PRINCIPIUM OF PRICE SYSTEM

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PREFACE

This book focuses on general theory of price.

Price, wage, interest rate, GNP and exchange rate, five factors, are very important not only in economics and economical activity, but also in social and political life. Those five factors are concrete, but also abstract. They belong to different concepts, but dependent on each other. If each of them changes, the other must make corresponding adjustment.

In order to recognize the inner link between them and their influence on social and political life directly, a functional value, price and wage described by a relatively abstract mathematic sum in place of amount of money are created in a model of closed country or region. Then a concrete Four-Rate formula and Exchange Rate Formula expressed by money are born.

The inner link between them and their influence on social and political life are clearly displayed by either of two formulas. Two formulas are very useful for economist and politician to evaluate the macroeconomic trend in their country or region and to analyze the relationship of growth and decline among price, wage, interest rate and GNP (or GDP) so as to make a suitable economic policy.

Philosophical principium will pour new energy and youthful vigor into macroeconomics theory.

This book is also a concise outline of a part of macroeconomics and a good reading and educating material for new economic student.

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In Denmark

CONTENTS

PRODUCTIVE FORCE OR PRODUCTIVITY

In order to reproduce posterity and continue its survival, humankind and its individual have to adjust its structure and function to adapt to the change in natural and environment. In other words, the continuity of human being is a result of natural need and the action of natural force. When nature needs humankind to survive, they have to do so. The adjustment demanded by the natural needs and the changes in nature and environment is evolution. The evolution is a slow progress that can be called evolution process.

To maintain survival of humankind and its individual, humankind has to make sufficient use of some materials and convert them into energy that is needed by its own structure to perform function. Some of them can be used directly by human being, such as oxygen and water. Some others have to be changed from one physical and chemical state to the other to be used by man, such as carbon, hydrogen, oxygen and nitrogen. The great majority of them have to have the participation of human labor, such as production, collection and processing before materials are absorbed in body of man, whether directly or indirectly. Therefore, all the materials needed by humankind and its individual to maintain their survival require the participation of human labor is called ***productive materials***. The corresponding course in which materials becomes product is a ***productive process***. The force that promotes or works on the processes is called ***productive force***. Productive expressed by a person is called personal productive force, but by society ***productivity*** some

thing produced by the productive force or productivity is called ***product*** that is a ***non-natural thing***.

Of the productive materials, food is the most essential and indispensable for human survival. Therefore, food is the number one material or the ***first necessary*** or ***first necessary product***. It can be called the ***first necessaries*** for short.

Compared with food, other necessaries, such as clothes, shelter, transportation and other concerned materials, rank second, which can be called the ***second necessary material*** or ***second necessary product*** and the ***second necessaries***.

Of course, in addition to the above basic necessaries, nowadays, people need medicine, cultural life or spiritual life. However, when compared with the first necessaries, these necessaries are undoubtedly included in the second group. Therefore, they will not be given a new classification.

It is self-evident that every goal of activity of humankind or its individuals, directly or indirectly aims to acquiring the first and the second necessaries. It can be vividly explained by a well-known Chinese saying: The aim to be an official far away from one's home is to enjoy luxury in food and clothes.

Since the first and the second necessaries needed by human survival are productive materials, they must be non-natural or man-made things. Their birth is the joint effort of two forces: the force of human needs and productive force or productivity. Comparatively, the need force is human desire for the first and the second necessaries, which is a static one; whereas the productive force is the one

that makes human desire turn to actuality by labor, which is a dynamic one.

Someone holds an improper opinion that productive force is a human ability to alter the nature. However, what is finally changed is not nature but human being itself. It has already been made clear at the beginning that survival and evolution of human being are the results of ***natural need***. If nature wants human being to live, it has to live; if nature wants it to change and evolve, it has to change and evolve.

Of course, human activity can change and affect nature partially. This change will ultimately shift onto human being itself and forces it to make the structural and functional adjustment. If not, it will be eliminated by nature.

It is very clear that who changes whom.

Human need-force is infinite, so is its productive force. It is always said that even the deepest sea has a bottom, but there is no end for the human desire, which implies that human needs are endless.

However, in a given age, human need force and productive force is finite and they cannot surpass the reality. From the Old Stone Age to the New Stone Age, from the Old Iron Age to the New Iron Age, i.e. Industrialization (or Mechanization) Age. Now we are in an Electron-Communication Age. The history of humankind tells us that the developing order of productive force cannot be inverted or surpassed. According to this order, humankind has gone for several thousand years step-by-step.

In a certain age, if the need force is considered as a constant,

then, productive force is the ***decisive force*** to the birth of non-natural thing. The birth process of a new thing, a new product, is the one in which the new replace the old, or the old possesses new property. This is a process of quality change. As soon as the process is finished, humankind can decide how many individuals of new thing are produced at its own will. At this stage, there is only a quantity change of individual for new thing. The birth process of new thing and its individual is a ***quality change*** while the process reproducing the new individuals is a ***quantity change***. Correspondingly, the productive force that performs function at the stage of quality change is ***quality productive force*** while the one that works in the process of quantity change is ***quantity productive force***

The quality productive force includes the intelligence of brain, the labor of hands and tools needed for the labor. Under the joint effect of the three factors can human being create new non-natural thing, new product. Therefore, the quality productive force belongs to the ***creative ability*** of human being.

Human beings can create new thing only by understanding its law well. For example, if people want to make higher speed automobiles, they have to know aerodynamics, mechanics of materials etc. The prerequisite to creating new thing is to study the generality and the truth of thing. Therefore, the force that works in this process certainly belongs to the quality productive force.

Tools are the products of intelligence and labor. Therefore, the quality productive force has two important elements: intelligence of brain and the labor of hands.

Undoubtedly, the intelligence of brain refers to the sum total of human intelligence or the sum total of its knowledge.

It is often said that knowledge is power, which implies that knowledge or intelligence is a part of productive force.

The source of quality productive force is the man who has mastered scientific knowledge. The intellectuals are the representatives of quality productive force. In other words, the quality productive force is the power expressed by the intelligence of intellectuals through the labor of their hands.

Although the intelligence of brain, the labor of hands and tools needed by the worker are also three indispensable factors in quantity productive force, when it is compared with the quality one, there is an essential distinction between them. The intelligence or knowledge indicated by the quantity productive force is that it can only enough meet the needs of how to use tools and repeat a fixed process to produce the individuals of a new thing. It is not harmful to distinguish the quality productive force from the quantity productive force. The latter may be induced to two elements: the hands of worker and tools. That is to say, the quantity productive force is a power expressed by the hands of worker through tools.

The above classification and definition are purely artificial for convenience of explaining it. In fact, both the quality and quantity productive forces are a power expressed by the intelligence of human being through the labor of hands.

It is obvious that tools play a very important role in productive force. Therefore, it should be included as a part of productive force,

when it is discussed. Here, it is classified into the products of intelligence and labor.

Evidently, worker and farmer are the representatives of quantity productive force.

The quality and quantity productive forces are two aspects of a same property of productive force. They cannot be separated completely because the two are both opposite and interdependent.

The mutual interdependence means that the two depend on each other for existence; otherwise, they will disappear. The mutual opposition indicates that with the more workers undertaking quantity production there will be fewer intellectuals in a closed society. The reverse is true too.

At the early stage of human society, the labor of humankind was confined to produce the first necessary product needed for survival. That is food production. Even this production was only limited to the lowest level for meeting the daily energy consumption of every individual in a society.

Therefore, at that time, the level of productive force was so low that every member of the society had to take part in labor to produce food.

At that time, there was no social division of labor, for if one did not participate in the production of the first necessaries, he would have no food. Social division of labor did not take place until the quantity of food production could not only satisfy producer's own needs but also have some surplus.

It is self-evident that the social division of labor is a result of

higher developing of productive force.

The level of productivity in different countries is different, although they are in the same age. It is not only revolved with education, culture and economy, but also politics and political system. In order to make it easier to study, discuss and calculate, a ***closed country*** or ***closed region*** that can be seen as one with self-sufficiency is designed for the following discussion.

If productive force at the time when all the members in a closed community or region must take part in the production of the first necessaries is regarded as zero, the productive force is seen as one, when one in one hundred social members undertakes the production of the second necessaries.

Suppose F_p stands for productive forces in a society or productivity and P for whole population in this society, and P_1 for all the people who participate in the production of the first necessaries in a closed community or region, the ***first producer***, then,

$$F_p = \frac{P - P_1}{P} \cdot 100 \qquad \text{(Formula 1)}$$

From the formula, one can find that the value of productivity within a closed country or region is in reverse proportion to the populations that undertake to produce the first necessaries.

Suppose P_2 stands for the populations that undertake to produce

the second necessaries, the ***second producer***, P_3 for the populations that undertake the production indirectly, merchant and the commercial staff and governmental administrant, ***third producer***. And again let us suppose that all people in a closed country participate in production, then, the above formula can be put into this:

$$F_p = \frac{P_2 + P_3}{P} \cdot 100 \qquad \text{(Formula 2)}$$

Because the representative of the producer for the first necessaries is farmer, the more farmers there are in a closed country or region, the lower productive force is. The opposite is also true. The representative of the producer for the second necessaries is worker; so, the more workers there are in a closed community or region, the higher productive force is. This relationship is revealed in figure 1.

If the sum of P_2 and P_3 is a constant, the productivity raises with the increase of P_2 value, but lowers with the increase of P_3 value, because the direct producer specially decreases with the increase of commercial staff and governmental administrant.

From formulas, one can see that the smallest value of productive force in a country or region is zero, which means that all the members in it must take part in the production of the first necessaries. The biggest one is close to 100, but it can never reach 100 because if there is no one to produce the first necessaries, the community cannot survive any longer.

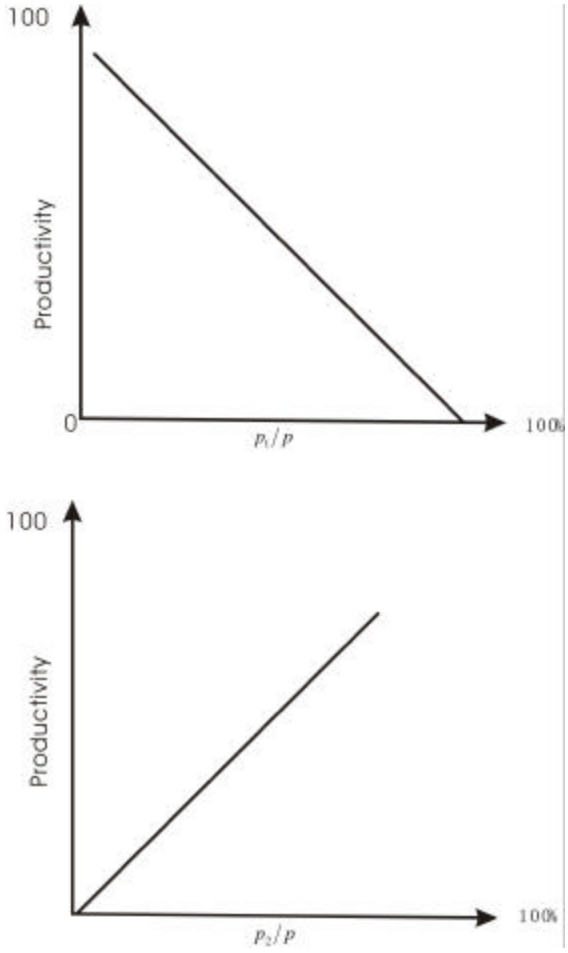


Figure 1: the relationship between productivity and producer number of the of the first and the second necessaries

This method of calculation of productivity makes it easily to understand the theory of price system. The value calculated by this method is a relative number. So, it is easily comparable with other.

The popular measure method of productivity by output per hour of all persons for the full year is not different with efficiency of produce. The value calculated by this method is an absolute number. So it is incomparable with other.

The productive force for the first necessaries is the most basic one for human society, when they are judged either from the importance to humankind survival or from the birth order of the kinds of productive forces. The productive force represented by farmer in producing the first necessaries is unquestionably the first or the basic one.

At the early stage of human society, when there was no social division of labor, there was also no division between intellectual and producer: producer is intellectual and intellectual is producer. At that time, the able men among producers were the early intellectuals because they designed and instructed production, such as the legendary expert carpenter Lu Ban in ancient China.

In a closed country or region, only when the people who produce the first and the some second necessaries can satisfy their food, clothes, shelter and transportation and have produced some surplus, can intellectuals or specialists in a specific field emerge and exist as an independent class. Therefore, the existence of quality productive force as an independent power is a result of the development of

quantity productive force.

In Chinese history, intellectuals began to play an active and independent role in social activities at the time when Confucius advocated education. That is to say, since the Confucius age, China had had its true quality productive force.

The artisan is the early representative of producer of the second necessaries. Together with farmer, they laid a foundation for the birth of intellectuals and quality productive force. The worker, who acts as the representative producer of the second necessaries, is the result of birth of capitalism in recent era.

Nowadays, there are far more workers and farmers than intellectuals, so their voice in politics is very higher than that of intellectuals. Furthermore, because intellectuals do not participate in material production directly, they seem to be an appendage to worker and farmer. Therefore, some politician and economist include intellectuals in the above category and do not regard them as an independent class.

From the viewpoint of productive force, although the quantity productive force is the foundation that makes the quality productive force exist dependently as a thing, it can't be denied that the quality productive force has always been the leader of quantity one since the beginning of human society. The leadership of quality productive forces is especially prominent in production nowadays. With the development of human society and its science, this leadership becomes more important and prominent.

So, as far as the independence is concerned, any class cannot be separated from the others and exist independently. Moreover, as the dependence is concerned, any class is an appendage to the others. Nevertheless, as the leadership is concerned, only intellectuals and quality productive force represented by it can fully deserve the honor of the leadership.

From the viewpoint of productivity, if farmer is the representative of producing the first necessaries and worker as the producer of the second, and intellectuals as the representative of quality productive force, then, farmer, worker and intellectual are ***three elements*** of productive force. The three elements of productive force are also called ***three classes*** in sociology. There are ***worker class***, ***peasant class*** and ***intellectual class*** respectively. Those three classes are interdependent each other and can not be separated.

However, among them, farmers are a very basic power in a society, for without them there is no say of social division of labor and the existence of worker and the intellectual. In a word, without farmer, there is no productive force.

Intellectuals stand for quality productive force, without them, the generality of thing would be not realized and new thing for human being survival could be not created. Before producing new thing, the creation of it by quality productive force always is at first and the quantity production by worker according to the design in the second. In this sense, modern worker class is an appendage to intellectual.

There is no meaning of belittling worker or denying the parallel exist-relation among worker, farmer and intellectual by making the use of productive force concept as a pretext. A closed community cannot function smoothly without worker, farmer, or intellectual. Therefore, they play an equal role and are parallel in a closed society. It is difficult to tell which is noble or which is humble, which is important or which is unimportant, which is advanced or which is backward.

From the viewpoint of productive force, the more the farmers are there in a closed community, the lower the productive force is; the more the intellectuals are there, the higher the quality productive force is, and the higher the productive force becomes.

It is one-sided and unscientific that the cœxistent, harmonious and interdependent relation among classes is artificially divided into unequal classes. It is also unilateral and unscientific to entitle the one as the more advanced and the other as more backward on the bases of their some relative features according to communist theory.

The higher quality productive force is, the more intellectuals are, and the greater the potency of producing new thing is. However, what must be kept in mind is that force is only an ability of work. Force can only exert its action when it finds a function point. Then, force works on time distance and new thing is invented. All the factors that affect the force to exert function, such as social system, policies, economy etc, will influence the birth of new thing, either promote or curb it.

With the development of science and the increase of productive efficiency, the first and the second necessaries for mankind are becoming more and more diverse, so are foods, clothes, shelter and transportation and spirit product. All these are the result of the gradual evolution and division of manmade thing under the work of productive force. The higher the productive force is, the shorter the time distance for evolution and division is. The opposite is also true.

As to a region or a country, whether its education is advanced or not is a direct symbol of its productive force. On the contrary, if the basic agriculture and industry in a country are not developed, by no means can it raise its educational level. Therefore, a country with a backward education is consequentially the one whose business is languishing, while a country with an advanced education is certainly the one whose trade is thriving.

The ways for a closed country or a society to raise its productivity and quality productive force are first to develop its agriculture and then to vitalize its education. Once these two key links are grasped, everything falls into place. It is a curse, not a blessing, to develop export industry aimlessly, import the luxury and modern consumer goods blindly; the high priority is give to city and neglect domestic agriculture.

Now we are in Electron-Communication Age. In the developed counties with high productivity, the high education has already become universal. Intellectuals are the main part in the various walks of life in society. All parties in these countries agree with to develop education, scientific research and agriculture and to bring a high

productivity, quality productive force and prosperous economy. The boundary between parties is becoming blurred.

In the some developing and undeveloped countries, government the party in power concerns only how to strengthen state apparatus and army, not education, agriculture and quality productive force.

Violent revolution caused by autarchy and corruption could not promote to develop productivity, because it is always connected with upheaval and war that always extremely destroy productivity.

The historical experience tells us that peace and democracy with gradual reform is a most ideal mode for promoting to develop productivity.

FUCTIONAL VALUE OF PRODUCT

After productive force works on materials and takes a certain time distance, a new thing and its individual or product comes into being. The birth of a new product must experience a process during which the productive force works and a state of matter has changed into another state. Therefore, force and time distance, the two elements, participating in the birth process of a new product, are the elements of product value.

The value of any material product includes the following ***four elements***

The first is human needs force, the first power for the birth of non-natural thing.

The second is human productive force including quality and quantity one, the second power for the birth of non-natural thing.

The third is the objects, the raw materials on which the force works.

The fourth is time distance along which the force works, the time spent by labor.

The value of any product is an index that reflects how many times labor spends for producing one unit product.

When force and raw materials are fixed, the value of a product is in direct proportion to time distance spent by labor.

The productive force of humankind can be regarded as a constant within a country or a region in an age. Therefore, the longer the time distance spent on a product is, the greater its value becomes. The reverse is true too.

Now, the ***value of product*** can be defined as this: the value of any product is an index representing that human needs force and productive force work on a certain matter in a certain time distance.

The value of production described by an abstract amount can be called ***functional value of production*** as to distinguish it from that expressed by an amount or sum of money in classical economics.

In the same age and same society or region, because the need force and the productive force can be seen as a constant, the value of product is equal to the time distance taken by labor. If V_p stands for the value of a product and T_d for time distance or time spent by labor, ***labor time***, then,

$$V_p = T_d \qquad \text{(Formula 3)}$$

In the same age, within a same society, the longer the time distance spent on a product, the greater its value is. So is the opposite.

In different ages, the value of the same product is different because the time distance spent on it is different. The value of a product cannot directly be comparable with the same product in different era, because the different ages have the different productive forces.

On the same reason, the same product has different values in different countries with different productivity in the same era.

FUNCTIONAL EXCHANGEABLE VALUE

In a closed community or region, since the social division of labor, the people who undertake the production of the first necessaries have exchanged their surplus products with those who produce the second necessaries. As a result, the former not only has satisfied their first needs, but also have got the products associated with clothes, shelter and transportation and so an. In addition, the latter have their first necessaries by exchanging with the former. Nevertheless, the difference between the two exchanges lies in a basis that the former exchange their surplus to get the second necessaries for a comfortable life but the latter has to exchange their products to get

the first necessaries for survival. If there is no surplus, the former will not risk their life to enjoy the second necessaries. But as the latter are concerned, even if they haven't any surplus they have to exchange for getting the first necessaries because the most vital thing for them is to satisfy their hunger. So, in a closed country or region, the first necessaries are the foundation for exchange, without which, there will be no exchange action at all.

The ancient Chinese had concluded the law for the exchange in a close region: The price of everything depends on the price of the grains. An ancient Chinese story told two men were trapped on an isolated island surrounding by water. The rich held a bag of gold, and the poor one only had a bag of black bread. The rich one wanted to exchange the bag of the black bread with his bag of gold, but the poor one refused. Of course, the rich one died of starvation holding the bag of gold in his hand, and the poor one survived.

It tells us that, in a closed country or region, the first necessaries are the basis for exchange action.

In a closed society or region, the exchange action by which both sides can satisfy their first necessities is called ***equal value exchange***. The value produced at exchange is called ***exchange value*** and the products that have exchange values are called ***exchangeable products***, whose property is called ***exchangeable property***.

An exchangeable product must possess the exchangeable property, or else it is not an exchangeable product. There are ***two characteristics*** for the exchangeable property. One is that an exchangeable product is belonging to the first or the second necessities for the sur-

vival of individuals of humankind, with which humankind can live happily and comfortably. The other is that an exchangeable product must be the results worked by the productive forces on a time distance, or it must contain the time distance spent by the labor of producer.

For example, although oxygen and water are the necessaries for individuals of humankind to survive, generally speaking, they can be obtained from nature. Therefore, they are not product because they do not contain the time distance and the labor of man. Therefore, they are not exchangeable products, have no exchangeable value and property. They are also not exchangeable matter.

However, when oxygen is used in medicine or in industry and water is used by city residents or in industry, they need accumulating, purifying and reserving. In a word, they have been affected by productive forces. Those products possess value and two characteristics for the exchangeable property. So, they become exchangeable products.

However, as for some other goods, although productive forces have made every effort to producing them, if they have nothing to do with the first or the second necessaries for humankind, no one will pay any attention to them. Therefore, such kinds of things have not possessed any exchangeable property and value, nor can they be exchanged. They are just like a solitary flower in love with its own fragrance

Suppose U_1 stands for a unit of the minimum amount of the first necessities in a day (0r a unit time) for a person and U_2 for a unit of the minimum amount of the second necessities for a person everyday (or every unit time). Then, the exchangeable value of U_1 is inevitably equal to that of U_2 according to the definition of the exchange at equal value. If V_{u1} stands for the exchangeable value of a unit of the first necessity and V_{u2} for that of the second, then,

$$V_{u1} = V_{u2} \qquad \text{(Formula 4)}$$

Based on this formula, we can work out the exchangeable value of every product. The ***exchangeable value*** of a product is the value created by two producers who satisfy life needs each other through exchangeable process with their product. Because it is described by an abstract amount, the exchangeable value can be also called ***functional exchangeable value***

Suppose a unit of second necessary product is a result spent certain days (certain unit time) by a number of people. If P_2 stands for the number of the people taking part in the producing it and D_2 for the days (time) needed by it, then, the formula of the exchangeable value for a unit of product of the second necessaries can be put out like this

$$V_{e2} = D_2 \cdot P_2 \cdot V_{u2}$$

Similarly, the formula of the exchangeable value for a unit of product of the first necessaries can be put out like this,

$$V_{e1} = D_1 \cdot P_1 \cdot V_{u1}$$

Above two formulas can be synthesized as following:

$$V_e = D \cdot P \cdot V_u \qquad \text{(Formula 5)}$$

From the above formulas, one can find it easily that the more procedures for a unit of product there are, the bigger the value of D, P for it and the bigger its exchangeable value become. In a word, the more a product is elaborated, the bigger its exchangeable value becomes. This is the reason why the value of a primary product increases with reprocessing it. It also explains why the primary agricultural products have low exchange value, for many producing procedures of them are done by nature, such as photosynthesis and soil nourished by humus and irrigated by rain. However, when the above procedures are done by labor, their value will be raised.

The making of a dress, from cotton-plant planting, spinning and weaving, to clothes sewing, not only concerns workers and farmers but also includes the workers who make machines. When it com-

pares with the producing procedure of grain, it has a more complex procedure. This explains why the primary agricultural products have a lower exchange value than that of the industrial ones.

Some socialist economists explain that this happens because worker have made greater contribution to society than farmer, which deliberately raises the status of worker, depreciates farmers, and dramatizes the difference between two classes.

The goods for goods exchange between producers are the most basic way of exchange. As long as there is exchange, it certainly undertook according to necessity. ***Necessity*** of goods is not only connected with the degree of its close relation to the survival of individuals of humankind, but also associated with the exchangeable value of the goods. The necessity of goods is in direct proportion to the degree of its close relation to the survival of individuals of humankind and in inverse proportion to its exchangeable value.

As for a certain exchangeable product, its closeness with the survival of individuals of humankind remains a constant; its necessity is a reciprocal to its exchangeable value. If N stands for the necessity of an exchangeable product, then,

$$N = \frac{1}{Ve} \qquad \text{(Formula 6)}$$

The bigger the exchangeable value is, the smaller the necessity becomes. The reason lies behind it is very simple, because it is so

expensive that people cannot afford the high cost. They have to adjust the exchangeable order and postpone consuming it.

In the same region, the same age and on the same developing level of productive force, the more labor time spent on a product, the smaller its necessity is.

FUNCTIONAL PRICE OF PRODUCT

Due to the development of productive forces and the expansion of the ranges of exchange products, goods for goods exchange can no longer satisfy the needs of exchange. Therefore, exchange media emerged.

After the birth of exchange media, especially in present currency age, instead of the old exchange at equal value, there appears the exchange at equal price. It is ***equal price exchange***.

The exchange at equal value is an exchange form bartering one product for another, which takes place between the producers face to face. This exchange is at first based on the satisfaction for the first necessaries. With the birth of the exchange at equal price, there appear fortunately the indirect producer, merchant and the related administrative staff, the third producer, between the direct producers of the first and the second necessaries. The exchange media emerges between exchangeable goods.

The ***trustworthiness*** of exchange media is the basis of exchange at equal price. The trustworthiness of the early exchange media,

such as gold, silver and precious stone, is built on their permanent, rare, difficult duplication and attractive characteristics. Any other thing, if it possesses the above characteristics, can also be used as an exchange media, such as an unusual calligraphy and painting, a rare antique and so on. The trustworthiness of currency in today is set based on political and economic stability of a country.

The appearance of merchants and commercial and governmental administrative staff make the producers of the first and the second necessaries not only satisfy their own needs, but also provide the necessaries for those indirect producers. That is to say, they will bear the first and the second needs for themselves, also shoulder a same task for merchants and administrative staff.

We call the indirect producer the ***third producer*** to separate it from those of the first and the second.

Suppose the population of the third producer for the exchanging a unit product is P_3, and the days D_3 (or a unit time) they spent for P_3. We have known that a unit of daily needs to the first necessaries for each third producer is U_1, and that to the second is U_2. Their exchangeable value is respectively V_{u1} and V_{u2}. The exchangeable value of the first and the second necessaries for each third producer every day (or unit time) is the sum of V_{u1} and V_{u2}. Because V_{u1} and V_{u2} are equal, the above exchangeable value may be described as $2V_{u1}$ or $2V_{u2}$. $2D_3P_3V_{u1}$ Or $2D_3P_3V_{u2}$ is the exchangeable value created by the third producer.

The ***price*** of a unit of product is the sum of the functional exchangeable value created by the direct producers and the indirect third producers.

In order to distinguish it from the view of classical economics in which the price is expressed by a sum or amount of money, the price in this book is called ***functional price***

Suppose P_{r2} stands for the price of a unit of product of the second necessaries, then,

$$P_{r2} = D_2 P_2 V_{u2} + 2D_3 P_3 V_{u2} = V_{u2}\left(D_2 P_2 + 2D_3 P_3\right)$$

Or

$$P_{r2} = V_{u2}\left(D_2 P_2 + 2D_3 P_3\right)$$

Because V_{u1} and V_{u2} are equal, then

$$P_{r2} = V_{u1}\left(D_2 P_2 + 2D_3 P_3\right)$$

Similarly, any price of a unit of the first necessity can be calculated as this,

$$P_{r1} = V_{u1}\left(D_1 P_1 + 2D_3 P_3\right)$$

Or

$$P_{r1} = V_{u2}\left(D_1 P_1 + 2D_3 P_3\right)$$

The above formulas can be synthesized as follows:

$$P_r = V_{u1}(DP + 2D_3 P_3) \qquad \text{(Formula 7)}$$

Or

$$P_r = V_{u2}(DP + 2D_3 P_3) \qquad \text{(Formula 8)}$$

Above two formula tell us that, price of a unit of product is the sum of the first or second necessary's functional exchangeable value created by the direct producers and the indirect third producers.

The formula seven and eight can be put together as follows:

$$P_r = V_u(DP + 2D_3 P_3) \qquad \text{(Formula 9)}$$

As soon as an exchangeable product possesses the property of price, it has become a ***commodity***. P_r is actually the price of commodity Therefore, the exchange at equal value has turned into the exchange at equal price.

V_{u1} or V_{u2} in the formula eight and nine is the exchangeable value of a unit of the first and the second necessaries in one day (or one unit time) for each producer. It is not hard to understand that the more contents concerning the food, clothing, shelter, and transportation and so on are included in a unit, the bigger the exchangeable value of the unit is.

In fact, every producer needs the first and the second necessaries for their daily live. The sum of V_{u1} and V_{u2} is the exchangeable value of one unit product obtained by each producer every day (or a unit time). It is also the ***minimum wage*** of a unit time for each producer.

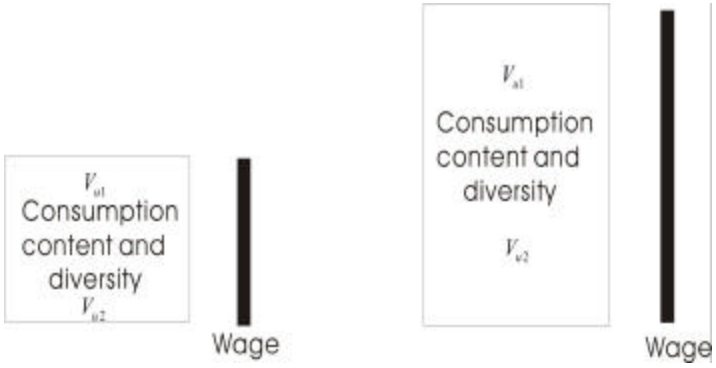


Figure 2: the relation between wage and consumption content and diversity

In a society, the content of food, clothing, shelter, transportation and so on for one producer in one day (a unit time) is related to the diversity of consumer goods. The diversity of products is connected

with how many new thing or products are created through the evolution and the division of thing, which are the function of productive force. Therefore, in a closed society with the increase of the productivity, the thing evolves and divides quickly and quickly, which brings about a great diversity of product.

With the increase of the diversity of product, the content of a unit of the first and the second necessaries increases. The exchangeable value of every unit product created by each producer in a unit time also increases. In other words, the level of the daily wage for a producer is decided by the consumer content and diverse under the function of the developed of productive force (Figure 2).

THE PROPERTY OF VALUE, EXCHANE VALUE AND PRICE

We know that the value of product consists of four elements. One of them is productive force that consists of quality and quantity productive forces expressed by wisdom or knowledge through labor of hands. Wisdom or knowledge that comes from social education and cultural accumulation of human being belongs to whole humankind or member in a society.

Therefore, the productive force is an index of society. A class or an individual in a society cannot singly create the value of any product.

The value of any product and the productive force are all an index of society. They do not belong to a certain one or a certain class. In a word, the value of product is an index of productive force.

The exchangeable value is based on the quantity of the first and the second necessaries for each producer in one day (or one unit time). This quantity is different in accordance with the people, the era and the district. It is a ***negotiated value*** that makes both sides of exchangers be happy. It depends on both sides of exchanger who agree on how to exchange goods with goods, or value with value or price with price. This is an agreeable one for two sides of exchanger or producer. Thus, exchangeable value is created by the direct producers themselves. Exchangeable value can be created by an individual or a single class.

The exchangeable value of a product is not its value, but an index of ***individual survival***, because the value of product is an index of productive forces of the whole society. An individual can independently create the exchangeable value by himself, but he cannot create the value singly.

The exchangeable value is a negotiated value, which makes price have a ***negotiated feature***, also wage.

This negotiated feature decided by many facts (for example: social, economic, political fact and so on) make the inertia of price and wage decrease.

Similar to the exchangeable value of product, the price of commodity is also the index of individual survival, but it contains the third producer. The price is the exchangeable value plus the value of

the minimum volume of the first and the second necessaries needed by each third producer in one day (or one unit time). Therefore, price is a joint creation of the first, the second and the third producers.

According to classical view of value, it is an amount, as of goods, services, or money, considered being a fair and suitable equivalent for something else, a fair price or return. This view is not exact, because it obscures the borderline among value, exchangeable value and price.

There are many parlances for the classical view of price. So, it is also not exact. For examples, it is the amount as of money or goods asked for or given in exchange for something else; price is the charge for cost expense; or it signifies an amount given or asked for in payment for goods or services; or price is the amount of money needed to purchase something offered for sale, and so on. Overall, they cannot reflect two important facts in price, i.e. the labor time and the exchange value of the first and the second necessaries needed for life.

Some one may say that the wages level is always related to the productive efficiency. The higher productive efficiency is or the more products are made in a unit time, the higher the wage becomes.

However, in a closed country or a region, the wage level is not only determined by the productive efficiency. The fixed people in a society have a fixed amount of consumption. Pick automobile as an example, Generally speaking, an automobile for each person is enough to satisfy his needs. With the production of more and more

automobiles, they are not needed and become overstocked. Therefore, the high productive efficiency for a single product will quicken the unemployment for workers. Therefore, wage increase is not decided only by the high efficiency of any single product.

The development of quality productive forces is the decisive factor to the raise of wage. With its development, there emerge more and more new products. Then, the content of consumption for every one in a society also becomes plentiful. For example, before the creation of TV sets or automobiles, they had not been included in V_{u2} or in the unit of the daily second necessity of the worker. However, as soon as they were born, a TV set and an automobile has been included in V_{u2} and the wage of worker is raised.

The most basic difference between exchangeable value and the price lies in that the exchangeable value can be created by an individual or a class, while the price is a joint product of direct and indirect producers. An individual or a class cannot create the price alone.

Now, it is very clear that price is neither value nor exchangeable value.

The error of the theory of Surplus Value clarified by Karl Marx is that it has mixed the three concepts together, used the price of commodity to calculate its value and contributed all the creation of the value to worker.

Because there is a sharp difference in the index of individual survival between worker and owner of capital and productive material, the conditions of living and working are as different between

owner and worker as the paradise and the hell. Due to the very unequal status in economy, there emerges the very unequal status in politics. Worker for their survival in a certain negotiation is in exploitation and oppression. Therefore, workers have launched the proletarian revolution.

However, the result of every revolution is that they have only relatively reduced the sharp difference in the index of survival between two classes, but have not changed the nature of capital and means of production. The capital and the means of production, whether possessed by private or by state, are used to expand the production of the necessaries needed by the whole member in a society.

Furthermore, what the theorists of Surplus Value have failed to realize is that every activity, including revolution, under a certain system in human society only strengthens, solidifies and perfects the social system, but cannot change and destroy it. The social system is the product of the development of productive force, not the revolution. The system will not die out until it is no longer able to suit to the new and high level of productive force. Then, in its place, there is a new system. Revolutions can only mend the old system, but cannot create a new one, because what is most important to a new system is that it must have different mode of production and productive forces from the old.

In the twentieth century, revolution is a very modern noun. Because the revolution strengthens, solidifies and perfects social system, capital system. In its age, there appears a welfare system in

Western Europe, of which Denmark or Sweden are a very good example.

In this sense, Marx and communists are only the nominal revolutionaries, but not the actual rebels against the capitalism. On the contrary, they are the very persons who gave a push to developing capitalism system and made it perfect.

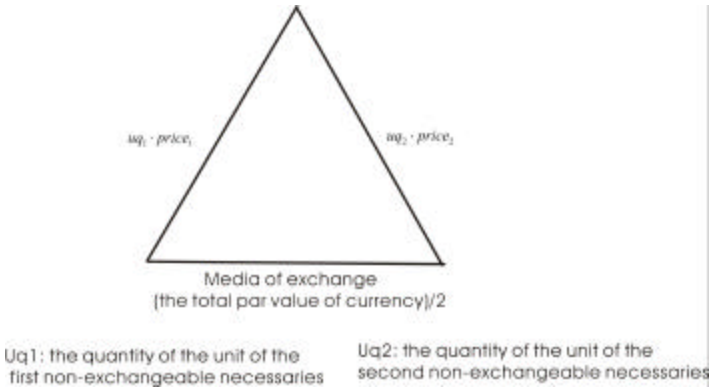
It is obvious that the more the third producer between the first and the second ones are and the more labor time will be needed for the exchange, the longer time for the circulation of commodities. It will lead up to the increase of the value of $D_3P_3V_{u1}$ or $D_3P_3V_{u2}$.

With the increase of the value of $D_3P_3V_{u1}$ or $D_3P_3V_{u2}$, the price becomes higher and higher. The circulation with hindrance, too many circulation links and a large administrative and national defense staff is all the dreadful factors that raise the prices. The streamlined administration, combating hoarding for speculation, and securing the smooth circulation have been the sound strategies for every wise statesman to run the country and to promote the development of economy in history. His aim is to do every effort to reduce the population of the third producers, and shorten the time used in the process of circulation and let the surplus third producers put into the production of the first and the second necessities.

BALANCED TRIANGLE

In a closed country or region, either the first or the second necessities can be divided into two parts. One part is consumed by the producers themselves for survival. This part of product that does not participate in the exchange process can be called ***non-exchangeable product***.

The other part is exchanged to keep the survival of the others, which is called ***exchangeable product***.



$$U_{q1} \cdot P_{r1} = U_{q2} \cdot P_{r2} = \frac{1}{2} \text{ (corresponding par value} \times \text{quantity in exchangeable circulation)}$$

Figure 3: balanced triangle

If the exchange takes place in a closed country or region, the sum of price value of the first exchangeable necessities must equate to that of the second. The value sum of exchangeable product is certainly equal to the corresponding total par value of currency

($U_{q1} \cdot P_{r1} = U_{q2} \cdot P_{r2} = \frac{1}{2}$ (corresponding par value × quantity in exchangeable circulation), which forms an equilateral triangle that is called ***balanced triangle*** (figure 3).

Non-exchangeable product does not enter into exchange process and give an influence on triangle balance system.

In a closed country or region, the diversity of non-exchangeable product, ether the first necessaries or the second necessaries, is unlimited, but the amount of every non-exchangeable product limited, because the sum of population or consumer is a constant in a given time.

In the old times, the non-exchangeable product is directly consumed by producer self. But now, it is also seen as commodity and enters into side circulation in which the third or indirect producer who participate.

In the developed countries, the total value of industrial product and the second necessaries are much higher than that of agricultural product and the first necessaries.

The sum of price value of the first and second non-exchangeable necessities in side circulation is equal to the corresponding par value of currency.

The sum of two above corresponding par value of currency in a year, one in exchangeable circulation and another in side circulation, is just equal to GDP , the total value of all goods and services produced within that territory during a specified period.

Human society in the world has been artificially divided into many parts forming countries based on different regions and nationalities. If the exchange only takes place in a restricted region and the triangle built on the price remains an equilateral one in dynamic equilibrium state, a society of such is a closed-door and self-sufficient one.

Because of the unbalance of the development of human society, the development of productive force is also unbalanced. Putting the large number of labors in the production of a single necessity will cause large surplus of commodities. The commodities cannot be sold out even after cutting down their prices. As a result, they have to be destroyed or put aside idly because of the saturation of consumption. It is the saddest result to the producers, because a large number of labor power and material resource are wasted. Thus, surplus goods become a key to open the closed-door of a society. Trade among different regions comes into being.

Based on the concept of productive force and using the triangle, one can easily evaluate the economy in a closed region or in an open one; one can even find the causes of economic problems and solve them properly.

FUNCTIONAL WAGE OF PRODUCER

The non-exchangeable product only circulates in a side of the first or the second producers. It is called ***side circulation***.

In the age when the productive force was not developed, the non-exchangeable goods were produced and consumed by producers themselves. For example, farmers planted grain, made flour and baked bread for their own use.

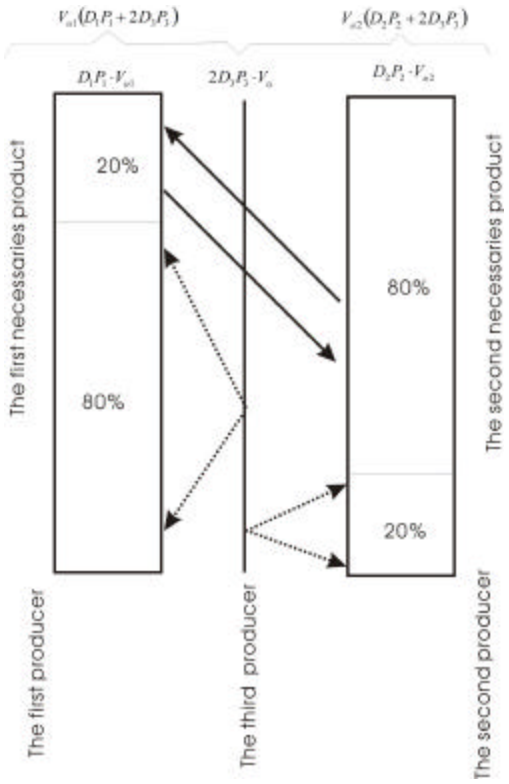


Figure 5: side circulation and exchange of commodity (productive force is 20 in a region)

With the development of productive forces and the social division of labor, the non-exchangeable goods, such as grain, through the tradesmen of flour and bread, entered into market, and returned again to the producers.

At this time, this part of the non-exchangeable goods remains to circulate in one side. It does not enter the main stream of exchange and influence the prices of exchange.

Suppose in a community whose productive force is 20, and 20 percent of the first necessities product exchange with 80 percent of the second necessities product. Thus, 80 percent of the first necessities product and the 20 percent of the second necessities product is kept for the consumption of the producers themselves. Those products do not participate in the exchange process and only circulate through a side way (See figure 4). This is side circulation.

Similarly, the goods kept in side circulation do not affect the prices of exchange at equal price in a closed country or a region and the balanced triangle.

In some country with backward agriculture, for example, in China, where investment in agriculture is always ignored by some reasons, the purchasing power of peasants in country is much lower than of population in city with flourishing industry and commerce.

Therefore, two relatively independent consumption units are formed in city and in rural area respectively.

In the city, the great majority of industrial goods does not exchange with agricultural product and circulates in one side. People in city have chance to enjoy the expensive industrial product, but peas-

ant not, which gives rise to a great difference between town and country.

We have already known that the sum of V_{u1} and V_{u2} only represents the minimum amount of the first and the second necessities. That is just ***minimum wage*** or ***functional wage*** for one third-producer in one day (or one unit time). With the development of productive forces and the emergence of more and more new products, the consumption contents represented by the sum of V_{u1} and V_{u2} become larger and larger. The consumption products become more and more diverse. So, wage is raised higher and higher (Figure 2).

What is the wage of the first and the second producer? Their wage also consists of $V_{u1}+V_{u2}$. For the first producer, the part V_{u1} of his wage that takes part in the side circulation does not in exchange. So does the part V_{u2} for the second producer.

The seventh and eighth formula can be written by the following Formula:

$$V_{u1}=\frac{P_r}{DP+2D_3P_3}$$

And

$$V_{u2}=\frac{P_r}{DP+2D_3P_3}$$

The formula 9 can be synthesized as following:

$$V_{u1} + V_{u2} = \frac{2P_r}{dp + 2d_3P_3} \qquad \text{(Formula 10)}$$

$V_{u1} + V_{u2}$ standing for the ***average wage to*** produce one unit product can be replaced with W in a closed country. The denominator $dp + 2d_3 p_3$ representing the population and the time of labor put in the producing and exchanging one unit product can be replaced by t. It is ***average labor time***. Similarly, the numerator $2P_r$ can be replaced by P_r that is the ***average price*** of a unit product in a closed country. Then, the formula 11 can be simplified for the convenience of memory and application like this:

$$W = \frac{p_r}{t} \qquad \text{(Formula 11)}$$

From the above formula, the relationship among wage, price and the labor time are very clear.

Nevertheless, when a concrete problem is considered, we cannot neglect the contents of formula 10 before simplified. What is to be stressed is that "t" not only stands for the time of labor, but also includes an amount of population participating in the producing and exchanging one unit production.

One worker may create more exchangeable value, but needs only one share of survival materials and consumes only one share of consumption content. So, the cost of employing one more workers will be much higher than that of making worker work overtime.

Therefore, a shrewd and cruel capitalist would rather make their workers work extra hours than employ any other workers. Some European countries, such as Denmark, stipulate the maximum limit of weekly working time to guarantee the interests of workers, the theoretical grounds of which are consistent with the above formula.

RELATIONSHIP AMONG PRICE, WAGE, LABOR TIME, INTEREST RATE AND GNP

The value of the denominator t is a function of productive forces and production efficiency. With the increase of productive force, the production efficiency will also increase and the value of denominator t becomes small. The opposite is also true.

It can be seen from formula 11 that the efficiency represented by t is a constant and wage is also a constant, when productive force is an invariable. So is price. The consumption content remains unchanged. If consumption content is not developed and diversified, merely rising wage will increase the value of the numerator or decrease that of the denominator. Because the numerator is price and denominator is labor time put into the production and exchange, rising wage will lead either to rising price or to aggravation of unemployment.

ployment.

It is obvious that reasonable way of raising wage is only to develop productive force, to raise production efficiency and to diversify consumer goods. Then, the sum of V_{u1} and V_{u2} will become bigger and the value of the denominator will become smaller because of raising efficiency and decreasing the value t. Thus, the price can remain unchanged. The fluctuation of prices is the sign of whether the wage rising is reasonable or not.

Let us further discuss the relation among wage (W), price (P) and labor time (t).

Assuming $W = \frac{P_r}{t}$, because of production activity in an enclosed region or country, we can interpret the compositions of the formula as following. W represents the ***average compensation*** for one unit product within one unit time. The more the varied consumer goods represented by W, the higher salary. P_r is the ***average price*** of product per unit. The time, ***average labor time*** spent on producing and exchanging one unit of product is t, an abbreviation of $dp + 2d_3p_3$. The number of people (p and p_3) and the amount of a unit time (d and d_3-day) needed for producing and exchanging one unit product are dp in producing process and $2d_3p_3$ in exchanging process.

There are three variables in $W = \frac{P_r}{t}$. To simplify the discussion, we will assume one of the variables is a constant for a moment. We will further assume that one of the variables is a dependent variable whose value depends on the other variables.

Relationships among average wage, average price and average labor time put in producing and exchanging product are clear when applying $W = \frac{P_r}{t}$ locally, such as within one department or one enterprise. It is easy to see that average wage in one unit time is just equal to product price divided by labor time.

Relationships among three variables become much more complex when using $W = \frac{P_r}{t}$ to develop macro-economic policies and controls for a large territory or a country. A number of possible factors can influence the variables and thus complicate their relationship. The following are some possible scenarios.

T**aking W as a constant**, we can see a positive relationship between price and labor time.

The value of P_r **depends on the value of t**.

One of major possible factors that can change t is the ***production efficiency*** ($e = \frac{1}{dp}$). It is defined as the average labor time (dp) to produce one unit of product in a social. The production efficiency changes slowly because of its ***inertia nature***.

The inertia of production efficiency is decided by productivity. Productivity changes very slowly in a society. This is reason why the inertia of production efficiency is very big.

Because of that the Gross National Product (GNP) is the total value of final goods and services produced in a year by domestically owned factors of production and assuming full employment (p) and constant population in a society or a region, $\frac{dp}{GNP}$ is the time (d-year) in which one unit of value or product is produced.

Therefore, we have: $e = \frac{GNP}{dp}$ that indicates how many units of product are produced in one unit of time (a year). Here is one unit of product expressed by its price according to the definition of GNP.

The change in GNP reflects the change of production efficiency with reasonable accuracy.

GNP and production efficiency change are positively related. We may use the change in GNP (gross national product) or GDP (gross domestic product) as a substitute or referential index.

As above mention, the popular measure method of productivity by output per hour of all persons for the full year is not different with efficiency of produce.

So, there is not natural difference between concepts of productivity and gross national product.

With higher efficiency, labor time (dp) put in one unit of product decreases, and t decreases. Thus, numerator p_r decreases. Lower efficiency means increases in dp, t and p_r.

Holding wage constant, the product price will increase or decreases with the change in production efficiency. The price changes are ***real changes***.

Another factor that can change t is the exchange efficiency ($e = \frac{1}{2d_3 p_3}$). The ***exchange efficiency*** of product is defined as the average labor time put by a third producer in accomplishing the exchange process for such a unit product in a social. A product becomes a commodity at the completion of the exchange process.

In the process of exchange, the transport system may be called ***hard way*** in which the commodity flows. Bank system in which exchange media (money) circulates may be called ***soft way***. The two ways constitute ***two large arteries*** for commodity exchange. Two large arteries are very important fact that influences the exchange efficiency. The social policies are their lubricant.

There are also many other factors that retard smooth commodity exchange. Among them are hoarding, speculation, bureaucracy, and heavy government and military budgets and so on.

The high exchange efficiency means less labor times and population put in the exchange process or less value of $2d_3 p_3$ and t. Thus, numerator price p_r decreases.

The ***inertia of exchange efficiency*** is as large as the inertia of production efficiency, because they are not only relative to the social and productive structure, but also politics and social system. Change of price resulted from change in exchange efficiency is a real change.

Interest rate that is a part of bank system, soft way, in exchange process is yet another important factor that influences exchange efficiency. Variation of interest rate will artificially quicken or retard exchange process and change $2d_3p_3$ or t and then p_r. Having high interest rate has the same effect as having more labor time in commodity exchange. High interest rate increases $2d_3p_3$, then t. Thus, Pr increases. With lower interest, the value of $2d_3p_3$, t and p_r will decrease.

Interest rate can be adjusted as need, because ***interest rate inertia*** is not as large as the exchange and production efficiency. However, the volatile interest rate inevitably causes volatility in product price.

In a stable society and a certain time, the other elements that affect exchange efficiency may be seen as a constant. Thus, the change in the interest rate reflects the change in the exchange efficiency with reasonable accuracy.

On the other side, the ***value of t depends on the value of*** p_r.

Ignoring the above factors that influence the change in t and taking W as a constant, p_r value will change because of too much or

too little money in circulation according to equilateral triangle theorem and side circulation.

Assuming the production efficiency in a country as a constant, its total production quantity is a constant. Furthermore, the currency face value exists as a constant. Now, we can see a positive relationship between product price and currency quantity in circulation. If the quantity of currency circulation increases faster than that of the product, we will have inflation. The currency will be depreciated in this case. The deflation occurs when the quantity of product increases faster than that of currency put into circulation. The currency appreciation occurs in this scenario.

With W being a constant, the increase or the decrease in numerator p_r will force the increase or the decrease in denominator t. Since the value change of t comes from reasons other than the change in the production or exchange efficiency, we call those change ***artificial change***.

In a stable society, the production and exchange efficiency do not change much in a short time. The value of t can be treated as a constant. Consequences with an artificial increase in t are an artificial increase in employment. On the contrary, an artificial decrease in t will cause an artificial decrease in employment.

Assuming that W and production and exchange efficiency remain unchanged, the increase of interest rate only (i.e. increasing denominator t) to balance inflation (higher p_r) come from the excessive currency in circulation will cause an artificial decrease in ex-

change efficiency as well as in unemployment. Wage earners can be hurt.

Following the same logic, the decreasing interest rate to balance deflation only will give an artificial increase in exchange efficiency as well as in unemployment. Wage earners are beneficiaries.

Holding price p_r ***constant***, wage W has negative relationship with labor time t in which one unit product is produced and exchanged.

Variable t depends on W. Within a relative short period, the production and exchange efficiency in a country remain stable. Thus, denominator t is approximately constant. Now, if we only increase wage or increase wage faster than the production and exchange efficiency, the value of denominator t will be forced to decrease. According to what we discussed earlier, this shrunk t will then in turn cause artificial unemployment increase. Similarly, artificial employment increase occurs when wage increase is lower than production and exchange efficiency.

Variable W depends on t. With improved production and exchange efficiency, labor time t will decrease, wage W will increase. Following the same logic, we can see that decrease in production and exchange efficiency results in increase in labor time t and decrease in W. Wage change discussed her is real change.

Holding production and exchange efficiency and t constant, wage W has a positive relationship with price p_r.

Variable p_r ***depends on W***. Under constant t, raising or diminishing wage only will create the increase or the decrease in product price p_r according. The variations of p_r are considered artificial changes.

Variable W depends on p_r. Under constant efficiency, the increase or the decrease of price that is resulted from too much or little currency in circulation, will create increase or decrease in wage W according. These are too artificial changes.

PRICE SYSTEM

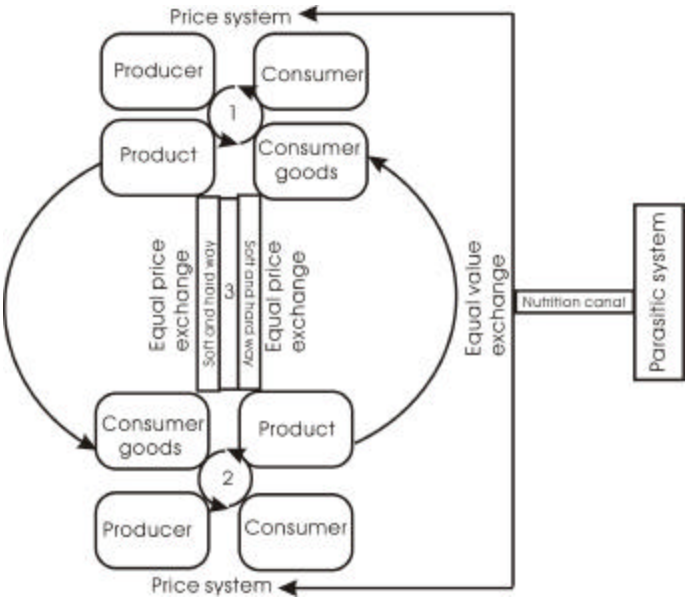
Product price p_r is the wage earned by direct and indirect producer in a unit labor time. It is an indicator of survival. Wage is in nature negotiable and different in different time and areas. Accordingly, the price often fluctuates and changes.

The ***inertia of price*** is smaller than the ***inertia of wage***, the efficiency of production and exchange, because price is apt to get excited over economic, social and political trifles. As a rule, the speed of the change in price often is bigger that that in wage. This is the reason why the agreement of the increase of wage is often made in a wave of protest of employee.

In a closed country or region, producer and exchanger together create product price and every one is both producer and consumer.

Currency is the media between producer and consumer. Thus, they form a ***price system***.

There is a ***dual property*** in price system (Figure 5). Every producer is at the same times a consumer, every product is a consumer goods, and currency is for both production and consumption.



1: the first producer and necessaries

2: the second producer and necessaries

3: the third producer

Figure 5: Price system

Everyone, every product and every currency complying with the above criteria are within the price system. Otherwise, they are outside of it and constitute a ***parasitic system***.

In an ***ideal price system***, agriculture and industry lay equal stress on and go on together, otherwise ***no-ideal price system***

A country or region with no-ideal price system, for example, some city country, Hong Kong, Singapore and so on, where there is only industry, or some country where mainly agriculture, must depend on other. Oppositely, a country or region with ideal price system, for example, unit state, china and the region of European Economic Community where there is a good industrial and agricultural system respectively is certainly independent.

Price, like a red threaten, runs through the price system. In the price system, the change in price determines that in wage and interest rate. However, price is also basically determined by the wage, the productive and exchange efficiency reflected by the change in GNP and interest rate in a stable country or region, although the balance between the demanding and the supplying have a influence on it.

In the parasitic system, handicapped, elderly people, young children are fully or partially dependent on the price system. So do the people, for example, wildcatter in the monetary and trade market who controls a part of currency and product as a tool for making profit from the price system. They get their nutrition for their survival from the price system through a canal that is made of political and economical policy.

Speculation in the monetary and trade market is a very importunate and complex problem in the world in our era. It is very dangerous for price system in wide scope. It not only leads market into chaos or economic crisis, but also makes this system wither away because loss of nutrition, which would destroy economy of a country and even the world.

FOUR-RATE FORMULA

From above discussion, we can lead to two Four-Rate-Formulas as follows:

$$1 \pm w\% = \frac{1 \pm p_r\%}{1 \pm gnp\% \pm i\%}$$

$$1 \pm w'\% = \frac{1 \pm p_r'\%}{1 \pm i'\%}$$

Or

$$1 \pm w\% = \frac{1 \pm P_r\%}{1 \pm gnp\%}$$

Assuming that the percentage change of wage (W) is $\pm w\%$, the symbol + and − indicate respectively the increase and the decrease in wage. After the changing, the real wage (W') is $W(1 \pm w\%)$.

So:

$$W' = W(1 \pm w\%)$$

Assuming that the percentage change of price (P_r) is $\pm p_r\%$, the symbol + and − indicate respectively the increase and the decrease in price. After the change, the real price (P_r') is $P_r(1 \pm p_r\%)$. So:

$$P_r' = P_r(1 \pm p_r\%)$$

Assuming that $\pm i\%$ is the percentage change in interest rate (I), the change in the exchange efficiency will be expressed by the change in interest rate in a stable society and in a period.

The symbol + indicates the increase in interest rate and the decrease in exchange efficiency. Therefore, the labor time increases. On the contrary, the symbol − indicates the decrease in interest rate and the increase in exchange efficiency. So, the labor time decrease.

After change, the real labor time taking in the process of exchange $(2d_3 p_3)'$ is $2d_3 p_3(1 \pm i\%)$. So,

$$(2d_3 p_3)' = 2d_3 p_3(1 \pm i\%)$$

Assuming GNP percentage change is $gnp\%$. Changes in production efficiency will be expressed by $\pm gnp\%$ change in a stable society in a period. The symbol + indicates GNP decrease and production efficiency decrease. So, the labor time increase and dp is positive. The symbol $-$ indicates GNP increase and production efficiency increase. The labor time decrease and dp is negative. After change, the real labor time dp' taking in production process is $dp(1 \pm gnp\%)$.

So, $dp' = dp(1 \pm gnp\%)$

All the changes are made and we have a formula look like this:

$$W' = \frac{P_r'}{t'}$$

Or

$$W' = \frac{2p_r'}{dp' + (2d_3p_3)'}$$

Then, the each element is substituted in the above formula with appropriate value.

$$W(1 \pm w\%) = \frac{2p_r(1 \pm p_r\%)}{dp(1 \pm gnp\%) + 2d_3p_3(1 \pm i\%)}$$

(No blending formula)

When the value of $\pm gnp\%$ is totally equal to that of $\pm i\%$, we have

$$W(1 \pm w\%) = \frac{2P_r(1 \pm P_r\%)}{(dp + 2d_3p_3)(1 \pm gnp\%)}$$

Or

$$W(1 \pm w\%) = \frac{2P_r(1 \pm p_r\%)}{(dp + 2d_3p_3)(1 \pm i\%)}$$

Since $W = \frac{2p_r}{dp + 2d_3p_3}$,

We have

$$1 \pm w\% = \frac{1 \pm P_r\%}{1 \pm gnp\%} \qquad \text{(Formula 11)}$$

Or

$$1 \pm w'_0\% = \frac{1 \pm p_r{}'_0\%}{1 \pm i'_0\%} \qquad \text{(Formula 12)}$$

If the exchange and production efficiency are artificially blended together, the percentage changes in the whole labor time t, $(dp + 2d_3 p_3)$, is $\pm gnp\% \pm i\%$.

After the changing, the real whole labor time t', i.e. $(2d_3 p_3)'$, is $(dp + 2d_3 p_3)(1 \pm gnp\% \pm i\%)$. So,

$$t' = (dp + 2d_3 p_3)' = (dp + 2d_3 p_3)(1 \pm gnp\% \pm i\%)$$

Substitute the element $(dp + 2d_3 p_3)(1 \pm gnp\% \pm i\%)$ for t' or $(2d_3 p_3)'$ in the formula

$$W' = \frac{2p_r'}{(dp + 2d_3 p_3)'}$$

Then,

$$W(1\pm w\%)=\frac{2P_r(1\pm p_r\%)}{(dp+2d_3p_3)(1\pm gnp\%\pm i\%)}$$

(Artificially blending formula)

Since $W=\dfrac{2p_r}{dp+2d_3p_3}$,

We have:

$$1\pm w\%=\frac{1\pm p_r\%}{1\pm gnp\%\pm i\%} \qquad \text{(Formula 13)}$$

For convenience, we call the formula 11, 12 and 13 Four-Rate Change Formula, shortly, ***Four-Rate Formula*** .

The advantage of this formula is that it is easy to use and give a reliable calculation result.

Let us discuss the reliability of Four-Rate Formula.

The denominator of the right side of the equation, the no blending formula , is as following:

$$dp(1\pm gnp\%)+2d_3p_3(1\pm i\%)$$
$$=dp\pm dp\cdot gnp\%+2d_3p_3\pm 2d_3p_3\cdot i\%$$

Similarly, the denominator of the right side of the equation, the blending formula, is as following:

$$
\begin{aligned}
&(dp + 2d_3p_3)(1 \pm gnp\% \pm i\%) \\
&= dp \pm dp \cdot gnp\% \pm dp \cdot i\% + 2d_3p_3 \\
&\pm 2d_3p_3 \cdot gnp\% \pm 2d_3p_3 \cdot i\%
\end{aligned}
$$

Compared with the former, there are two extra terms, $\pm dp \cdot i\%$ and $\pm 2d_3p_3 \cdot gnp\%$, in the later. Obviously, the calculated value of the former is more precise than that of the latter. Therefore, the liability of the value calculated from the formula 13 is higher than that from the formula 14.

However, a crucial premise in the formula 13, the value of $\pm gnp\%$ is totally equal to that of $\pm i\%$, is uncommon in actual economical activity. If the symbol of $i\%$ and $gnp\%$ is opposite, but their absolute value is very close or even equal, the maximum liability of the result calculated from the formula of 14 will be achieved.

Let us look at the following example to show how to use this formula in practice.

In a country, the change rate of the GNP increase, the inflation and the interest rate increase are 2.5%, 2.0%, and 3.5% respectively. What would be a reasonable wage increase rate?

According to Four-Rate Formula, the interest rate increase results in the decrease in the exchange efficiency. Thus, the labor time increases, $i\%$ is positive. Since GNP increases, the efficiency of

productivity increases and the labor time decreases. So, the value of $gnp\%$ is negative. Positive inflation means positive $p_r\%$.

Putting $gnp\% = -2.5\% = -0.025$,

$i\% = +3.5 = +0.035$,

$p_r\% = +2.0\% = +0.02$ into Four-Rate Formula, we have:

$$1 \pm w\% = \frac{1 \pm p_r\%}{1 \pm gnp\% \pm i\%}$$

$= (1+2.0\%)/ (1-2.5\%+3.5\%)$

$= 1.02 / (1- 0.025+0.035)$

$= 1.02 / 1.01 = 1.0099$

$= 1 +0.99\%$.

Therefore,

$w\% = +0.99\%$.

The rate of the wage changes in this country should not be lower than +0.99%.

Another example:

In a country, the statistics show that the increase rate of GNP, inflation and wage increase are 3.3%, 1.8% and 3.3% in the latest 3 months respectively. What would be a reasonable interest rate change?

Since GNP increases, the efficienc y of productivity increases and the labor time decreases. So, the value of $gnp\%$ is negative. Inflation means that price increases and $p_r\%$ is positive. Wage increase means $w\%$ is positive.

Putting

$gnp\% = -3.3\% = -0.033$,

$p_r\% = +1.8\% = +0.018$,

$w\% = +3.3\% = +0.033$ into Four-rate formula, we have:

$$1 \pm i\% = \left(\frac{1 \pm p_r\%}{1 \pm w\%}\right) - (\pm gnp\%)$$

$= [(1+0.018) / (1+0.033)] - (-0.033)$

$= (1.018 / 1.033) + 0.033$

$= 0.9855 + 0.033 = 1.0185$

$= 1 + 0.01848 = 1 + 1.85\%$

So,

$i\% = +1.85\%$.

In a word, interest rate must at least be increased 1.85% in this country in the last 3 month.

The third example:

In a country, the statistics show that the increase rate of GNP, interest rate and wage are 3.5%, 4.8% and 3.0% in the latest 3 months respectively. What would be a reasonable price change?

Since GNP increases, the efficiency of productivity increases and the labor time decreases. So, the value of $gnp\%$ is negative. Interest rate increase means the exchange efficiency decreases and the labor time increases. Therefore, $i\%$ is positive. Wage increase means $w\%$ is positive.

Putting

$gnp\% = -3.5\% = -0.035$,

$i\% = +4.8\% = +0.048$,

$w\% = +3.0\% = +0.030$ into Four-rate formula, we have:

$$1 \pm p_r\% = (1 \pm w\%)(1 \pm i\% \pm gnp\%)$$

$$= (1+0.030)\ (1+0.048-0.035)$$

$$= (1.030)\ (1.013)$$

$$= 1.0434$$

$$= 1+ 4.34\%$$

Therefore,

$p_r\%$ is 4.3%,

So, price may at least increase 4.3% in this country in the last 3 month.

From the Four-Rate Formula, we can understand the following meanings.

Holding the percentage changes of wage and interest rate constant, the value of the numerator, the percentage change of price, is negatively related to the percentage change of GNP. This change in price is a real change.

Holding the percentage changes of price and interest rate constant, the percentage change of wage is positively related to the percentage change of GNP. This change is also a real change.

Holding the percentage changes of wage and GNP constant, the percentage change of price is positively related to the percentage change of interest rate.

Holding the percentage change of price and GNP constant, the percentage change of wage is negatively related to the percentage change of interest rate.

GENERAL THEORY OF INTEREST RATE

Fluctuating interest rate certainly causes fluctuation in price and wage. These changes are all artificial changes.

There are two phenomena (see figure 6).

The first should be called a ***negative effect*** or ***contrary effect*** of interest rate (i) on GNP, if their signs are opposite (GNP$\uparrow$–, i$\uparrow$+ or GNP$\downarrow$+, i$\downarrow$–). In the negative effect, the change in the exchangeable efficiency cancels that in the productive one out.

Under this condition, the value of the denominator would tend to be close to 1, then, the change of wage and price would totally synchronize at the same level. The third producer, lender, is greatly beneficiary, but it is harmful to wageworker, when interest rate rises with GNP increase, and vice versa.

The second should be called ***positive effect*** or ***mutual effect*** of interest rate on GNP, if they signs are the same (GNP↑–, i↓– or GNP↓+, i↑+). In the mutual effect, the change in exchangeable efficiency enhances that in productive one.

Under this condition, the value of the denominator would be larger than 1 when their symbol is positive, but smaller than 1 when their symbol is negative. With denominator increase, price would tend to increase or wage decrease. So, the third producer, lender, is greatly beneficiary. With denominator decrease, price would tend to decrease or wage increase. So, wageworker is beneficiary.

The percentage change in the interest rate has the following characteristics:

The inertia of interest rate is small some that price. The change in interest rate is determined by that in price, GNP and wage. So, the changing interest rate is often employed by economist as a ***flexible lever*** to adjust and balance the relationship between price and wage.

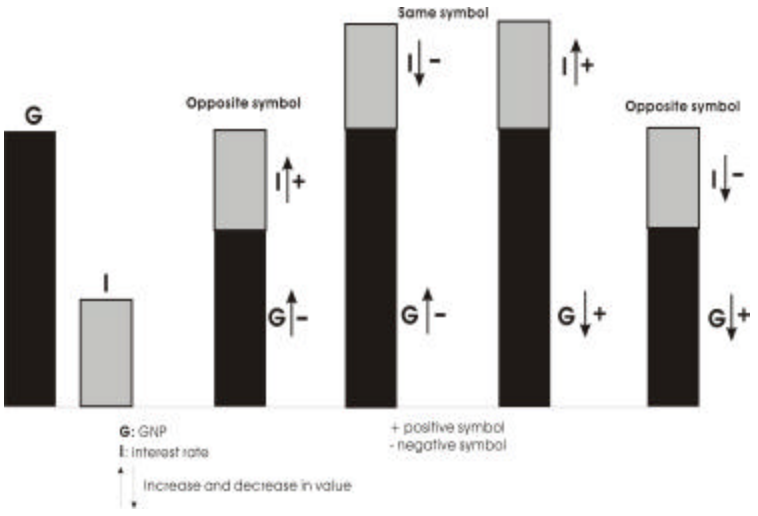


Figure 6: two phenomena: negative effect and positive effect of interest rate (I) on GNP (G)

The relationship between the percentage change of price and wage would be fully harmonious if the percentage change in GNP and the percentage change in interest rate are equal, but with opposite signs (Formula 11,12).

With a positive interest rate change, there is an artificial decrease in production efficiency in order to restrain the wage increase caused by price rise.

The artificially increasing interest rate means that the speed of the percentage change of wage is lower than that of price. On the contrary, the artificially decreasing interest rate means that the speed of the percentage change in wage is quicker than that in price.

With a negative interest rate, there is an artificial increase in the production efficiency in order to restrain a cascade of the subsequent price increase caused by the wage rise.

According to classical economical theory, interest rate is the return that lenders require and practically seen as a fiscal and monetary tool in money market. This is a ***special theory of interest rate***.

According the definition of Four-Rate Formula, the interest rate is seen as an indicator of the change in exchange efficiency. Interest rate has multiplier effects on economy and society. This is a ***general theory of interest rate*** argued by Four-Rate Formula.

As we has discussed above, the change in interest rate has a great impact on the wage, price and employment. Interest rate has positive and negative effect on GDP (gross domestic product) or GNP (gross national product). These effects will first bring about an artificial change in price or wage, then, probably lead to a real change in employment.

Even though Four-Rate Formula is not 100% accurate (because the changes in GNP and interest rate do not fully represent the production and exchange efficiency respectively), its advantages well outweigh its shortcoming.

Considering the complexity of economy in a country, Four-Rate Formula allows us to understand the main issue in macroeconomics. Thus, it is inspiring and worth reading.

Certainly, the more stable the politics and the economy in an enclosed society with an ideal rice system are, the more accurate the value calculated by Four-Rate Formula is.

Politic leaders and economist can use this formula in guiding their economic policies very easily.

PHILOSOPHICAL DEFINATION OF PRICE

According to formula nine $P_r = V_u(dp + 2d_3p_3)$, the price decided by the labor time $(dp + 2d_3p_3)$ put in the producing and exchanging one unit product that is the first or the second necessaries (V_u) needed by every producer for their daily or unit time live can be called ***real price*** that is an abstract concept. Simply, the real price of a product is created or negotiated by persons who take part in its production and exchange in times. The amount of real price is theoretically equal to output expressed by money in times when it is produced and exchanged.

High real price means high consuming content or volume (V_u) or high wage for producer if $dp + 2d_3p_3$ is a constant. Oppositely, high real price means high employ, if V_u, consuming content or volume, is a constant.

Compared with the real price, a price is decided by the balance between demand and supply. This is ***balance price***. The balance price is just ***market price***. The balance price has a volatility property. The balance price that varies widely will bring about a high volatility of wage and interest rate.

Under the condition of negative effect or contrary effect of interest rate (i) on GNP, the effect of change in interest rate and GNP on price become weak. So, price rate changes synchronously with that of wage can be called ***synchronous price*** according to Four-Rate Formula.

If the value of both interest rate (i) and GNP is totally equal, but symbol opposite, the change rate in wage is just equal to that in price. This price can be called ***harmonious price***.

Under the condition of positive effect or mutual effect of interest rate (i) on GNP, price have also two opposite behaves.

The inflation may break into gallop, if GNP is negative growth and interest rate rises at the same time, i.e. the symbol of both is positive. The price under thin condition is called ***crisis price***. The crisis price indicates that economical crisis has come.

However, wage would increase and price decrease if the symbol of both interest rate (i) and GNP is negative. This price may be called ***healthful price*** that indicates that economy is good and both of production and consumption booms.

When the value of the change rate of wage and interest rate is zero, the change rate of price certainly follows that of GNP. With the increase of GNP, price will decrease, and vice versa. This price can be called ***reasonable price***.

A stable interest rate and wage (no or little change in interest rate and wage) will give rise to reasonable price. At the reasonable price, all wageworker can get benefit from the increase of GNP and the decrease of price.

Obviously, if the balance price is little higher than the reasonable one, a little inflation may at first artificially promote to enlarge GNP or GDP, then to employ and boost consumption and wage.

Economist and government may always search reasonable price and control a little inflation to promote employ and boost consumption.

TRADE EFFECT

The countries or regions with no-ideal price system must depend on the other. The each country or region with ideal price system requires supplying what the other needs. So, trade is born.

There are two kinds of trades: ***surplus goods trade*** and ***non-surplus goods*** trade.

If the trade takes place between regions with the same development level of productive forces, two sides exchange the other's surplus goods with their own surplus ones. So, both of them get another consumer products, which is equivalent to the raising the productivity level for both sides. This trade can be called ***surplus goods trade***.

The trade effect caused by surplus goods trade may be called ***positive trade effect***.

If each of both countries has a new product, both get two new consumer products through trade. In a word, the invention of one new product leads to the consumption of two new goods, which means the improvement of productivity for both sides. This can be called the ***double effect*** of trade of surplus goods.

Yet, if the trade takes place between regions or countries with high and low productive forces, the former with its surplus goods exchanges the non-surplus goods of the latter. So, the region or country with high productivity will take the profits brought by the double trade effect. The side with high productivity gets two new products for consumption through trade at the same time when it invents a new product. The side with low productivity loses its own consumer goods or natural resource at the same time when it gets a new product from the side with high one, because it has not new product and surplus except daily consumer goods and natural resource. This trade is called ***non-surplus goods trade*** for the country with low productivity.

The trade effect caused by non-surplus goods trade may be called ***negative trade effect***.

The sum of V_{u1} and V_{u2} of the side with high productivity rises, so does its wage, because of the enlargement of consumer content and volume. The side with low productivity can at most maintain its original consumption level and wage.

With increasing wage in the country with high productivity, price must become higher and higher, but wage and price might decrease or at most keep unchanged in the country with low productivity.

So, a ***wage gap*** and a ***price gap*** between them will gradually come into being through a positive trade effect and a negative trade effect.

With the development of productive forces, in order to obtain the double, trio or even more positive trade effect, the side with higher productivity will certainly enlarge the production of surplus goods. However, this production may be restricted by the limited natural and environmental resource and labor force in a country or region. Because of this, there emerges non-goods trade today. It is ***capital trade***.

To expand the production of the surplus goods, the side with the higher productivity will invest to build factories in the regions with the lower. The capital trade makes the side with the higher productivity not only obtain the multiple positive trade effect, raise its wage and improve its living standard greatly, but also save on its natural

resource, labor forces and environmental resources. So, it is a beautiful richness.

Although the side with lower productivity can also get some new consumer products, it may lose its traditional consumption products, natural and environmental resources. There is no profit for it.

Then, price gap and wage gape between them would become much wider and deeper. Then, a great wide gap between the rich and the poor country becomes larger and larger.

Therefore, the capital trade becomes a tool for the developed country with high productivity to maintain its high wages and good living standard.

When compared with the goods trade, the capital trade is more deceitful for the countries or regions with low productivity. These countries or regions belong to undeveloped or developing country or region.

Both sides with different productivity have different prices and wages. The side with the higher productive forces has higher wages and price, while the other side has lower ones. The result of capital trade between them is that the former obtains the multiple positive trade effect and gets more profits and the latter is just the opposite. Thus, the rich become richer and the poor become poorer. Although the latter can also little improve its living standard at the cost of its labor, natural and environmental resources, such improvement is certainly very limited.

EXCHANGE-RATE FORMULA

Because wage is a survival index for producer in time per unit (in an hour, a day, a month or a year), it is appointed by a contract, which is different for people at different levels in the same age and region, for they have different consumption contents and volume demanded by them. Therefore, the different classes in a society or region are formed.

Of course, wage is manifested by money today. The different classes have different consumption-content and consumption-volume demanded by them.

In different regions and different ages, because the varieties in wage form and the amount of issuing money are different, the wage of a unit time and the quality and the quantity of goods represented by money per unit are different.

It is said that Tao Yuanming, a well-known poet in ancient china, did not bend to five Dou of millet (Dou is an old unit of capacity in china. One Dou is equal to 5 kilogram). From the story we can see that millet was a manifestation of Tao's wage at that times and that the wage of a unit time was five Dou of millet that was the minimum amount needed by a unit time for those who were at the same social status as his.

The wage of a unit time for each producer are $V_{u1} + V_{u2}$ in which U_1 is the minimum amount of the first necessities for each

producer in a unit time, its price is $P_{r1} = V_{u1}(D_1P_1 + 2D_3P_3)$. There are many concrete contents in U_1, including all kinds of food.

For convenience, one food-product needed by every one and every day's life will be picked as a reference, such as flour or rice. This product may be called ***reference product***. Then, the price of reference product will be picked as a ***reference price*** to measure the mass (amount) of this food-product represented by one unit time wage of different class with different wage in a countries or regions.

The price of this food-product may be also picked as a reference to measure the mass (amount) of it represented by per unit money in different countries or regions with different moneys.

For example, the wage for a producer is five units of money an hour in a certain age and region. Taking rice as a reference product and that its reference price is one-unit money per kilogram, the amount of referential product represented by wage in a unit time is 5-kilogram rice for this producer. The amount of referential product expressed by one unit money is 1-kilogram rice in this region at this age.

If a certain product is used as a reference, and its price is reference price, then its amount represented by money per unit is called ***money reference amount***. The money reference amount means how many unit of reference product is represented by money per unit. Suppose R_p stands for reference price, R_a for money reference amount, we have:

$$R_a = \frac{1}{R_p} \qquad \text{(Formula 14)}$$

The amount of referential product represented by wage (W) in a unit time is as follows:

$$w_a = \frac{W}{R_p} \qquad \text{(Formula 3. 15)}$$

The w_a can be called ***wage referential amount***.

In the same age and in the different regions or countries with the same level of productive force, their w_a and the consumption content and volume are at the same level. The ratio of their money reference amount expressed by per unit money and the ratio of their reference prices equal to the ratio of a unit of their money. This ratio is just the ***exchange rate*** of per unit money between them at the same age and same level of productivity.

The money reference amount and wage referential amount are can be called ***purchasing power factor***.

For example, if M_{ua} and M_{ub} stand for a unit money of country A and B respectively, R_{aA} and R_{aB} for their money reference amount and R_{pA} and R_{pB} for their reference price, the formula of exchange rate between two moneys and between two countries with the same productivity at the same age is as follows:

$$\frac{M_{uA}}{M_{uB}} = \frac{R_{aA}}{R_{aB}} = \frac{R_{pB}}{R_{pA}}$$

Or

$$\frac{M_{uA}}{M_{uB}} = \frac{R_{pB}}{R_{pA}} \qquad \text{(Formula 16)}$$

Suppose that the productivity of America is totally equal to that of Denmark. Taking wheat flour as a referential product, if the price of it a kilogram in U.S.A. is one Dollar and seven Kroner in Denmark respectively, the exchange rate between Dollar and Krone can be calculated by as following:

$$\frac{M_{uA}}{M_{uB}} = \frac{R_{pB}}{R_{pA}} = \frac{7}{1}$$

The exchange rate between U.S. Dollar and Danish-Krone is 1:7 according to this supposed condition.

In different regions or countries with different productive forces at same age, the wage referential amount in a unit time is also different. The wage referential amount in a region or country with high productivity is bigger than that with low one, which means that the

consumption content and volume in the former is larger than that in the latter.

Suppose that there are country A with high productivity and country B with low productivity. If w_{aA} stands for the wage referential amount in the country A and w_{aB} in the country B. Therefore, we have:

$$T = \frac{w_{aA}}{w_{aB}} \qquad \text{(Formula 17)}$$

T is how many times the wage referential amount in the country A is that of it in the country B.

According to $P_r = V_u\left(dp + 2d_3 p_3\right)$, because the wage referential amount in the country A is T times as many of that as in the country B, the consumption level, i.e. the consumption content and volume (V_u), represented by the reference price of a unit product in the former is also T times as many of that as in the latter.

If the consumption content and volume and living standard in country A is T times as many of that in country B, the price of one unit reference product in country A is one unit money A and $\frac{1}{T}$ unit money A in country B. If the price of one unit reference product in country B is R_{pB}, the value of R_{pB} is equivalent to $\frac{1}{T}$ unit money A. in a word, the value of $T \cdot R_{pB}$ is equivalent to one unit money A.

Therefore, the formula of the exchange rate between moneys of country A and B is as follows:

$$\frac{M_{aA}}{M_{aB}} = R_{pB} \cdot T$$

Or

$$\frac{M_{aA}}{M_{aB}} = R_{pB} \cdot \frac{w_{aA}}{w_{aB}}$$

Or

$$\frac{M_{aA}}{M_{aB}} = R_{pB} \cdot \frac{w_{aA}}{w_{aB}} = \frac{W_A}{W_B} \cdot \frac{(R_{pB})^2}{R_{pA}}$$

Or

$$\frac{M_{aA}}{M_{aB}} = \frac{W_A}{W_B} \cdot \frac{(R_{pB})^2}{R_{pA}} \qquad \text{(Formula 18)}$$

Here, M_{ua} and M_{ub} stand for one unit money of country A and B respectively.

The formulas 16 and 18 are called ***Exchange-Rate*** Formula. To demonstrate how to use this formula, the following example is supposed.

For example, taking white flour as a reference product, the average wage for a producer in the U.S.A. is hourly about 18.08 dollars (According to GNP per capita 2003, 37610$ / 52 week / 5 work-days / 8work hour) ($W_A = 18.08\$$), and the reference average price for bread, white, pan, per lb is about 1 dollar in 2003 or a kilogram price 2,21 ($R_{pA} = 2.21\$$). In the other country, for only example, in Denmark, the average wage for a producer is hourly about 124.7 Kr (According to GNP per capita 2003, 259,400Kr/ 52 week / 5 work-days / 8work hour) ($W_B = 124.7kr$), and the reference price for bread, white, pan, per kilogram, about 10kr ($R_{pB} = 10kr$) in supermarket in 2003.

Note: above data come from U.S. Department of Labor Bureau of Labor Statistics and Denmark's Statistics except the white bread price in Denmark. Here, white bread price in Denmark comes from supermarket.

The wage reference amount for American is hourly 8.181-kilogram white bread while that for Danish is 12.47-kilogram white bread. That is to say, the consumption contents or volume and the living standard of American are about 0.6561 times that of Danish.

$$\frac{M_{aA}}{M_{aB}} = \frac{W_A}{W_B} \cdot \frac{(R_{pB})^2}{R_{pA}} = \frac{18.08}{124.7} \cdot \frac{(10)^2}{2.21} = \frac{1808}{275.587} = 6.561$$

Because of that the consumption contents and volume and the living standard of American is 0.6561 times that of Danish, the price of a unit of the referential product in the U.S.A. is one dollar and 0.6561 dollar in Denmark . If the reference price of white bread in Denmark is 10kr a kilogram, 10kr is equivalent to 0.6561 dollar, which means that 6.561kr equivalent to one Dollar. In a word, the ratio of the exchange rate between U.S. dollar and Danish-Krone is 1:6.651. That is to say, one dollar equates to 6.651 kr.

Taking white flour for all purpose as a reference product, the average reference price in U.S.A is 0.678 $ per kilogram (0.312$ per lb-453.6 gram) in 2003 according to U.S. Department of Labor Bureau of Labor Statistics, but about 5.5 Kr in Denmark supermarket. Exchange rate calculated according to the formula is 1: 6.469 ($18.08 \cdot 5.5^2 / 124.7 \cdot 0.678 = 546.92 / 84.5466 = 6.469$).

Two theoretical calculation values are very close to the value in the international monetary market.

If money against the other is overvalued, the price or interest rate in this country would artificially tend to decrease at first and then wage to rise, because the inertia of price and interest rate is smaller than that of wage. Last, it would artificially promote consumption and lead GNP to grow, if currency was little overvalued, because the inertia of GNP is very big. If currency was greatly overvalued for long time, a severe depression and deflation might come into being.

Oppositely, if money is undervalued, the price or interest rate in this country would artificially tend to rise at first and then wage to decrease, which would artificially lead to curb the growth of consumption and GNP.

It is obvious that over-valuation is likely benefic for economic development, but under-valuation is very harmful to economy.

Exchange Formula have many advantages, for example, simply and quickly to calculate, easily to understand.

Exchange Formula, as Four-Rate Formula, is not 100% accurate, because a reference product is relative and its price does not totally represent the average price. However, its advantages are obvious.

International monetary market undergoes a myriad change in the twinkling of an eye. This formula can maximally give economist and politician a reliable reference to keep a clear head before the monetary market. So, it is worth seeing, hearing, and reading.

A very simple Exchange Formula allows us to understand the relationship among money value, wage and product price in macroeconomics. Thus, it is worth recommending to economist, economical student and politician.

Certainly, the more stable the price of reference product, the more accurate the value calculated by Exchange Formula is.

Reader can use this formula in guiding their economical evaluation and activity very easily.

The referential product should have the following characteristics:

It has the largest comparability between different regions or countries; it is a necessary product for consumer basically and daily; it must be produced by producer in his own country or region; its price is the free fluctuation with the change of wage, GNP and interest rate, not with artificial speculation and interference.

Gold as a media of exchange is replaced by money today. The money is a substitute for gold. The value of a unit weight of gold is basically determined by how many units of the referential product it contains. So is money.

Gold is also a product.

Any product and its price, including gold, cannot directly compare with another, because they come from different countries or regions with different productivities. Because of the different productivities and the living standard in different countries or regions, any product has different price in them. There is not a unified ***international price*** in the market for any kind of product coming different countries or regions with different productivities. If so, this unified international price is an artificial and unreasonable one that cannot reflect real productivity.

Furthermore, some countries have no gold in their mineral resources or output of gold cannot keep pace with the demanding of produce and trade in this era. There is not an ounce of gold in a region or a country, but people in it are engaged in various activities of

production, their products themselves and their money are as precious as gold.

Gold like money as a media is meaningless unless it represents or expresses a certain amount of products. According to the above criterions and reason, gold as a reference or a media of exchange is not good or suitable now. It is wrong artificially to give gold a unified or unanimous price in international market. It is also wrong to measure different par value by gold with a unified price in the international monetary market. Therefore, if gold or its reserve is used as a reference and standard, the one country in which there is only rice but little or no gold will have a lower rate of exchange for its money. Oppositely, if a country with low productivity have abundant gold mine, produces a great amount of gold every year and has a great amount of gold reserve, the value of its money must overvalue.

Of course, gold can be only seen as a media as money. However, gold is much more precious than money that is paper currency. Gold reserve is very little and its production is very difficult. Comparatively, it is waste to take gold as media as money.

When the trade and exchange rate is based on the gold system with a unified international price, the value of money in the country with a smaller reserve of gold will artificially suffer a lower price or undervalue, which will artificially lead to depreciation of money and forced wage, price and productivity to decrease. Such kind used gold to calculate exchange rate is irrational. Oppositely, the value of money in the country with a plenty reserve of gold will artificially suffer a high price or overvalue.

With the progress of globalization, the political, social and economic environment would be more and more stable. The influence of gold as a media on the international monetary would be less and less.

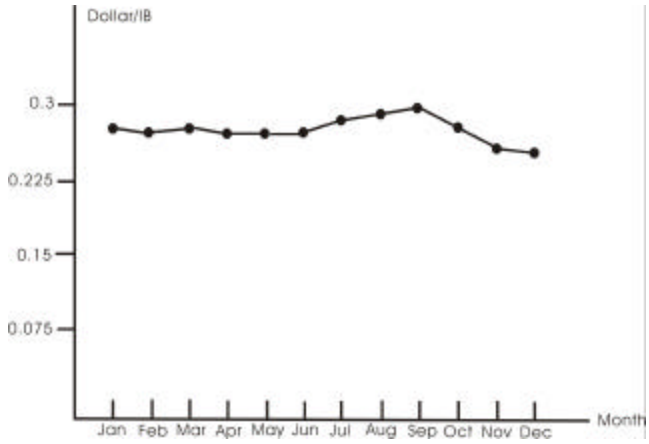


Figure 7: the average price of white flour, all purpose fluctuates in 0.248 - 0.270 us$ per IB - 453.6 gram in 12 months of 25 years (1980-2004) at city in U.S.A.
(U.S. Department of Labor Bureau of Labor Statistics)

White flour is basically and daily one of many necessary products for consumer. It is the first necessary and a very good referential product, because its price is very stable. Its price only fluctuates in the range of 0.248-0.270 us$ per Ib (453.6 gram) in U.S.A. in 25 years (Figure 7). The price difference between the highest (0.239$ / Ib) and lowest (0. 202 $ / Ib) is only 0.037$. The rate of price fluctuation is maximally 18.32% in 25 years. The range of the price

fluctuation of this first necessary is much lower than that of gold and money. So, the first necessaries taking as a reference product are reasonable (Figure 7).

SINGLE CURRENCY AND MATCH

Four-rate formula and Exchange-Rate Formula argue that ***Single currency*** has not single value.

Exchange rate is decided by price and wage. The inertia of wage is small, but bigger than that of price. So, the inertia of exchange rate must be bigger than that of price, but smaller than that of wage.

The development of productivity in different regions of a big country or economic community with a single currency is always unbalanced. This difference is very big in some country.

Different regions with different productivity in a big country or area, for examples, European Economic Community and Economical Monetary Union, China and U.S.A., have different GNP with different price for the same goods and different average wage in the same labor time respectively according to Four-Rate Formula. Then, the values of single currency in those regions in a country would be different according to Exchange-Rate Formula.

The certain change rate of interest rate has its corresponding change rate of GNP, price and wage. This phenomenon can be called interest rate-GNP-wage-price-match or ***Four-Rate-Match***.

The interest rate in those countries or economic community is single and can not change with different change rate of GNP, price wage in different regions. So, there has only ***Three-Rate-Match***.

The currency with a certain level of average wage and price has also its matched exchange rate. This can be called wage-price-exchange-rate match or ***WPER-Match***.

The wage-price-exchange-rate match is different in different regions with different productivity. However, single currency has the same value with fixed exchange rate, which caused an unmatched phenomenon between them. Single currency in a region with low productivity would be depreciated or undervalue, and vice versa.

If the exchange rate of single currency is higher than that with a certain wage-price-exchange-rate match in a region with low productivity, the value of this single currency in this region would be undervalued. Then, according to the theory of Exchange-Rate Formula, the average wage would be artificially forced to decrease or price to rise in order to show identity with single currency value. Because the interest rate in single currency country is united or fixed and the inertia of wage is bigger than price, price raises at first, then wage decreases. It would artificially lead to a tendency to curb consumption and GNP according to the theory of Four-Rate formula, which would harm economy development in this region.

Oppositely, if the exchange rate of single currency of a country is lower than that with a certain wage-price-exchange-rate match in a region with high productivity, the value of this single currency in

this region would be appreciated or overvalued. Then, the average price would be artificially forced to decrease or the average wage to rise in order to show identity with single currency. According to inertia theory, price would go down at first, then wage raise. So, it would artificially bring about a boomed consumption and a tendency to increase GNP. But, a great overvaluation may lead to a great depression and deflation.

The change in Price and wage is always paralleled according to four-rate formula, if interest rate and GNP is a constant. A percentage change in wage must bring about the same change in price, and vice versa. Otherwise, it may make economy inharmonious.

Of course, single currency may fully benefit to import and traveling with it for the region or area with low productivity, because its low value money is equivalent to the high value money in the world monetary and trade market, but harm to export.

Let us take an example for demonstrating why single currency may manifest different value with different productivity in different region in a big country or area.

For only a supposing example, taking white flour for all purpose as a reference product, the average wage for one producer in Germany is hourly about 12 €(EUR) ($W_a = 12$), and the reference average price for white flour is about one €euro a kilogram ($R_{pA} = 1$). In Spain, the average wage for a producer is hourly about 6 €(EUR) ($W_B = 6$), and the reference average price for white flour

is 0.6 € (EUR) a kilogram ($R_{pB} = 0.6$). The reference material amount of wage for a producer in Germany is hourly 12 kilogram white flour, while that in Spain is 10 kilogram white flour. That is to say, the consumption contents and volume and the living standard of German is 1.2 times that of Spanish.

The ratio of the exchange rate between €(EUR) of Germany and €(EUR) of Spain is as follows:

$$\frac{M_{aA}}{M_{aB}} = \frac{W_A}{W_B} \cdot \frac{\left(R_{pB}\right)^2}{R_{pA}} = \frac{12}{6} \cdot \frac{(0.6)^2}{1} = 0.72$$

Because of that the consumption contents and volume and the living standard of German is 1.2 times that of a Spanish, and the price of a unit of the referential product in Germany is one € (EUR) and $\frac{1}{1.2}$ Germany € (EUR) in Spain. If the reference average price of white flour in Spain is 0.6 € (EUR) a kilogram, 0.6 €(EUR) of Spain is equivalent to $\frac{1}{1.2}$ € (EUR) of Germany, which means that the ratio of the exchange rate between EUR of Germany and EUR of Spain is 1:0.72.

This result means that 1 € (EUR) of Germany in Spain is only worth 0.72 € (EUR).

The economic development or productivity in the countries of European Economic and Monetary Union is very different. Single

currency does not get a harmonious GNP-wage-price-match and wage-price-exchange-rate match. The exchange rate of euro may be overvalued for those counties whose productivity is relatively low, but undervalued for those counties whose productivity is relatively high.

It is also true. The hope of price stability, sound public finances and low interest rates, incentives for growth, investment and employment by single currency may not surely obtain.

The increase of productivity or improving the efficiency of production and exchange is an only way to improve economy.

China is a very big country. The economy in the east provinces is very flourishing, but in the west and middle much undeveloped. Moreover, most of population in china is peasant who lives in rural. The difference between city and rural is so very big that peasant lives a life with no enough dress warmly and eat one's fill. Comparatively with city people, they have no enough money to pay for hospitalization and children's education.

The value of its single currency (Renminbi RMB) must be undervalued for the rich province and city, if the calculation is based on the data of country's average GNP, price and wage. Oppositely, it must be overvalued for the poor province and rural.

So, a reasonable fluctuation range of exchange rate for china's single currency may be very and very big according to the calculation of Exchange-Rate Formula.

GNP in China in 2003 is about 9500 RMB (Renminbi) per capita. The average wage is about 4.567 RMB per hour (9500 RMB

/ 52 week/ 5 workday/8 work hour = 4.567 RMB/h). The average price of wheat white flour is about 2 RMB per kilogram.

GNP in U. S.A in 2003 is about37, 606 $. The average reference price of white flour in U.S.A is 0.678 $ per kilogram. The average wage in U.S.A. is 18.08$ per hour (37,606 $ / 52 weeks / 5 workday/8 work hour = 18.09$/h). So, Exchange rate between RMB of china and Dollar of U.S.A. is about 23.356: 1 according Four-Rate Formula ($\frac{18.08}{4.567} \cdot \frac{(2)^2}{0.678} = 23.356$).

However, the average wage per hour in some rich region or province is already close to 20 RMB per hour (GNP above 40,000RMB per capita) in china. The price of agriculture product does not change much, because peasant is very poor. According to this level of average wage and GNP, Exchange rate between RMB of china and Dollar of U.S.A. is about 5.33: 1.

If the calculation is based on average wage and GNP in the poor province or rural, the exchange rate of RMB against to Dollar would be very lower. Oppositely, calculation is based on average wage and GNP in the rich province or city, it is very high.

The current exchange rate of RMB (official exchange rate) against Dollar is about 8.24. This rate is relatively fixed.

Is this exchange rate of RMB against Dollar undervalued or overvalued? The answer is very clear: it is overvalued for the poor provinces and poor peasants, but undervalued for the rich provinces and cities.

This is reason why we say that a reasonable fluctuation range of exchange rate for china's single currency may be very and very big.

Four-Rate Formula and Exchange Formula make a very complex phenomenon of economics be perfectly simply in order and easily understood. This is philosophical power in the economical study.

FREE EXCHANGE RATE OR PEGGED EXCHANGE RATE

Free exchange rate, i.e. a currency free-floating exchange rate against other, has a big problem with speculation in the financial market, which is harmful to price system and may cause economy instability.

However, the inertia of price and interest rate is very low. So, they are apt to change at any time, which makes exchange rate be unstable.

According to principle of Four-Rate-Match and wage-price-exchange-rate match or WPER-Match, completely pegged exchange rate, i.e. to fix currency exchange rate at a certain level, cannot reflect this change.

The economical and political policy is relatively very stable in the developed country now. Wage, price and interest rate in those countries also are relatively very stable today. It is time to give up

gold reserve as a reference and standard to calculate the exchange rate among different monies.

There also appears an opportunity to establish a new financial policy and system, by which the exchange rate between them is relatively fixed or pegged with a permitted and limited fluctuation in a region. For example, every country had a relatively pegged exchange rate with Germany's Mark in the early stage of European Economic Community. Putting the pegged exchange rate into practice, the capital will greatly circulate in the price system, which can maximally avoid speculation in the financial market and promote economy development and stability.

It is good idea to establish free trade region with a relatively pegged exchange rate against one currency that is very stable. This system can be called ***relative pegged exchange rate or region pegged exchange rate***.

The relative or region pegged exchange rate may be not worse than single currency, because the disadvantage of single currency may be avoided, but the advantage of single currency is maintained.

COUNTER-FLOWING OF WEALT AND MULTIPLICATION OF WEALTH

Wealth always flows from the poor countries to the rich one.

The exchange rate system dominated by Dollar of U.S.A. pays a leading role in trade between countries in the world.

As we know from the above example, the wage for an American per hour is 18.08 dollar and can originally buy 26.67-kilogram white flour in America, but that for a Chinese is only 2.165-kilogram. The consumption contents or volume and the living standard of American are 12.32 (26.67/2.165 = 12.32) times higher than that of Chinese.

Because exchange rate between RMB and Dollar is 23.356: 1 calculated by average level, 18.08 dollar equals to 422.276 RMB (23.356 x 18.08 = 422.276) and may exchange 222.69-kilogram white flour in china thorough trade and the exchange rate system. In a word, the consumption contents or volume and the living standard of American is 195.05 (422.276/2.165 = 195.05) times than that of Chinese now by trade. If China imports one unit product from Unite State, Chinese will pay 195.05 unit products according to exchange rate. In a word, one American is supported by 195.05 Chinese.

American would enjoy very cheap product from China by trade.

In another words, wealth flows from china to Unite State.

On the same reason, wealth would flow from the poor province and rural to the rich province and city in china. People in city in China has high wage, but enjoy very cheap agricultural product.

So, wealth would flow from the poor country or region to the rich by trade and exchange rate system.

The productivity in the developing and undeveloped country is lower than the developed one. The trade and exchange rate are two good tools of developed country for making benefit from cheap consumable from the developing and undeveloped country to improve

their living standard. This is the reason why the developed country always insists on the position of free trade and economic and capital globalization with developing and undeveloped country.

By economic globalization with gigantic flows of capital, free trade in goods and services is stimulated, intensified and stretched across the globe.

With the development of productive force, many new products will be created, which further brings multiple trade effect. Thus, the countries or the regions with higher productive forces will enjoy more multiple trade effect, more diverse consumption, higher wages, higher price, and higher value of money per unit.

Because of this, wealth is always flowing from the poor country or region with low productivity to the rich one with high productivity in the course of trade. This phenomenon can be called ***counter-flowing of wealth***

By trade effect and counter-flowing of wealth, wealth would rapidly accumulate in the rich country with high productivity. This phenomenon can be called ***multiplication of wealth***. Both counter-flowing of wealth and multiplication of wealth develop at the same time. So, two phenomena can be sorted into one. This is ***Multiplication of Wealth with Counter-Flowing***. The phenomenon of Multiplication of Wealth with Counter-Flowing is an unavoidable economic law rather than exploitation.

The poor countries may expand their export by trade with the rich in order to buy some modernization product. The raising of

people's living standard in poor countries is a mathematical progression, but in those rich countries, it is a geometric one.

The poor countries enlarge their export and raise their people's living standard a little at the heavy expense of their natural materials, labor and environmental resources. On the contrary, the rich countries obtain the largest material enjoyment with losing little resources through trade, especially capital investment and highly advanced and technical industry-products trade.

The free trade, capital globalization and the great difference of exchange rate between the rich and poor countries will make the poor poorer and the rich richer.

It is completely impossible for the poor countries to get rich by export or absorbing foreign capital except completely currying out that what is taken from the people is used in the interests of the people to raise productivity. The rich country has reasonability and duty to help the poor to raise its productivity.

The poor country must learn how to use the chance of free trade and capital globalization to raise its productivity. Through free trade and capital globalization, the poor country would at first use the limit foreign currency to buy modern science knowledge, productive technology and equipment, not only consumable. By the chance of free trade and capital globalization, the poor country would produce its own new product and enlarge internal need, not only to export and let investor use its own resource or raw materials unlimitedly to produce exported product according to investor's samples. At the

same time, universal education and spread cultural and scientific know ledge among the people must be given priority to.

What becomes obvious is that the policy of free trade and freely flowing capital in today that has replaced force and warship is a good excuse for the countries with higher productive forces to expand exporting their over-surplus product to those with lower ones.

It is very clear that the only way for the poor countries to enrich their states and to benefit their people is to develop agriculture, initiate education and raise productivity, which are also the ways to create the new product to exchange the other's products with their own surplus. It is very foolish to tighten their belts and to pursue the large export blindly. It is also very foolish artificially to make its money devalue to expand export bases on political reason, not economical.

However easy it is to say.

INDEX

L

M

N

P

Q

R

S

T

V

W