organization as such, but did include consideration of the effect of government regulation of “noise damage” in which the government was acting as decider for the community or society. Thus systems at three different levels were involved in the economic events of the situation.

A more thorough economic analysis of Coase's problem would have to consider the costs and benefits to the factory employees and the cost of regulation to the community. If the latter costs are greater than the savings from promoting a cost-effective solution to the public noise problem then it makes no economic sense to regulate such matters. A better solution for the community might be to require (and perhaps facilitate) negotiation of such disputes. As for the factory owner and employees, sound proofing is likely to benefit them as well, though perhaps not in measurable economic terms. If the employees are not directly represented in the negotiations, the owner should be required to represent their interests as decider for the organization.

Economic theory could represent these complexities more clearly if it were to adopt certain features of living systems theory. In particular economic analysis should recognize and reflect the various levels of systems that are likely to be involved in real-world problems. Economic

scenarios should also take cognizance of the real difficulties that can result when the deciders in negotiations or in rule-making must represent multiple interests of two or more levels of living systems.

A current political controversy in the United States about medical insurance is a prime example of an economic muddle that requires living systems analysis. The dispute is about whether medical insurance provided by employers should include items desired by many employees but opposed by some of the employers. On one side we have large religious organizations, controlled primarily by men, opposing contraception on spiritual grounds and seeking to deny benefits to individual female employees who want the insurance to cover payments for contraceptives. In economic terms the benefit would cost nothing to the employers because contraception actually reduces medical costs overall. Thus the federal government has sought to resolve the dispute by having the insurance companies offer the benefit directly to the employees, thereby freeing the employers from moral costs, the employees from some medical costs, and the society from costs such as caring for unwanted babies.

In classical economic terms that would be a good solution. If those were the only living systems involved in the dispute the problem would be solved. Unfortunately there are also political party organizations weighing in on both sides of the question. One side basically argues that medical insurance is none of the government's business and that in a “free economy” it is purely up to employers whether to provide medical insurance for employees and what to cover in it. The other side insists that this is a matter to be decided at the level of the society because the health of our citizens is important to the state.

Living systems analysis insists that for the good of each of the participants in this dispute their deciders should properly represent the interests and values of their system and its members. If money were the only measure of a good decision that might be easy. As I have argued elsewhere employers became the prime source of health insurance in the United States through shear accident. The society never chose that route; it simply happened as a result of World War II (Tracy, 2001). Thus a simple societal solution would be to take employers out of the equation everywhere and allow individuals and groups to deal directly with insurers or not, as they choose. If the society chooses to provide care for those who cannot afford insurance that is a proper societal decision. This solution would resolve the moral dilemma now faced by some religious employers. It would also, I suspect, save one (or perhaps both) of the major political party organizations from shooting itself in the foot. Yet political grandstanding in which our Representatives abandon the interests of their constituents in favor of their own personal or party interests has blocked a rational economic solution.

Economic analysis in a situation like this is futile if we fail to recognize the fact that multiple parties at multiple levels are involved, each party with its own set of costs and benefits. Furthermore we must contend with the fact that whatever parties are brought to the bargaining table to pursue a reasonable economic outcome those deciders may represent multiple, and often competing, interests. In fact in America whenever the government is involved we can pretty well guarantee that it is representing a variety of interests. That is the nature of multi-

party democratic government. And as a result of our Supreme Court's "Citizens United" decision we can also assume that money will be strongly involved in any situation involving corporate interests. Corporations are now equivalent to people. But in living systems theory we already knew that!

To my knowledge the Supreme Court was not asked to examine the broader question of the purpose of money in a modern society. Was our monetary system designed to control the political processes of our nation? That certainly seems to have been the intention of some early rulers of other societies who introduced coinage into the lives of their subjects. Once money was in regular use it became much easier to collect taxes, for instance. Much less clear to me, however, is whether the framers of the Constitution of the United States intended that our monetary economy would assert control over the process of selecting a government. I wonder what the original Boston Tea Party participants would have thought if the bales of tea they tossed into the sea had turned out instead to be bales of money?

CONCLUSION

Living systems theory and monetary systems theory would be strengthened by stronger analysis of interactions between system levels. In living systems particular attention should be paid to inter-level influences on the behavior of decider subsystems. The Motivation Complex might provide a path for such analysis.

Economic theory has shown us the value of paying attention to some of the subtler aspects of Charles Darwin's observations on the evolution of species. Living systems theory could profit from applying those observations to the reproducer function and to the shred-out process. Living systems theory could in turn offer assistance to monetary systems theory in analyzing the multi-level complexities of competition for money.

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