MARX'S ECONOMIC LAW OF MOTION

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Thesis Abstract

İbrahim Korkmaz, “Marx’s Economic Law of Motion”

As the economist Stephen Cullenberg pointed out, for Marx, the law of falling rate of profit is the most important law of political economy. The central theses of this study are [a] that Marx’s law of falling rate of profit is an idealized law in the sense that the law should be seen within a theoretical model Marx constructed to represent an aspect of capitalist mode of production, and [b] that the law is perspectival in the Gierean sense, that is, it is limited, partial, contingent, context-, agent- and purpose-dependent.

Tez Özeti

İbrahim Korkmaz, “Marks’ın İktisadi Hareket Yasası”

Ekonomist Stephen Cullenberg’e göre, Marx için, azalan kar oranı yasası, politik ekonominin en önemli yasasıdır. Bu çalışmanın temel tezleri; [a] Marks’ın azalan kar oranı yasasının, Marks’ın kapitalist üretim tarzınının bir boyutunu temsil etmek için inşa ettiği kuramsal modelin içinde ele alınması gereken idealize edilmiş bir yasa olduğu; ve [b] bu yasanın Giere’ci anlamda belirli bir perspektifle ilgili, bu bakımdan sınırlı, kısmi, olumsal ve bağlam, ajan, amaç bağımlı olduğudur.

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To my love, Gamze

For my little butterfly, İpek

CONTENTS

CHAPTER I

INTRODUCTION

In Karl Marx's economical writings, there are two basic economic laws: The law of falling tendency of the rate of profit and the general law of capitalist accumulation. Marx's law of the falling rate of profit is the central subject of Marxian political economy. As the economist Stephen Cullenberg pointed out, for Marx, this is "the most important law of political economy, the most important law from the historical standpoint. It is a law which, despite its simplicity, has never been before grasped."[1]

In the thesis, I shall attempt to show that this law should be seen within the theoretical model Marx constructed to represent an aspect of capitalist mode of production. Using this theoretical model, Marx made scientific claims about the capitalist mode of production. This model, I will argue, is a theoretical model in the sense that it is composed of "idealized objects having idealizing properties and being in idealized relation to one another and obeying idealized law." [2]

In the literature, it is commonly accepted that Marx constructed a model for the reproduction of capital, but only a few economists saw that Marx also constructed a model within which the law of falling rate of profit is introduced. Therefore, the commentators miss that as far as the law of falling rate of profit (LFRP) is concerned, it is an idealized law within a model even though they may accept that Marx constructed the model in question independently from his model of enlarged reproduction of capital. Economist Howard Petith, for example, argues that Marx constructed a single sector model within which LFRP is shown, but he does not say anything about the status of the law itself. Unlike all of these approaches, I will

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[1] Stephen Cullenberg, *the Falling Rate of Profit*, London, 1994, p. 1.

[2] Robert Nola & Gürol Irzık, *Philosophy, Science, Education and Culture*, Springer, 2005, p. 306.

show that Marx constructed a two-sector dynamic idealized model within which LFRP is exhibited as an idealized law. It is very important to clarify this aspect of Marx's law in order to realize that the law does not apply to the real capitalist mode of production directly, i.e., the relationship between the law and the reality is indirect.

In the thesis, I will begin with Marx's presentation of the law of falling rate of profit, and at the end of the chapter IV, I will derive the formulation of the law. The chapters, from I to IV, discuss Marx's argument that the rate of profit tends to fall. Then in chapter V, I will introduce Ronald Giere's understanding of scientific activity in order to examine Marx's way of representing reality, i.e., constructing and using the model in question. Following Giere's understanding of scientific activity, I will argue that Marx constructed his theoretical model from a socio-economic based perspective. In addition, he also provided a *new* perspective by constructing the model, which we may call a labor-based perspective. I thus argue that Marx's theoretical claims in this context are perspectival in the Giereian sense. As I will show in this chapter, for Giere, theoretical claims are perspectival due to the fact that they, on the one hand, reflect a particular social and historical context; and, on the other hand, they are also claims influenced by purpose and intention of agents. In other words, the interaction between the (social, historical, and even cultural) context in which the theoretical claims are made and the intention, purpose of the agents makes all theoretical claims perspectival. For this reason I will also present firstly, Marx's purpose, and then the context within which he developed his theory.

CHAPTER II

COMMODITY

Marx begins his presentation with the analysis of commodity. A commodity is a thing outside us satisfying human beings' wants, and its utility is its use value. It has various use values. A commodity has also different exchange values, which present themselves as quantitative relations among commodities. The relations among commodities constantly change with time and place. That is why, according to Marx, these relations are also social and historical relations depending on the level of development of human beings' productive power.

For Marx, socially necessary abstract labor time is a common substance of all commodities produced and sold in a capitalist economy. The substance of a commodity presents itself as different exchange values, or as relative prices since the exchange-value of a commodity is the form of appearance of labor value. The labor value, or simply value, of a commodity is to be distinguished from its exchange value. The exchange value of a commodity, including labor-power, is the "form of appearance of value."[3] In this case, as the philosopher Ian Hunt pointed out Marx thinks that (1) value is the 'substance' of exchange value, and (2) the magnitude of value is determined by socially necessary labor time."[4] [5]

In contrast to exchange values of a commodity, labor value of a commodity is its intrinsic value. A commodity can be exchanged for other commodities in

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[3] Karl Marx, *Capital: A Critique of Political Economy*, vol.1 Penguin Classics, 1990, p. 128.

[4] Ian Hunt, *Analytical and Dialectical Marxism*. Aldershot: Avebury, 1993 p. 143.

[5] For example, Robinson does not distinguish the exchange value of a commodity from its value and even its use value. And for this reason, she maintains that Marx's argument for the value of a commodity is not an argument, but mere assertion. See Joan Robinson, *Economic Philosophy*, New York: Penguin Books, 1964, p. 38.

different proportions, i.e. it may have many exchange values. Yet, even if this is the case, exchange values of a commodity must be replaceable by each other. For this reason exchange values of a given commodity present something equal that is, commodities in question must share same property, which is common to all commodities. For example, the ratios which represent the rate of exchange among commodities can be shown in the following way: 1 kg sugar=0.5 kg rice, 0.5 kg rice=2 kg flour", and"1 kg sugar=2 kg flour. These statements can be represented by an equation "1 s= ½ r=2f". The equation implies that there must be "something" common to sugar, rice, and flour quantitatively. The common thing, in the first place, is the property of being a product of labor, since all commodities produced in labor process and sold in market place of a given simple capitalist economy share this same property. Marx argues that this property of a commodity emerges if we make abstraction from the use-value of a commodity. He writes:

> If we make abstraction from its use value, we abstract also from the material constituents and forms of which make it a use-value. It is no longer a table, a house, a piece of yarn or any other useful thing… Nor is it any longer of the product of the labor of the joiner…[6]

Therefore, when we set aside the use-value of a commodity, the property of being the product of abstract human labor is emerged. Marx makes this abstraction to analyze the nature of the exchange relations among commodities, which do not originate from the usefulness of the commodities since the relations present themselves as quantitative relations and not as qualitative ones. Then he argues that there must remain something that is accumulated in all commodities when commodities are in relations. The thing that is accumulated in all commodities, according to Marx, is the abstract homogeneous human labor. Therefore a useful

[6] Ibid., p. 128

article can be exchanged on the market only if it has this property, i.e., only if abstract human labor is objectified in it. For this reason we can argue that the common things between two commodities are not simply the property of being a product of labor but, in fact, property of being a product of abstract homogeneous human labor-power. That is why the value of a given commodity is determined by socially necessary labor-time required to produce its use-value under normal conditions of production.

CHAPTER III

LABOR AND LABOR-POWER

In this part, I will focus on Marx's fundamental distinction between labor and labor-power. Marx clearly distinguishes labor power from labor on the one hand, and the exchange value of labor-power and the use value of labor-power on the other. I argue that Marx's argument for the law of falling rate of profit depends crucially on these two distinctions.

All labor is an expenditure of labor-power. A worker as a bearer of labor power does not sell his labor but his labor power. Labor-power is the capacity of a worker for a given period of time. This labor-power becomes a "special" commodity under capitalism, and gains a specific value. Its specific value is its exchange value. The exchange value of labor-power is the quantity of social labor necessary to re-produce it. This value of labor-power can be expressed by the value of consumer goods, which are necessary to keep the bearer of labor-power in condition to work.

Labor-power also has a special use value for the capitalists. A capitalist consumes the use value of labor power in order to make worker produce value, i.e. a commodity. The labor-power of a worker has a double capacity to create value of a commodity produced. On the one hand he transfers the value of means of production consumed in the labor process into product, and on the other hand, by consuming his labor power he creates a new value. This new value added by labor comes from the special character of labor power, i.e. from the difference between the use value of labor power and its exchange value. The exchange value of labor-power presents itself as a wage s/he receives on the commodity market. The profit of a capitalist originates from the difference between what workers produce in value terms and

what they receive to keep themselves in condition to work. In a given capitalist economy, this difference appears in the form of value, not a physical output. Let us look at the nature of this special 'commodity', i.e. labor-power in detail.

The Sale and Purchase of Labor-Power

> Our friend the money owner must be lucky enough to find within the sphere of circulation, on the market, a commodity whose use-value possesses the peculiar property of being a source of value... the possessor of money does find such a special commodity on the market: the capacity for labor, in other words labor-power.[7]

Labor-power is a peculiar commodity since it is a property of a human being. It is the productive potential of a human being, which can be sold on the market for a given period to a capitalist. A worker as a bearer of labor-power cannot accumulate his labor-power. He just re-produces it for a working day by the consuming means of subsistence that he has. The power of a human being as a potential is presented as a useful thing, i.e. a labor-power on the market by a bearer of labor-power. Then the bearer of a labor-power tries to sell his power as a commodity. If he manages to sells his power, he not only transforms his power into labor-power, but also transforms himself, from a living person as a bearer of labor-power into a worker. He, in the end, becomes a worker of a capitalist for a given time. On the other hand the money owner transforms himself from being a money owner into a capitalist. As a living body, a human being also consumes his potential by his own physical and mental activities during the time when he is not at work, and a human being's productive power, therefore, cannot be accumulated or preserved. The owner of labor-power just works for today, and consumes his potential: Later he must re-produce his potential

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[7] Ibid., p. 270

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even if he is not at work. For this reason, the relation into whom capitalists and workers enter is an unequal relation of dependence on the market since the money owner can preserve his money, but workers do not preserve their labor-power when they are not at work since they consume it through activities other than working.

In his analysis of labor-power, Marx takes labor-power as a commodity. What does it mean for labor-power to be a commodity? According to Marx, labor-power presents itself as a commodity if an individual as a bearer of labor-power sells it as a commodity. By selling his labor-power as a commodity, for Marx, a worker "manages to alienate his labor-power and to avoid renouncing his rights of ownership"[8] That is why, unlike the slave, when a worker sells his labor-power as a commodity, he treats labor-power as his own commodity, and hands it over to capitalist temporarily. On the other hand, if an individual sells his labor-power as a commodity, he, in this position, according to Marx, must sell his labor-power as commodity since he has nothing to sell but his labor-power.

In his article, "Exploitatıon *via* Labour Power in Marx" Philosopher Henry Laycock critically analyzes the nature of labor-power as a commodity. Labor-power, as Laycock rightly points out, is the most fundamental theoretical concept in Marx's analysis of capitalist mode of production.[9] According to Laycock, Marx's views on labor-power seems to be inconsistent if the selling of the labor power is not to be understood as a selling of the use rights of the labor power. Marx, on the one hand, argues that labor-power can appear on the market as a commodity only if the individual sells it as a commodity. However he also writes that the worker

[8] Ibid., p.271

[9] See Henry Laycock, "Exploitation *via* Labour Power in Marx" The Journal Of Ethics 3, 1999, p. 122.

"constantly treat[s] his labor-power as his own property, his own commodity . . . In this way he manages to avoid renouncing his rights of ownership over it."[10] It is obvious that Marx's view seems to be inconsistent. If labor-power is a commodity that an individual sells, then he no longer owns it, and he cannot claim his rights of ownership over it. To resolve this inconsistency, I think that the dual character of labor-power must be taken into consideration.

Firstly, labor-power is not an article. It is just a potential of a human being. It can be activated or becomes reality through working, that is, it manifests itself through working. From this perspective, it is a dispositional property of a human being, and so before manifestation, it does not have any economical value. For this reason, the talk of the selling or buying labor power may be taken as an example of a category-mistake. However, labor-power appears in the market, and a capitalist pays for a daily value of labor-power, i.e. a daily cost of maintaining labor-power. He pays for the exchange value of the labor-power. The "real" value of labor-power for the capitalist is not its exchange value, and "real" value manifests itself in the labor process as its use-value. Therefore, labor-power is not to be taken as a commodity in the strict sense of the word. Unlike other commodities, it has dual character; its use creates greater value than its cost.

Secondly, as Marx pointed out, the capitalist acquires "the right to make the worker work for him during one day,"[11] and does not own the labor-power: "The capitalist has bought the labor-power at its daily value. The use-value of the labor-power belongs to him throughout one working day"[12] In other words, the capitalist

[10] Marx, op. cit., p. 271.

[11] Ibid., p. 341, 342.

[12] Ibid., p. 341.

pays for the exchange value of labor power, but buys its use value. The exchange value of labor power is different from its use value, since its use value, or its 'real' value manifests itself through creating *surplus* value in the labor process and not on the market. Owing to this peculiar character, it is not just a commodity, but a peculiar commodity.

The Difference between the Exchange and Use Value of Labor Power As a Source of Surplus Value

In Marx's model, an individual sells his labor-power in the commodity market at its daily value. This selling is a transformation of money into capital. Labor-power has not only use-value but also exchange value. The socially necessary labor-time for the production and re-production of labor-power is its the exchange value.[13]

The production of labor-power, in the first place, necessitates a producer, an individual. The individual re-produces his labor-power through consuming a certain quantity of the means of subsistence. Therefore, the exchange value of the labor power is determined by the socially necessary labor time to produce it. In other words, the exchange value of labor-power is equal to the value of means of subsistence through which the owner of labor-power re-produce himself. The means of subsistence are consumer goods such as food, clothes, furniture etc. Consequently, the exchange value of labor power depends on the value of the consumer goods.

The exchange value of labor-power has ultimate and minimum limit. Its minimum limit is determined by physically indispensable means of subsistence. Before manifesting itself in the labor process, and even before selling it in the commodity market, labor-power has to be produced. Then the bearer of labor power

[13] In the essay, I assume that exchange value of labor is equal to its value.

tries to sell his labor power. If he manages to sell his labor power, he alienates his labor power. Therefore, "the alienation of labor-power and its real manifestation, i.e., the period of its existence as a use-value, do not coincide in time."[14] The use value of labor-power is realized through working in the labor process. That is why the labor process should be examined in more detail. In the labor process, the money-owner is transformed into a capitalist, and a bearer of labor power is transformed into a worker by the capitalist mode of production.

[14] Ibid., p. 277.

CHAPTER IV

LABOR POWER IN THE LABOR PROCESS

The use of labor power in the labor process is labor itself in the sense that the labor power is activated in labor process through labor. The worker under the control of a capitalist consumes labor-power in order to product use-values. When the labor power is bought by the capitalist, his aim is not only to produce a good, i.e. a use-value, but to produce an exchange value, i.e. commodity, and in addition produce a surplus-value.

In general, a simple labor process is the appearance of the productive property of labor power. It is a process between man and the nature. By using tools of labor, a person produces something useful by which his needs are met. By his action, he changes not only the external world, but also his nature. In this simple form of labor process, he does not alienate himself (his labor-power) since he owns the products of labor, as well as his labor-power.

In contrast to this simple form of labor-process, in a simple capitalist mode of production, a worker works under the control of a capitalist. This process involves three different elements:

1. Labor as a purposeful activity, i.e. as a productive labor,
2. The objects of labor (raw materials), and
3. The instruments of labor such as machines, building etc.

Both the instruments and objects of labor are the means of production. They are objective elements of labor process, and labor power is the subjective element of labor process since it is an active factor of the labor process in the sense that it creates a new value.

The labor process in a capitalist mode of production takes place under the control of the capitalist. His aim is, in the end, to produce a surplus value. Therefore, two phenomena can be observed in the labor process: the worker, who is under the control of a capitalist, is forced to use the means of production in a proper manner according to the aim of the capitalist. Secondly, the product, produced at the end of the process, belongs to the capitalist.

By adding the means of production to labor power, which is purchased at its daily value, i.e. its exchange value on the commodity market, the capitalist is able to consume the use value of labor. He incorporates the use value of labor-power into the material world of the instruments of production. This material world of the instruments, too, belongs to the capitalist. He brings all the elements of production together in the same place at the same time. This incorporation is the process of transformation of money into a capital from which surplus value arises.

How does a surplus value arise from a capital? To answer this question, the elements, the nature of capital is to be examined since in forming the exchange value of a product, the elements play different parts. Therefore, first of all, I will examine the process of creating surplus value, and then I will explain the source of a surplus value from which, according to Marx's account, the profit of the capitalist originates.

The Process of Creating Surplus Value

Constant and Variable Capital

In the simple form of labor process, a person produces use-value. He works for his own sake, and owns the product he produced in labor process. In the capitalist form of the labor process as a part of production process, a worker works for the capitalist and not for himself, and the capitalist determines the conditions of labor

process. The capitalist owns the product since the means of production and the labor process belongs to him.

This capitalist version of labor process shares the same property, the property of producing use-value, with the simple form of labor process, whereas, the purpose of the capitalist production differs from its simple form. The capitalist wants to produce use-value not for its own sake, but he wants to produce use-value which has exchange value. In other words, he wants to produce a commodity, an article destined to be sold. Nevertheless, a capitalist not only wants to produce a commodity, but the commodity surpassing in value the total values of means of production and the labor-power. For this reason, the production process may be divided into two processes: labor process, and the process of creating value. However, these processes take place simultaneously.

According to labor theory of value, the value of a commodity, including means of production and labor power, is determined by the labor time socially necessary to produce it, which means that in use-value of a commodity, a quantity of labor is objectified. In other words, in use-value of a product produced at the end of the labor process, a quantity of labor, which can be expressed by labor time, is materialized. Therefore, a use-value has value only because abstract human labor is objectified in it.

The quantity of labor objectified in the product is composed of the value of means of production and the labor power in the first place. However, it is obvious that if the value of the finished product is equal to the total value of the means of production and labor-power, then the surplus value has not been created, cannot be arisen from the capital. The goal of the capitalist production process is not only the production of a use-value, but also the production of surplus value in order to

transform money invested into capital. That is why surplus value has to be created since capitalist's aim is to get as much profit as possible.

The sum of socially necessary labor-time for the production of a product is composed of socially necessary abstract labor-time objectified in the means of production used up in the labor process and socially necessary abstract labor time expended by workers in the same process. But the "daily cost of maintaining labor-power and its daily expenditure in work are totally different things. The former determines the exchange value of the labor power; the latter is its use-value"[15] From the difference between two magnitudes, that is, the value of labor-power and the value that labor-power valorizes, the surplus value originates. In other words, the total labor time required for the product consists of the labor-time materialized in the means of production and the *current* labor-time expended by the workers in the labor process.[16] Therefore the worker realizes the exchange value of his labor-power, but alienates its use value if we assume that capitalist paid the *full* value of each commodity, and consumed use value of all commodities including labor power, *ceteris paribus.* These two processes as a capitalist production process form the unity of labor process: i.e., the process of creating surplus value. The dual character of labor corresponds to it.[17]

The value of means of production does not add a new value other that its value to the product. Its value is preserved, and reappears itself in the final product

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[15] Ibid., p. 300.

[16] Anwar Shaikh, "Introduction to the History of Crisis Theories", 1978, p. 221. http://homepage.newschool.edu/~AShaikh,

[17] "Initially the commodity appeared to us as an object with a dual character, possessing both use value and exchange value. Later on it was seen that labor, too, has a dual character; in so far as it finds its expression in value, it no longer possesses the same characteristics as when it is the creator of use-value. I was first to point out and examine critically this twofold nature of the labor contained in commodities." See Marx, op. cit., p. 271.

by losing its exchange value at the same amount of labor time through the mediation of labor. The same labor, i.e. living labor, in contrast to dead labor in the means of production, adds fresh value to the final product through consuming labor power. This fresh value originates from the productivity of labor; therefore the value of the final product exceeds the value means of production and labor power, i.e. the initial capital invested. However the process of transferring the dead labor to the final product and adding to fresh value to it occurs at the same time. Consequently, surplus value emerges from the difference between the value of the final product and the value of its constituent elements.

In order to add fresh value to the final product, a worker, firstly, has to reproduce value of his labor power and, then to produce the value exceeding it by means of his productivity since the value of means of production reappears in the final product at the same amount of labor time. The part of initial capital advanced corresponding to means of production is called by Marx as a *constant capital*. And, he calls the part of initial capital corresponding to labor-power as a variable capital.

Surplus Value and the Rate of Surplus Value

At the beginning of the production process, the capital invested is composed of two components: the sum of the money spent on the means of production and the sum of money expended on labor-power. In other words, the capital at the beginning C equals=c (constant capital) + v (variable capital). The commodity is produced. Hence surplus value is created, the initial capital C changes from C to C' where C'= c+v+s (surplus value). In this formula, the value of constant capital reappears in the final product at the same amount of labor time objectified in it. It is transferred to final product through labor. And a new value is created in the production process. In other

words, the constant capital invested is changed qualitatively, but not quantitatively when it loses its exchange value since same amount of abstract socially necessary labor time embodied in the value of constant capital is transferred to final product through mediation of labor. The worker, when transferring that same amount of labor time, at the same time produces the value of his means of subsistence indirectly through which he reproduce his labor-power. He produces surplus value directly during the production of a commodity. This means that in a part of working day the worker works on his own account. In this part he reproduces the exchange value of his labor power indirectly. This part of a working day is called by Marx as necessary *labor-time.* On the other hand he, in the second portion of a working time, works for a capitalist during the creation surplus value. This part of a working day is called by Marx as *surplus labor time.* Therefore Marx writes:

> The variable capital and the labor power purchased by that capital are equal in value, and the value of this labor-power determines the necessary part of the working day; and since on the other hand, the surplus value is determined by the surplus part of a working day, it follows that surplus value is in the same ratio to variable capital as surplus labor is to necessary labor In other words, *the rate of surplus value*, s/v= surplus labor/necessary labor[18]

According to Marx, this ratio also expresses the degree of exploitation of labor-power by capital, and therefore, in a working day a capitalist, in order to increase the absolute surplus value tries to extend the surplus labor time by shortening the free time of workers if the technology being used is given.

[18] Ibid., p. 316.

Absolute and Relative Surplus-Value and the Rate of Profit

According to Marx, absolute surplus value is the surplus value produced by the lengthening of a working day, while the relative surplus value is the surplus value produced by lessening necessary labor time relatively.

By purchasing labor power, a capitalist acquires the right to make the worker work for him in a working day in which the capitalist consumes labor-power, and he tries to pull out the maximum benefit from the use value of labor-power in order to increase surplus value if the technology being used in the labor process is given. However the worker also maintains his rights over his labor-power since he treats his labor-power as his own commodity, and hands it over to the capitalist temporarily when he sells his labor-power as a commodity. That is why "there is therefore an antinomy, of right against right ...between equal rights, force decides."[19] Even though this is the case, there is a limit for consuming of the labor power by the capitalist in a working day, and in the end, the surplus value is determined by the amount of *variable* capitals advanced, if the rate of surplus value, the necessary labor time, and the limit of working day are given. Since the nature of labor-power and the working set a limit to absolute surplus value, the capitalist also tries to increase the relative surplus value.

A working day is composed of two elements: necessary and surplus labor time Necessary labor time is determined by the value of a labor-power, that is, the labor time necessary for the reproduction of labor power. Therefore an increase in relative surplus value depends on the fall of the value of labor power on the assumption that the exchange value of labor power is equal to the value of labor-

[19] Ibid. p. 344.

power, that is, under the condition that all commodities, including labor-power, are bought and sold at their full value. In other words, by diminishing the value of labor-power, the necessary labor-time to reproduce labor power is also lessened since the worker consumes less time than before on his own account to produce the value of his means of subsistence. The value of labor-power, *ceteris paribus,* falls if the productivity of labor increases. However the productivity of labor depends on the technical and social conditions of production process, i.e. the mode of production. That is why, before all else, the mode of production has to be changed in order to increase the productivity of labor and consequently reduce the value of labor-power. Moreover this process also causes to cheapen the price of commodities indirectly. That is, "relative surplus value increases in direct proportion to the development of the productivity of labor, while the value of commodities stands in precisely the opposite relation to the growth of productivity on the assumption that commodities, including labor power are sold at their full value."[20] Nevertheless, the growth of productivity of labor manifests itself in a falling profitability of capital and the falling profitability of capital affects the accumulation of capital. "The employment of surplus value as capital or its reconversion into capital since capitalist accumulation is motivated by profitability." [21] [22]

A capitalist, in order to maximize profit as much as possible, struggles against on the one hand workers in the production process in order to increase surplus value,

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[20] Ibid. p. 437, 655-663, 1068, 1069.

[21] Ibid. p. 723, Shaikh, op. cit., p. 231, 232.

[22] According to Marx's model, capital as value is composed of the value of the means of production, constant capital and the value of labor power; variable capital; and capital as a material thing, on the other hand, can be taken as a composition of dead labor and living labor power. Former composition of capital is called as a value-composition of capital; Marx calls the latter as a technical composition of capital.

on the other hand against other capitalists in order to extend his market share of his commodities. Competition of capitals occurs on the market for sale, materials, and cheap labor power. In the labor process, as we saw before, a capitalist tries to increase the productivity of labor in order to maximize his profit. However, the social productivity of labor in labor process depends on the technical and social condition of production process, in other words, in the long term, the best way to increase the productivity of labor is to revolutionize the mode of production. This process manifests itself as a relative decline in variable capital to fixed capital. A capitalist also struggles against other capitalist for sale. Capitalists are forced to lower unit cost of product. This battle leads a capitalist to investigate a new method of producing to achieve lower costs per unit of product. As Shaikh indicates "to raise productivity leads above all to the *mechanization of production*, machines replace workers and if the mechanization is to be successful, it must also reduce unit costs."[23] This shows that lower cost of production can be achieved by greater fixed capital bound up with per unit of a product. The lower cost method of production changes, in the first place, the whole picture of investment of the industry where the product is produced. On the assumption that if the value of labor power on a working day is given, and the rate of surplus value is fixed, a continual change in the technical composition of capital, i.e., the gradual growth in the constant capital to variable capital, and in relation to total capital "must necessarily results in gradual fall in the general rate of profit"[24] This is what Marx calls an LFRP (law of falling rate of profit), and regards it as a law of motion of modern capitalist societies. I introduce the law in the

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[23] Anwar Shaikh, "The Falling Rate of Profit as the Cause of Long Waves: Theory and Empirical Evidence" http://homepage.newschool.edu/~AShaikh, 1992, Shaikh, ibid., 1978, passim.

[24] Karl Marx, *Capital: A Critique of Political Economy*, vol.3 Penguin Classics, 1991, p. 318. .

following formulation: (In this formulation, Constant Variable: c; Variable Capital: v; Surplus-value: s. The value produced in one year: c plus v plus s)

1-Rate of Surplus Value (Rate of Exploitation): $\frac{s}{v}$ (I)

2-Rate of Profit: $\frac{s}{c+v}$ or $\frac{\frac{s}{v}}{\frac{c}{v}+1}$ (G)

3-Organic Composition of Capital[25]: $\frac{c}{v}$ (A)

Then from 1 and 3 the rate of profit can be shown in the following way:

G: $\frac{I}{A+1}$

On the assumption that the rate of surplus value (I) is fixed if the organic composition of capital rises, then the rate of profit tends to fall. This fall does not present itself in an absolute form, but rather in a tendency. The law is simply the expression of the continual development of the social productivity of labor, and is peculiar to the capitalist mode of production.

Consequently, capitalists struggle against workers and other capitalists in order to maximize their profit as much as possible. Under the capitalist mode of production, the necessity of competition among capitals forces capitalists to techniques with lower unit cost of the final product, therefore the mode of production is revolutionized. The progressive and relative decline in variable capital to fixed capital[26] and in relation to total capital takes place. The relative and progressive

[25] Organic composition of capital is determined by a change in the constant capital to variable capital, and in relation to total capital in the initial capital. It represents the composition of the capital.

[26] By “fixed capital,” I mean machines.

decline in variable capital to total capital, firstly, increases the social productivity of labor. This is the process of the mechanization of production. Secondly, it causes a continual cheapening of the final product since the final product contains smaller sum of socially necessary labor-time to produce it than before. The progressive and relative decline, in the end, changes the technical composition of capital, and it occurs in all spheres of the industry and raises the average organic composition of total capital of a given society. As a result, the general rate of profit falls gradually on the assumption that rate of surplus value remains the same in the long term even though the mass of surplus value and the absolute mass of profit grow.

CHAPTER V

GIERE ON SCIENTIFIC PERSPECTIVISM

In this part of the thesis, I will introduce Giere's understanding of scientific activity in the hopes of clarifying Marx's endeavor from a philosophical point of view. With the help of Giere's views, it will be seen that Marx's model, and the law are firstly perspectival, and secondly idealized constructions. These determinations help me focus on the structure of the model ontologically, an issue on which Giere does not concentrate.

Let us begin with the concept of perspectivism. What is scientific perspectivism? Giere does not coin the concept; it means a particular way of considering something. In his writings on scientific theorizing, Giere uses the concept as an inevitable feature of any attempt to constructing a model.

Giere begins his argument with a well-known premise: the universe has a definite structure, but its structure is exceedingly complex. Since this is the case, no models could capture more than limited aspects of the total complexity. In other words, one way of constructing models of the world may both provide resources for capturing some aspects of the reality more or less well.

In order to justify his idea that theoretical claims are also perspectival in the sense that they apply only to some aspects of the world without complete precision, Giere claims that both human perception and scientific observation virtually all of which involves instrumentation are perspectival. Scientific theorizing is, in a broad sense, based on human perception and scientific observation since without a perceiver and his scientific observation scientific activity of representing an aspect of world would be impossible. Before focusing on Giere's perspectivism specifically,

two general features of perspectivism should be indicated. First of all, there is no perspective from nowhere or from everywhere at once. All perspectives are partial and they are relative to the material object. (They are not relative to a person). For example, the experience of viewing an object from different angles and different distances provides different perspectives on the object. This is good evidence that there is something there and that each perspective is a perspective of something real.

In order to make his position clear, and illustrate how perspectivism works Giere uses the example of color vision. So, let us examine the nature of color vision. According to the science of color vision, colors are not physical light radiation itself. They are not inherent characteristics of objects. A complex *interaction* between aspects of the environment (including physical properties of lights, physical, and chemical properties of objects) and the human visual system is the reason for experiencing the color of an object. In this sense the interaction is perspectival to its object. Giere uses the term color perspectivism to designate interaction, and to emphasize the human side of interaction. What are the features of a colored perspective or color perspectivism?

In the first place, humans experience the real world from a colored perspective, and their perspective is a perspective on the world. Secondly, color perspectivism is to be regarded as partly subjective. It has a subjective part since the human experience of a color is partly based on activities of human visual system. Thirdly, different colored perspectives are compatible since viewing objects from different perspectives produces different perspectives, and their compatibility are guaranteed by the uniqueness of the world under the assumption that the causal

mechanism of visual systems are effectively deterministic.[27] In other words all perspectives are perspectives on a single world. Fourthly, the colored perspectives are intersubjectively objective in the sense that most people generally see the same objects as similarly colored in similar circumstances. And finally the colored perspectives are always partial, because human visual system is responsive to and is affected by only a narrow range of light radiation. Giere argues that scientific observations, which involve instrumentation generally, share more or less the *same* features of color vision.

Even if humans perceive one of the aspects of the world itself, and their perceptions of the aspect of the world are determined by their sensory capabilities, humans can also create instruments in order to enlarge and enrich their perspectives. However, scientific observations via instrumentation are also responsive to limited aspects of the world, and in this sense they are perspectival like human visual systems. But they produce more accurate and even more objective data of the world since different observers using same the instrument get more or less the same sets of measurement. In the same vein, Giere writes:

> Just as the human visual system responds only to electromagnetic radiation, so do ordinary microscopes or telescopes. These systems are equally blind to cosmic rays and neutrinos. But even for those aspects of the world to which they do respond, the response is limited.[28]

As Giere points out, like our capacity for color vision, scientific instrumentation provides us with a different perspective from which we can experience aspects of the world in detail. In this sense all forms of observation or detection via scientific instruments such as radio telescopes or optical telescopes

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[27] In scientific investigation of the world, as Giere puts, scientists presume that there is a unique causal structure of the world.

[28] Ronald Giere, *Scientific Perspectivism*, Chicago: University of Chicago Press, 2006, p. 41.

might be understood as perspectival in nature. On the other hand, these forms of observation provide not only kinds of outputs about the aspect of the word but also access to an aspect of reality. However, this access is always partial. Another point that must be emphasized is that, for Giere, choosing an instrumental perspective depends on aims of scientific investigation. There are multiple perspectives and all forms of instrumental perspectives have their own virtues and deficiencies relative to aims of scientific investigation, and they are equally valid in a pragmatic sense. Moreover, instrumental perspectives are compatible under the assumption that scientists operate with the methodological presumption that nature has a unique causal structure. As Giere stated, this is not to say that different instruments, e.g., two different radio telescopes, do not sometimes produce incompatible results about the same scene, but that if this is the case, scientists do not easily conclude that this result is originated from some strange curiosity of nature, but they conclude that one or the other instrument is malfunctioning. This behavior of scientists comes from the methodological presumption mentioned above.

The perspectives on an object might overlap; however, this does not mean that there is a move from a mere perspective to absolute truth. As Giere said:

> Before the seventeenth century, the Milky Way, as part of a commonsense perspective on the world, was perceived using human eyes simply as a broad band of light extending across the night sky. From the perspective of Galileo's roughly thirty power telescopes, it was perceived as being made up of a very large number of individual stars. But this was a change in perspective, not a move from a mere perspective to objectivist truth.[29]

[29] Ibid., p. 58

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Giere, then, extends these ideas to scientific theorizing. Before introducing Giere's idea specifically on scientific theorizing, I will introduce his notion of naturalism, of which perspectival realism is a part.

Naturalism is the position that all aspects of the world can be given a naturalistic explanation. Scientific explanations are the obvious exemplars for naturalistic explanations. For a naturalist, a scientific explanation is an explanation approved by a recognized science. Giere proposes that naturalism is to be taken as a method, not as a doctrine, and his view, in this sense, is a modified form of naturalism. In Giere's understanding, naturalism is the view that there is no justifiable a priori principle in science. Giere defends methodological naturalism, which means that naturalism is a tool with which scientists study science. However, this is not to say that naturalism is an a priori truth about science, but it is regarded as a programme in Giere's philosophy. This means, for any aspects of the world, one should seek a naturalistic rather than a super-naturalistic explanation.

To begin his argument that all theoretical claims are, like observational claims, perspectival, Giere firstly attacks the assumption that fundamental representational resources are linguistic. Then he argues that scientific practices of representing the world are fundamentally pragmatic. Giere writes:

> Pragmatics (…) seldom systematically investigated. Some recent work on the nature of natural languages suggests that language is primarily a cultural achievement (Clark 1997; Tomasello 1999). It is, if you will, a cultural artifact. Learning a language is learning to be a member of a culture with its history and mores. Insofar as it makes sense to talk about levels here, this all takes place at the level of pragmatics. Syntax and semantics seem to be emergent features of language use that only become visible, so to speak, in the study of written languages.[30]

[30] Ronald Giere, "How Models are Used to Represent Reality," Philosophy of Science 71(5): 742-752, http://www.tc.umn.edu/~giere/R&Fpubs.html
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Giere carries over the latter views to, specifically, scientific cultures. To examine scientific activity in these cultures, he proposes not to begin with the language itself, but with the scientific practices in which language is used. This proposition implies a shift to focus on the activity of representing rather than representation as a two-place relationship between linguistic entities and the world.

In the activity of representing, according to Giere, scientists generate models using principles and specific conditions, and then attempt to apply their models to the world. He, thus, writes:

> The attempts to apply models to the world generate hypotheses about the fit of specific models to particular things in the world. Judgments of fit are mediated by models of data generated by applying techniques of data analysis to actual observations. Specific hypotheses may then be generalized across previously designated classes of objects[31]

According to Giere, since the scientific activity of representing reality is fundamentally pragmatic, it is obvious that scientific models themselves do not represent the real world, but scientists use them to represent an aspect of the world.[32] Therefore, a model like a predicate could not have truth-value; it makes no sense to call a model true or false. But, models could be applied to a thing truly, or be true of a thing. If it is true of a particular system, then one reaches a mere conclusion that it fits that system.

Models are not compared directly with real systems. Only specific models can be directly tested empirically, and these tests provide the basis for the indirect empirical evaluation of more general or more abstract models. Empirical testing of

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[31] Giere, op. cit., p. 60, 61

[32] Giere challenges the idea that the structure of a model must be similar to the structure of the world; he dislikes isomorphism between models and the real world. He thinks that correspondence between model and the world is not given, but is to be resolved empirically.

models is a process of bringing observational and theoretical perspectives together in order to decide whether the model fits the world as well as desired. In other words, testing the fit of model experimentally to an aspect of the real system is a matter of comparing aspects of model with the model of data, not data directly.[33]

What are the elements of a scientific theory other than a model or sets of models? One of the elements of a scientific theory, in many sciences, is principle. Giere regards principles as defining quite abstract objects. By adding them special conditions scientists construct less abstract objects, models. In some sciences, these principles involve "laws of nature". The laws are interpreted as empirical laws. That is, generalizations that are true and universal. Giere dislikes this understanding of laws of nature, and for this reason, he argues that laws of nature are nothing but principles which are to be regarded as vehicles for making empirical claims.

In Giere's account, the linguistic formulations of principles[34] themselves do not tell us anything about the real world. The principles as genuine statements do not describe something in the universe nor is there something to which they refer. For example, Giere regards Newton's three laws of motion as principles, just referring to quantities called force and mass and relating force and mass to position, velocity and mass. However the principles themselves do not tell us what might count as force or

[33] What is a model of data? A model, for example, might include a number of variables. Suppose that two of the variables are related linearly by an equation: (B= MxA) Tentatively, two measurable quantities (Bo and Mo) in the real system are identified with B and M respectively. Scientists, then, make measurements, and they get a set of measurements that yields pairs of data points of the form, Bo and Mo. They also get a set of measurements for Ao as well. Even though there are many ways of analyzing the data to obtain a model of data, this set of measurements can be evaluated by using statistical instruments to compute the best estimate of observed slope Ao. This activity of scientists yields a linear model of the data. If the predicted value of A agrees well enough with its observed value, a scientist, or a group of scientists may conclude that the model fits the real system.

[34] Philosophers clearly distinguish "law" from a "law statement." The former is state of affairs in the world manifesting itself as regularity; the latter is a generalization, universally quantified statement, and the linguistic expression of a law. Giere attacks this interpretation of "laws of nature." See Nola & Irzık, op. cit. passim.

mass. It is unknowable whether or not the law applies to anywhere in the universe. As Giere writes:

> Could one find, for example, any two bodies, anywhere in the universe, whose motions exactly satisfied these laws? The most likely answer is no. The only possibility of Newton's Laws being precisely exemplified by our two bodies would be either if they were alone in the universe with no other bodies whose gravitational force would affect their motions, or if they existed in a perfectly uniform gravitational field.[35]

In this sense, according to Giere's account of laws of nature, linguistic formulations of Newton's laws of motion have not been interpreted empirically. They don't represent anything in the world but defining abstract objects. They characterize a particular *perspective* on the world. Thus only abstract meaning, not an empirical one is given to them. The principles, such as Newton's three laws of motion, (first law: an object at rest tends to stay at rest and an object in motion tends to stay in motion with the same speed and in the same direction unless acted upon by an unbalanced force; second law: F=m.a, and third law: for every action, there is an equal and opposite reaction) define a model, called as principled model by Giere. The principled model perfectly exemplifies the formulations. These formulations are true, even necessarily true for the model.[36]

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[35] Ronald Giere,"Using Models to Represent Reality,"*In Model-Based Reasoning in Scientific Discovery, Ed. L. Magnani, N. J. Nersessian, and P. Thagard, 41-57. New York: Kluwer/Plenum, 1999/www.tc.umn.edu/~giere/R&Fpubs.html*, 1999, p. 90.

[36] What about economics? Are there any principles regarded as laws? There is no consensus on even the concept of a model among economists; however, there are principles, equilibrium principles, laws such as supply and demand laws, a law of diminishing returns, and assumptions such as "an individual seeks more wealth" in economics. It is not obvious the status of the principles, laws or assumptions in economics. The main debate among economists is on whether the assumptions are true or not. However, by assumption, most of them mean principles taken as laws that govern agents' economic behaviors.

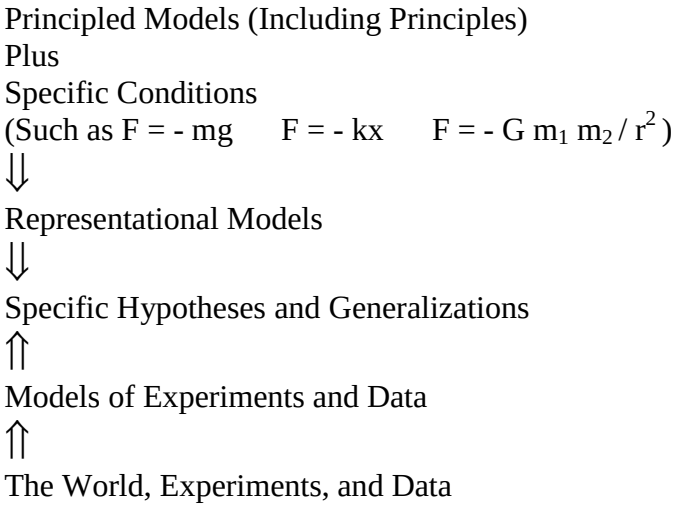

Figure 1

Figure 1 shows Giere's revised[37] understanding of a scientific theory. Let's look at the features of this scheme.

In constructing a model, moving from an abstract model, by adding specific conditions to them, to representational model, scientists, on the one hand, interpret elements, such as "x" (F=-kx) in a model according to a perspective provided by the principled model in order to show its relationship with other terms; and on the other hand they identify specific things in the real world with the elements of the model.

It should be remembered that a scientific model is not like a predicate but rather the definitions of a predicate according to Giere's understanding of model-based view of scientific theories. By interpretation and identification, scientists give a new definition of a predicate. For example, the predicate "is pendulum" can be interpreted according to a Newtonian perspective. Then it applies to a set of idealized models, for example, to a simple pendulum. Since a simple pendulum as an idealized

[37] Giere revised his view on interpretation in his book *Scientific Perspectivism*. In this book, he argued that a scientific activity of representing begins with the movement from principles to models. Then he changed his view. In his last essay, he argues that scientists begin with principled models. See Ronald Giere, "An Agent-Based Conception of Models and Scientific Representation" Synthese, 2010, 172:269–281.

model is a mass swinging from a massless string fixed to a frictionless pivot, no real pendulum is a simple pendulum. However scientists have still used simple pendulum model to represent an aspect of the real pendulum for a purpose, but how?

As I stated before, a scientific model itself does not represent the aspects of the world. Therefore we need to focus on the following question: how do scientists manage to use a scientific model, e.g., a simple pendulum model, to represent the physical world. That is, what makes a model a representation of something in the world? There is an easy answer: possible similarities between a model and the reality modeled make the use of model for representation possible. Nevertheless anything can be similar to anything else in many respects; besides, unlike representation, which is asymmetrical, similarity is a symmetrical relation. Therefore, scientists must specify the respect in which similarity is claimed. Since scientists as intentional agents with goals and purposes *intend* to use the model to represent an aspect of the world, they also specify which similarities are intended, and for what purpose. In this context, Giere states:

> …The formula is: Agents (1) intend; (2) to use model, M; (3) to represent a part of the world, W; (4) for some purpose, P. So agents specify which similarities are intended, and for what purpose. This conception eliminates the problem of multiple similarities and introduces the necessary asymmetry.[38]

So, here is Giere's formula for representing as an asymmetrical relation: A intends to use X to represent M for purposes T.

Another part of a scientific theory is a hypothesis, which is a claim, a linguistic entity that can be true or false, that the model fits a particular real system more or less well. Since, the issue of "fit" is to be resolved empirically, scientists

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[38] Ronald Giere, "An Agent-Based Conception of Models and Scientific Representation," Synthese, 2010, p. 269.

test how well the model fits to a real system by comparing aspects of the model with a model of data. This testing process is shown above.

Idealization and Modeling Reality

Giere focuses largely on the functions of a scientific model in the human activity of representing, and not on the ontology of models. He claims that there is no unified ontology of models due to the fact that, on the one hand, variety of things can be used as models, and on the other hand, there is no simple answer to the question of what is the structure of a scientific model. Here we deal with idealized models. Giere does not say anything directly and clearly about the method of idealization in constructing a model since he deals with *using* a model for specific purposes, by intentional agents, to represent an aspect of the world. In other words, he deals with an idealized model (through which we acquire scientific knowledge) to address questions of epistemology.

We may begin with idealization. There is no simple answer to the question: What is an idealization? An object, a property, a theoretical model, and "natural" laws are all the subject of idealization. When an object is idealized, we ignore one of its properties, or some of its properties, which is irrelevant to our theory[39]; we construct a *new* object, an idealized one, which is not a real item to be found in the world. However, idealized objects and real objects still share some common features. We even idealize properties, and obtain an abstract property not to be found in actual world. By means of idealization, we take into account essential properties of objects that may be linked in an idealized law within a theoretical model. Which property, or properties, is essential for understanding phenomena might be determined with

[39] Let us remember that Giere treats scientific theories as well as observations as perspectives. For this reason, an object is idealized according to a perspective.

respect to a perspective that one holds. Therefore, idealization is a necessary step in order to lay bare the primary/essential elements that govern phenomena under consideration. A simple pendulum model is an idealized model, that is, it consists of idealized objects, with idealized properties and obeying idealized laws.

Let us look at Marx's analysis in this context. Marx begins his analysis, or his presentation, with an abstraction. He makes an abstraction from a real object. He takes an object's property of satisfying human wants[40] into account, and ignores other properties, such as the chemical or atomic ones, which are irrelevant to his presentation/perspective. However, he still deals with a real object that can be found in the real world. Then he idealizes the object and obtains an ideal object that has the property of being a product of abstract homogeneous human labor-power. He writes:

> If we make abstraction from its use value, we abstract also from the material constituents and forms of which make it a use-value. It is no longer a table, a house, a piece of yarn or any other useful thing…Nor is it any longer of the product of the labor of the joiner…[41] [42]

I argue that this idealization process, even if Marx does not use the term idealization and does not distinguish idealization from abstraction, is the first step to construct a model in Marx. He extends this process to humans, means of productions etc. However to construct a theoretical model and lay bare the LFRP, he must also make idealizing assumptions. I will introduce all the idealizing assumptions below.

I would like to summarize using Giere's analogy of map features of a scientific model. In the first place, like models maps are representational. They are

[40] This is a use value of an object as I stated before.

[41] Marx, *Capital vol: 1,* 1990, p. 128.

[42] Marx calls this property exchange value of an object

used to represent an area. Second, like a model, maps are partial. That is only some features of territory in question are represented. Third, maps are of limited accuracy about included features. In this context, like models, maps are perspectival: Both using a map for representing and making a map are perspectival. Finally, it should be noted:

> Cultural background, the conventions for mapmaking, the designation of the region mapped, the specification of what features are mapped, and degree of accuracy all determine a perspective from which the region is mapped. Every map reflects a perspective on the region mapped, a perspective built in by the mapmakers.[43]

Interpreting Marx's Model for LFRP

From Giere's analogy, we may reach the conclusion that there are possible factors that may affect a perspective. I will first introduce possible factors that determine Marx's perspective. Second, I will introduce Marx's idealizing assumptions for his model, and then I will introduce Marx's theoretical model. Let us begin with Giere's formula for representing: A intends to use X to represent M for purposes T. In Marx's case, I will, thus, examine the following formula for representing: Marx intends to use a scientific model X to represent the capitalist mode of production for purposes T.

Let us begin with Marx's purpose. What is Marx's purpose? Marx examines the capitalist mode of production, relations of production and forms of intercourse that correspond to it in order to reveal the economic law of motion of modern society. Therefore, Marx's purpose is to lay bare the economic law of motion of capitalist societies. Marx intends to use a scientific model to this end. On what basis did Marx generate his model? What is/are perspective(s) within which he constructed

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[43] Giere, *Scientific Perspectivism*, p. 75.

the model? The short answer is the socio-economic based perspective. But, why did Marx begin his analysis with this perspective, with the economic base of society in order to lay bare the economic law of motion of modern society?

The answer to this question can be found in Marx's well-known *Preface.*[44] For him, the relations of production of a society constitute the economic structure of society. The economic structure of a society, according to Marx, is the real foundation to which the legal, political superstructure and even social consciousness correspond. For this reason, he begins his analysis with the capitalist mode of production to which relations of capitalist production correspond. Marx's approach to capitalist mode of production, which is a specific social form of economic organization in the history of mankind, originates from his understanding of history of mankind. Let us look at Engels' letter to Joseph Bloch to clarify Marx's general perspective in context:

> According to the materialist conception of history, the *ultimately* determining element in history is the production and reproduction of real life. Other than this neither Marx nor I have ever asserted. Hence if somebody twists this into saying that the economic element is the *only* determining one, he transforms that proposition into a meaningless, abstract, senseless phrase. The economic situation is the basis, but the various elements of the superstructure… also exercise their influence upon the course of the historical struggles and in many cases preponderate in determining their *form*. There is an interaction of all these elements.[45]

Marx made all the claims that I introduced in the first chapter of this thesis, about capitalist mode of production on the basis of the general perspective which I just introduced. But, specifically, he made the claims on the basis of the principles of labor theory of value. Also, there is a standard answer. The standard answer, in a

[44] See http://www.marxists.org/archive/marx/works/1859/critique-pol-economy/preface.htm

[45] See http://www.marxists.org/archive/marx/works/1890/letters/90_09_21.htm

broad sense, is that he made all the claims in question on the basis of German philosophy, English political economy and French socialism. However, not all these subjective factors, but also the features of a capitalist mode of production, its cultural and historical aspects may determine Marx's perspective. Finally, Marx's very specific observation on the condition of the English workers forms his perspective[46]. He begins his presentation in his *opus magnum, Capital*, with this observation. He writes: "The wealth of societies in which the capitalist mode of production prevails appears as an 'immense collection of commodities."[47]

These commodities, including labor-power, belong to capitalists, whose desire for profit is unlimited, since the means of production are privately owned. On the one hand, there is an immense collection of commodities in a capitalist society, on the other hand there are free wage laborers in the same society who have nothing but their labor power. Therefore "Immense collection of commodities" is not only the manifestation of total capital (in the form of commodity capital), but also manifestation of the fundamental antagonism between free wage laborers and capitalists. Free wage laborers are enforced to sell their labor power since they have nothing to sell but their labor power. On the other hand, when capitalist mode of production is taken into consideration, the ultimate aim of this production is the production of surplus value, the greater value than invested. Since the precondition for the production of surplus value on a social scale necessitates the existence of the class of free laborers, and all commodities are exchanged at their value, including

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[46] Marx uses England as the main illustration of the theoretical development he makes. However, he warns his reader: "If, however, the German reader pharisaically shrugs his shoulders at the condition of the English industrial and agricultural workers, or optimistically comforts himself with the thought that in Germany things are not nearly so bad, I must plainly tell him: *De te fabula narratur* (the tale is told of you)" See, Marx, op. cit., p. 90.

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[47] Ibid., p.125.

labor power, the system, within its own logic, is not unjust. How will this antagonism be resolved within the own rules of the system? In the theoretical level, Marx introduces a law, the law of falling rate of profit, to resolve this antagonism, but he argues that the system itself will not resolve this antagonism.

Finally, we may say, all of these factors may affect Marx's perspectives, i.e., all these factors constitute a context, from which he makes claims about capitalist mode of production. From this socio-economic based perspective, he sets aside non-essential features of the motion of capital in the capitalist production to lay bare the laws that govern capitalist mode of production. The theoretical model, in this sense, captures the essential features of the motion of capital within a perspective.

What are the idealizing assumptions of Marx's model? I argue that Marx constructed a dynamic two-sector macroeconomic idealized model. He, in the first volume of the *Capital*, focused on the production of the individual capital, its condition and movement. Individual capital includes money capital, production capital, and commodity capital. He, then concentrated on the interconnections of individual capital in social context. In other words, he began with the value analysis of individual capital, its product, and then he tried to analyze the interconnections of individual capitals under the condition that an output of one individual capital is an input of another capital. Before introducing Marx's model, I would like to emphasize that I argue that Marx's model (for LFRP) is a part of his model of reproduction of capital. Marx does not even use the term "model". But when Marx introduces his model, suprisingly, he writes: "We intend to use the following schema."[48] The word schema is suggestive of the concept of a model.

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[48] Ibid., p.473

I will derive Marx's model from his model of the reproduction of capital. I begin with assumptions of the model, some of which are also used for constructing the model of reproduction of capital. Some of the assumptions, as I indicate below, are idealizing assumptions that make his model an idealized one.

1. Price is constant, and products are exchanged at their full value. Prices, including prices of the components of capital, do not change. According to Marx, price changes do not affect his model. Therefore, this assumption is not a *ceteris paribus* assumption, but an idealizing assumption.

2. Economy consists of two sectors. Marx divides total economy into two sectors. In one of the sectors, the means of production are produced, and in the other sector, the means of consumption are produced. Therefore, total product of an economy breaks down into two departments: means of production and production of consumer goods. This is also an idealizing assumption since there are more sectors in economy.

3. Both capitalists, whose desire for profit is unlimited, and workers who have nothing to sell but labor power, are idealized humans in the sense that they are not real items to be found in the real world. As Marx said: "Individuals are dealt with here [in *Capital*] only in so far as they are personification of economic categories, the bearers of particular class-relations and interests".[49]

4. Capitalists consume all surplus value; it is spent on consumer goods. Wages are, too, spent on consumer goods.

5. Since a capitalist consumes all surplus value, he does not augment a part of surplus value and invest in enlargements of capital, and therefore accumulation does not take place.

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[49] Ibid., p. 92

6. All fixed capital is used up during the production capital.

7. The rate of surplus value s/v is taken as 100 per cent.

8. Rate of organic composition of capital c/v is the same in all departments.

Ceteris paribus assumptions in the model, which affect the rate of profit in the model, are about, following economist Shaikh, "Oscillations and other variations in the balances between aggregate demand, supply, and capacity, as well as changing trends in shift work."[50]

In this model, the individual production is a part of total production in the economy. Total product of the society-Marx calls this social capital or social commodity capital-is the sum of individual capitals. A part of the total capital is consumed by the workers in spending their wages, and by capitalists in spending surplus value. As mentioned above, Marx firstly focuses on the reproduction of individual capitals in which production capital generates commodity capital. Then he deals with the total social capital and its value. Thus, let us look at two departments (sectors) under these assumptions. In department I, means of production are produced, and in department II, consumer goods are produced. In a very broad sense, in capitalist mode of production, (initial) capital produces capital (commodity capital) and the value of the total product produced in each department breaks down into c+v+s.[51] Thus in department I (production of means of production): initial capital (c_1+v_1) generates commodity capital ($c_1+v_1+s_1$), and in department II (production of consumer good) initial capital (c_2+v_2) generates commodity capital

[50] Anwar Shaikh, "The Falling Rate of Profit as the Cause of Long Waves: Theory and Empirical Evidence," 1992, p. 176

[51] C represents constant capital that is the value of means of production used up in each department, and v represents variable capital that is equal to the value of social labor-power applied in each department. However, it should be indicated that it is not necessary for us to distinguish fixed capital from constant capital here.

($c_2+v_2+s_2$). Therefore, total commodity product in an *idealized* society is: ($c_1+v_1+s_1$) + ($c_2+v_2+s_2$)

Under these assumptions, it is necessary to conclude that total means of production produced in department I is equal to the means of production actually used in both departments (A), and in the same vein, total consumer goods produced in department II is equal to consumer goods actually consumed in both departments (B)

Total product is to be disturbed as follows:

In department I (production of means of production)

Initial Capital: (c_1+v_1): 4000+1000

Surplus value: s_1 (s/v from assumption 7): 1000

The organic composition of capital(c/v): 4c/v

Total means of production: ($c_1+v_1+s_1$): 6000

In department II (production of consumer goods)

Initial capital: (c_2+v_2): 2000 + 500

Surplus value:(s/v from assumption 7): 500

Total consumer goods: ($c_2+v_2+s_2$): 3000

Therefore, total commodity product in an *idealized* society is: ($c_1+v_1+s_1$) + ($c_2+v_2+s_2$): 9000

Let us add two necessary conclusions (A and B); thus

If $c_1+v_1+s_1= c_1+ c_2$ and $v_1+s_1 + v_2+s_2= c_2+v_2+s_2$: then we reach the basic axiom of the model:

$v_1+s_1= c_2$.

In the production part of the department, means of production are produced, they are entered into production, and capitalist and working classes consume means of consumption. They consist of idealized humans in this theoretical level.

Let us drop assumptions 4 and 5, and add an assumption to model that capitalists in department I save up half of the surplus value. This gives the following results: ($c_1 = v_1 = 1000, s_1 = 1000, c_2 = 1500, v_2 = 375\ s_2 = 375$)

Department I: 4000+1000 +500+500[saving] = 6000

Department II[52]: 1500 + 375[125][53]+375[125][54]= 2250

Total: = 8250

Let us change the last assumption that capitalists invest half of the surplus value for enlargements of his capital. In the first schema (model), it is assumed that the ratio of organic composition of capital is 4c/v. The capitalists, then, must divide half of the surplus value according to this ratio. Therefore they will buy new labor power for 100; and new means of production for 400. This gives the following results:

Department I: 4400+1100+1100= 6600

Department II: 2200+ 550+550 = 3300

Total: = 9900

According to Marx's socio-economic perspective, our idealized humans, the capitalists, as I previously stated in detail, are forced to invest in new methods of production in order to maximize their profit, i.e., they are forced to maximize surplus

[52] It is 1500, since half of surplus value cannot be consumed by the capitalist, which then reduces demand for consumer goods.

[53] The amount of investment decreased due to the saving in department I.

[54] The amount of investment decreased due to the saving in department I.

value and minimize the variable component of capital. This leads to the relative and progressive decline in variable capital to constant capital. Thus, the ratio of organic composition increases, i.e., machines and material are combined with less labor. Taken these views into consideration, let us drop assumption 8 and this gives the following results:

Table 1 Falling Rate of Profit

	c	v	s	s/v	c/v	Rate of Profit	
Existing Method	4000	1000	1000	1	4	0,2	Department I
Existing Method	4000	1000	1000	1	4	0,2	Department I
Existing Method	4400	1100	1100	1	4	0,2	Department I
Existing Method	2000	500	500	1	4	0,2	Department II
Existing Method	1500	375	375	1	4	0,2	Department II
Existing Method	2200	550	550	1	4	0,2	Department II
New Method of Production Incorporated	6000	1250	1250	1	4,8	0,17	Total
New Method of Production Incorporated	7000	1100	1100	1	6,3	0,14	Total

This table more or less shows results of Marx's model and its law, the law of falling rate of profit. The progressive and relative decline in the ratio of variable capital to constant capital changes the technical composition of capital, and it occurs in all spheres of the industry and raises the average organic composition of total capital of a given society. Then the general rate of profit falls gradually on the assumption that rate of surplus value remains same in the long term even though the magnitude of surplus value and the absolute magnitude of profit grow.

CHAPTER VI

CONCLUSION

Economists Ernest Mandel writes that Marx's *Capital* is based on "an understanding of the relativity, social determination and historical limitation of all economic laws"[55] This kind of understanding of Marx's law implies that the law applies to real capitalist mode of production truly. In the same vein, Shaikh does not clearly distinguish the law within Marx's model as an idealized law from its testing against the model of data since he takes formulation of the rate of profit within the model as basic rate of profit, and distinguishes it from actual rate of profit. Then, he argues that this basic rate of profit tends to fall. However, this conceptualization is not necessary. The formulation of basic rate of profit is one of the componets of the idealized law of falling rate of profit within Marx's model.

Marx's law is an idealized law in the sense that it is unknowable whether or not the law applies to anywhere in the universe. It is not universal, and its linguistic formulation does not describe something real in the universe. Therefore it is not true, but it is true of Marx's model. However, elements of the model could be interpreted and then identified with real humans and things in the real world, and then the law itself could be tested, by means of the model, against the model of data. At the end of the testing process, the model and law may become concrete.

Marx, from the socio-economic perspective, interprets the concept of labor, distinguishing labor from labor power, and then he interprets the concept of labor power as a commodity. Within the socio-economic perspective, specifically on the basis of labor theory of value, he distinguishes exchange value of labor power and its

[55] Marx, op. cit., p.13.

use-value. From the difference between these two magnitudes, that is, the value of labor-power and the value that labor-power valorizes, the surplus value originates. Marx, then, extends these views to the concept of profit. He argues that profit originates from surplus value. These claims, in this sense, are perspectival. On the other hand, using these views and assumptions about capitalist mode of production, he constructs a new model which is intented to be used to represent the capitalist mode of production by taking its essential features into consideration. Then within this model he reveals the law of falling rate of profit. His model, of course, does not capture all the aspects of capitalist mode of production since he constructs his model from a socio-economic perspective. Therefore, his theoretical claims are also perspectival.

Let me sum up my conclusions. Firstly, Marx's law is an idealized law. Secondly, the law is perspectival in the Gierean sense, that is, it is context/agent-dependent, limited, partial, but modestly real, and finally, it should be noted that Marx, in creating this model, creates also a new perspective, labor-based perspective from which we conceive economic phenomena as a manifestation of the struggle between capitalists and workers, and of the competition among capitals in history of mankind.

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