Research on Social Stability Mechanisms Based on Activation Energy and Gradual Activation Reaction Theory

Miao Ning[1,2] and Jifa Gu[3]

[1] Institute of Policy and Management, Chinese Academy of Sciences,
Zhong Guancun East Road.55, 100190, Beijing, China
[2] Center for Interdisciplinary Studies of Natural and Social Sciences, CAS,
Zhong Guancun East Road. 95, 100190, Beijing, China
[3] Academy of Mathematics and Systems Sciences, Chinese Academy of Sciences,
Zhong Guancun East Road.55, 100190, Beijing, China
ningmiao@casipm.ac.cn

Abstract. This paper draws a comparison between social stability and chemical reaction process, and brings forward the concept of "social temperature" and "activation energy of social agent". It is considered that social temperature turns out to be the macro symptom of social average energy, and its unceasing up-climbing roots in the energy accumulation of "inferiorization" process of social system; that "activation energy of social agent" stands for the social energy or temperature where individuals or groups reach the limit of their psychological bearing ability. This paper, basing on above concepts, elaborates on and demonstrates the gradual activation reaction mechanisms of social stability by a lot of concrete examples. It is thought that there is a threshold value for social stability, and the society will be unstable if social temperature goes higher than this value; that the larger the social average activation energy is, the higher the temperature threshold value of social stability will be; and considering that different groups have different activation energy, those fragile groups with low activation energy are often the risk source which might pose a threat to social stability.

Keywords: Social stability, Social temperature, Activation energy of social agent, Gradual activation reaction, Mechanisms.

1 Introduction

At present, China is going through a transformation period where various formations exist simultaneously, which, seen from the perspective of risk analysis, is reflected as the co-existence of various types of risks, namely, the phenomenon of risks co-existence. It is an obvious fact that Chinese people and its social safety are currently being threatened not only by traditional risk, including infectious diseases, natural disasters etc, but also by such social risks as unemployment, wide gap between the rich and the poor, work accidents, labor-capital conflict and criminal crimes and so on

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which keep rising and sharpening in the course of modernization featured by industrialization and urbanization. What's more, specifically speaking, China is being through the social formation of postindustrial society period, that is, individualization starts to get its way and high-and-new technology keeps evolving, which indicates that our social life and natural environment are both threatened by increasingly accumulated risks. Co-existence of risks in social transformation period also boasts other meanings. China's social transformation turns out to be the simultaneous start-up of system transition and structure transformation, including the change from a single society featured by planned economy to a diversified one featured by market economy. It is the very fact that we are in the middle of this transformation, namely, on the one hand, we are going through the disintegration of old distribution system, control system and integration system of social resources, on the other hand, new system and mechanism have not been completed and brought into play, that triggers and intensifies some special types of risks, such as increasingly widened gap between the rich and the poor, deviant social behaviors, up of crime committing rate, intensified conflict among clans, morality loss, trust crisis and control failure etc.

Various risks we are facing in transformation period bring hidden troubles for social stability of China and the phenomenon of structural split has already presented itself in our society. Consequently, we can see, that it is an important task to keep the safety, stability and harmony during a transformation period. According the study paradigm of socialphysics [1], this paper is trying to compare the mechanisms which helps keep social safety and stability with the activation energy concept and gradual activation reaction theory which are used in chemical dynamics.

2 Activation Energy and Gradual Activation Reaction Theory

Being a very important concept in chemical dynamics, activation energy's definition varies in different theories, for example, the energy reactant molecule needs to become activated molecule; the energy reactant molecule with average energy needs to become activated molecule; the D-value between the average energy of activated molecule and the average energy of reactant molecule; the lowest energy a molecule has, which is able to be collided effectively; the D-value of the lowest potential energy between transition-state and reactant etc. although the above mentioned definitions are based on different theories and therefore their statement might vary, they all point out one similar thing, namely, the reactant molecule has to be change into activated molecule, or activated complex molecule from common molecule first before chemical reaction happens. And the bringing forward of activation energy concept aims to measure the threshold energy, energy barrier and necessary energy.

If the lowest energy an activated molecule has is defined as the activation energy of reaction, we can see, from transition-state theory and collision theory, that there is an interaction potential energy among all types of reactant molecule, namely, the chemical bond which is a function indicating the relative position of molecules. If molecule A and B are about to react, it is necessary to have their components of relative kinetic energy at the direction of center of mass go larger than the threshold value E_0 of certain energy so as to break away from their potential energy respectively and get close to each other or collided and hence form new chemical bond. During the

reaction, the mobility velocity of molecule or energy distribution meets the Maxwell-Boltzmann velocity or energy distribution law, which makes it possible to calculate the percentage n_{E_0}/n activated molecule number n_{E_0} takes up in total molecule number n at certain temperature T. According to Maxwell velocity distribution rate, the molecule number during $u \sim u + du$ goes like (1)

$$\frac{dn}{n} = 4\pi \cdot (\frac{M}{2\pi RT})^{\frac{3}{2}} \cdot e^{-\frac{Mu^2}{2RT}} \cdot u^2 du \tag{1}$$

Because the kinetic energy of molecule $E = 1/2Mu^2$, $dE = Mudu$, and put this into formula (1), we can see(2).

$$\frac{dn}{n} = \frac{2}{\sqrt{\pi}} \left(\frac{1}{RT}\right)^{\frac{3}{2}} \cdot e^{-\frac{E}{RT}} \cdot E^{\frac{1}{2}} dE \tag{2}$$

Through calculating the integral of (2), we can get the percentage the molecule of certain kinetic energy E_0 takes up in total molecules. It goes like (3).

$$\frac{n_{E_0}}{n} = \int_{E_0}^{\infty} \frac{2}{\sqrt{\pi}} \left(\frac{1}{RT}\right)^{\frac{3}{2}} \cdot e^{-\frac{E}{RT}} \cdot E^{\frac{1}{2}} dE = \frac{2}{\sqrt{\pi}} \left(\frac{E_0}{RT}\right)^{\frac{1}{2}} \cdot e^{-\frac{E_0}{RT}} \left[1 + \frac{RT}{2E_0} - \frac{RT}{4E_0} + \cdots\right] \tag{3}$$

For general chemical reaction, it goes like $E_0 \gg RT$, we only take the first item of the (3) bracket, and formula (4) stands for percentage the molecule number of E_0 which goes beyond certain energy takes up in total molecules, among which, E_0 stands for the activation energy of chemical reaction, *T* for absolute temperature, *R* for gas constant. And the chemical reaction rate k is directly proportional with n_{E_0}/n.

$$\frac{n_{E_0}}{n} = \frac{2}{\sqrt{\pi}} \left(\frac{E_0}{RT}\right)^{\frac{1}{2}} \cdot e^{-\frac{E_0}{RT}} \tag{4}$$

If we assume that $E_0 = 103.4kJ \cdot mol^{-1}$, (4) can be a guide for drafting the curve where n_{E_0}/n changes with T, like Fig.1. From Fig.1, we can see that chemical reaction has a preparation period. In this period, the environment temperature is comparatively low and the activated molecule increases with a slow rate. The proportion activated molecule takes up in total ones almost keeps unchanged. Under this circumstance, the original substance structure remains stable in that the collision among reactant molecules happens very slowly, with a slow reaction rate. Nevertheless, when the temperature goes over the upper limit of preparation period, here comes the reaction period where the proportion activated molecule takes up in total ones increases rapidly and the collision and combination among reactant molecules happens more frequently, and original bond will be destroyed the chemical reaction will be accelerated.

Reaction tendency indicates the ability of a substance to happen chemical reaction, namely, whether it's easy for a substance to be involved in a reaction or not. Like what has been shown in Fig. 2, the smaller the activation energy is, the lower the

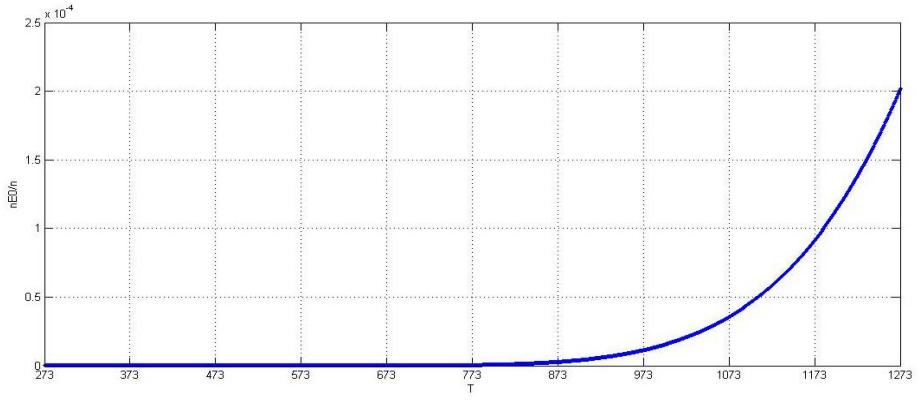

Fig. 1. Curve where activated molecule's proportion in total molecules changes with temperature

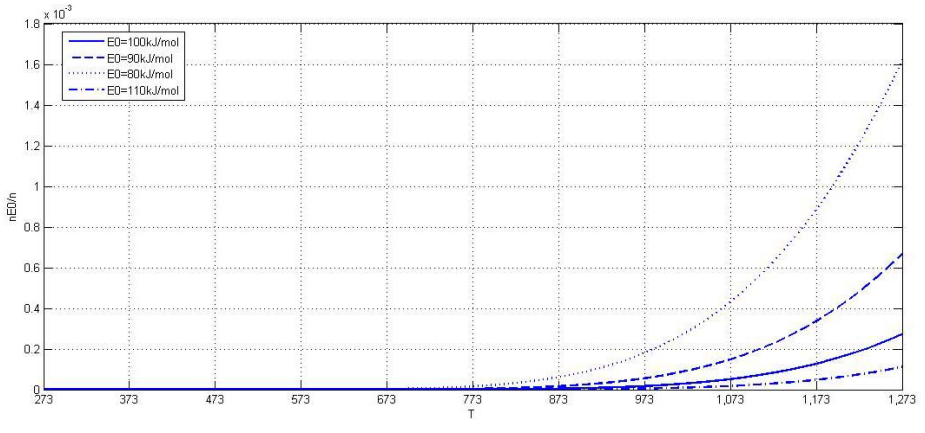

Fig. 2. Curve where activated molecule's proportion in total molecules changes with temperature under different activation energy levels

upper limit of temperature will be in preparation period of chemical reaction, which means that a quick reaction can happen in a comparatively low temperature. If there are functional groups with different activities in the structure of certain substance, the structure which requires comparatively low activation energy will be activated, collided and then reacted when the temperature goes up. As the environment temperature goes higher, and the substance itself is heated by the energy released from earlier reactions, structures and functional groups which require larger activation energy will be activated and reacted. So, gradual activation reaction mentioned in this paper indicates the phenomenon and processes where various structures of certain substance which require different activation energy will be activated and reacted step by step.

3 Analogy between Social Stability and Chemical Reaction Process

The research object of social science often turns out to be a giant system, such as the crowd of a city. Among this giant crowd, individuals don't know each other and are identified as people of certain nationality, sex and country only by few characteristics, like skin color, dress style and language etc, and the interaction among this giant crowd only depends on very limited information. Owing to the fact that lots of necessary information is not available, most people tend to give this giant crowd an abstract and general characteristic, for example, Japanese office workers are known to be busy and Judean businessmen smart. Putting aside the micro differences these general characteristics might present for single individual, they are the basic elements which tell one group from another. Phenomenon like this can be called social atomization [2,3,4], that is, the element of social system is the "agent", instead of diversified individuals, and the former features few obvious characteristics and whose behavior and selection are subject to certain rules[5,6]. When the probability that individual behavior runs counter to the main rules of the whole society increases, social stability is threatened. Seen from certain angle, social system works like a chemical reactant and it is reasonable to draw an analogy between social stability and chemical reaction process.

3.1 Social Temperature

It is deemed in this article that social temperature turns out to be the symbol of social average kinetic energy [7], and its unceasing up-climbing roots in the energy accumulation of "inferiorization" process of social system. The so called "inferiorization" of social system stands for the process where the micro elementary particle or individual of social system get disordered from assimilation to dissimilation. The basic differences of current society include the following five aspects: concept difference, culture difference, nationality difference, religion difference and difference between the rich and the poor [7], the first four kinds of differences are objective and not subject to human's will, and do not change with time, even at all sometimes. Consequently, the increasingly up social temperature lies in the widening of difference between the rich and the poor, which is particularly reflected in widened income gap between strata, urban and rural area, regions, and industries.

Income gap among strata. Like what has been shown in fig. 3, ever since 1981, the gap of individual income of China's citizen has been widened all along, no matter among urban citizens, rural ones, or among all Chinese people. During 1981-2004, the Gini coefficient of urban citizen's income was widened from 0.17 to 0.33, which means an increase of 94.1%in uneven income distribution among urban citizens[8]; the Gini coefficient of rural citizen's income was widened from 0.25 to 0.36, which means an increase of 44％in uneven income distribution among rural citizens[8]; while the Gini coefficient of China's entire citizens had gone above 0.4 in 1998---an worldwide accepted warning limit of uneven income distribution, and kept widening since 2000, which put China into the one of those countries where income distribution seriously goes uneven [8].

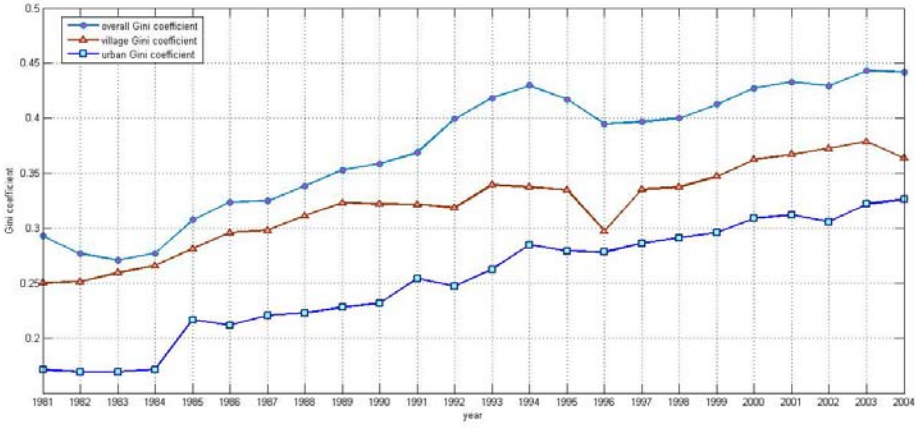

Fig. 3. Gini coefficient of income of urban citizens, rural citizens and all Chinese people from 1978-2004. Data source: Cheng, Y.H. 2007：51-52

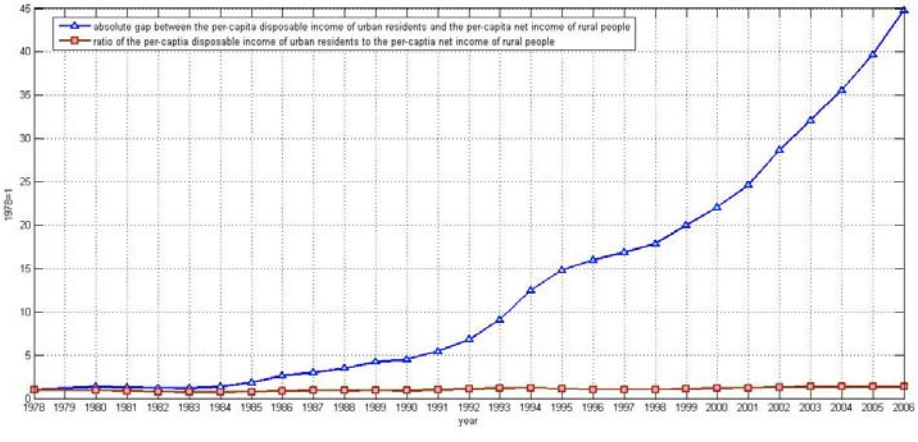

Fig. 4. Absolute and relative differences between urban per capita disposable income and rural per capita net income from 1978-2006. Data source: China Statistical Yearbook

Income gap between urban and rural areas. Big difference between urban and rural areas has always been one obvious characteristic of China. Like what has been shown in fig. 4, ever since 1978, the income difference between urban and rural areas has gone through a curve course of being narrowed down first and then widened up, however, the absolute difference has been widening all the way. According to the data of National Bureau of Statistics of China, during 1978-2006, the per capita disposable income of urban families went from 316 Yuan to 11, 759.45 Yuan, with an annual increase of 13.3%; the per capita net income of rural families from l33.6 Yuan to 3,587.04, with an annual increase of 12%. By comparing these two groups of data, we can find out that the difference between the per capita disposable income of urban families and the per capita net income of rural families was widened from 2.37 times

in 1978 to 3.28 times in 2006, and the absolute difference from 182.4 Yuan in 1978 to 8,172.41 Yuan in 2006. At present, the difference will be even larger if taking various material benefits urban citizens enjoy into consideration.

Income gap among regions. As a big developing country with vast territory, China's difference between the rich and the poor is especially embodied in the income difference of different regions. According to the idea stated in China Statistical Yearbook, that is, to have its territory zoned into four regions, e.g. the east, the middle, the west and the northeast. And fig.5 tells the results of estimating and analyzing the per capita GDP differences among these regions by Theil Index,from which we can see that the difference change of China's regional economy went through the following stages : during 1978-1986, the Theil index went down from 0.072242 to 0.060097, which indicated that China's regional economic difference narrowed down a little bit; during 1986-1992, the Theil index almost kept unchanged, which indicated that China's regional economic difference almost were the same in this period; while from 1992 till now, the Theil index went up from 0.060513 to0.076965, which indicated that China's regional economic difference has been widening. We can, according to the decomposable formula of the Theil index, calculate the contribution value of differences within these four regions, total difference of four regions and differences among four regions to China's regional economic differences. It is shown, from the calculation results, that the difference between the rich and the poor mainly exists within the east region and among four regions. From the angle of change trend, during 1978-1992, the difference contributed by the east to total difference went higher than that among four regions, however, the former kept being narrowed down while the latter went the other way around; from 1992 till now, the difference contributed by four regions to total difference went higher than that within the east, nevertheless, the former kept being widened while the latter kept being narrowed down.

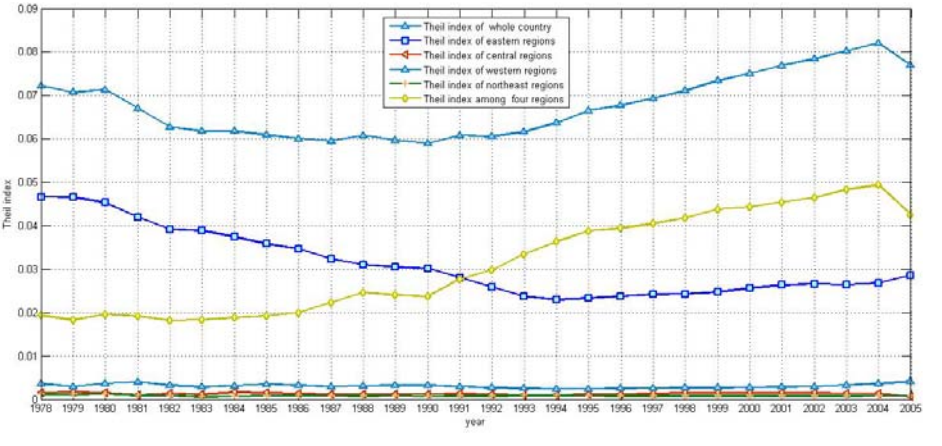

Fig. 5. The Theil Index of China and the contribution value of the east, middle, west, northeast, within the whole area and among regions from 1978-2005. Data source: 55 years of Statistical Information Collection of New China.

Income gap among industries. There are 15 types of industries in China, including agriculture, forestry, husbandry, fishery, excavating industry, manufacturing industry, production and supply industry of power, coal and water, construction industry, geological prospecting industry, hydraulic management industry, industry of traffic transportation, storage and post and telecom, industry of wholesale and retail trade and catering, finance and insurance industry, real estate industry, social service industry, industry of hygiene, sports and social benefits, industry of education, culture and art, and radio, movie and TV, scientific research and comprehensive technical service industry, and state organizations, political organizations and social associations and so on. Ever since the implementation of reform and opening up policy, difference between the highest income and the lowest income has been widening all along, from a difference of 528 Yuan in 1985 to that of 26,275 Yuan in 2003, namely, a difference of 49.76 times, with an average increase of 22.83% annually. From the perspective of relative difference, we can see that the relative difference between the highest income and the lowest income during 1985-2003 was widened from 1.6 times to 4.63 times, with an average increase of 5.8% annually, among which, 1998-2003 witnessed the fastest widening of relative difference, from 2.34 times of 1998 to 4.63 times of 2003, with an average increase of 12% annually. If we introduce the Theil Index to measure the salary difference among industries since 1990, the index went up from 0.015637 times of 1990 to 0.0341 times of 2003, with an average increase of 5.7% annually, which indicated a continuous widening of salary difference among industries.

From above mentioned, we can find out that it is the social basic energy which is accumulated during the "inferiorization process" of social system caused by the widening of difference between the rich and the poor that increases the probability of disorder degree and breaking main social rules by basic particles (individuals) of social system, and augment social behavior entropy and hence make social temperature go up. Under a high temperature for a long time, certain particle (individual) is able to gain sufficient energy to get away from the restriction of main social relationships and

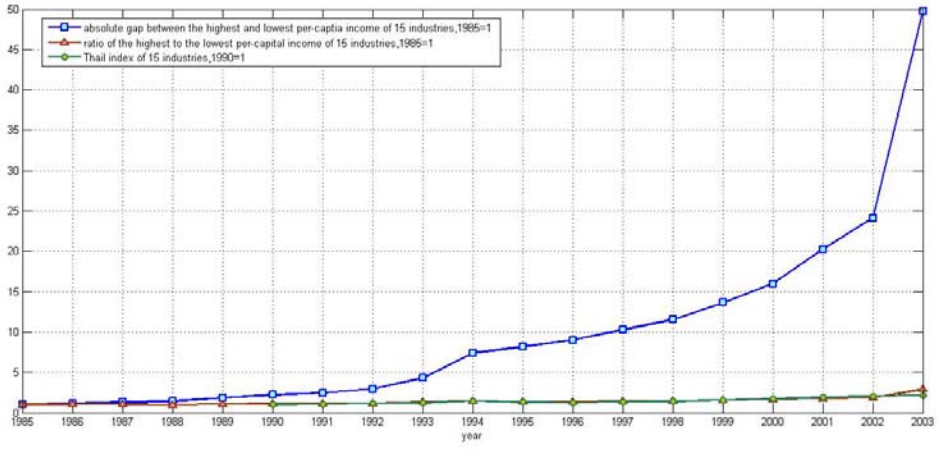

Fig. 6. The Theil Index and the absolute and relative differences among China's fifteen industries form 1995-2003 (year 1995=1). Data source: China Statistical Yearbook.

rules, dissociate with social basic structure and collide or conflict with upper individuals (particle) and pose a threat to stability and safety of the whole social structure.

3.2 Activation Energy of Social Agent

A harmonious body and mind of social members serves as an important premise of social stability, and the increasingly up-climbing social temperature caused by the inferiorization of social system will pose harm to this harmony and put it to unbalanced edge, with an obvious phenomenon of the sense of "relative deprivation" of low income people. The sense of "relative deprivation" stands for an unbalanced psychological state of feelings, which comes from judging and evaluating the loss and profit of oneself and is the result of social comparison[9]. Marx once pointed out that "What we use for measuring our need and enjoyment is social criteria, instead of materials which will satisfy our need and enjoyment, because our need and enjoyment is of social characteristic and therefore relative. [10]" As for the comparison within the whole society, if certain individual or group thinks that he doesn't get what he should have had after comparing his loss and gain with other individual or group, here comes the sense of "relative deprivation" naturally. With the deepening of reform and opening up to outside and the development of social productivity, each social member is receiving a higher income than before, which, however, coexists with an increasingly widened income gap between the rich and the poor. If people with lower income draw a comparison between themselves and those with a higher income, they will feel like being deprived. The sense of "relative deprivation" is proportional to the difference degree of the rich and the poor. When this kind of difference reaches or goes beyond the psychological bearing ability of some low-income people, some extreme behaviors might occur and hence pose a threat to social stability[11,12]. So, the "activation energy of social agent" can be defined as "social basic energy" or "social temperature" where the psychological bearing ability of individual or group reaches a certain limit. It's also an active reflection of people to social reality and a compound psychological ability structure of people formed under the interaction between the stimulation of certain social temperature and existing psychological foundation.

The activation energy of social agent is subject to the following factors: (1) difference between the existing psychological foundation of social agent and the reality. Chinese people are affected deeply by the mind-set of "it's not terrible being scarce but uneven" and "everyone shall be as rich as anyone else" of feudal society and by the concept of "having everyone eat from the same big pot" of planned economy period, which will make it even harder for people to stand the fact that the income distribution gap keeps widening. (2) A rational social distribution and insurance system. Through re-distribution of income, a rational insurance system can change the final distribution situation among social members and insure the basic living standard of vulnerable groups; meanwhile, a rational distribution system can effectively prevent unfair distribution, including illegal high income (industry monopoly and corruption etc.). So a rational social distribution and insurance system plays a significant role in enhancing people's psychological bearing ability and activation energy. (3) Layer structures of social income. One Gini coefficient is able to make big difference in different income group, for example, after seeing this obvious difference, will feel this

strong contrast and ignore the fact that there are transitional income groups between these two extreme sides. This will weaken the psychological bearing ability and activation energy of the whole society, especially that of low income group, and a proper proportion of middle-income group in the whole society will improve the relative beneficial degree of citizens and hence strengthen the psychological bearing ability and activation energy. (4) The psychological bearing ability of each region and community. Owing to the regular psychological tendency of "keep pace with neighbors", people of the same system will feel the difference within their system more directly than that among different systems. Currently, the difference between the rich and the poor of China mainly lies between urban and rural areas, different regions and different industries, which brings forward an effect of "screening" and virtually weaken people's psychological bearing ability to this increasingly widened income gap and exalt the activation energy of social agent.

3.3 Gradual Activation Reaction Mechanisms of Social Stability

We can divide people into three types according to how large or small the activation energy of social agent is, namely, the matching state between people's psychological bearing ability and social basic energy or temperature: (1) vulnerable people with low activation energy; people of this type have an extremely low psychological bearing ability and are unable to stick up to the strike caused by up-climbing temperature. Upon any stimulation of certain social temperature, there will be obvious psychological disordering symptoms appearing on them. (2) sensitive people with middle activation energy. People of this type enjoy a psychological bearing ability which can stand the stimulation of certain social temperature, that is, they have middle-level activation energy which can be motivated to resist the impact of high social temperature in "inferiorization" process, however, they are fully alert to external stimulation. (3) enduring people with high activation energy; people of this type enjoy a high psychological bearing ability which will not be affected by the stimulation of certain social temperature or energy at all, so they are very flexible and will pose no threat to social stability upon relevant stimulation. The above mentioned analysis indicates that different people will react differently to the same social temperature, namely, under one similar temperature, vulnerable people with low activation energy might instantly react to it, start to break away from main social structure and vent out their senses of deprivation, loss and risk through various ways and hence pose a threat to social stability; while people of the second and third type might be in a dormant or preparing phase and are able to resist those negative affects caused by social disordering through their will and hence pose no threat to social stability. In general, different social agents with different activation energy will have the energy necessary for the transition of activation early or late as social temperature goes up. Up-climbing of social temperature will not only increase activation agents within each group, but also spread its way gradually to people with higher activation energy, which will lead to overlapping and intensified reaction and finally to the change of social system from order to disorder. Social gradual activation reaction presents itself in reality from the following two aspects: one is "round table-politics" and "street-politics", that is, the occurrence frequency of group incidents keeps increasing annually, the other is "night-politics",

that is, crime-committing and law breaking rate goes higher rapidly. These two aspects have caused harm to social stability more or less.

Before the implementation of reform and opening up policy, China's crime rate keeps low all along and was one of the countries whose rate of exposed criminal cases is the lowest, with 30 to 60 criminal cases per 100,000 people and 200,000 to 300,000 or more criminal case each year [13]. Ever since 1978, China's crime problem became more and more serious and seemed to be on the up trend. Take only crime cases registered by public security organ for instance, 1978 witnessed only 530, 000 or more cases across the country, with a crime rate of 0.56‰ (56 cases per 100, 000 people, similarly hereinafter); while 2006 witnessed as many as 465,000 cases and more, with a crime rate of 3.54‰, which indicates that crime cases have increased by10.3% annually during 1986-2006. Law-breaking and crime-committing cases and crime rate in 2006 was 6.1 times and 4.8 times more than that of 1986 respectively. If we research law-breaking and crime-committing cases and the rate by putting criminal cases and public security cases together (namely, take public security cases as light crimes), it is found, from the statistics, that there were about 1,660,000 crimes in 1986, with a crime rate of 1.55‰, and this number increased to as many as 11,850,000 and more in 2006, with a high crime rate of 9.01‰, which indicates that crime cases have increased by10.3% annually during 1986-2006. Law-breaking and crime-committing cases and crime rate in 2006 was 6.1 times and 4.8 times more than that of 1986 respectively. The rapid increase of law-breaking and crime-committing cases has made China no longer one of the countries whose rate of exposed criminal cases is the lowest, and instead, this phenomenon gets serious in our country.

If using these four kinds of differences between the rich and the poor to express social temperature in general, we get the equation (5), among which, STI stands for social temperature index, IDIi for the difference index between the rich and the poor. Specifically speaking, difference between rich stratum and poor stratum will be indicated by Gini coefficient; difference between urban and rural areas by the

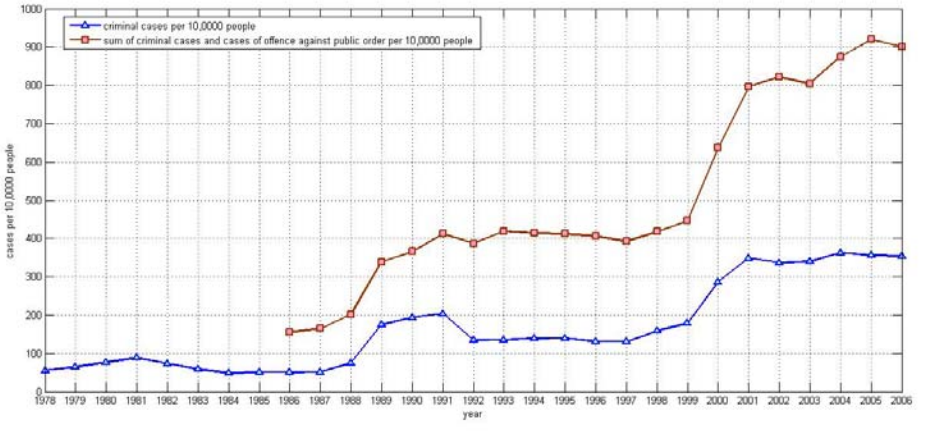

Fig. 7. Time Serial Change of China's crime rate and law-breaking and crime rate. Data source: Law Yearbook of China and China Statistical Yearbook; number of criminal cases during 1978-1980 is from Guo,X. 2002.

absolute and relative differences between urban per capita income and rural per capita income; difference between rich region and poor region by the Theil index of per capita GDP of four regions; difference among industries by the Theil index and the absolute and relative differences of above mentioned fifteen industries. For the comparability of index IDi, we can use the equation (6) to change it into IDIi. Additionally, the crime rate can, to some degree, be seen as the proportion of activated agent in social system, like what has been analyzed in Fig. 8. So, there are similarities between social stability and chemical reaction. Social temperature also has a threshold value ST0, and when ST is equal to or goes smaller than ST0, the up-climbing of ST will make no big change to the crime rate and social system is in a safe and stable state, which is similar to the dormant or preparing period of chemical reaction; however, when ST goes larger than ST0, the up-climbing of ST will accelerate the crime rate and social system will be in an unsafe and unstable state and finally be out of control, which is similar to the reaction period of chemical reaction. The reason why social stability will change with social temperature accordingly is that, like what has been elaborated, activation energy varies for different groups and the temperature threshold value of social stability is subject to the temperature or basic energy the vulnerable group need for activation. If this threshold value is overtopped, the risk will be increased for sensitive group with higher activation energy and group with endurance and the highest activation energy and so will the crime rate.

$$STI = \frac{1}{n}\sum_{i=1}^{n} IDI_i \tag{5}$$

$$IDI_i = \frac{ID_i - \min ID_i}{\max ID_i - \min ID_i} \times 100 \tag{6}$$

The theory of activation energy and gradual activation reaction can be used not only to explain the change mechanism of social stability trend from a macro angle, but also to explain the occurrence mechanism of specific incident which might pose

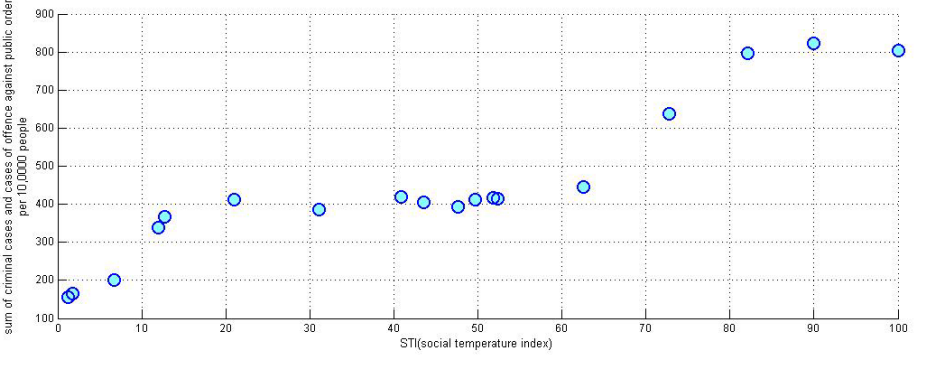

Fig. 8. Relationship between China's social temperature index and law-breaking and crime rate. Data source: China Statistical Yearbook.

threat to social stability, group event for instance. Before the outburst of group event, certain basic energy which will exalt social temperature has been accumulated in the process of social inferiorization and is close to the activation energy of some group. At a time of t, a sudden incident with certain scale and influence occurred at some space point and it concerns vital interest of certain individual or group of this space point. Occurrence of this incident intensified the sense of "deprivation" of above mentioned people and made the social temperature reflected on them go up quickly and finally and over the critical value and gain the energy necessary for activation. What's more, out of the idea of "freemasonry " and "understanding among groups", groups who are indirectly concerned with this incident can also gain an energy preparation of activation and transition. If these groups with the same or similar interest requirement can not have their interest protected or met, they start to break and even confront the existing social regulations, including disturbing the normal working order of Party and government organs together, smashing, looting and burning public properties, parade and demonstration, placing slogans, collective strike of work, market and class, confronting order-maintaining policemen, and blocking the traffic and so on to reach their intention of solving their problems and causing negative affect in society.

4 Conclusion

We can see, from the above mentioned, that it's necessary to lower social temperature under the threshold for keeping social stability. There are two ways of doing this, on the one hand, legality building and legal supervision mechanism shall be improved and enhanced and relevant laws and regulations shall be established. Specifically speaking, we can start with issuing the "Anti-monopoly Law" to narrow down the scope of monopoly industry, put a higher standard for market accession for this type of industry, encourage other qualified industries participating in the competition and standardize the operation behavior and distribution system of this monopoly industry; secondly, improve tax supervision system. Apart from relevant departments like tax, industry and commerce, and audit etc, we can try to let representatives of the public and the media supervise tax levy at the same time so as to establish an effective social supervision mechanism. Thirdly, establish and improve the system for personal income tax, legacy tax and grant tax, high consumption tax and enjoyment behavior tax etc; and it is feasible to set up a social mechanism which encourages dividing social fortune with the help of legal and economic measures, for example, set up various funds to donate for charity, welfare and education undertakings, and no tax will be levied for sponsors of this kind. Fourthly, further perfect various rules and regulations against economic crimes, including punishing severely illegal transaction of money and power and illegal quick-rich. On the other hand, keep working out a policy preferential to the peasant and western regions. At present, the largest difference between the rich and the poor lies in that between urban and rural areas and between the east and west, so insisting on supporting the poor and developing the west will be a great way to eliminate the phenomenon of polarization. As for short term plan, active efforts shall be made in developing a circulation system for rural

land, reforming the management system for social affairs; as for long term plan, a road of urbanization, industrialization and industrialization of agriculture will be feasible. When it comes to the backward western area, more manpower, material resources and money shall be invested by the government to strengthen its competitiveness. Meanwhile, the macro-adjustment ability of social re-distribution shall be enhanced to narrow down the difference between the east and west as much as possible.

Additionally, efforts shall also be made to improve the average activation energy of social system. By drawing an analogy between social stability and chemical reaction rate, the relationship between social stability degree (crime rate will also work) and social temperature can be expressed by such equation as $sk = \alpha \cdot e^{-\frac{SE_0}{\beta \cdot ST}}$, among which, *sk* stands for social stability degree, *ST* for social temperature, SE_0 for regional social average activation energy, α and β for constants. If we assume that social stability degree is *sk* under social temperature *ST*, and we can see the following equation: $SE_0 = \beta \cdot [\ln(sk) - \ln(sk')] \Big/ (\frac{1}{ST'} - \frac{1}{ST})$. The instability tendency of social system can be divided into three categories according how large or small SE_0 is, namely, first, easy to be unstable; second, hard to be unstable; third, never to be unstable. Great attention shall be paid to area with a big instability tendency to improve its social activation energy and make sure that all reform policies will be built on a strong social psychological basis of citizens. According to above mentioned analysis, social activation energy is subject to the following factors: difference between the stimulation of social reality and the existing psychological basis of social groups; the rationality of the layer structure of social income; the caring degree to vulnerable groups reflected in social insurance system; social orders; and healthy and advanced mind-set etc. consequently, efforts shall be made in above mentioned aspects to enhance social average activation energy, for example, a lot of insurance systems have been issued, including the basic salary standards for employees, medical insurance for unemployed workers, and the basic living insurance line for urban citizens etc, however, these systems need further improvement; what's more. Apart from this, special support and help shall be given to those poor and vulnerable groups like peasant, peasant-workers and unemployed urban citizens and so on.

The defect of this paper lies in that it only covers how the widening of difference between the rich and the poor will affect social temperature and assumes that such different factors as concept, culture, religion and nationality etc will keep unchanged within certain period, which will, to some degree, affect the accuracy of the results. Additionally, because of the space limit, this paper only elaborates on how social temperature and activation energy will affect social stability, however, apart from temperature and activation energy, there is another important factor—catalyst which can lower the activation energy down and enhance the reaction rate. So, what does the catalyst mean when it comes to social stability and what kind of role it plays for maintaining social stability? It is predictable that a social stability mechanism interacted by these three factors (temperature, activation energy and catalyst) will be more complicated and requires further research.

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