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# Developower: The Potential Motivity in Economic Process

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## **Abstract**

Stating from the intrinsic characteristics of macroeconomic process, this paper puts forward the concept of developower and its theoretical frame. The developower is the potential and invisible motivities to push economy to progress. By means of the developower theory, we can explain some important problems in macro-economy. We discuss the basic properties of developower and obtain some interesting inferences. The evaluating approaches are given for one or more developowers, and then we can measure them in analytic way and analyze the correlated effects among them. Finally, we illustrate that the developower movements exist widely in the social and economic development.

**Key words** developower, macroeconomic process

**JEL classification:** E0 - General

## **1. Introduction**

There are many of the important studies in the economic theory, such as R. E. Lucas's business cycle theory (1981), Prescott's real business cycle theory (1982), P. M. Romer's new growth theory (1986), and D. Kahneman's prospect theory (1979), etc. These theories has availably propeled forward the economic development of world. Here, author try to make a discussion on the invisible and Potential power hidden in economic development. This power, called the developower in this paper, is very important to control the economic growth or recession. We could feel it being anywhere, anytime and in many ways. But, there seems no many special researches about it yet now.

### **1.1 The important economic theories**

After World War II, Keynesian once obtained a lot of glorious researches, as for the some economist think the economic cycle to be dead already, and the role of

government is to adopt some measures timely to eliminate the economic cycle. But, R. E. Lucas used the time series analysis based on the theory of rational prospect (Lucas, 1981 and 1987), and demonstrated the Philips curve (so the economic development follows a equilibria cycle), at the same time, this also mean the Philips curve to be unsteady, and it would vary along with the variety of the government policy. So the economic cycle is ineluctable, and the governmental interfere will finally be out of order.

The new classical school quickly grew up at 20th century 80's, and the real business cycle theory is brought forward ( Prescott, Kydland et al). The real business cycle theory still completely followed the Lucas' research route in the economic cycle research, and used the complete Economic person as a basis, and designed the economic system laboratory in order to avoid the expensive experimental fee for actual economic policy. Therefore, Lucas is still the most important person to the real business cycle theory. Another famous research from Lucas is his proposition about policy invalidation, i.e., the famous Lucas' "A Critique" (1976). Lucas pointed out: only if the construction of quantitative economic model is consistent with the optimal decision rule of economy individual, and the optimal decision rules change along with the variety of the environments around the decision maker, then the economic policies would change systematically the construction of quantitative economic model. This proposition is a rigorous challenge to the foundation of quantitative model of macro-economy prevailed at that time.

In 20<sup>th</sup> century 80's, another important progress in the field of macroeconomics is the new growth theory. Romer (1986) and Lucas (1988) established a theoretical foundation of the new economic growth theory. They think that the market condition of realistic economy is incompletely compete, thus the scale income gradually increase, this kind of result is obtained depended on the accumulation of manpower capital. And then, they regarded the endogenesis, accumulation and growth of manpower capital as the headspring and the power for economic growing. In other words, knowledge accumulating, technique innovation and professional manpower capital can not only make themselves growing, and but also make the economy growth be continuous. Prescott, Kydland and Plosser et al (1982,1983,1989) think, that the economic fluctuation is just nature action of real output of production, the reason that economy fluctuates is a result of technique advance, and put forward the real business cycle theory. But some others think: in short-term, there is no certainly causality between the fluctuation of economic output and a technique advance; that the productivity and output are all descending at the economic crisis can't be explained by technique retrogress; also the bigness influence of changing of monetary policy to economic output fluctuation is under no consideration. Therefore, most of economists do not think that the theory can sufficiently explain the reason for fluctuating on economic output.

The traditional economics thinks that a "rational economic person" (Simon, 1954) can

estimate the emergence possibility of different future results, and then maximize its expectation utility. This kind of “expected utility theory” is widely applied in the economic field. But D.Kahneman and et al (1979, 1986, 1990) completed a lot of experiments and investigations, all the results indicate: the assumption about “rational economic person” deserve a doubt. Thus the “prospect theory” is established and the assumption about “non-rational economic person” is put forward, and by the comparison experiments, most of the individual are not always rational and aversion of risk. This means that the problems with which persons have faced will influence their decisions or behaviors.

Is there any way to generalize all the theories above?

## 1.2 The Problems and considerations

Despite all of economic theories above contain its real excellent contents, but there still are some problems which are difficult to explain. Such as:

1) Why the economy will develop? If the reason is social demands, what is the motivity to bring the social demands?

2) Can we confirm there are the cycles in the economic development? If there are, we may ask:

- What is the reason that cause the cycle in economic development?
- What are the characteristics of each stage in cycle of economic development?
- Are there any different characteristics of promoting power and economic vitality inside the each stage of cycle of economic development?
- How we estimate the time period of each cycle in the way of movement.

3) Whether the policys interfering to economy will be effective or not. If being effective, what time the the interfering policys are effective ? If not, the the interfering policys are no effectiveness in what case?

4) Economic output is an objective esse, but what is the real reason for fluctuation in economic output? Is social demands, techniques or policies ?

5) There are the equilibrium phenomenon in the economic development. This also means there are non-equilibrium in the economic development. How the equilibrium and non-equilibrium are coexistent, corresponded and converted one another?

6) The assumption and the behavior of “rational economic person” are in conflict with that for “non-rational. What is the case both of them will conflict one another, what is the case not ?

Is there any theory to describe and interpret the problems above in a total way ?

Aiming at some current perplexities in economic theory, this paper try to bring forward the theoretical frame system of development power. The development power is defined as the invisible motivity to bring about the advance in economic progress, the “developpower” for short.

The productivity, as we know, is the visible and material ability to improve economy, and then, the developpower is the immaterial strength to improve economy. The visual

description is that the developower is the “software” of economic development if the productivity is regarded as the “hardware” of economic development. The developower is existent in economic feilds in the forms like policy and system, science and technology, knowledge and education, market system, economic management, law and regulation, cultural background, public idea, consumed desires, etc.

The developower is always in movements. it includes two basic way of developower accumulating and releasing. It is the movements, accumulating and releasing, constitute a whole motion process of developower. And by the movements of developower, the productivity is pushed to progress and the economy is impelled to develop continuously.

In the following, we shall give a deeper discussion about the developower in its cases, concept, theoretical frame and evaluating models, in order to demonstrate the rationality and validity of the developower theory.

We shall see that the developower is widespread to exsist in the economic fields. And it could help us to analyze the economic problems in a view differred with the current way.

## **2. The Basic theory of Developower**

Here, we shall elucidate that developower is really existent by some fundamental models, the definition of developower, and explain the core contents of the developower theory from the fundamental assumptions and basic conclusions.

### **2.1 The basic cases and analysis**

In general, many of economic problems (such as production in confusion, business swindle, financial drift, circulation blocked, etc.) always start to come in the process of economy development, then the demands to solve these problems also come into being, yet the demands do not very strong. These demands will become stronger and stronger along with the problems becoming more and more serious. Finally, the demands to solve the problems may be satisfied in part or entirely until these problems are solved. Henceforth, some new problems, which need to be solved, will come yet. If there is a kind of motivity which causes demands to solve the problems, the motivity is invisible and comes from the problems. This motivity is just the developower. Also we could call it the economic developower. The developower is accumulated while the related problems become more and more serious and the demands to solve problems become stronger and stronger. While the problems are being solved and the economic development comes into order gradually, developower is releasing. The accumulating and releasing are the two basic ways of developower movement.

The economy should be growing if the demands to solve the problems come and are satisfied very well, i.e. developower is accumulated or released very well. We could think the developower or the movement of it impels the economy to develop in growth

way at this time. Of course, the economic development may be recession if the problems can not be solved very well. The developower could be thought to impel the economy to develop in recession way at this time. In fact, the economic growth and recession are all the results of developower movement. Further, we have the following examples about developower.

### **2.1.1 Developower in the process of renovating a policy.**

Mankind needs to establish many policies and carry them in order to manage the economic courses. Although the policies may be able to impel most of the economic industries to develop very well in some period of time, there are always some problems of industrial development need to be solved, such as industrial policy, price policy, policy of production and sale, financial policy, tax policy, policy of interest rate, policy of exchange rate, and etc. Of course, there must be many of new policy problems of appeared continuously.

In the process of policy establishment, we need to put away some policies if they are not available to economic development and establish some new policies if needed. A policy will make some troubles to economic activities when it is not suitable. At the beginning, the demands to modify the policy or to replace it by a new one do not very strong when it makes some small troubles only. The demand will become stronger and stronger along with the policy making more and more troubles. Finally, the troubles will be disappeared gradually when the policy is modified or put away or replaced by a new one. Henceforth, another one or more of policy, which need to be modified or put away or replaced, will occur yet. And this process will be continuous forever.

We could think there is a motivity which causes demands to modify or put away or replace the policy. The motivity is just the policy developower. It is invisible and comes from the troubles coursed by the policy. Also, we could call it the policy developower. The developower is accumulated while the policy troubles become more and more and the demand to modify or put away or replace the policy becomes stronger and stronger. The troubles will disappear gradually when the policy, which causes the troubles, is modified or replaced, and developower is releasing in that process. This is also the process of policy level getting higher and higher, and the way how developower impels the policy level to rise.

The argument of this case is also correct in the process of renovating the social policy.

### **2.1.2 Developower in the perfecting a system of laws and rules.**

The system of laws and rules is very important to the social and economic development. The transform in economic system of China at 1978 should be the key for the Chinese economy to develop rapidly latter.

From 1979 to 2004, the National People's Congress of China deliberated the 323 laws, 212 of them are effective now); State Department of Chinese has established 970 administrative laws, 650 or more of them are effective now); The legislatives of

District People's Congress have established ten thousands or more of district laws, 7500 or more of them are effective now; The data are come from the Web: <http://www.people.com.cn /GB/paper85>. The laws mentioned above do not include those of economic industries. Comparing the times field of 1979-2004, there are a little laws only established between 1952 and 1978 (China had started to develop its economy after 1952).

So we could see that a perfect system of laws and rules (system for short) is the basis on which the economic growth could be quick. In general, a perfect system should include the more of laws and rules. In fact, the quantity of various economic laws is rising quickly after the 1978's economic reforms in Chinese.

If an economic system is not perfect, there must be some of irrational conducts and vicious phenomenon in economy. At the beginning, these conducts and phenomenon do not make a larger influence to an economic industry or the economic society when they are only in a narrow range, and it seems no need to establish one or more of new laws in order to perfect the system. The need gets stronger and stronger along with the influence of the conducts and phenomenon becoming larger and larger to the some normal economic activities. Finally, the one or more new laws have been established and the conducts and phenomenon disappear gradually. Afterward, some other irrational conducts and vicious phenomenon may be occurred, and will disappear owing to some new laws being established. This process is continuous forever and no end.

So we should think there is a motivity which causes and strengthens the need to perfect the laws system of economy. The motivity is just developower. It is invisible and comes from the disgusting conducts and vicious phenomenon coursed by the lack of law and rule in economic system. Also, we could call it the law or system developower.

The developower is accumulated while the influences of the conducts and phenomenon become larger and larger and the need to establish one or more of new laws gets stronger and stronger. Thus, the developower is in releasing when the new laws are established and applied. This is also the process of economic system becoming more and more perfect, and the way how developower pushes the economic system to get better and better.

### **2.1.3 Developower in the operating a firm.**

If trying to become successful in the modern economic society, it is necessary for a business enterprise to hold the producing technique and to make the production management. Both techniques and managements not only bring the problems in firm developing, but also become the power for firm developing. So, there are two ways for developower movement at least.

1) The production in firm must hold the technique (include the techniques for producing products, techniques of equipments, and etc.). If a firm lacks of some kinds of new production techniques, it seems not to feel that the techniques should be held at

the beginning. Afterwards, the firm will feel stronger and stronger in holding some new production techniques because of market competition getting more vehement and the other firms developing quickly. Finally, some new techniques have been held and applied to its production. The production level is improved and the firm managers feel the smaller pressure. The pressure occurs and becomes stronger means the technique developpower occurs and is accumulated. And the pressure becomes weaker means the developpower is being released.

2) The better operation for a firm is based on the effective management (include the perfect system, the suitable relation between production and sale, the harmonious relation between sharing the works and cooperating with one another, and etc.). If a firm is not very good in its management, it may be thought not to improve at the beginning. Afterwards, the firm will feel stronger and stronger in improving its management when the confusions occurring anywhere in its management and the production can not proceed normally. Finally, the new management measures have been carried out and the confusions have been eliminated, and the levels of management and production are advanced obviously. The confusions occur and become larger and larger in the range of its influence means the management developpower occurs and is accumulated. And the confusions becomes smaller in its influence means the developpower is being released.

There are more examples of developpower in the references (Dai et al, 2004, 2005).

#### **2.1.4 A primary comments about Developpower**

From the examples above, we should see that

- 1) Developpower exists widely in economy, in society and many other fields.
- 2) Developpower is a kind of motivity, also a kind of energy.
- 3) Developpower could push the economic level to grow, and it is the similar to society, education, and etc.
- 4) Developpower is occurred, accumulated and released owing to the changes in environments of it.

In reality, there are developpower accumulating and releasing in many activities, such as need and consumption to commodities, prospect and actuality, consciousness and behavior, work and leisure, reorganization and expansion in economic field, etc., or say that we can use the idea of developpower accumulating and releasing to explain the Potential energy movements in the former activities.

## **2.2 The basic concepts and characters of developpower**

Here, we give the formal definition of developpower and related interpretations.

### **2.2.1 The concepts and basis about developpower.**

**Definition 1.** The developpower is the potential and invisible motivities to push economy to progress.

The developpower can impel the various economic resources to convert to the visible

productivity, include the products and services needed in society or economy. Developpower has the functions to impel some exogenous resources to endogenous resources, for examples, transforming the national macroeconomic policies to some policies or rules inside industries, transforming the general and basic technology to the producing and equipment techniques needed in economic production, etc.

As a kind of motivity, developpower exists and moves based on the three basic points:

- The environments of firm producing have been changing continuously.
- The environments of economic resources have been changing continuously.
- The natural environments of society and economy have been changing continuously.

All of changes in the environments mentioned above are just the motivities themselves. Where, the environments include the market of production goods and the consumption market. These motivities cause peoples to need something, and these motivities cause society and economy to progress. These motivities are the developpower.

Speaking in essential, developpower is created and changed from the movement in economic environments is similar to that the energy lurked in the volcano magma is created and changed by the diastrophism continuously.

As the depiction in the former, the developpower could be presented in the policy and system, science and technique, laws and rules, management, innovation, information, cultural, knowledge, consciousness, idea, spirit and other invisible social and economic factor. We call these the developpower elements. The productivity is the visible behavior ability for mankind to improve the nature, and the developpower is the invisible behavior motivity for mankind to improve the nature. In the economic society, developpower is the behavior motivity to develop economy.

The emergence of a new technique is the inevitable outcome of technique developpower being accumulated, and the application to the new technique means the developpower in the technique being released. Also, Establishment of a policy is an inevitable outcome of policy developpower being accumulated, and a policy is applied to practice means the developpower in the policy being released. The production level is a measurement of productive ability, and similarly, the developing energy is the measurement of developpower.

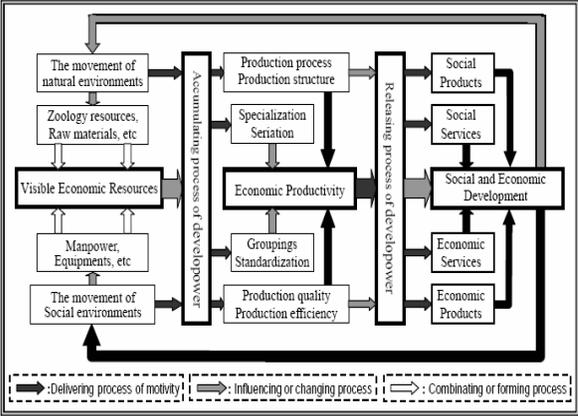
### **2.2.2 The moving behaviors and manners of developpower.**

**Definition 2.** Accumulation of developpower is a movement process in which developpower becomes stronger and stronger, release of developpower is a movement process in which developpower is converted to other kind of power, and becomes weaker and weaker.

Developpower can be valuated by the developing energy in economy. The development energy becomes larger and larger when the developpower is accumulated, and the development energy becomes smaller and smaller when the developpower is released. Developpower could be accumulated, released, re-accumulated, and re-released, so it could impel the society and economy to develop continuously.

If we divide the visible economic resources into the visible nature resources (such as

zoology resources like forest, river land etc, and raw materials like mines, coal, petroleum etc.) and the visible social resources (such as the manpower, workshops, equipments, surplus product of society, etc.), then the basic way and process of economic developower impels conversion from the visible economic resources to the productivity and products can be drawn in figure 1.



**Figure 1** The way and process of economic developower impelling conversion from the visible economic resources to the productivity and products

The moving behaviors of developower are the accumulating and releasing are, then the moving manners of developower are the converging and diffusing. For example, the development of the computer industry makes the computers being used widely, and the usage of computer causes other industries to develop, such the industries as manufacturing control, weather analysis, spaceflight engineering, scientific simulation, etc. This process is a diffusing on developower. As for manufacturing control, the application of computers can bring about an advance in technique ability of manufacturing control, i.e. developower of manufacturing control being accumulated efficiently, so that the productivity of manufacturing control is propelled forward; and if the products of manufacturing control based on computer are applied to producing process, and achieve a good actual results, thus developower of manufacturing control starts releasing. Afterwards, the higher request to computer from manufacturing control will influence or change the computer industry again, i.e., accumulate the developower of computer industry again. A converging process is completed after the case of manufacturing control is occurred to weather analysis, spaceflight engineering, scientific simulation, etc. and all of these influences even changes the computer industry with together again. Further more, the development of manufacturing control will propel the its downstream industries forward, such as spin and weave, paper making, steel industry, machine and electronics, etc., this is also a diffusing process. After this, another converging process will be occurring. All of these can be described by figure 2.

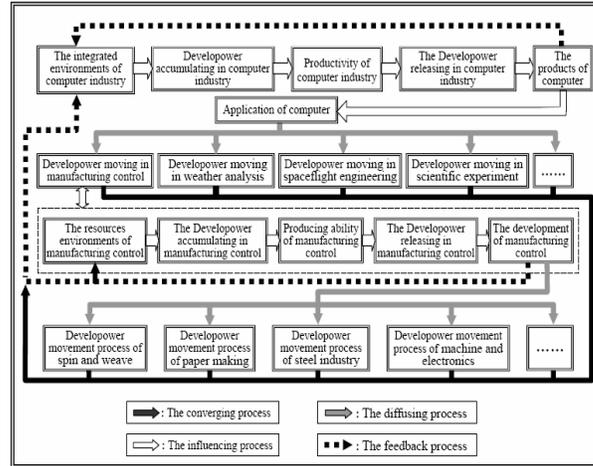
**Definition 3.** A derivative process is a stage in process of developower movements. It includes two movements of developower, i.e., an accumulating process and a releasing

process.

In general, the movements of developower could compose the derivative processes, and could reflect the economic cycle. We shall describe the derivative process on the models of partial distribution afterward.

### 2.3 The basic inferences about developower

According to the basic cases, definitions and movement analysis, we give some basic inferences and the evaluated method about the developower as follow.



**Figure 2** Developower diffusing and its converging in computer industry. Developower of computer industry, as an underlying developower, could be diffused to other industries, and the developower of those other industries might be accumulated along with underlying developower accumulating. After being accumulated, the developowers should be released. And then, the information of these developowers will be converged and feeded back to underlying developower and a new similar process started again.

#### 2.3.1 The basic properties about the developower.

In the meaning of physics, the force is a kind of energy, i.e., force exists just because there is the energy contained in it. So, developower is a kind of developing energy. For the sake of convenience, we do not strictly distinguish developower from development energy in the following description.

- 1) developower is a primitive force to push economic development. Any development and change in economic field are the results of the developower moving.
- 2) developower is always changing , stronger or weaker. The economy or society is full of vitality or not is corresponding to its developower is larger or not.
- 3) The formation and increase of developower depend on the proper process in which it is accumulated. When developower is small to a certain degree, it naturally requires to be accumulated. The longer the developower is accumulated effectively, the stronger the impetus contained in it is.
- 4) When developower is accumulated to a higher degree, it will be released out in a

certain way. The quicker the developower is released effectively, the stronger its impetus is.

5) The moving cycle of developower. A standard and basic cycle of developower moving is a derivative process, i.e., includes an accumulating process and a releasing process.

6) The structure of developower moving. To developower moving, a longer or integrated cycle will include many shorter or basic cycles. In a larger scale, these basic cycles constitute a larger derivative process. Whether the cycles of developower moving are longer or shorter, they are alike in construction, includes a processes of accumulating and a process of releasing, namely, the auto-similarity.

### **2.3.2 The basic inferences about the developower.**

According to the theory of developower and derivative process, we can get the following inferences:

1) The efficient developments in economy depend on the efficient accumulation and release in developower. The efficient accumulation in developower will lay a better foundation to develop economy; and the efficient release in developower will impel economy to develop in a better order. The key to decide the efficiency and speed of economic growth is that the productivity is efficiently aroused. In basically, that the economic productivity is efficiently aroused depends on releasing the developower reasonably when it is higher. The reasonable way to release the developower is actualizing some policies or management measure, applying some techniques, etc.

2) The process of economic development is a derivative process. The process of economic development is essentially a process that developower becomes weaker or stronger. Both the growth and the recession in economy are the derivative processes in which accumulation and release of developower are interlaced. In the economic growth with developower accumulating, developower becomes stronger and stronger to boost economic level by degrees; and in the economic growth with developower releasing, developower becomes weaker and weaker to boost economic level by degrees. In the economic recession with developower accumulating, developower becomes stronger and stronger to make economic level decline by degrees; and in the economic recession with developower releasing, developower becomes weaker and weaker to make economic level decline by degrees.

3) The economic development causes derivative process more efficient. Along with the advance in productivity, production is trending to standardization gradually, namely, specialization, larger scale, collectivization, legalization and technicalization. The standardization is beneficial to accumulate or release developower, so the derivative process is more efficient. On the other hand, the standardization will cause developower to become weaker more quickly. At this time, the main way to accumulating developower is to push the standardization to a higher degree, and to form the more high-efficient derivative process.

4) The macroeconomic development is a cyclical process in developower movements.

All kinds of economic units, such as single of firm, groups of firms, economic industries, even the economic society, have their own cycle of developower movement. When these cycles are synchronous, the macroeconomic development will be obvious in its cycle; if these cycles are not synchronous, the macroeconomic development will be not obvious in its cycle. Whether the cycle is obvious or not, we can not deny there are cycles in developower movements, so that we can not deny there are cycles in macroeconomic development. Therefore, the integrated developower constituted on all those units boost the macroeconomy and result in the cycle of macroeconomic development. If the developower in a unit is exhausted and can not be accumulated again, the economic development in this unit may go to its end.

5) The effect of economic policy depends on its developower. In fact, the government's policy is effective to economic development in the many circumstance. Whether the interfering effect of economic policy is good or not is determined by the current status of policy developower. If policy developower is sufficiently accumulated, the influence of policy will be very obvious, and if policy developower is sufficiently released or is not accumulated yet, the influence of policy will be very feeble, and even no effect.

6) The imbalance of economy development is caused by the different developower. For different countries or different regions, their economic backgrounds (economic level, economic consciousness, cultural environment, technical level and economic system, and etc.) are different, and the abilities to accumulate or to release developower are also different. In the developed countries or regions, there are the good economic backgrounds to enable their economic developower to be accumulated or released effectively, so that their economy could be developing to a higher level. But, the backward nations or regions can not like those because their developower level is lower, i.e., they have the lower abilities to accumulate or to release developower. The developower level is hard to improve in a shorter time, and it is an integrated environment which needs to be developed for a long time. So the difference in developower level between the developed and backward nations or regions is the basic reasons that there is a big gap in their economic development.

7) The fluctuation of developower decides the fluctuation of economic output. The fluctuation of developower is caused by the change of economic environment, and also influences the economic production. So the fluctuation of the economic output is caused by developower, and lags the fluctuation of developower. Therefore, the fluctuation of *EDP* is a real reason for fluctuation of economic output.

8) Modern economic development is more beneficial to new arisen industry. The economic development which is impelled by accumulation or release of developower can bring the benefits and the opportunities to many industries, also can bring the risks to some industries. The industries that acquire the benefits are usually the new arisen industries, and the traditional industries may suffer the loss. Because developower of the traditional industries have been accumulated and released again and again, the promoting space of their developower is very limited. And it will be harder and harder

for these traditional industries to accumulate developower if they did not develop their new content.

9) Developower decides the individual economic behavior. In economy society, whether is a “rational economic person” or “non-rational economic person”, his economic behavior is decided by his economic environment, consciousness, idea, knowledge, experience and other elements. The different consciousness, idea, knowledge, experience may cause the differences in their developower, and these differences may be shown as their conflicting behavior characteristic further. According to the developower theory, the assumptions of “rational economic person” and “non-rational economic person” are actually the reasonable results of the different tropism in developower.

10) The actual economic level may be zero, developower can't be zero. If a country or a region suffers a fatal strike because of the war or nature disaster, all of its visible economic establishments and throughput lose, and then its actual economic output may be near or equal to zero in a short time. At this time, if there are peoples, and their experiences, consciousnesses, techniques in the countries or regions, their developower is also higher than zero. The higher the developower level of a country is, the quicker the rebuilding of the countries or regions is after a war or a nature disaster. Germany and Japan are rebuilt of after War II are just the two examples.

### **3. The Basic Approach and Valuating Model for Developower**

If want to use the developower theory to analyze the economic problem, we need to know the approaches to accumulate and release developower and have a appropriate model to evaluating developower. we shall give the basic discussions.

#### **3.1 The basic approaches to control the developower**

To control and manage the developower effectively include the approaches for accumulating developower and releasing it.

##### **3.1.1 The main approaches for accumulating developower**

What we need to indicate is, that the developower is efficiently accumulated and released should match with the appropriate and reasonable way. For example, if a policy to be designed is not appropriate to its real circumstance, the policy developower will not be efficiently accumulated, and if the policy actualized can't be accurately understood and used, it is difficult for policy to produce ideal effect, namely the policy developower being accumulated can't be efficiently released. In general, we have the approaches to accumulate developower as follow.

1) The positive innovation to national economic system. The national economic system plays an enormously important role to control the economic development. This function is radically produced from the system developower. Making a continuous innovation on economic system, and insuring the economic system being reasonable

and efficient, will allow the system developpower to be accumulated continuously, and enable the different branches of economic society to be always coordinated one another, so that the economy could keep on growing.

2) Perfecting continuously the economic policies and economic laws. The perfection of economic policies and laws can impel, control and guide the economy to develop in right direction. This kind of function of economic policies and laws is the policy developpower. Therefore, we could acquire the developpower to accelerate economic growth by renewing and perfecting the national policy and laws system continuously.

3) Establishing effectively the innovating mechanism in science and technology. The developing vitality of economy comes from many of new economic products going into market, and new economic products are the results of the application of various new science and technology. Just the kind of force for science and technology to impel economic development is the developpower of science and technology, ST developpower for short. So we must establish the innovating mechanism in science and technology, promote science the technical to progress, and translate the results of new science and technology to new economic products, namely accumulate the ST developpower continuously, in order to get the inexhaustible power of science and technology for economic development.

4) Developing the system of economic education in all round way. The good education system and the practice environment in economy can make peoples who are engaged in the economic activities learning the necessary knowledge, and get the worthy experience. Those peoples can use their knowledge and the experience in economy to promote the national economic development. So the knowledge and experience are a kind of power, is called the knowledge developpower. Therefore, establishing roundly a system of economic education is very important for improving the national economic environment, accumulating the knowledge developpower effectively, and offering a good foundation for the economic development.

5) Standardizing pattern and optimizing structure in the economic management. Standardizing management in every levels of economic departments plays an important and non-replaceable parts in promoting economy to develop orderly and effectively. We could regard this function of Standardizing management as the management developpower. Therefore, management developpower will be accumulated effectively if we make a positive innovation in standardizing the economic management and in optimizing the hierarchical structure of economic departments, so that the developing power in management will be obtained to push forward the economic progress.

6) Designing and achieving the large scale and synthetic projects. Designing and achieving a large scale and synthetic project usually affect the status of national construction and the economic development as a whole. Just the power of large scale project pushing economy forward is a project developpower, e.g. both the success in application to celebrate the Olympic Game'2008 and the successes in launching and returning of spaceflight airship with person at 2003 are all the better ways to

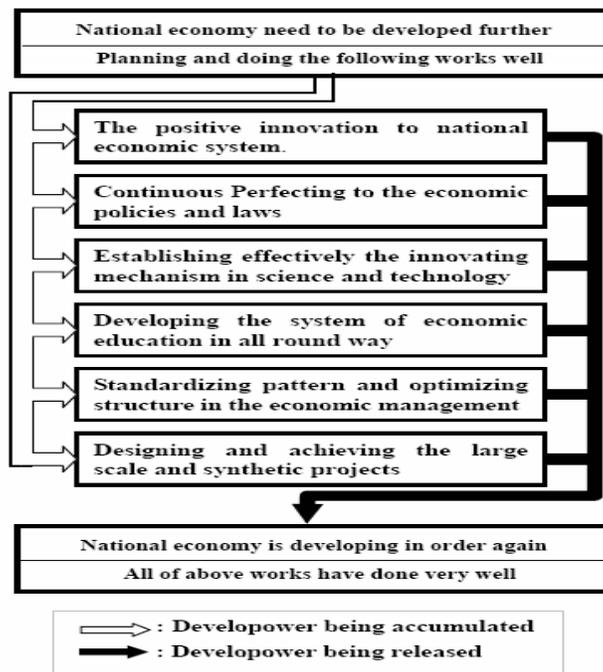
accumulate project developower for Chinese economic development.

Just the process of launching the full of items mentioned above completely is the accumulating process for national economic developower. Of course, there are many other ways to accumulate economic developower.

### 3.1.2 The main approaches for releasing developower

After all of the works mentioned in section 3.1.2 have been done, we have the new or improved systems of economy, new economic policies and laws, new innovating mechanism in science and technology, new or improved system of economic education, standard and optimal management in economy, and other things in that developower are accumulated. At this time, the economic systems and environments are better and ordered, economy starts developing in a good process, and the developower which had been accumulated starts releasing. In the releasing process of developower, the economy will have a stable and order development until developower is released sufficiently, and then a new process of developower accumulating should start.

The process of accumulating and releasing developower is shown in figure 3.



**Figure 3** The approaches to accumulate and release developower and their processes. Developower is the invisible motivity for developing economy, and it include policy, science and technology, education, knowledge, management, systems and laws, culture, idea, etc. There are many other ways for accumulating and releasing developowerbeside those listed in this figure.

### 3.1.3 A brief summary

In figure 3, we describe the approaches and process of accumulating and releasing developower.

To say in short, the developower is accumulated by the integrated innovations, and released by the applications of the integrated innovations. The developower in accumulation and release are changed in the fluctuations of economic energy, and those fluctuations influence the economic growth or economic recession.

Both economic growth and recession are the natural phenomenon in economic development. Whether the economic growth and the economic recession all need to be pushed by the motivity and energy. Developower is the motivity and energy.

Finally, we need say there is an assumption about developower accumulating. It is that enough funds will be got when needed.

### **3.2 The Models for measuring developower**

Here, we should define the economic level first.

**Definition 4.** The economic level is the integrated status of all industries in economic fields, and includes the basic economic level and the real economic level. The basic economic level is the integrated ability which has been reached in economy (basic level for short). The real economic level is the integrated ability which will be presented in reality (real level for short).

The basic level is the known and due level in economy. The real level is the future and unknown level in economy. To a certain period of time, the basic level is the economic level at the beginning of the period, and the real level is the economic level at the end of the period. So the real level of the current period of time will be the basic level of next period of time.

**Assumption 1.** The assumptions about the economic level are as follow:

- 1) Both the basic level and the real level are all nonnegative. Namely in theoretical, the smallest values of the basic level and the real level are the zero.
- 2) The real level should fluctuate around its basic level, and the fluctuation range is positive, namely the smallest value of the fluctuation range is larger than zero in theoretical.
- 3) The basic level and the fluctuation range of it are the constants. The actual economy level can't be accurately foreknowledge, so it is a stochastic variable.
- 4) The possibilities that the real level is much lower than t the basic level, or is much higher than the basic level, will be very small.

Here, we give the rules about the measures for the economic level and developower as follow:

- 1) The basic measuring index for the economic level is the statistic results of the integrated status of economic development and generally could be the GDP (gross domestic product).
- 2) The basic measuring scale for developower is generally the development energy, Because the developower is come from the changes in economic environment, so it could be measured by the fluctuating range of economic level, namely the variance of economic level.

3) Further more, if we define the development rate as the ratio of developower to economic level, i.e., the proportion of variance of economic levels to the economic level

$$\text{The development rate} = \frac{\text{developower}}{\text{the economic level}} = \frac{\text{variance of the economic levels}}{\text{the economic level}}$$

The development rate also means the developower contained in unit of economic level in economy or the ability of unit of environment to push the economy to rise in its level.

As we know, the process is called the economic growth with developower accumulation if the economic level grows gradually along with developower being accumulated continually. The process is called the economic growth with developower release if the economic level grows gradually along with developower being released continually. To the circumstance that the economic level declines gradually, we have the economic recession with developower accumulation and the economic recession with developower release. If the economic level is stable, we have the economic stability with developower accumulation, or the economic stability with developower release.

## 4. The Partial Distribution and Economic Results on Developower

According to the theory of developower, we could interpret many of economic phenomenons and solve some problems in economy. If we want do all of those better, an appropriate analytic model is necessary based on the partial distribution. Now we give the definition of the partial distribution and some related results underneath.

### 4.1 The definitions about partial distribution

**Definition 5** (partial distribution) Let  $X$  be a non-negative stochastic variable, and it follows the distribution of density (Dai and Gi, 2001):

$$f(x) = \begin{cases} e^{-\frac{(x-\mu)^2}{2\sigma^2}} / \int_0^{\infty} e^{-\frac{(x-\mu)^2}{2\sigma^2}} dx & x \geq 0 \\ 0 & x < 0 \end{cases} \quad (1)$$

then  $X$  is called to follow a Partial Distribution, and note as  $S \in P(\mu, \sigma^2)$ .

**Definition 5** (The Partial Process). If the stochastic variable  $X$  is related to time, i.e.  $\forall t \in [0, \infty)$ , we have  $S(t) \in P(\mu(t), \sigma^2(t))$ , then the  $\{S(t), t \in [0, \infty)\}$  is called a partial process.

**Definition 6** (Multivariate Partial Distribution, MPD for short) if  $X_1, \dots, X_n (n \geq 2)$  are all the non-negative stochastic variables, and follow the multivariate distribution of density

$$f(x_1, \dots, x_n) = \begin{cases} \frac{e^{-\frac{1}{2|M|} \left[ \sum_{i=1}^n M_{ii}(x_i - \mu_i)^2 + \sum_{i,j=1, i \neq j}^n M_{ij}(\sigma_i(x_j - \mu_j)) \right]}}{\int_0^\infty \dots \int_0^\infty e^{-\frac{1}{2|M|} \left[ \sum_{i=1}^n M_{ii}(x_i - \mu_i)^2 + \sum_{i,j=1, i \neq j}^n M_{ij}(\sigma_i(x_j - \mu_j)) \right]} dx_1 \dots dx_n} & 0 \leq x_1, \dots, x_n < \infty \\ 0 & \text{other cases} \end{cases} \quad (2)$$

where,  $M = \begin{bmatrix} \sigma_{11} & \sigma_{12} & \dots & \sigma_{1n} \\ \vdots & \vdots & \dots & \vdots \\ \sigma_{n1} & \sigma_{n1} & \dots & \sigma_{nn} \end{bmatrix}$ ,  $\sigma_{ii} = \sigma_i^2$ ,  $\sigma_{ij} = r_{ij} \sigma_i \sigma_j$  ( $i \neq j$ ),  $\sigma_i > 0$ ,  $|r_{ij}| \leq 1$ ,  $i, j = 1, \dots, n$ .

$n$ . then we call  $(X_1, \dots, X_n)$  to follow  $n$ -dimensions Partial Distribution, and note as  $\mathbf{X} \in P(\boldsymbol{\mu}, \boldsymbol{\sigma}^T, \mathbf{R})$ . where,  $\mathbf{X} = (X_1, \dots, X_n)^T$ ,  $\boldsymbol{\mu} = (\mu_1, \dots, \mu_n)^T$ ,  $\boldsymbol{\sigma} = (\sigma_1, \dots, \sigma_n)^T$ ,  $\mathbf{R} = (r_{ij})_{n \times n}$ ,  $\mu_1, \dots, \mu_n \geq 0$ ,  $\sigma_1, \dots, \sigma_n > 0$ ,  $r_{ij}$  is called the correlation coefficient between  $X_i$  and  $X_j$ ,  $r_{ii} = 1$ ,  $i, j = 1, \dots, n$ .

As a special example of MPD, if the non-negative stochastic variables  $X$  and  $Y$  follow the multivariate distribution of density:

$$f(x, y) = \begin{cases} \frac{e^{-\frac{1}{2(1-r^2)} \left[ \left( \frac{x-\mu_1}{\sigma_1} \right)^2 - 2r \left( \frac{x-\mu_1}{\sigma_1} \right) \left( \frac{y-\mu_2}{\sigma_2} \right) + \left( \frac{y-\mu_2}{\sigma_2} \right)^2 \right]}}{\int_0^\infty \int_0^\infty e^{-\frac{1}{2(1-r^2)} \left[ \left( \frac{x-\mu_1}{\sigma_1} \right)^2 - 2r \left( \frac{x-\mu_1}{\sigma_1} \right) \left( \frac{y-\mu_2}{\sigma_2} \right) + \left( \frac{y-\mu_2}{\sigma_2} \right)^2 \right]} dx dy} & 0 \leq x, y < \infty \\ 0 & x < 0 \text{ or } y < 0 \end{cases} \quad (3)$$

then,  $(X, Y)$  is called to follow 2-dimensions Partial Distribution, and note as  $(X, Y) \in P(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, r)$ , where, the constants  $\mu_1, \mu_2 \geq 0$ ,  $\sigma_1, \sigma_2 > 0$ ,  $-1 < r < 1$ .

If  $r=0$ , thus we know, from expression (3) and (1),  $f(x, y) = f_1(x)f_2(y)$ , i.e.  $X$  is not correlating with  $Y$ . Where,

$$f_1(x) = \begin{cases} e^{-\frac{(x-\mu_1)^2}{2\sigma_1^2}} / \int_0^\infty e^{-\frac{(u-\mu_1)^2}{2\sigma_1^2}} du & x \geq 0 \\ 0 & x < 0 \end{cases}, f_2(y) = \begin{cases} e^{-\frac{(y-\mu_2)^2}{2\sigma_2^2}} / \int_0^\infty e^{-\frac{(u-\mu_2)^2}{2\sigma_2^2}} du & y \geq 0 \\ 0 & y < 0 \end{cases}$$

We will use the following notations:

- $\mu$  The basic level in economy,  $\mu \geq 0$ .
- $\sigma$  The fluctuation of the basic level, i.e. the standard variance of the basic level.  $\sigma$  can be applied to evaluate developpower,  $\sigma > 0$ .
- $v = \sigma/\mu$  The developpower rate,  $v$  can describe the development vitality in economy.

$X$  The real level in economy.  $X$  is a stochastic variable,  $X \geq 0$ .

Depending on assumption 1, definition 5, the real level follows the partial distribution, i.e.  $X \in P(\mu, \sigma^2)$ .

If the objects discussed is related to time, the above notations can be expressed as  $\mu(t)$ ,  $\sigma(t)$  and  $X(t)$  separately. In the following discussions, we do not distinguish  $\mu$ ,  $\sigma$  and  $X$  with  $\mu(t)$ ,  $\sigma(t)$  and  $X(t)$ .

## 4.2 The related results on partial distribution

Let the real level  $X \in P(\mu, \sigma^2)$ . According to references [16], [21], have

### 4.2.1 The expectation value of the real level

The expectation value of the real level  $X$  is the average value of the actual level:

$$E(X) = \mu + \sqrt{\frac{2}{\pi}} \frac{\sigma e^{-\frac{\mu^2}{2\sigma^2}}}{1 + \sqrt{1 - e^{-\frac{2}{\pi} \left(\frac{\mu}{\sigma}\right)^2}}} \quad (4)$$

where,  $R(X) = \sqrt{\frac{2}{\pi}} \frac{\sigma e^{-\frac{\mu^2}{2\sigma^2}}}{1 + \sqrt{1 - e^{-\frac{2}{\pi} \left(\frac{\mu}{\sigma}\right)^2}}$  can express the average increment of the real

level to the basic level.

### 4.2.2 The variance of the real level

The variance of the real level  $X$  is

$$D(X) = \sigma^2 + E(X)[\mu - E(X)] \quad (5)$$

Thus,  $\sigma$  or  $\sigma/\mu$  can evaluate the basic developpower, and  $\sqrt{D(X)}$  or  $\sqrt{D(X)}/E(X)$  can evaluate the real developpower.

### 4.2.3 The related results about multivariate partial distribution

Let  $X_1$  and  $X_2$  be real levels of two different developpower elements, e.g. economic policy and economic management, and  $X_1$  and  $X_2$  follow 2-dimensions Partial Distribution, i.e.,  $(X_1, X_2) \in P(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, r)$ . According to reference [21], we have  
1) The expectations of real levels on each developpowers, i.e., the real averages of economic policy and economic management, are separately as

$$E_r(X_1) = \mu_1 + r\sigma_1 + \sqrt{\frac{2}{\pi}} \frac{\sigma_1 \sqrt{1-r^2} e^{-\frac{1}{2} \left( \frac{\mu_1 + r\sigma_1}{\sigma_1 \sqrt{1-r^2}} \right)^2}}{1 + \sqrt{1 - e^{-\frac{2}{\pi} \left( \frac{\mu_1 + r\sigma_1}{\sigma_1 \sqrt{1-r^2}} \right)^2}}} \quad (6)$$

$$E_r(X_2) = \mu_2 + r\sigma_2 + \sqrt{\frac{2}{\pi}} \frac{\sigma_2 \sqrt{1-r^2} e^{-\frac{1}{2} \left( \frac{\mu_2 + r\sigma_2}{\sigma_2 \sqrt{1-r^2}} \right)^2}}{1 + \sqrt{1 - e^{-\frac{2}{\pi} \left( \frac{\mu_2 + r\sigma_2}{\sigma_2 \sqrt{1-r^2}} \right)^2}}} \quad (7)$$

2) The variances of real levels, i.e., the squares of real developowers in economic policy and economic management, are separately as

$$D_r(X_1) = \sigma_1^2(1-r^2) + E_r(X_1)[\mu_1 + r\sigma_1 - E_r(X_1)] \quad (8)$$

$$D_r(X_2) = \sigma_2^2(1-r^2) + E_r(X_2)[\mu_2 + r\sigma_2 - E_r(X_2)] \quad (9)$$

### 4.3 The Economic Analysis on Developpower and Partial Distribution

#### 4.3.1 Economic growth is a general and basic trend

Let  $X(i)$  be a dispersed partial process,  $X(i)=X_i, i=1, \dots$ . Suppose that  $X_i$  is the real level in  $i$ th stage and  $X_i \in P[E(X_{i-1}), D(X_{i-1})]$ ,  $E(X_0)=\mu, D(X_0)=\sigma^2, i=1, \dots$ . From (4) and (5), we have,  $E(X_i) > E(X_{i-1}) > \dots > E(X_0)$ ,  $R(X_i) < R(X_{i-1}) < \dots < R(X_0)$  and  $D(X_i) < D(X_{i-1}) < \dots < D(X_0)$ .

These make clear that: In general view, if all the economic system, integrated environments and asset quality do not change,  $E(X_i) > E(X_{i-1}) > \dots > E(X_0)$  mean the real level in economy will get higher and higher;  $R(X_i) < R(X_{i-1}) < \dots < R(X_0)$  mean the increment in economic growth will get lower and lower;  $D(X_i) < D(X_{i-1}) < \dots < D(X_0)$  mean the developpower will be released continuously, and economic production will go to a stabile status or equilibrium. These indicate that economic growth is a general and basic trend. But, in a certain period of time, the growth process will go to its end when developpower is released sufficiently. We need to accumulate a new developpower, such as new policies, new techniques, etc., in order to go to a new economic growth process.

#### 4.3.2 The relation among the developpower elements will influences economic development

Let the  $X_1$  and  $X_2$  be two developpower elements, e.g., policy and technique, then the expression (6) and (7) are separately the average real level of  $X_1$  and  $X_2$  in correlation meaning. The correlation coefficient  $r > 0$  means that basic levels of policy and technique are positively correlated. If we regard  $r > 0$  as that policy and technique are consistent one another, the real levels of the two elements will become higher together. And if their functions are in the same direction with the economic growth, they will push the economy to grow together. The correlation coefficient  $r < 0$  means that basic levels of policy and technique are negatively correlated. If we regard  $r < 0$  as that policy and technique are conflicted one another, the real levels of the two elements will become lower together. At this time, they will hinder the economic growth. So we see the relation among the Developpower elements will influences economic development, and the differences from the influence can mainly valuated by  $r\sigma_1$  in (6) or  $r\sigma_2$  in (7).

On the other hand, whether  $r > 0$  or  $r < 0$ , according to expressions (8) and (9), the variances of  $X_1$  and  $X_2$  will all become lower generally. This means the developowers of two elements all have been released for the combination of them.

### 4.3.3 The economic cycle could be reflected by developower movements

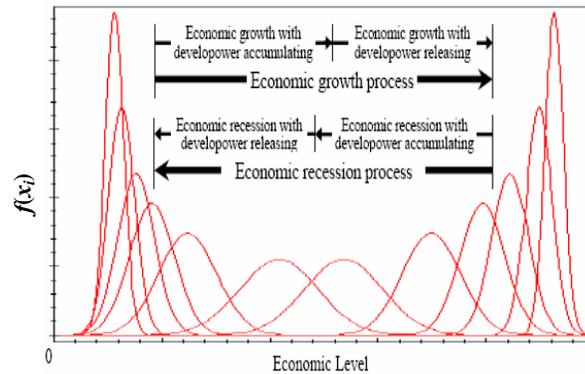
As we know, a whole derivative process includes an accumulating process and a releasing process of developower. Further more, and growth process includes a growth process with developower accumulating and a growth process with developower releasing, and a recession process includes a recession process with developower accumulating and a recession process with developower releasing. A whole growth process is similar to a whole recession process in structure, but developower moves in a reverse direction. These could be shown in figure 4.

In figure 4, the notations are

- $\mu_i$  The basic level of  $i$ th stage,  $\mu_i \geq 0$ .
- $\sigma_i$  The basic developower of  $i$ th stage,  $\sigma_i > 0$ .
- $v_i = \sigma_i / \mu_i$  The d developower rate of  $i$ th stage.
- $X_i$  The real level of  $i$ th stage,  $X_i \in P(\mu_i, \sigma_i^2)$ .
- $f(x_i)$  The probability density of  $X_i$ , see also expression (1)

In the economic growth process, the direction is from left to right. Developower is smaller at the beginning, and gets larger and larger, and this is the growth process with developower accumulating; after developower has been accumulated to a higher degree, it will become smaller and smaller, and this is the growth process with developower releasing. In the recession process, we have the reverse depiction.

So we see there is the cycle of developower moving in the economic growth or recession.



**Figure 4** The structure of a derivative process based on the partial distribution. In the economic growth with developower accumulating, developower changes from smaller to larger; and in the economic growth with developower releasing, developower changes from larger to smaller. To the recession process, we have the reverse depiction.

## 5 The Empirical Examples

In the section, we will illustrate that the developower and derivative process can be described.

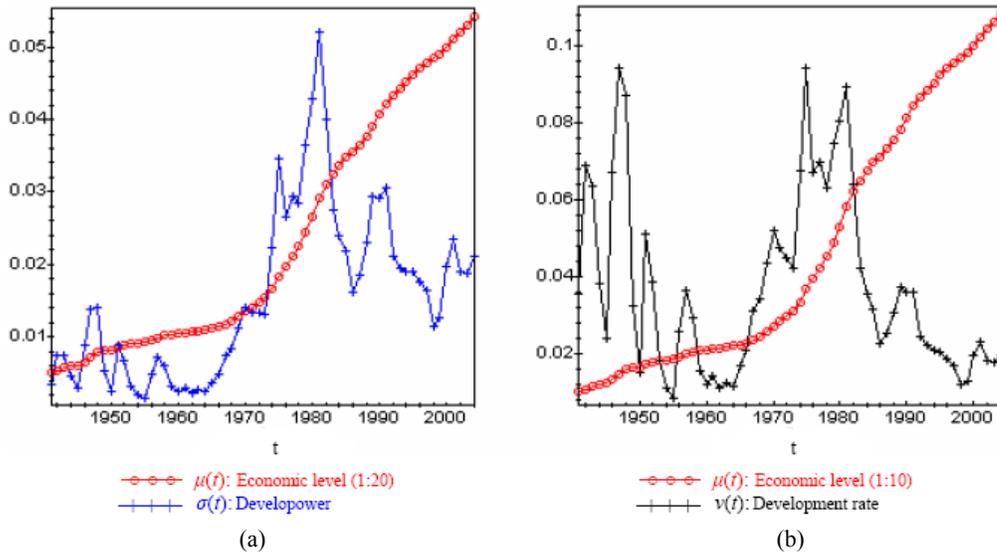
## 5.1 Data and notations

Here we take US GDP (chained) price index (<http://www.whitehouse.gov>, Fiscal Year 2000 = 1.000, the GDP index for short) in the period of 1940-2004 as the scale to evaluate the productivity and the empirical samples. Though US economy has been growing from end of World War II to 2004, developower fluctuates always. There are many different characteristics of developower in this period. We have the notations and expressions as follow:

- $\mu(t)$  The basic level in economy of the year  $t$ ,  $t=1940, 1941, \dots, 2004$ , measured by the GDP index.
- $\sigma_2(t)$  The basic developower of the year  $t$ ,  $\sigma(t)=|\mu(t)-\mu(t-1)|$ ,  $t=1941, 1942, \dots, 2004$ .
- $\nu(t)$  The developower rate of the year  $t$ ,  $\nu(t)=|\mu(t)-\mu(t-1)|/\mu(t)$ ,  $t=1941, 1942, \dots, 2004$ .
- $X(t)$  The real level of the year  $t$ , a non-negative stochastic variable.  
 $X(t) \in P(\mu(t), [\nu(t)]^2)$ .

Where,  $\mu(t+1)=X(t)$  ( $t=1940, 1941, \dots, 2004$ ). These mean the real level will become the basic level after it come into reality.

Because the interval unit of GDP data is one year, the economic status can be reflected stably and economic fluctuation can be nicely described by the difference between GDP value on one year and that of last year. So we adopt the formulas of  $\sigma(t)$  mentioned above to measure the developower, and  $\nu(t)$  to measure the development rate. The curves of developower, development rate and economic level in US economy on GDP (Chained) price index are drawn in figure 5. In figure 5(a), the proportion of the index drawn to the real GDP (Chained) price index  $\mu(t)$  is 1:20. In figure 5(b), the proportion of the index drawn to the real GDP (Chained) price index  $\mu(t)$  is 1:10.



**Figure 5** The curves of US economic levels  $\mu_1(t)$ , the developowers  $\sigma(t)$  and developower rates  $\nu(t)$  in the time period from 1941 to 2004.  $\mu(t)$  is valued by GDP (chained) price index (Fiscal Year 2000=1.000). In (a), the proportion of the indexes of  $\mu(t)$  drawn to the real indexes is 1:20, and the proportion of the indexes of  $\mu(t)$  drawn to the real indexes is 1:10 in (b). As we see, both the developower and the developower rate fluctuate always though the economic level  $\mu(t)$  has been growing.

## 5.2 Developpower movements and derivative process in US economic development

We could see, from figure 5, the developpower and developpower rate would go down if they are higher to a certain degree, namely developpower will release if it is accumulated to a certain degree. Also, the developpower will accumulate if it is released to a certain degree.

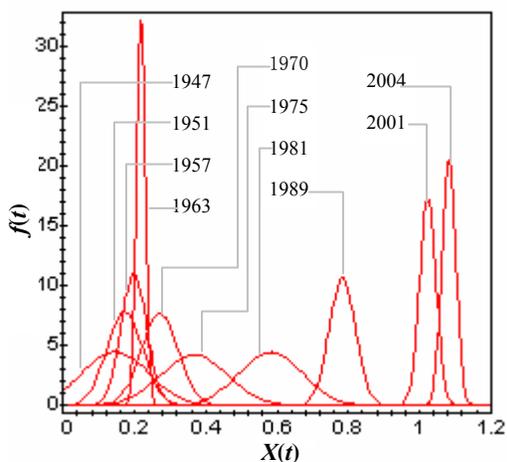
In figure 6, we have drawn the partial distribution curves of  $X(t)$  according to local top values of  $v(t)$  on the years ( $t=1947, 1951, 1957, 1961, 1970, 1977, 1981, 1989, 2001, 2004$ ). According to figure 6, we see that the process of US economic growth from 1942 to 2004 can be divided as three phases.

First phase: 1942-1963, this is an economic growth process with developpower releasing.

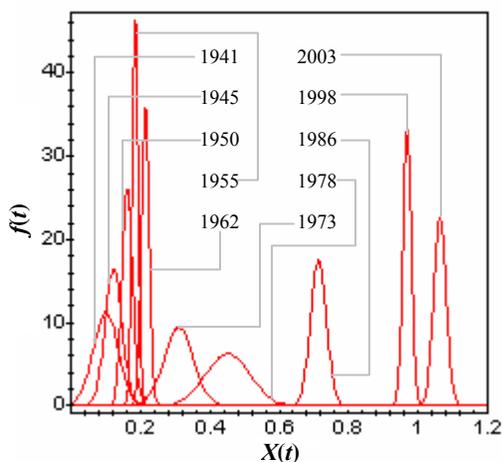
Second phase: 1963-1975, this is an economic growth with developpower accumulating.

Third phase: 1975-2004, this is an economic growth process with developpower releasing also.

In order to check the characteristic of derivative processes that exist in the economic development, we also have drawn the partial distribution curves of  $X(t)$  according to local bottom values of  $v(t)$  on the years ( $t=1941, 1945, 1950, 1955, 1962, 1973, 1978, 1986, 1998, 2003$ ) in figure 7. From figure 7, we also see that the process of U.S. economic growth from 1941 to 2003 can be divided as four phases.



**Figure 6** The partial distribution curves of economic level  $X(t)$  at the years of local top points on developpower rates. The periods of time 1947~1963 and 1975~2004 are the economic growth with developpower releasing, and in the period of time 1963~1975, there is an economic growth with developpower accumulating.



**Figure 7** The partial distribution curves of economic level  $X(t)$  at the years of local bottom points on developpower rates. The periods of time 1941~1955 and 1978~1998 are the economic growth with developpower releasing, and in the periods of time 1955~1978 and 1998~2003, there are two economic growth processes with developpower accumulating.

First phase: 1941-1955, this is an economic growth with developpower releasing.

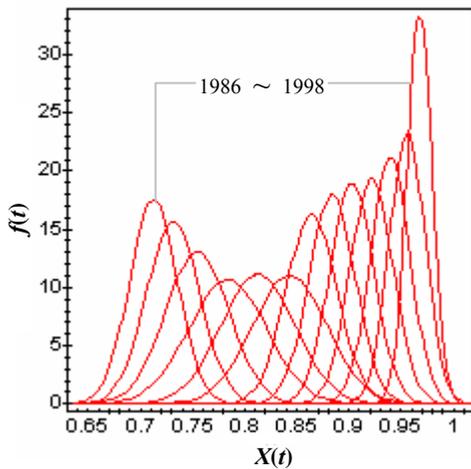
Second phase: 1955-1978, this is an economic growth with developower accumulating.

Third phase: 1978-1998, this is an economic growth with developower releasing also.

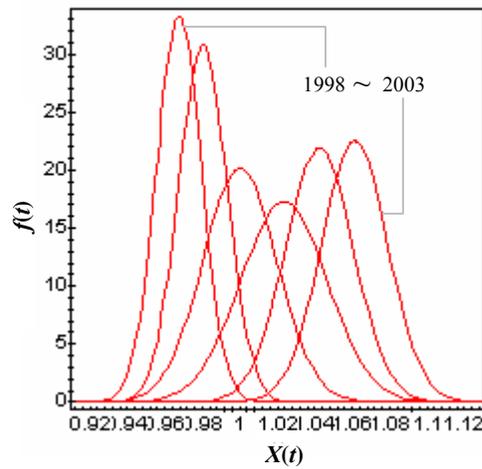
Fourth phase: 1998-2003, this is an economic growth with developower accumulating also.

In figure 6 and figure 7, we do not see the developower movements between 1986 and 1998. If drawing the distribution curves of  $X(t)$  this 13 years, we get the results shown in figure 8. There is another whole derivative process in figure 8, includes an economic growth with developower accumulating and a economic growth with developower releasing. There are the similar developower movements between 1998 and 2003, see also figure 9.

Making a sum from above discussions, we get a conclusion that the developower movements and derivative process always are being in the economic development. If there are differences in derivative processes, it must be the differences in the length of time, their macroscopic structure are similar generally.



**Figure 8** The curves of partial distribution on developower movements between 1986 and 1998. This is a whole derivative process in a smaller scale.



**Figure 9** The curves of partial distribution on developower movements between 1998 and 2003. This is also a whole derivative process in a smaller scale.

### 5.3 The interim remarks

From the above analysis, we see sure there are developower movements in economic process. In addition, there are two phenomenon needed to indicate:

- 1) The economic growth may run advance, i.e., economy may start growing in the middle or later period of developower accumulating.
- 2) The developower rate in US economy is at a lower degree. Because developower can not be illimitably released, US economy may start a larger scale of accumulation in developower about 2010<sup>[19]</sup>. This process should be an economic growth with

developpower accumulating, or an economic recession with developpower accumulating. In order to avoid the economic recession, US government needs to do a lot of works, such as economic innovation, technology innovation, policy innovation, system innovation, market innovation, financial innovation, education innovation, management innovation, cultural development, etc., and the workloads would be very enormous. If like that, US economy may keep on growing stably in next decade or more.

## 6 Conclusions

In this paper, a concept developpower and its theoretical frame is put forward for the first time. This theory thinks that the real motivity to impel the economy to progress is the developpower implicated in the economic environments. Though the developpower, such as policy developpower, scientific developpower, etc. does not increase directly economic level itself, they can efficiently promote to improve the productivity, and push economy to develop completely. Therefore, it is important for us to study developpower.

In addition, by use of the model in this paper, we can availably describe developpower movements in the process of economic development, and analyze the scale of the economy cycle, evaluate the status of economic development, establish the suitable policies for economic development and lead economic development in a positive way.

Some problems which are worth to study further about developpower and derivative process are listed as follows:

- The theoretical system of developpower needs to be developed and perfected further.
- The empirical analysis and research on developpower need to be made further.
- The researches on policy developpower, scientific developpower and other developpowers should be carried through further.
- More measuring methods for developpower should be put forward, in order to describe and analyze the macroeconomic problems more accurately.
- Which developpower elements will take their effects under a certain circumstance, and others do not? If some of developpowers elements will take effects, how big are the effects of them?

The growth rate in investment is closely related to economic growth, but we do not deal with it specifically in the discussion on developpower, the reason is that investment capital will be increased if it is droved by developpower, i.e., the growth in investment is passive.

Perhaps, we could also study the stability and growth rate of economic development by use of the methods in this paper.

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