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Contents

Introduction

View on market is not much discussed in economics. The reason is quite plain: almost all economists use the word "equilibrium" to describe the mechanism of market. Needless to say, mainstream economics mathematically formulates the theory of equilibrium, which is reflected in the belief to the natural force of market, expressed as neoliberalism. Although many heterodox economists reject the idea of neoliberalism, they more or less rely on the theory of equilibrium developed in orthodoxy. The 2007-8 crisis stimulated the interest in the turmoil in the financial market and the ensuing income gap among the people. While post-Keynesians rediscovered "the financial instability hypothesis" in Hyman Minsky's

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works, analysing the dysfunction innate in finances, Marxians relaunched the criticism against the mainstream trickle-down myth by stressing the inevitable disparity in wealth under the capitalist mode of production. Nevertheless, in order to theorise, or even just to talk about, these contemporary issues in economics, we still need to think of the state of equilibrium first. Talking of disequilibrium or other failures of market requires talking of equilibrium. Thus, we have just a single market view: equilibrating view on market. This is so prevalent in economics because it originates in classical political economy, as we shall see later. Equilibrating view on market, therefore, can be put classical market view as well.

In my opinion, Marxians today are more liable to this classical market view than post-Keynesians. This is at least partly due to Marx's renowned theory of exploitation. The former half of *Capital* Vol.I mainly argues how the surplus value is created even on the condition that all commodities are sold at their value. Marx raises the problem in Chapter 5 as "contradictions in the general formula" of capital: the transformation of money into capital "must, and yet must not, take place in the sphere of circulation" where all commodities are exchanged with their equivalents (Marx[1990]p.289). It is addressed in Chapter 7, Section 2, "the valorisation process". While the value of the labour-power is determined by the value of the means of subsistence of the workers, the working time is not restricted to the time necessary for producing the means of subsistence. Thus, the labour-power can be employed longer than its value and the resultant difference is the source of the surplus value. The exploitation of the workers occurs, therefore, even if the market functions perfectly in the sense of the equivalent exchange. This theoretical explanation on the exploitation is mathematically sophisticated as the Fundamental Marxian Theorem later, and has been discussed repeatedly in various forms. As the mathematical formulation evolves, Marxians seem to become more and more addicted to the theory of equilibrium, or classical market view.

Meanwhile, Marx's contribution to our study on capitalism should not be reduced to the theory of exploitation. What Marx remained to us is the whole set of theoretical apparatus to analyse the capitalist social system and its history. The theory of exploitation is only a part of them. While the theory of exploitation is about the capitalist mode of production, Marx sheds light on the dynamics of what we can put as the capitalist mode of market as well. When the exploitation is revealed, the market should be assumed to be working perfectly with no price fluctuations or unsold commodities, but this does not mean that we must stick to this presumption throughout the analysis. The moment we doubt this presumption, we plunge into the world of disequilibrium. But calling the state disequilibrium is of no use: it is just saying "this is not an equilibrium". Here we need a completely different view on market. This paper tries to capture the image of the capitalist market from the viewpoint unique to Marx, which will be encapsulated as Marx-

ian market view in the following texts.

There are a number of issues to be addressed in the capitalist market: roughly speaking, all the subjects the mainstream economics does not pay enough attention to can be the point of argument, including the existence of money and the resale of commodities which presupposes the price fluctuations. In this paper, we are going to deal with the production techniques, or the conditions of production in a broad sense. The general equilibrium theory has developed a very effective tool on this issue: the non-substitution theorem. It is formulated in Samuelson[1951] as follows:

Theorem 1 (The Non-substitution Theorem)**.** *Regardless of the assigned values of* C_2*,* C_3*, ...,* C_n*,* x_{n+1}*, the optimal coefficients of production will always assume the same constant values, and the resulting production-possibility schedule for society will be of the simple linear form*

$$K_1C_1 + K_2C_2 + ... + K_nC_n = x_{n+1},$$

where the K's are constants independent of the C's and x_{n+1}*.*

This theorem allows us to assume the uniformity of the condition of production in each industry under competition. It is a simple but powerful proposition. Each producer has now no need to compare the production techniques on producing some kind of commodities by herself/himself: competitive market automatically selects a single optimal condition of production in every branch of industry. In consequence, the theory dependent on this theorem misses what features global capitalism. Multi-national companies are constantly exposed to global management issues, including the decisions on production locations. Applying this theorem consciously or unconsciously, we would assume the global market to be perfectly working, consequently overlooking the problem of global conditions of production.

What is important here is not the fact that the non-substitution theorem is unrealistic. Every theory must be in some respect unrealistic in order to be logically compelling. Nevertheless, the assumption on the theorem might oversimplify the matter by removing practically all the questions of selecting conditions of production. It might fall short of grasping the defect in market that is globally expanded in contemporary capitalism. Then, Marxian political economy might be able to offer another viewpoint by handling the problem of the plurality of the production process in a renovated theory. It is no easy task also for Marxian political economy. The difference in the conditions of production is discussed in one of the most complicated chapters in Marx's *Capital*, viz. Chapter 10 in *Capital* Vol.III. This chapter, titled "the Equalisation of the General Rate of Profit through Competition. Market Prices and Market Values. Surplus Profit", has been regarded as

the argument on "the theory of market value". We begin this paper by analysing Marx's text there.

1 The Theory of Market Value in *Capital*

Part 2 in *Capital* Vol.III is titled "The Transformation of Profit into Average Profit", mainly discussing how the general rate of profit is achieved among various industries and the price system is described. The first two chapters in Part 2, viz. Chapter 8 and 9, are today summarised as "the theory of price of production". Here the commodities are bought and sold not at their value, or in proportion to their objectified labour times, but at their price of production as the general rate of profit is determined. On the other hand, the exchange of commodities at their value was assumed throughout the analysis of *Capital* Vol.I. The gap between the two volumes had to be bridged in some way, and this is what the long-discussed "Transformation Problem" is all about. Because it has to do with the theoretical consistency of the whole framework of *Capital*, both Marxians and their opponents have been involved in the debate, making the problem one of the most popular theoretical topics in Marxian political economy. Meanwhile, the following Part 3 is about the tendency of the rate of profit to fall (TRPF). This is a clear-cut view on historical feature of capitalism in *Capital*, and has also attracted wide attention from Marxians. Sandwiched between the two, the Transformation Problem and the law of TRPF, the theory of market value in Chapter 10 is relatively unnoticed, remaining to be studied carefully. But the unattractiveness of Chapter 10 is not owing to its position in the configuration of *Capital* Vol.III. It is because of its difficulty in catching what the problem itself is in the theory of market value. We must, therefore, look into Marx's text itself in order to define the problem first. Marx uses the term "market value" for the first time in *Capital* Vol.III in the following sentences:

> The assumption that commodities from different spheres of production are sold at their values naturally means no more than that this value is the centre of gravity around which price turns and at which its constant rise and fall is balanced out. Besides this, however, there is always a *market value* (of which more later), as distinct from the individual value of particular commodities produced by the different producers. The individual value of some of these commodities will stand below the market value (i.e. less labour-time has been required for their production than the market value expresses), the value of others above it. (Marx[1991]p.279)

"The assumption" presented in the first sentence is no surprise. We can observe everywhere throughout the text of *Capital* the idea that the value is "the centre of gravity" that constantly attracts price fluctuations. It is true that this "assumption" about the value is also applied to the market value in this chapter, as Marx maintains "if supply and demand regulate market price, or rather the departures of market price from market value, the market value in turn regulates the relationship between demand and supply, or the centre around which fluctuations of demand and supply make the market price oscillate." (Marx[1991]p.282) Accordingly, the problem of the market value would be to find out how to determine the centre of gravity for price fluctuations under the general situation, i.e. where capitalists are faced with several conditions of production in certain industry.

The above-quoted sentences, however, use the contradictory conjunction to introduce the concept of market value after referring to the well-known "assumption". At least in this quotation, it is maintained that the value should not be regarded just as the centre of price fluctuations, but should be divided into two kinds, viz. the individual value and the market value. This distinction means not only the plurality of the conditions of production for certain commodity: what it exactly means is the coexistence of the plural conditions of production. The capitalists who produce the commodities of the individual value unequal to the market value do not disappear, but coexist with those who produce at the market value. If this is not the case, the concept of the market value is of no use in fact: if the commodities of the individual value are immediately swept away from the market, the market value always becomes the sole value, making the distinction nonsense. This might be the reason why the theory of market value has not been discussed so much. We must, therefore, contemplate the theory of market value as the problem of how the situation of the coexistence of different conditions of production affects the market. The determination of the centre of price fluctuations is just one of the points at best: here we must deal with broader questions regarding the market to which various individual capitalists with different conditions of production provide one kind of commodity.

Indeed, a very interesting idea is suggested in the texts on competition among capitalists in this chapter. Marx states "Nothing is easier to understand than the disproportions between demand and supply, and the consequent divergences of market prices from market values. The real difficulty lies in determining what is involved when demand and supply are said to coincide", following which he discusses why political economists assume that demand and supply coincide despite the fact that they rarely do in reality. The following text is his answer, depicting how price fluctuations appear in market.

> For the disproportions are contrary in character and, since they constantly follow one another, they balance each other out in their move-

> ment in contrary directions, their contradiction. Thus if there is no single individual case in which demand and supply actually do coincide, their disproportions still work out in the following way — and the result of a divergence in one direction is to call forth a divergence in the opposite direction — that supply and demand always coincide if a greater or lesser period of time is taken as a whole; but they coincide only as the average of the movement that has taken place and through the constant movement of their contradiction. Market prices that diverge from market values balance out on average to become market values, since the departures from these values balance each other as pluses and minuses, when their average is taken. And this average figure is by no means of merely theoretical significance. It is, rather, practically important for capital whose investment is calculated over the fluctuations and compensations of a more or less fixed period of time. (Marx[1991]p.291)

While this text regards the market value as the "average" of the movement of prices during "a greater or lesser period of time", the motion of capital behind this balance is somewhat different from what political economy usually assumes. Price fluctuations and capital movement are generally related with each other in a way that can be described as *a posteriori* adjustment typically shown in Chapter 4 of Ricardo's *On the Principles of Political Economy and Taxation*.

> Suppose now that a change of fashion should increase the demand for silks, and lessen that for woollens; their natural price, the quantity of labour necessary to their production, would continue unaltered, but the market price of silks would rise, and that of woollens would fall; and consequently the profits of the silk manufacturer would be above, whilst those of the woollen manufacturer would be below, the general and adjusted rate of profits. ... This increased demand for silks would however soon be supplied, by the transference of capital and labour from the woollen to the silk manufacture; when the market prices of silks and woollens would again approach their natural prices, and then the usual profits would be obtained by the respective manufacturers of those commodities. (Ricardo[1951]pp.90,91)

If this classical law of price and capital were applied to the above text of Marx's, however, we would not be able to understand why the "average figure" could be "practically important for capital". If capital were invested accordingly as price fluctuations instructed, the "average figure" would be just a consequence

of the transference of capital, "of merely theoretical significance". Here it is assumed that capital does not blindly abide by the price fluctuations as Ricardo describes. The market value itself is supposed to influence capital allocation among industries as "practically important" figure in this text.

This way of developing the theory of market value, however, seems to have failed. Although Marx illustrates various kinds of motion of capital in this chapter, it is very difficult to grasp how the market value, not the market price, definitely becomes practically important for capital. Instead, the common understanding appears as follows: "Capital withdraws from a sphere with a low rate of profit and wends its way to others that yield higher profit. This constant migration, the distribution of capital between the different spheres according to where the profit rate is rising and where it is falling, is what produces a relationship between supply and demand such that the average profit is the same in the various different spheres, and values are therefore transformed into prices of production." (Marx[1991]p.297) This style of the motion of capital is virtually identical with what is told in Ricardo's *Principles*, which leaves no room for the presence of the market value. Marx's progress from Ricardo could be found only in the distinction between values and prices of production, hence most Marxians have concentrated on the study of the Transformation Problem.

However, Japanese Marxians, the Uno school in particular, were the exception. They regarded the theory of market value as no less important than the theory of price of production, debating fiercely on the construction of the field. The next section overviews the debate and its consequence.

2 Development of the Theory of Market Value

Kozo Uno, who had a great impact on the postwar academia in Japan, challenged Marx's work in various fields, including the theory of market value. He emphasised the significance of the market value on the basis of his own understanding on the relation between value and price. Though *Capital* usually assumes commodity price is equal to its value and ignores the accidental difference between the two, Marx sometimes pays attention to the irregular disparity. The following sentences are the most quoted one: "The possibility, therefore, of a quantitative incongruity between price and magnitude of value, i.e. the possibility that the price may diverge from the magnitude of value, is inherent in the price-form itself. This is not a defect, but, on the contrary, it makes this form the adequate one for a mode of production whose laws can only assert themselves as blindly operating averages between constant irregularities" (Marx[1990]p.196). Here, Marx admits that price can depart from value and that the departure is "inherent in the price-form itself". This possible "incongruity" does not immediately mean instability, but it can be

the cause of unstable price fluctuations by promoting speculation on commodity price. If we can replace "price-form" with the word "market", this quotation is about possible instability "inherent in" market, which is often regarded as absent in Marx's theory.

But we should notice Marx points out that the possible "incongruity" between price and value "is not a defect". Rather, this inherent feature of market is regarded as appropriate for the capitalist mode of production, which is always subject to "constant irregularities". We cannot precisely know what the "constant irregularities" mean in this quotation. Going on reading, we bump into the similar terminology in Chapter 12, where Marx discusses the difference between the division of labour in manufacture and the division of labour in society: "The planned and regulated *a priori* system on which the division of labour is implemented within the workshop becomes, in the division of labour within society, an *a posteriori* necessity imposed by nature, controlling the unregulated caprice of the producers, and perceptible in the fluctuations of the barometer of market prices" (Marx[1990]p.476). If we could guess the meaning of "irregularity" from this passage, it would be the way in which individual capital is distributed to various branches of industry, signalled by the fluctuations of commodity prices. The social division of labour is "irregularly" arranged by industrial investment judged individually by each capitalist, whilst the division of labour within each factory is "regularly" controlled. This difference is also put as "anarchy in the social division of labour and despotism in the manufacturing division of labour" (Marx[1990]p.477). Here, the "irregularity" is assumed to be the same with the "anarchy", which is contrasted with the planned economy. It is natural that many respected scholars, including Rudolf Hilferding, paid more attention to the "anarchy" as the nature of the capitalist mode of production [1)].

On the other hand, Uno's point is that the fluctuation in prices is not only because of the "anarchy in social division of labour", but also due to the inherent nature of capitalist market. This is not to say that he regarded the "incongruity" as "the defect". Quite the contrary. He highly stressed the autonomy of market through price movements, but commodity prices move irregularly and independently from the state of social reproduction. Even if the scale of social reproduction was balanced quantitatively like the model in reproduction schema, prices could accidentally deviate from its value. This is because individual capitalists cannot observe the socially balanced scale of reproduction and are always driven to enhance their own production capacity to generate higher profit. The "anarchy in social division of labour" is, therefore, not the sole source of the "irregularity" in market, but only one of the causes. We can say that Uno contributed to Marxian political economy by distinguishing the irregular mobility inherent in market from the anarchical aspect of the capitalist mode of production.

Instead of reducing the "irregularity" of market to the anarchical capital allo-

cations in social division of labour, Uno tries to capture the nature of capitalist market in two theoretical fields: the one is the measure of values as one of the functions of money, and the other is the theory of market value. Since Uno's developments in these two fields are quite unique and related with each other, we need to check his argument on the measure of values in the theory of money before going onto the argument on the market value. According to Uno,

> The price of a commodity expresses its value in terms of the socially recognised *general equivalent*. But mere pricing by itself does not signify that society has approved of it; a money price too is a value-form which reflects a subjective evaluation on the part of the commodity-owner. Even if his pricing is made with due consideration of what other sellers of similar commodities do, that alone does not guarantee that his price is an accurate indication of the value of his commodity... A commodity offered at a certain price is socially confirmed in its value only when it is recurrently purchased at that price by the money-owners who demand that commodity. (Uno[1980]p.9)

Here Uno opposes Marx's view that money as the measure of values displays the value of commodities. Money does play the role, but if it were the function of measuring values, why would we need to discuss it after analysing a value-form? In order to understand what money does, we must carefully observe what the price-form does. The values of commodities cannot be measured only by showing themselves in price-forms. They must be purchased, and this should be the true function of money to measure values. The purchase must be recurrent, Uno insists. As commodities are purchased recurrently, their prices rise and fall incessantly and a resultant central price is confirmed as the value. Thus, money "functions as the measure of value in M—C" (Uno[1980]p.10).

This unique view on the measure of value is the basis of Uno's theory of market value. Again, Uno condemns Marx for the opaque description on market value in *Capital* and expresses his original idea as follows:

> As a general rule, the bulk of any kind of product tends to be supplied under average (or normal) conditions of production and the market value of the product is determined by the *individual value* of it supplied under such conditions. But this need not always be the case. The market value of a commodity must reflect an equilibrium of demand and supply, the market value being the centre of attraction for the market price of the commodity. This means that the supply of the commodity increases as the demand for it raises its market price above the centre, and decreases in the reverse case. Hence the determination of the market value of a commodity depends upon the

> conditions of production under which the supply of the commodity is capable of being adjusted to the demand for it. If in general the value of a commodity produced under normal conditions of production is said to determine the market value of the same kind of commodity, this means that the supply at the margin of this kind of commodity is, in most cases if not always, drawn from an increase of its production under the normal conditions and seldom from an increase of production under particularly favourable or unfavourable conditions. (Uno[1980]p.83)

It is clear in this text that Uno considers the problem of the theory of market value lies in finding out how the centre of gravity of price is determined. The centre is reached by the function of money as the measure of values, but is not determined. Uno solved this question raised in the function of money by maintaining that it "depends upon the conditions of production under which the supply of the commodity is capable of being adjusted to the demand for it". In other words, the determinant of the centre of gravity is the condition of production that can be adopted to expand production to meet the additional demand. Even if most part of the commodity is supplied under normal condition of production, the market value as the centre of gravity is determined by an inferior or superior condition when capitalists using normal condition fail to meet the increasing demand. Hence the market value cannot be fully grasped when considered only within the sphere of production. The determination of the market value must be related to "an equilibrium of demand and supply" on the basis of the function of money as measure of value within irregular price fluctuations [2)].

Uno's solution to the problem of market value looks quite simple and elegant. It is also systematic in that it is grounded on the development on the function of money, which casts a light over the essential "irregularity" of market. However, if his understanding on the problem itself is not relevant, the simplicity and elegance is obstructive to the insightful discussion of Marx, if not meaningless. As we have studied in the previous section, finding the centre of gravity for price fluctuations is just one part of the problems in the theory of market value in *Capital*. Of course, this question is of greatest importance when we need to establish quantitative labour theory of value. We must reconcile single price for one kind of commodity with different labour time objectified, or individual value, under plural conditions of production. But what is really unique in this chapter is the premise of the concept of the market value itself, viz., the situation in which different conditions of production do coexist. Indeed, considerable amount of Marx's text here is devoted to examining how capitalists compete with each other under such circumstances. Uno's theory of market value subsumes this issue on competition, which seems to have troubled Marx, under the banal equilibrating process. While

Uno is unique in determining the centre of gravity for price, his market view is rather stale, almost indiscernible from classical market view. In other words, the "irregularity" depicted in how values are measured by money is now just "regulated" by the market value as the centre of price, not investigated further.

Uno's emphasis on the theory of market value was driven by his reinterpretation of the functions of money, remaining the relation to the theory of price of production, which is discussed just before the market value, to be examined by his followers. In order to address this issue, they substitute the concept of "market prices of production" (Marx[1991]p.300) to that of market value. By the time we focus on the theory of market value, value has already been transformed into the price of production, which is based on competition among individual industrial capitalists. If this equilibrating process is also taken into consideration in the theory of market value, why don't we take it as the applied theory of price of production? Consequently, the concept of market value lost its position even in the configuration of Uno's style of discussion. This history of the Uno school teaches us that Uno's theory of market value, which is firmly based on uncriticised classical market view, is not compatible with the fundamental idea latent in the concept of market value.

3 Dual Standards in Investment

Therefore, we must recognise that we cannot make full use of the concept of market value unless we criticise our common sense on market: classical market view. We must go into a deeper question: why did Marx bring up this concept of market value? This concept is based on the unusual premise, i.e. the coexistence of plural conditions of production. This is, indeed, not at all unusual in our real world, but unusual just in theory. We must penetrate into theoretical feature of Marxian political economy so as to understand how different conditions of production could coexist theoretically.

Admittedly, the theory of surplus value must be recalled together with the labour theory of value. In so far as every capitalist successfully produces surplus value from exploitation, all of them can earn profit regardless of their technical condition of production. Even the worst technical condition can produce surplus as long as it is employed under exploitative capitalist mode of production since the surplus comes from the difference between labour time and necessary labour time, not from the difference in technical efficiency. The less competitive conditions of production yield less profit, but they cannot be the direct cause of loss. Thus, capitalists with those unfavourable techniques do not retire immediately, consequently letting different conditions of production coexist in the same industry.

Nonetheless, less profit means losing competition in market. Though fixed

capital prevents quick change in employed technology, capitalist gradually renews their conditions of production into advantageous ones. Then we should assume the uniform condition of production in each industry in the long run. However, this assumption can be justified when the unfavourable techniques always lead to less profit. The surplus generated in the sphere of production must be realised in market. Without the realisation in market, the surplus cannot be turned into profit in cash. Even if one could have attained higher level of surplus than the other by employing the competitive condition of production, s/he could realise less profit than the other if s/he failed to sell her/his products successfully.

The realisation process has no regularity and is totally unpredictable. Capitalists with favourable conditions of production usually have money to spare for more circulation costs, but it does not necessarily mean that more spending leads to fast turnover of capital. This means capitalists with unfavourable conditions of production do not always lose competition in market. Those capitalists always produce less surplus, but they can enjoy more profit if they sell their products with fewer circulation costs. As a result, irregular capitalist market has room for inefficient technologies.

If we are to capture this irregularity in market, we need at least two kinds of standard to evaluate the valorisation of capital. One is for estimating the efficiency in production, and the other is for circulation. The latter is what we usually consider as the rate of profit. It has realised profit as a numerator and has invested capital as a denominator. We can break it down more as follows:

$$r = \frac{\text{gross profit} - \text{circulation cost}}{\text{production capital} + \text{circulation capital}}$$

If all products were sold at the price of production, the gross profit would be realised. But in order to get through the circulation process, capitalists must spend circulation cost. Some part of the products remain unsold and turn to be loss included also in circulation cost. The realised profit will be net profit, which is less than gross profit. Hence gross profit is a maximum amount of profit under the given condition of production. Besides, industrial capitalists invest circulation capital that consists of cash reserve and commodity stock to be ready for unexpected change in conditions of circulation process. They would be in no need if we would not have to worry about circulation process. If we abstract the factors in the circulation process, we can get the following fraction as an ideal rate of profit, as it were:

$$R = \frac{\text{gross profit}}{\text{production capital}}$$

This gross rate of profit, R, can be a measure of the efficiency in production, namely the productivity of conditions of production. The advantageous condition

of production gives larger R than the disadvantageous, which can be described as $R_A > R_B$. But it does not necessarily follow that the net rate of profit, r, is also larger. $r_A < r_B$ can follow if the capitalist with advantageous technology spends too many circulation costs and/or invests too much circulation capital [3)].

This dual formulation of the rate of profit is useful to enhance our understanding on investment in production, or capital allocation to branches of industry. Following Ricardo, we have long assumed that capital is invested into the branch of industry where the product is sold at higher price, and is withdrawn from where the price of product is falling. The price fluctuations are reflected in r in the above formulation, not in R, since the cause of those fluctuations is the very "irregularity" in circulation sphere. It is true that a capitalist tries to raise the net rate of profit, r, as high as possible, but it is quite difficult to identify where the highest profit can be earned among various kinds of industries. Capitalists are suffered from the "irregularity" in market, confronted with considerable difficulty in investing their capital to response to the fluctuations of r. Meanwhile, the difference in the gross rate of profit, R, is relatively easier to observe. Because R is the indicator of the productivity in the conditions of production, we can forget about the unstable factors in circulation when estimating the value. When there are several conditions of production coexisting in the same branch of industry, capitalists are likely to find the difference in R, not in r. The advantageous R does not necessarily mean the larger net profit, but it certainly means the larger gross profit, which will be the resources for expending circulation costs to win the competition in market.

Here we have dual standards in investment of capital: the gross rate of profit and the net rate of profit. The gross rate of profit is a comparatively reliable index, but on the other hand, cannot directly measure the valorisation of capital. The net rate of profit has the opposite feature: it is what all capitalists intend to improve, but is subject to incessant "irregularity" in circulation process. Classical market view pays attention only to the ebb and flows in the latter. Meanwhile, Marx's theory of market value is founded upon the theoretical situation where inferior conditions of production can survive due to the precarious market environment, which conceals the difference in the gross rate of profit underneath the difference in the net rate of profit. In this case, we observe capitalists who invest their capital to achieve higher R, if the fluctuations in r are too difficult to predict. These doubled investment goals characterise Marxian market view.

Everyone knows that market is incessantly unstable. Theoretical works must seek how to design the framework to describe this instability. When the equilibrating process of capital investment is taken, as is in classical market view, the market instability is considered as a symmetric and reciprocal movement. The centre of gravity for market prices cannot exist if the excess of investment, which is in itself estimated accordingly on the basis of the price movement, is not off-

set by the outflow of capital. This symmetry in the transference of capital is the foundation for the equilibrial market. On the other hand, if we think of the dual standards in investment, we must completely change the common sense on market. We have here two different approaches to achieve the valorisation of capital. Even if R goes higher, it will never be offset by the investment aiming at higher r, since these two standards are calculated differently. The two standards will never balance out at any centre of gravity. Without the equilibrating process, will the capitalist market collapse?

In order to answer this question, we need to discuss the relation between investment for R and that for r more in detail. When capitalists invest to achieve higher level of R, what they do in practice is to improve their technical condition of production. This improvement usually includes the introduction of the fixed equipment, if not the renewal. This fixed capital investment leads to the increase in demand in other branches of production, which will be followed by the increase in r in the demanded industry. When there is an industry with high R that attracts investments, there must be some other industries related to it where r is subsequently pushed up by increased demand. Though the rise in R does not accompany the downward pressure in itself, it brings the rise in r among other sectors, which disperses the investment socially. Fixed capital will be allocated in all industries through the combination of the two channels of investment.

Therefore, the dual standards in investment do not entail the disastrous dysfunction of market in itself, let alone collapse. Though the circulation process cannot avoid incessant instability, it is basically related only to the fluid and circulation capital. The movement of fixed capital abides by other principles, decisively affected by technological conditions. Here market is not equilibrial, but is stable with some irregular fluctuations.

In such market, the market value cannot be the centre of gravity of price fluctuations. It is supersensory but objective judgment on commodity prices in the market, the stability of which is maintained by the dual ways of investment. Within the stable market, we have a common six sense for the "phantom-like objectivity" (Marx[1990]p.128) regarding the reasonable level of price of every kind of commodity. It is rarely a unique dot, but is latitude of possible prices. Capitalist mode of production establishes this reasonable price for every commodity by regularly manufacturing it in a large volume. What the theory of market value elucidates is, in our view, the environment in which this stable market with reasonable pricing arises. Here classical market view with the equilibrating process is replaced with Marxian market view with the immaterial but objective theory of value [4)].

4 Requirement of Market Stability

Marxian market view, which is effectively distinguished from equilibrial classical market view, is important when we discuss the in/stability of market. In/stability cannot be unravelled as long as we dwell upon the equilibrium/disequilibrium dichotomy, because leaving from the equilibrium is not always being unstable. Disequilibrium usually goes to the equilibrium in theory. We must discern instability from mere disequilibrium, and the stable market described in Marxian market view would be useful to analyse the cause of the instability.

Classical market view tells us that there should be no obstacle to investment in any industry for market to reach the equilibrium. If there is, market will be distorted and there arises disequilibrium or instability. However, the requirement of the stable market is not only free competition among industries. In Marxian market view, one of the standards in investment is basically the same with classical market view, but the other is not. The productivity in conditions of production, shown in R, is also part of the incentives for investment. We have noted that this technological productivity is relatively easy to grasp compared with the net rate of profit, r, which is subject to all irregularity in circulation. While R is free from the ambiguity in circulation process, it has another problem: the technological difference must be translated into economic terms. Even if the material difference in conditions of production is obvious to everyone, the productivity in monetary term is not. In order to calculate R, capitalists need to evaluate all the components of production capital and gross profit in a monetary unit. And this must be done without using market prices, which constantly fluctuates in circulation process.

In this last section of this paper, we shall discuss how capitalists estimate the productivity of the technology by utilising a simplified example and consider whether or not we can assume all capitalists are always able to know which condition of production is the most productive in monetary term. If the answer is yes, Marxian market view might be nothing but a complicated version of classical market view, taking into consideration the technological aspect of the investment. If no, Marxian market view provides us with completely new perspective on market, with an original criterion for analysing market stability. This is a final and decisive watershed [5)].

We shall use the following two-sector model, known as a price equation to get price of production:

$$\begin{cases} (k_{11}p_1 + k_{12}p_2)(1+R) &= p_1 \\ (k_{21}p_1 + k_{22}p_2)(1+R) &= p_2 \end{cases} \tag{1}$$

The signs are defined as follows $(i = 1, 2; j = 1, 2)$:

k_{ij} : the quantity of input of commodity j to produce one unit of commodity i

$k_{ij} \geq 0\ (i = j)$ and $k_{ij} > 0\ (i \neq j)$

p_i : the price of commodity i

In this equation, prices are determined only by technological conditions, so we can distinguish them from market prices. We should calculate the gross rate of profit, R, using such technically determined prices of production. Price of production is uniquely determined when there is one condition of production in each sector [6)]. Since we have coexisting plural conditions of production in the same industry, we get several prices of production, which have different R respectively. It is known that the superior condition of production always remains advantageous even if there are two prices of production, when we have two different conditions of production in one sector [7)]. However, we do not stop here: we need to assume that we have two conditions of production in both two sectors, which lead to four kinds of price of production [8)].

Let us suppose that the following two conditions of production coexist in sector 1. The left side of the arrow indicates input as negative, and the right side is the output as positive, both of which are shown in vectors: the first element is the quantity of commodity 1 and the second is that of commodity 2.

$$\mathrm{A}_1(-10, -5) \longrightarrow (20, 0)$$
$$\mathrm{B}_1(-3, -11) \longrightarrow (20, 0)$$

We cannot know which of the two is more productive without price. Here if $(p_1, p_2) = (6, 7)$, the two conditions of production are equivalent in productivity: the both inputs are evaluated as -95 and the outputs are 120. We name this the equalising price vector, $\boldsymbol{p}^*$, the ratio of price that equalises the different conditions of production in the same sector.

We standardised the quantity of the output as 20 in sector 1. Let us take the quantity of the output in sector 2 also as 20. When $\boldsymbol{p}^* = (6, 7)$, 20 units of commodity 2 are evaluated as 140. If this equalising price vector were equal to the price of production, the two sectors would have to achieve the same level of $R = R^*$ in equation (1). Since $R^* = (120 - 95)/95 = 5/19$ according to sector 1, the input in sector 2 must be evaluated as $-665/6(\approx -110.83)$. Consequently, we obtain the following domain where the input vector in sector 2 is placed when the equalising price vector for sector 1 corresponds to the price of production:

$$-665 = 36x + 42y \qquad (x, y < 0) \tag{2}$$

It can be visualised as the thick line in figure 1. The abscissa represents the quantity of commodity 1 and the ordinate that of commodity 2. a is a constant

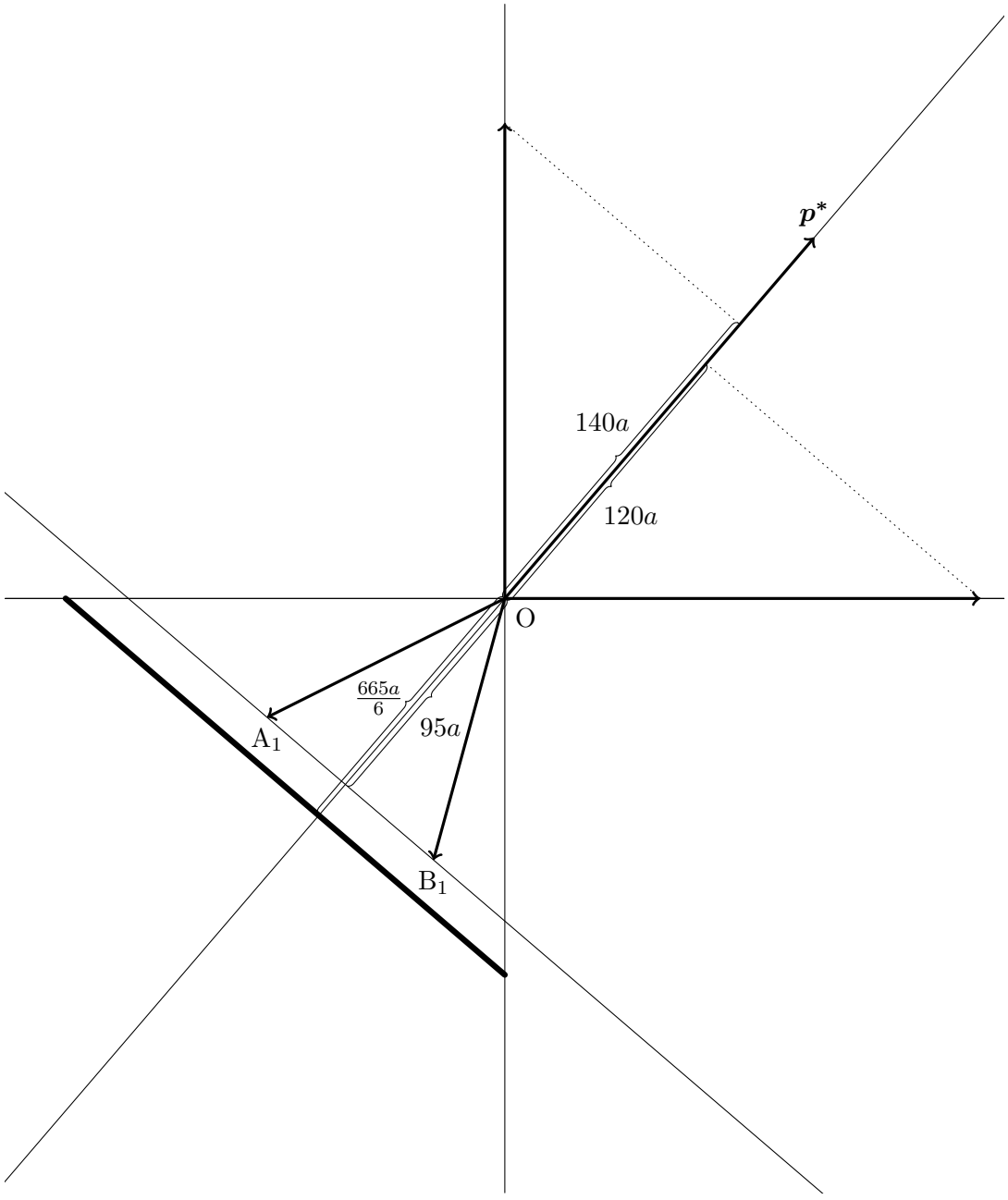

Figure 1: Domain in equation (2)

determined by the magnitude of the equalising price vector. This domain shown in equation (2) can be used to analyse how the estimated productivity in sector 1 is affected by sector 2. Consider sector 2 has the following condition of production:

$$\mathrm{A}_2(-8,-7) \longrightarrow (20,0)$$

If we evaluate A_2 by using $\boldsymbol{p}^*$, we get $(-8,-7)\boldsymbol{p}^* = (-8,-7)(6,7) = -97(> -665/6)$. This means that A_2 is too good to realise $\boldsymbol{p}^*$ as the price of production, hence causing the difference in productivity between the two conditions of production in sector 1 shown as A_1 and B_1. Since our equalising price is too advantageous for sector 2 with A_2, the price of production will be more advantageous for sector 1. Indeed, when A_1 and A_2 determines the price of production, $R = 1/3$ and $\boldsymbol{p} = (1,1)$. With this price as a measure, the productivity of the condition of production in B_1 can be calculated as $3/7$. Here, B_1 indicates superior technology to A_1.

This analysis clearly poses another issue: what if there is another condition of production in sector 2, the input of which is evaluated as under $-665/6$ at our equalising price $(6,7)$? Then the ranking of the productivity in sector 1 must be reversed, because the price of production must be calculated to the contrary. This second condition of production in sector 2 is subject to the reproduction requirement as well: sector 1 produces 40 units of commodity 1 in total, and A_1, B_1 and A_2 consumes 21 units of commodity 1 in total, leaving 19 units. The same calculation holds for commodity 2: 15 units are left. Hence we can identify the domain in which the second conditions of production in sector 2 brings about the reversal in productivity as follows:

$$\begin{cases} -665 > 36x + 42y \\ -19 < x < 0 \\ -15 < y < 0 \end{cases} \tag{3}$$

The grey-coloured area in figure 2 shows the above domain (border lines are not included). Here is one example included in the domain:

$$\mathrm{B}_2(-9,-11) \longrightarrow (20,0)$$

A_1 and B_2 give $R \approx 0.16$ and $\boldsymbol{p} \approx (1, 1.46)$. This time, we approximately get 0.06 for the productivity of the condition of production in B_1, which is lower than the approximate productivity for A_1, 0.16. The productivity order is reversed, now B_1 refers to an inferior technology to A_1 [9].

Such a domain does not exist all the time. Nevertheless, when it emerges, we cannot take it for granted that the monetary difference in productivity of the

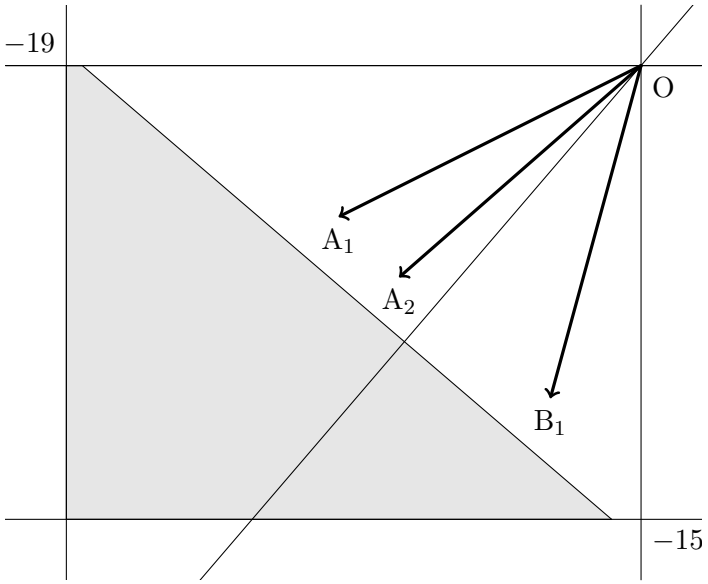

Figure 2: Domain in expression (3)

technical conditions is given. Unknown productivity is fatal to investment, particularly in Marxian market view. If capitalists take into consideration technological advantage as well as expected sound demand in investment, as we have discussed, productivity of conditions of production is so important in theory, not to mention in reality. Stable market is based not only on free competition, but also on the clear technological advantage in each industry. If one of these conditions is undermined, the instability in market could occur. Marxian market view provides us with a technological reference point for analysing the instability in market as such.

Notes

[1)] Hilferding[1981] ascribes the necessity of money to "the anarchy of commodity producing society" (p.35).

[2)] Uno's originality lies in mentioning the condition of production "capable of being adjusted to the demand", not in introducing demand side to develop the theory of market value. The latter solution had already been suggested in Rozenberg[1961]. Rozenberg insisted that the productivity that determined the market value changed in accordance with the change in social demand. But it is not always the case that more commodities are supplied under inferior conditions of production when social demand increases. For further introduction on how Uno's theory of market value was conspicuous among others,

see Itoh[1980]Ch.3.

[3)] The distinction between R and r is proposed in Obata[2009].

[4)] I owe the idea and expression on the objectivity of value here to Harvey[2010].

[5)] Marxians have long distinguished conditions of production by the labour time objectified to the product. Steedman[1977]pp.64,65 criticises this way of distinction based on the labour theory of value, pointing out the case in which the objectified labour time cannot be determined uniquely. Itoh[1980]p.178 refutes Steedman's argument on the basis of Uno's approach, but in my view, the labour-time distinction has another problem. Capitalists do not select conditions of production by the labour time objectified to their product. Therefore, we should not rely upon the labour theory of value when analysing the motion of capital under the plural conditions of production.

[6)] This proposition on price of production is well-known, proved by the use of the Frobenius theorem, but here I propose a simple proof of theorem 2, which is just enough in this paper.

Theorem 2. *Equation (1) uniquely determines* $p_1/p_2(>0)$.

Proof Equation (1) can be changed as follows, with $\frac{1}{1+R}=\lambda$.

$$\begin{cases} (k_{11}-\lambda)p_1+k_{12}p_2 &= 0 \\ k_{21}p_1+(k_{22}-\lambda)p_2 &= 0 \end{cases} \tag{4}$$

We can know from this equation that p_1/p_2 is positive when

$$k_{11}-\lambda<0 \quad and \quad k_{22}-\lambda<0. \tag{5}$$

If equation (1) have a solution that is not $p_1=p_2=0$,

$$\begin{aligned} &(k_{11}-\lambda):k_{12}=k_{21}:(k_{22}-\lambda) \\ &\Leftrightarrow k_{12}k_{21}=(k_{11}-\lambda)(k_{22}-\lambda). \end{aligned} \tag{6}$$

$f(x)=(k_{11}-x)(k_{22}-x)$ is illustrated as in figure 3 under the condition of $k_{11},k_{22}\geq 0$.

Due to $k_{12}k_{21}>0$, the line of $y=k_{12}k_{21}$ crosses the curve of $y=f(x)$ once and only once in the domain of $x>k_{11}$ and $x>k_{22}$ in figure 3. Hence equation (6) gives a unique solution that satisfies condition (5).

□

Itoh[1981] provides us with the proof using the quadratic formula, but it is complicated because it deals with a three-sector model. Here is the proof in a two-sector model using the quadratic formula.

Proof If equation (4) have a solution that is not $p_1=p_2=0$, then

$$(k_{11}-\lambda):k_{12}=k_{21}:(k_{22}-\lambda)$$

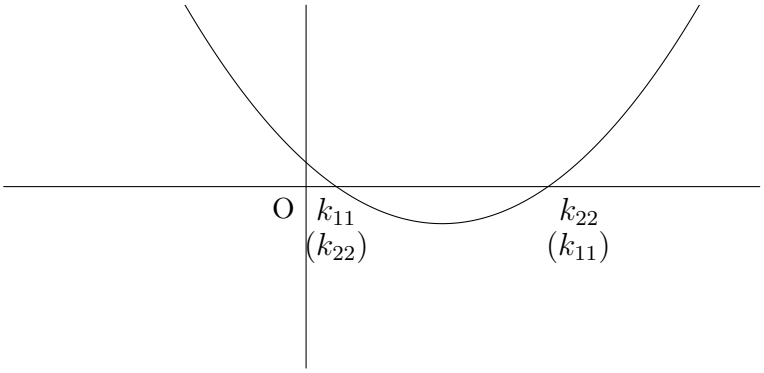

Figure 3: $f(x) = (k_{11} - x)(k_{22} - x)$

holds. It can be solved with the quadratic formula as follows:

$$\lambda = \frac{1}{2}(k_{11} + k_{22} \pm \sqrt{(k_{11} - k_{22})^2 + 4k_{12}k_{21}}). \qquad \text{(No double root due to } k_{12}, k_{21} > 0)$$

Use this λ to change equation (4) as follows:

$$\begin{cases} \frac{1}{2}(k_{11} - k_{22} \mp \sqrt{(k_{11} - k_{22})^2 + 4k_{12}k_{21}})p_1 + k_{12}p_2 = 0 \\ k_{21}p_1 + \frac{1}{2}(k_{22} - k_{11} \mp \sqrt{(k_{11} - k_{22})^2 + 4k_{12}k_{21}})p_2 = 0 \end{cases}$$

We know from the above equation that p_1/p_2 is negative when $\lambda = \frac{1}{2}(k_{11} + k_{22} - \sqrt{(k_{11} - k_{22})^2 + 4k_{12}k_{21}})$.

Hence $p_1/p_2 > 0$ only when $\lambda = \frac{1}{2}(k_{11} + k_{22} + \sqrt{(k_{11} - k_{22})^2 + 4k_{12}k_{21}})(> 0)$. □

[7] Okishio[1978].

[8] Piero Sraffa and his followers once studied the choice of technique intensively. See Sraffa [1960]Part 3, Passinetti[1977]Ch.6 and Mainwaring[1984]Ch.8. It was called a "switching" problem, because the superior technique "switches" as the rate of profit rises inversely with the decrease in wage. Since it was discussed as one of the problems regarding the change in the rate of wage, Marxians seems to have failed to appreciate the significance of the issue. For example, Dobb[1970]p.350 regarded it as the change in the ratio of surplus value and the transformation of value into the price of production. The "switching" problem, however, cannot be reduced to the traditional Marxian argument as Dobb suggested. It happens under the situation where the productivity in one sector is affected by that in other sectors, but this interrelation among various sectors was totally ignored by most Marxian discussions on technology. On the other hand, Sraffians did discuss the choice of technique, but did not consider the coexistence of plural conditions

of production, as the word "switching" suggests. This presumption of coexistence is quite Marxian, but has not been examined by Marxians.

[9] I studied this possibility of the reversal in productivity once in my dissertation (Ehara[2015]). Here the reproduction requirement is added so that we can discuss the domain of the second condition of production in sector 2 more in detail.

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