

Economics as Social Physics (Part II)

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5. Natural Law Tradition

As we explained in the first part of this article, the second characteristic of the philosophy of the enlightenment is that our nature and society are governed by the autonomous natural law so they repeat themselves harmoniously and rationally, because our nature and society are designed and constructed by Divine Providence. Of course, this kind of recognition would be accurately reflected in the later developed system of analytical mechanics and economics. Now, let us explain the case of analytical mechanics first.

As we can find in the system of analytical mechanics, d'Alembert's principle asserts that any problems of nature's movements (the problem of dynamics) can be reduced to the problems of nature's equilibrium (the problem of statics) without exception, and also Hamilton's principle asserts that any problem of nature's movements can be reduced to the problems of maximum-minimum problems. In other words, this doctrine of analytical mechanics is nothing but an intellectual system, in which the idea that our seemingly chaotic nature is in reality a well-regulated system full of homogeneity (d'Alembert's principle) and even rationality (Hamilton's principle) is embedded.

Second, let us explain the case of economics. As we can find in the system of economics, we can maintain that there exists a general equilibrium price in our economy, which clears all the commodity markets and so renders all the decision makings of economic agents mutually consistent by the proof of the existence of the general equilibrium price, and that our economy will converge to this general equilibrium position naturally by the proof of the stability of the general

equilibrium price, and even that this general equilibrium position has a very nice property on the welfare of economic agents by the first theorem of welfare economics. In other words, this doctrine of economics is nothing but an intellectual system, quite the same as analytical mechanics, in which the idea that our seemingly chaotic economy is in reality a well-regulated system full of harmoniousness (the existence of the general equilibrium price) and even rationality (the first theorem of welfare economics) is embedded.

In fact, we can show with ease that the fundamental framework of modern or neoclassical economics is formed by projecting the form and the meaning of analytical mechanics - especially the theory of a conservative mechanical field - to those of economics without essential alternations. And what is at stake is, not that famous founders of modern economics - Leon Walras, William Stanley Jevons, Francis Edgeworth etc - found the similarity between analytical mechanics and economics by chance, but that nobody but them reconstructed modern economics in quite a similar way as analytical mechanics intentionally. In other words, they invented the theory of economics, which has the same formal structure as the theory of analytical mechanics. By this reformation work of economics, they intended to sublimate the inferior position of economics of those days which were at best vague "moral sciences" to the sublime position on the same level as analytical mechanics which were believed to be "strict sciences".

Of course, the same thing can be said not only of modern economics but also of so-called classical economics. In fact, Francois Quesnay, the originator of Physiocracy and therefore the originator of economics itself, wrote

his well-known book titled *Tableau Economique* to show that money and commodities in our economy circulate regularly and harmoniously as if they conformed to the natural law of God, and therefore that our intervention into this harmonious economic order must not be justified absolutely because it will certainly incur a collapse of this harmonious order. And Adam Smith, the famous originator of Classical Economics, wrote his well-known book titled *Wealth of Nations* exactly in this same natural law tradition. He formulated the famous idea of the Invisible Hand, stressing that self-interest seeking behaviors of economic individuals in our economy can result in the increase of the whole interest of our economy, and discriminated between the market price which is determined by the invested labor value and the natural price which is determined by the demand-supply balance for commodities, maintaining that our economy converges to this natural price position naturally.

As we explained earlier, the third characteristic of modern economics is its adoption of equilibrium analysis, which supposes that our economy is governed by the autonomous natural law and therefore revolves harmoniously and rationally. The epistemological origin of equilibrium analysis in modern economics is already clear. The mode of thought which enabled modern economics to introduce equilibrium analysis was that philosophy of the enlightenment, which created the analytical mechanics on which modern economics was founded.

Taking account of what we have explained so far, we can elucidate that curious dual character of equilibrium analysis in economics. At first glance, equilibrium analysis in economics seems to possess the dual inconsistent character, "positive" and "normative".

More concretely, this analysis seems to wish to explain “positively” how our economy actually revolves (the theory of equilibrium and stability) and at the same time command “normatively” how our economy should be revolved prescriptively (the theory of Pareto efficiency). But this curious character of equilibrium analysis in economics is the necessary consequence of the epistemological origin of economics, the philosophy of the enlightenment, which came to think that our economy is governed (= “positive”) and must be governed (= “normative”) by the single natural-rational law because both society and nature are the creations of God. For that reason, equilibrium analysis can suppose that there exists a general equilibrium price in our economy, which clears all the commodity markets and so renders all the decision makings of economic agents mutually consistent, and that our economy will converge to this general equilibrium position naturally, and even that this general equilibrium position has a very nice property on the welfare of economic agents.

6. Religion and Science in the Philosophy of the Enlightenment

But many people may have doubts about the essential characteristics of the philosophy of the enlightenment. According to our presentations above, the essential feature of the philosophy of the enlightenment is its placing the fullest confidence on “reason” and “science”, showing the greatest respect for “the rationalism”. If so, how can the same philosophy suppose the “irrational” and “metaphysical” belief that both our nature and society are in origin designed and constructed by the transcendent being and derive many relevant propositions on the behavior of our nature and society from this belief? Can those presuppositions of the philosophy of the enlightenment be a mutually consistent statement? As a matter of fact, they can be consistent.

Before the emergence of the classical mechanics of Galileo or Newton, the concept of “God” had been generally

grasped in the role of “the supervisor” who controls and manages all the detailed events in the human world day after day. Of course, we human beings had not been supposed to have the opportunity to perceive this holy truth “directly”, but because of the undeniable existence of transcendent events such as “Revelation” and “Miracles”, we had been supposed to confirm “transcendently” that God exists in this world with certainty and that our daily lives are completely controlled and managed by God. Therefore, it is natural for us to believe that the existence and the truth of God consists in the words and legends of God embedded in the Holy Bible. To sum up, a religion before the philosophy of enlightenment had regarded the entity of God as the supervisor of our world, and had found the grounds for the existence of God in the transcendental perceptions such as Revelation and Miracles, and the place of the truth of God in God’s words embedded in the Holy Bible.

Contrary to this philosophy, after the emergence of the classical mechanics of Galileo and Newton, the concept of God came to be grasped in the role of “the designer” who designed and constructed our world in origin. Of course, as in the case of the pre-Newton

era, we were not supposed to have the opportunity to perceive this absolute truth “directly”, but because of the undeniable existence of regular and rational laws in our nature and society, we were supposed to confirm “scientifically” that there exists God in this world with certainty and that our world is the design and creation of God. Therefore, it is natural for us to come to believe that the existence and the truth of God consists in the words employed in natural and social sciences, that is, mathematics. To sum up, a religion after the philosophy of enlightenment came to regard the entity of God as the designer of our world, and transferred the grounds for the existence of God from the transcendental perceptions to scientific recognitions, and the place of the truth of God from God’s words embedded in the Holy Bible to the mathematics employed in natural and social sciences.

Now, we can understand the epistemological condition that the philosophy of the enlightenment could presuppose the existence of God while at the same time it could place the fullest confidence on reason. The philosophy of enlightenment did not attempted to negate a religion itself, but to ground a religion on mathematical

	Before the Philosophy of the Enlightenment	After the Philosophy of the Enlightenment
Concept of God	Supervisor	Designer
Confirmation of Existence of God	Transcendent Recognition such as Revelation	Scientific Recognition
Place of Truth	God’s Words in the Bible	Mathematics in Science

sciences or to suggest a new form of religious faith. As a result, the philosophy of enlightenment opposed to the political authority of a church in those days, not to a religion itself.

7. Emergence of Say's Law as Natural Law

So far, we have explained in detail that the three analytic tools of modern economics - methodological individualism, the optimizing hypothesis and equilibrium analysis - originated in the philosophy of the enlightenment. Therefore, in this last section, we elucidate how this fact prescribed the fundamental property of modern economics or what economy this fact enabled and forced a system of modern economics to consider. Now we assume that there exist a lot of consumers and a lot of producers in our economy. Then, when a producer maximizes her profit and a consumer maximizes her utility, the profit of a producer can be expressed as (producer profit) = (product sales) - (labor purchases), and the budget constraint of a consumer can be expressed as (product demands) + (money demands) = (labor sales) + (initial money holdings) + (share of producer profit). If we substitute the definition of producer profit for the definition of consumer's budget constraint and rearrange, we can obtain the following identity called "Walras Law".

(Gross Excess Supply of Commodity) \equiv (Gross Excess Demand of Money)

Furthermore, we assume that money does not have the same material utility as commodities (this is a normal assumption because we can not eat money physically). In this case, consumers do not have the incentive to continue to hold money after all the transactions are completed, so money will only be used as a medium of exchange for the transactions of products and inputs. In other words, we can say that money demands and the initial money holdings of a consumer must always be zero. And if we substitute this fact for the "Walras

Classical Mechanics	Modern Economics
Particle	Consumer (Producer)
Position	Commodity
Force	Price
Work	Budget Constraint (Cost)
Energy	Utility (Product)
Hamilton's Principle	Optimizing Hypothesis

Law" above, we can obtain the following identity.

(Gross Excess Supply of Commodity) $\equiv 0$

But this identity signifies that well-known "Say's Law", which insists the surprisingly optimistic propositions that there must not exist general over-production in our economy. In other words, when money does not have the material utility, "Walras Law", which we can obtain merely by summing the definition of producer's profit and consumer's budget constraint, is always equal to "Say's Law", which negates the possibility of general over-production and economic panic.

Let me summarize our previous discussion. When we show that the identity called "Walras Law" is equal to the conditional equality called "Say's Law", all we have to do is to invoke the three analytical tools of modern economics, that is, methodological individualism, the optimizing hypothesis, and equilibrium analysis. But as we have explained above, these analytical tools of economics originates in the natural law tradition of the philosophy of the enlightenment, which supposed that our nature and society are created by God so they should obey the natural law, and that the same analytical tools as natural science can be applied to social science. In different words, as far as we adopt the three analytical tools of

modern economics, or as far as we presuppose the natural law tradition which put the analytical method of social science and natural science in the same category, we cannot analyze the actual economy which has the possibility of general over-production and panic.

These arguments can be fundamentally applicable not only to neoclassical economics, but also to classical economics. Of course, there are a lot of differences between neoclassical economics and classical economics. For example, take up the value theory of classical and neoclassical economics. Classical economists might think that the value of a commodity is determined by the quantity of labor invested in a commodity. Of course, in the short term, the market price of a commodity, which is determined by the relative balance of supply and demand, is supposed to be able to be different from the natural price of a commodity, which is determined by the invested labor value. But in the long term, the market price of a commodity is supposed to converge to the natural price. Therefore, in the world of classical economics, the natural price and the market price, the theory of value and the theory of price must be strictly discriminated from each other. Contrary to this, neoclassical

economists might think that the value of a commodity is determined by the relative rarity of a commodity, which is determined only by the relative balance of supply and demand. Therefore, in the world of neoclassical economics, the natural price and the market price, the theory of value and the theory of price need not be strictly discriminated from each other.

And what is at stake is that there is more important epistemological meaning in this difference between the discourse of classical and neoclassical economics on value than it seems. In the first place, the value theory of classical economics, which find the origin and the real nature of the value of a commodity in the invested labor value, is identical to thinking that the essence of the value consists in the "external" "substance". For, the invested quantity of labor is "external" in the sense that it does not stem from the individual subjectivity (preference) and is "substance" in the sense that it is not dependent on the relative rarity of a commodity. On the contrary, the value theory of neoclassical economics, which find the origin and the real nature of the value of a commodity in the relative rarity, is identical to thinking that the essence of the value consists in the "internal" "difference". For the relative rarity is "internal" in the sense that it stems from the individual subjectivity (preference) and is "difference" in the sense that it is dependent only on the relative rarity of a commodity.

Notwithstanding these large differences between classical and neoclassical economics, "Say's Law" can always stand up in both classical and neoclassical economics. Of course, there is also a large difference on the foundation of "Say's Law" between classical economics and neoclassical economics. In the case of classical economics, "Say's Law" stands because a commodity is supposed to be sold at the value which is exactly equal to the invested labor value in a commodity at least in the long term, while in the case of neoclassical economics, it stands because the

optimizing hypothesis and equilibrium analysis lead to the formation of "Walras Law", which further leads to "Say's Law" when money does not have the physical utility. We came to be able to elucidate that classical and neoclassical economics have the term "classical" in common, in spite of many differences between the two. The reason is that both classical and neoclassical economics treat "Say's Law" as valid conservative law on our actual economy.

And what is quite surprising to us is, that only two economists, Thorstein Veblen and John Maynard Keynes can recognize these facts precisely. For example, Veblen said in his paper.

The economists of the late eighteenth and early nineteenth centuries were believers in a Providential order, or an order of Nature. ... The economic laws aimed at and formulated under the guidance of this preconception are laws of what takes place "naturally" or "normally", and it is of the essence of things so conceived that in the natural or normal course there is no wasted or misdirected effort. ... the ultimate theoretical postulate of which might, not unfairly, be stated as in some sort a law of the conservation of economic energy. When the course of things runs off naturally or normally, in accord with the exigencies of human welfare and the constraining laws of nature, economic income and outgo balance one another. ... The theorem of equivalence is the postulate which lies at the root of the classical theory of distribution. (Thorstein Veblen, *The Place of Science in Modern Civilization*, Transaction Publishers, 1990, pp. 280-281)

We can not help being surprised at this fact that these insights had been already gained by Veblen. For Veblen pointed out that nothing but the natural law tradition had served as the "preconception" to the founders of classical and neoclassical economics and had prescribed the fundamental structure of economics, and that this natural law tradition had enabled

economics to adopt the optimizing hypothesis and equilibrium theory as fundamental analytical tools, and that these analytical tools had enabled economics to insist that a law of the conservation of economic energy, which indicated the equivalence of income and outgo, that is, "Say's Law" could always stand.

In the same way, Keynes rejected the optimizing hypothesis of a consumer, and compared classical and neoclassical economics which continue to hold "Say's Law" to Euclidean geometry, while he compared his own economic theory which does not hold "Say's Law" to non-Euclidean geometry. At first glance, the former rejection seems to be natural because he attempted to propose a new theory of unemployment, and the latter metaphor seems to be empty rhetoric that is typical of him. But when we remember that the optimizing hypothesis and equilibrium analysis can lead to the formation of "Say's Law", and that Euclidean geometry is a mathematical framework on which analytical mechanics is grounded and non-Euclidean geometry is a mathematical framework on which the relativity theory of Einstein is grounded, we notice that Keynes pointed out quite the same thing as Veblen did.

In other words, only Veblen and Keynes had noticed half a century before that as far as we presuppose the natural law tradition in economics, we can not analyze the actual economy which has the possibility of general over-production and panic forever, which many economists nowadays do not notice. We can not relieve economic theory from the hell of economics as social physics even now.

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