

A Brief Introduction to Fairness Analysis

Rongqing Dai*

PHD, Freelance Philosopher, New Jersey, USA

*Corresponding author: Rongqing Dai, PHD, Freelance Philosopher, New Jersey, USA, Tel: + 0017185147243; E-mail: ronald_dai@yahoo.com

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Abstract

This paper provides philosophical analysis onto a fundamental force of human society and thus a fundamental parameter of any social system including economic system, which is fairness. It provides a brief explanation, through a simple deconstruction of the meaning and role of fairness in our everyday social life, about the nature and importance of fairness analysis in social studies. It could serve as an introductory discussion to the cultural transition from empirical investigation to rational analyses for social studies including economic studies.

Keywords: Fairness; Analysis; Dynamics; Social; Economics; Analytic; Transition

A Brief Background

At the very basic level, all activities in human world could be divided into three categories of interactions: interactions among human beings, interactions between human beings and inhuman objects, and interactions among inhuman objects. Even at the age of super cloud computing powers, it is clear that the most meaningful part of human civilization is created through interactions between human beings. Even for those great master artists who produced their master pieces mainly through their private personal work with inhuman objects, we could always identify the connections with other human beings that have helped to bring those works to this world. After all human beings are social beings so that no one could live a life without counting on interactions with others.

Human interactions introduces the meanings of morality, politics, culture, folk tradition, and economy, for which we have established the common moral standard, political knowledge and social political systems, cultural and traditional reflections, as well as practical and theoretical economic systems. Accordingly we have also developed correspondent vocabularies for us to understand and judge historical and present personal and social events, to explain why who and who did or do so and so at some time and somewhere, and to make guesses or predictions about what might happen in the future. By the help of these vocabularies we have also created great works in philosophical, literary and artistic, and other social and human cultural areas. However, compared to scientific languages used in the natural domain, our vocabularies in the social domain has so far failed to help us to comprehend the dynamic causes behind the apparent social values. For example, we are all familiar with the dark side of this world based on personal experiences as well as media news and literary stories, and we are all eager to learn how to fight against the social dark side, we might even go further trying to understand how poverty or human greedy and injustice produce the social dark side, but we normally would not dig deeper to see how various factors including our own behavior contribute to the cause of those dark side. This is

not simply an issue of lack of diligence or courage but more importantly is the consequence of lack of proper vocabularies. Or more precisely, it is not because we don't have the necessary words or phrases in our vocabularies, but because our way of using the words and phrases in our languages have not been organized to form the proper system to handle the complicated social dynamics.

The shallowness of our understanding could be seen across the whole social domain including views and comments about history and debates for the present and future. One important reason for this shallowness, or the reason why after thousands years of cultural evolutions our knowledge about our own social nature is still limited to the surface level by our vocabularies is that we have been focusing our attention to the relatively isolated colossal social behavior of collective or individual entities instead of the interactions between those entities. This situation is like what people in the natural domain faced to before Isaac Newton introduced the laws of forces¹ as the foundation of natural science about three centuries ago. This lag of centuries between social science and natural science is mainly due to the fact that we could not simply apply the laws of natural forces in our understanding of social phenomena; but instead we need to find the counterpart of natural force in our social domain, which is fairness as I would introduce in this writing. Obviously, this newly introduced fundamental force, fairness, for us to understand the dynamics in the social domain is nothing new or strange at all to all of us; however, it is not something well understood by most people either.

Market economy might be considered by many as not only the most complicated but also the most sophisticatedly developed field in the social domain. It not only is closely related to our everyday life but also has helped to produce a multitude of Nobel Prize laureates. Because of the central role of fairness in market economy, it is also a field that might serve as a convenient example to demonstrate the role of fairness as the fundamental force in the social domain and how fairness analysis could help us to better understand social dynamics. Since market economy is a game driven by interest based free wills, like in any other games played by people across the world around history, fairness is not only admirable but also demanded by most players in the game. Even those who do not respect the fair rights of

¹ The Mathematical Principles of Natural Philosophy, Isaac Newton, translated by Andrew Motte, published by Daniel Adee, 45 Liberty Street, NY. 1846.

others would also demand not to be treated unfairly when they cannot control the game. Therefore, the fundamental spirit of the game of market economy is fairness. Ironically, if we examine how the concept of fairness is used in academic literature or everyday life very carefully, we might find that the meaning of fairness is far from clear to people around the world.

If we attempt to anatomize any social standard of fairness, we might find that people have been constructing their standard with many specific conditions for any specific given subject. For example, a state-wise math test would be assumed to be fair in the sense that no student would know the questions in advance and everyone would be allowed the same length of time using similar tools to answer the questions during the test, plus the environment for all would be roughly the same. Those are the conditions on which the fairness of the test is constructed. However, if we deconstruct the foundation of this fairness of test by looking outside the isolated testing area and examining the fairness in the real life open society, then we might find the test is not really as fair as people might have imagined. First but not the last, no matter how carefully the questions are selected, it could not possibly cover all the teaching patterns in all the classes across the state, and thus some students might be more familiar with the subjects than others simply because their teachers have given them more exercises on the subjects by accident. There could be much more similar factors which would make the test not fair as they seem to be. Would this type of unforeseeable unfairness matter to the students? Of course it would, in this way or that way. But since this kind of unfairness seems unavoidable, people would tend to attribute it to something called luck. Nonetheless, not all the unlucky things are truly unavoidable. For example, if two test centers are located in two different places, one is quiet but the other is noisy, and one is with comfortable inner atmospheric condition but the other is freezing during the winter, then even though people could still extend the meaning of luck to their locations, it might not be the kind of luck that people cannot change it.

An open market system would be influenced by much more complicated factors than a single test event discussed above, and thus fairness would play a much more dynamic role and its impact upon whomever live and work in the economic system would be much more serious; yet the meaning of fairness for market economy is not as clear as most people might have thought either. Since fairness is not only the assumed precondition of a market economy but also the goal of any formal economic theory (at least in principle), the lack of understanding of fairness would no doubt be manifested in theoretical endeavor on economic issues. While scholars are struggling to promote more effective as well as fairer economic solutions, they might actually help to create polarized and thus ineffective market environment due to the lack of the understanding of fairness, which have happened many times during the history. Therefore, a better understanding of fairness is warranted in order for us to create a fairer economic system. However, once we start to investigate the meaning of fairness more carefully we would soon realize that fairness is not just a simple social standard, but indeed a fundamental driving force behind all human social activities, including economic activities. In order to acquire a full appreciation of what fairness is, we need a dynamic analysis of interactions between social elements (persons, organizations, and abstract cultures) in a way similar to what natural scientists have been doing for the past few centuries, but (unfortunately) without the handiness of a formal mathematical framework that natural scientists could enjoy.

The Role of Fairness

As we just saw in that math test example, to get a better understanding of fairness might involve a deconstruction of specific conditions in question and then bring in a full scale social and cultural inquiry. On the other hand, however, judgment about fairness always starts from very specific issues which might have immediate consequences in real life, such as corporate promotion, social wealth distribution, job opportunity decision, etc. More importantly, human awareness of issues of fairness in various events of their life would cause some urges for them to say something or do something for the change of what they might considered as unfair; or even if they don't feel the courage or don't bother to take the trouble to meddle in the unfair business of others, they would still choose to do whatever considered to be fair to themselves whenever possible. From this we could see the duality of fairness: fairness as the result of actions and fairness as the driving force to actions. Because of this duality, fairness functions as both a judge of the game of life and a player in the game. More precisely, fairness is not simply a concept of political or moral standard of a society but also a fundamental force of everyday life similar to the natural force Newton studied three centuries ago.

When we drive a car running on a highway, no matter how expensive the car is and how powerful the engine is, as we know according to our modern scientific knowledge that the car is always being pushed forward by the same friction force between the tire and the ground; besides, what is moving along is a colossal assembly of large quantity of tiny parts and each tiny part is being pushed (or dragged) forward by the total force from its neighboring parts or is undergoing chemical and electronic interactions. Similarly, even though there might be so called great social powers or very marvelous moments in this world, if we keep deconstructing the factors that build the social powers or create the big moments, we might at least for most of the time reach the very same interactive forces between human beings, and those interactive forces are all regulated by the same principle of fairness behind just like the interaction between material parts are regulated by the same Newton's laws at macroscopic scale.

Owing to the successful work of natural scientists for the past centuries, we could now understand very well the full scale dynamic complicity of material objects and systems around us in natural world; and due to the solid theoretical foundation of natural science, today when we enjoy our convenience of industrial artifacts we could have high level confidence in the technology behind the production. However, on the contrary, we don't have the same level of confidence in the data or the interpretation of data from economic studies. The main reason of this is indeed neither because people don't take economy as serious as natural sciences nor because nowadays people don't invest huge quantity of capital in potent electronic means to gather and process economic data, but because it is much more difficult to achieve same technological maturity in the social domain than in the natural domain.

About four centuries ago before Galileo (or Stevinus) legendarily dropped two metal balls down the Pisa Tower², natural scientists were facing a very uncertain world similar to what we are facing to today when dealing with the social issues. But natural scientists have overcome the uncertainty and constructed the scientific edifice since then. There are two important means that have helped them to achieve this: one is the experiment in controlled environment, another is the abstract analytical thinking based upon knowledge of interacting

² Drake, Stillman (1978). Galileo At Work. Chicago: University of Chicago Press.

forces between material objects. The second one is even more important than the first one since without abstract analysis, there would not be much meaningful controlled experiment.

We might certainly blame the open nature of any realistic economic system which lacks the controllability that natural scientists might enjoy in their labs. But on the other hand we might also reexamine whether we have pushed our analytical work far enough to help us better understand the social world as it should be. As matter of fact, in the domain of social sciences including economics, so far throughout the history, the knowledge system has not been properly reflecting the interactions between the basic units of the system--- human beings. Rather, social theories including economic theories have been constructed on top of collective concepts like moral standards and legal rights and penalties or inhuman numbers like market transaction data. For this reason people are fundamentally depending upon common senses and empirical knowledge to handle everyday social events without much abstract analysis about the nuances of human interacting dynamics even though this dynamics would indeed determine the development of the events.

One typical consequence of this lack of dynamic insight of social mechanisms in economic studies is the obvious detachment of economic data from the cultural environment from which those data are produced. Even though not too many nowadays people would naively deny the influence of political cultural development of a society upon its economic well-being, scholars are not able to relate them together in a sensitive way except for their personal judgment based on some eye catching big events or some histogram variation trend. Financial analysts forecast the possible rise and fall of market prices based on statistics of historical data and foreseeable big social or technological events without much knowledge about what kind of undergoing cultural movements are causing tomorrow's rise and fall. It is assumed to be the responsibility of historians to dig out subtle cultural influence upon political and economic status of real life afterword while nobody really knows or cares about whether or how historians would do the job correctly. Therefore, it is not hard to see the reason why supposedly sophisticated economic theories developed by elite scholars in the field could lead to many economic crises in the past.

The fact that the coarse-grained knowledge about underlining cultural forces has hindered the development of more rational social theories including economic theories could remind us that we are facing to a similar challenge as people in the age of Galileo were facing to for the study of nature: how to make a transition from empirical world into an analytic world. The answer should be to bring social sciences including economics down to the ground of interactive forces between basic social units---human beings. Only in that level we might conduct more sensitive bottom up investigations about human social system including economic system in a way similar to what natural scientists have been doing towards the inhuman world. In order to do so we need the help of fairness analysis since fairness is the key to understand the apparently dazzling interpersonal forces. Even though we should not unrealistically expect that we might pull out a highly analytical system for social sciences like the one for natural sciences, we still could make changes, radical changes, in the study of social problems including economic problems with the help of fairness analysis.

Fairness Analysis and the Challenges

Fairness analysis is a methodology or a philosophical way to examine human civilization based upon interactions between human beings with the help of abstraction of the force of fairness³. Because fairness analysis is aiming at the general nature of low end interpersonal interactions, unlike any existing theories of social sciences, it thus does not depend upon traditional moral standards or political norms; rather it could be used to analyze or deconstruct existing cultural concepts and social structural norms such as freedom, leadership and so on across cultural and geopolitical boundaries. For example, it is a common assumption that free market economy is fair. Someone might deduce furthermore based upon that assumption that the bigger the market size is the fairer the market would be since the benefit of the mechanism of free competition could be fully exploited with a bigger market. With that kind of mindset people would feel very confused when they saw things like global financial crises happened during past decades when the market was tremendously enlarged. But with fairness analysis, we might look into the real market logic in more details by deconstructing the presumption of fairness in free market economy. Once we do so we would then realize that the fairness assumption that people made about the free market economy was not much more sophisticated than the assumption people would make in the math test example we discussed above. Through the fairness analysis we might even discover some root cause of the global financial crisis: while it would inevitably involve some unfair factors from the real life open world into the assumed fair market system and those unfair factors would inevitably cause real life economic crises if they are not properly curbed, people just ignored the existence of these unfair factors by assuming that the market was fair because they were not aware of the importance of fairness analysis.

On the other hand, even though fairness analysis would help social scholars to acquire a dynamic insight of social systems such as economic systems, compared to natural sciences, there are still two fundamental difficulties people would not be able to get rid of.

The first difficulty is the lack of controlled experimental environment as already mentioned before. This is not only due to the complexion caused by the openness of any social system, but also because of the uncertainty resulting from the responsive nature of any intelligent system. Responsiveness of a system means it would make a self-adjustment quickly in response to ongoing events. For example, any published trick to teach people to buy good stocks at low prices would soon be invalidated by itself if it is truly a good trick. Besides, unlike natural scientists that are testing materials made of inanimate atoms or observing caged white mice in a lab, social scholars are studying ensembles that they themselves do fundamentally belong to. Ethics then should be one important restraint for anyone who attempt to make social experiments without sophisticated knowledge-based planning.

The second difficulty is the lack of elegant mathematical framework. There are mainly two factors responsible for this problem:

- The immeasurability of many abstractions involved in social activities. Unlike most abstractions used in natural sciences such as mass, temperature and speed which are measurable, many abstractions involved in social activities such as passion, love, greedy are not measurable or at least not easy to measure. This does not mean those

³ Chaotic Order: A Consequence of Economic Relativity, Rongqing Dai, Complexity in Economics, ed. Marisa Faggini, Anna Parziale, 2014, p.117.

abstractions do not make real senses. They do make real senses just like mass, temperature and speed in natural sciences since all people could not only clearly feel their own passion, love and greedy at different levels in different time periods in life but also could clearly perceive passion, love and greedy of different others at different time. But these abstractions are simply not measurable as mass, temperature and speed is. Nonetheless, in certain circumstances we might still find ways to measure social economic activities with some abstraction that reflects the dynamics of human interactions, and one good example is currency and prices measured by units of currency. Because the dynamics of social activities are constructed on top of non-measurable human wills, the values of abstractions (e.g. currency) used to gauge social activities would often exhibit higher instability and lower predictability than physical objects. For example, the face value of a bill is much more volatile than the weight of the paper which is used to print that bill;

- The nonlinear discrete divergent nature of any social system including an economic system. Even if we have found some way (e.g. stock prices) to measure the values of social abstractions.

It would be very hard for us to work out partial differential equations to precisely calculate their variations (e.g. partial differential equations of stock prices based upon all market data including sales and production as well as stock history). Or even if we could arrive at some type of equations with a selected set of abstract values for a very specific subject the equations would most probably highly nonlinear and difficult to solve due to the nonlinear nature of social (economic) activities.

The above mentioned two fundamental difficulties would pose great challenges for any effort to rationalize economic studies, but they are not sentences of capital punishment to our goal of transition from the empirical world into an analytic world for social (economic) studies. They just inform us of the limits of this transition we might expect in the same way the thermodynamics laws informed natural scientists of the limits they should expect centuries ago. But we are still very far away from those limits so that there are still many for us to achieve before we need to worry much about the limits just like what natural scientists have achieved during the past few centuries without the need to worry about the limitation posed by thermodynamics. These challenges should only make us smarter like what physical laws have made natural scientists smarter, not restrain us from moving forward.

Being aware of the difficulties of having controlled experimental environment or elegant math systems, we should tune our mind toward more realistic and productive efforts when attempting to

analyze social economic systems. Fairness analysis as a philosophical methodology is an ideal tool to examine social economic systems without the need to set up a closed controlled environment or a grand system of mathematical equations as you might find out once you start to look into the issue as I have done in the past years⁴.

Closing Words

While more and more scholars are looking into advanced mathematical approaches or numerical simulations by making use of the power of super computers to investigate social issues including economics, many of them seem to have ignored a basic fact that mathematics needs abstracted parameters or variables, which indeed would be results of more a philosophical work than a statistical work for a not very well understood domain.

The financial crises this world has faced in the past decade reminds us that studies in economic field could serve as a good example that mathematical or computational advantages could not replace the role of philosophical insight when investigating social issues. As a matter of fact, even with all the high-tech utilities employed in the economic field, human intelligence about economy could hardly be deemed as rational due to its fundamentally empirical nature. The root cause for this backwardness is obviously not lack of data processing technology or lack of fund but is lack of abstraction means to analyze full scale social cultural system.

Since Adam Smith first published his *The Wealth of Nations*⁵ more than two centuries ago fairness has always been the basic theme of economics. What differentiate classic economics, economic liberalism, Keynesian economics, socialism, or even communism are their different interpretations about what is fair and what is not. However, it might be a surprise to many that when supercomputing power is extensively applied to do complicated calculations or simulations in the economic field, the meaning of fairness is still far from clear to scholars around the world. This might raise a question concerning any effort of the computation: whether it is calculated to a fair market economy or calculated to an unfair future.

This paper provides an introduction to fairness analysis which would help us to revolutionize our social cultural system on this globe since the application of this philosophical methodology would impact our ways of looking at history, politics, economy, and even literary writing. I have done some initiative work on fairness analysis in the past years. But much more needs to be done if we are aiming at a more rational social cultural system in the future.

⁴ On Fairness Analysis, Rongqing Dai.

⁵ An Inquiry into the Nature and Causes of the Wealth of Nations, by Adam Smith, London: W. Strahan, 1776.